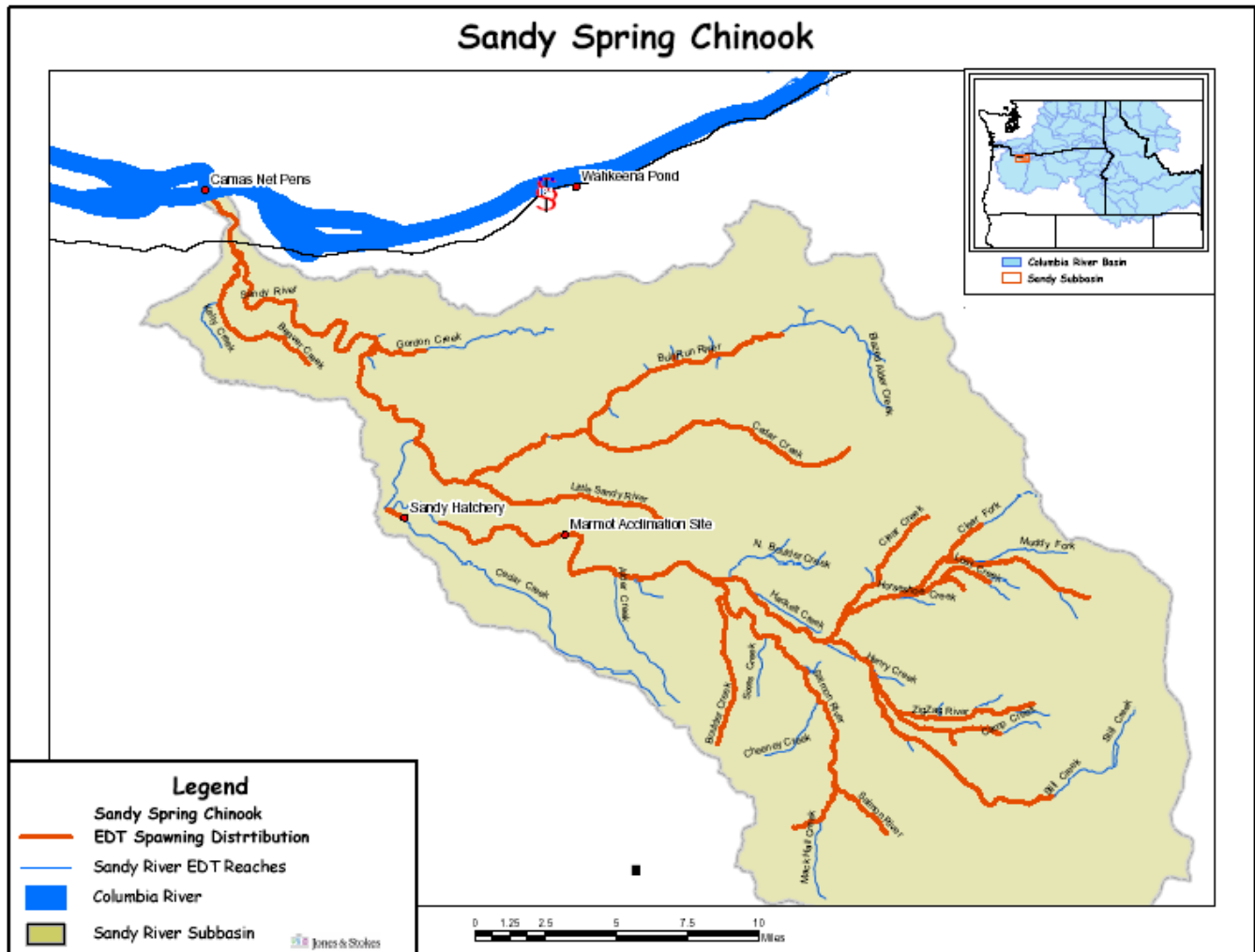


Hatchery Scientific Review Group Review and Recommendations

Sandy Spring Chinook Population and Related Hatchery Programs

January 31, 2009



1 Sandy Spring Chinook

The spring Chinook in the Sandy River are part of the Lower Columbia River Chinook Evolutionarily Significant Unit (ESU), which is listed as threatened under the Endangered Species Act (ESA). It is designated as a Primary population.

This hatchery program has recently transitioned to a native-type (integrated) broodstock program. Prior to brood year 2002, all hatchery releases of spring Chinook into the Sandy River were of Clackamas River origin. Native Sandy River spring Chinook were first collected as broodstock for this program in 2002. The first release of hatchery smolts from local natural-origin broodstock was in the spring of 2004. After the broodstock conversion to the localized stock was completed in 2007, 30% of the broodstock will now consist of wild fish.

2 Current Conditions

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the Sandy Spring Chinook population.

- **ESA Status:** The wild population of spring Chinook in the Sandy River is listed as threatened and is part of the Lower Columbia River Chinook ESU.
- **Population Description:** The Sandy River spring Chinook is a Primary population.
- **Recovery Goal for Abundance:** The TRT current abundance estimate is 2,600, while the ODFW abundance estimate is 1,800 to 2,000 for the natural population.
- **Productivity Improvement Expectation:** No information was provided about the expected change in productivity from implementation of habitat recovery plans and other recovery measures.
- **Habitat Productivity and Capacity:** Habitat productivity and capacity values were provided by ODFW (Chilcote); EDT values also were available from the City of Portland (Kucas). This analysis is based on the estimates from ODFW: Productivity 4.801, and Capacity 2,549¹.

Populations Affected by this Hatchery Population Include:

ESA-listed populations that may be directly affected by the program:

- **Lower Columbia River Chinook:** The Lower Columbia River Chinook salmon 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 populations: spring-run, tule, and late-fall bright Chinook salmon. The Sandy River contains listed spring-run and late-fall bright Chinook.

ESA-listed populations that may be incidentally affected by the program:

- All listed species occupying habitats in the lower Sandy River and the lower Columbia River migration corridor(s) may be affected by the presence of Sandy River (hatchery) spring

¹ The corresponding DT values are 4.2 and 7,695.

Chinook. While the potential exists for negative impacts, no direct effect has yet been quantified regarding which, if any, of these populations are affected, and in what way. However, it is believed that any incidental impact to listed species is minimal, based upon risk aversion measures of the hatchery program identified in this HGMP. These listed species include:

- 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.
- Lower Columbia River Coho: Lower Columbia River coho are listed as endangered by the State of Oregon and threatened by NOAA Fisheries.

2.2 Current Hatchery Programs Affecting this Population

Under the current program, a total of 200 adults are collected to meet the smolt production goal of 300,000. This number allows for an adult mortality of approximately 30 adults, and is expected to yield a maximum total of 300,000 smolts for release (300,000 is the target release number). Wild Sandy River adults are collected beginning in May, mature over the summer and are spawned from mid-September through mid-October. Adults are collected at the Sandy River Hatchery and at Marmot Dam. Collection sites for spring Chinook broodstock are currently being developed in upper Sandy Basin (e.g. Salmon River, Still Creek). Staff will utilize angler caught fish, traps, and seines to collect the wild component of the broodstock in the future. They are transferred to the Clackamas Hatchery for holding and spawning. Eggs are incubated at the Clackamas Hatchery and transferred as eyed eggs to the Willamette Hatchery. Fingerlings are transferred to Marion Forks Hatchery for rearing from April through October. Then the fish are transferred to Clackamas Hatchery for final rearing from October to February. The fish are acclimated for 3 or 4 weeks at Sandy Hatchery before direct release at the hatchery into Cedar Creek. Smolts are released in March at about 9 fish per pound.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 162 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 113 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 Recommendations 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 3.9 to 4.0. Average abundance of natural-origin spawners (NOS) would increase from approximately 1,550 fish to approximately 1,776 fish. Harvest contribution of the natural and hatchery populations would go from approximately 633 fish to approximately 317 fish.

3.2 HSRG Observations/Recommendations

In the Observations and Recommendations 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 incorporate all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

Observations

The current integrated Sandy spring Chinook hatchery program (300,000 smolts released; 100% pNOB; pHOS = 12%) is consistent with the Primary population designation.

The HSRG has concerns with the potential for pathogen transfer (and stress) associated with the practice of incubating and rearing the fish outside the Sandy River subbasin.

Removal of Marmot Dam in 2008 will eliminate existing opportunities for collecting natural broodstock and monitoring spawning composition.

Recommendations

Maintain the existing program and develop alternate strategies for managing broodstock and spawning composition after removal of Marmot Dam. We also recommend that risks associated with rearing fish outside of the basin be addressed.

The HSRG recommends that managers implement a BKD control strategy for their spring and summer/fall Chinook hatchery programs where BKD has proved a recurring problem. Ideally, the strategy should include culling (destroying) eggs/progeny from hatchery- and natural-origin brood that are found to be infected with the BKD agent. However, because brood fish with high levels of the BKD agent are more likely to transmit the agent to their progeny than brood with lesser levels of the agent, the culling of eggs/progeny from infected brood fish, should, at the very least, be applied to those with high levels of the BKD agent (e.g., ELISA OD value of 0.4 and above when broodstock are not in short supply and ELISA OD value of 0.6 and above when broodstock are in short supply). In addition, in programs using ESA-listed natural-origin brood fish, the culling of their eggs/progeny may, at the managers' discretion, be dispensed with. However, the ESA-listed broodstock should be injected, pre-spawning, with an appropriate antibiotic (preferably, azithromycin at 40 mg/kg fish), and the resulting eggs should be surface-disinfected with an iodophor. All pre-spawning brood injections may be limited to females, ESA-listed or otherwise.

Finally, eggs and hatchlings derived from broodstock found to be heavily infected with the BKD agent should be incubated/reared in isolation from those obtained from broodstock with no or lesser levels of the BKD agent. In addition, the hatchlings should be reared at the lowest possible densities (below current standards), and, at the first signs of infection with the BKD agent, they should be treated with orally administered erythromycin (100 mg/kg fish) for 28 days. The treatment should be repeated if there is evidence that the BKD agent has persisted in the hatchlings.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Sandy Spring Chinook. 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	300.5	90%	0%	12%	0.89	1,550	3.9	633	1,464
No Hatchery	None None	-	0%	0%	0%	1.00	1,776	4.0	317	-
HSRG Solution	Int Harv	300.7	90%	20%	6%	0.75	1,515	3.4	1,491	624
HSRG Solution w/ Improved Habitat	Int Harv	300.7	90%	20%	6%	0.78	1,753	3.9	1,548	624