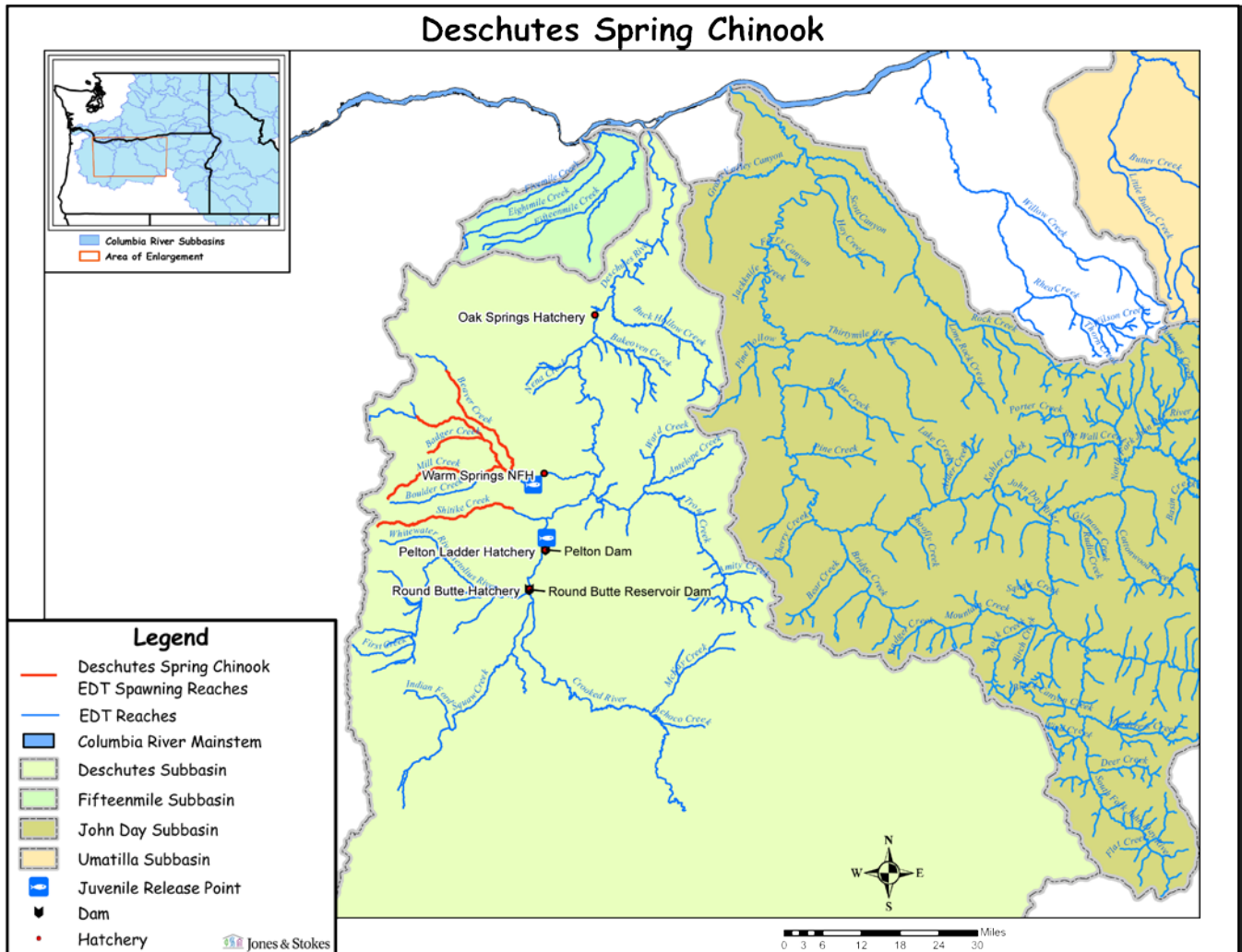


Hatchery Scientific Review Group Review and Recommendations

Deschutes Spring Chinook Population and Related Hatchery Programs

January 31, 2009



1 Deschutes Spring Chinook

The Deschutes River enters the Columbia at RM 205 above Bonneville and The Dalles dams, draining 10,500 square miles (the second largest subbasin in the state). It originates in the Cascade Mountains and flows north along the eastern margin of the hills where the Cascades to the west meet the low-lying flats to the east.

Dam construction in the Deschutes system has cut off much of the historical spawning grounds used by spring Chinook. Construction of Cove Power Plant in 1910 on the Crooked River and the subsequent construction of Ochoco Dam, Bowman Dam, Crane Prairie Dam, Wickiup Dam, Round Butte Dam and Pelton Dam have led to a division of habitat, restricting spring Chinook to only a quarter of their historic spawning range. The wild spring Chinook run averages 1,780 adults returning to spawning grounds in the Warm Springs River and Shitike Creek drainages on the Warm Springs Reservation. Fish managers have no evidence that wild spring Chinook spawn in the mainstem lower Deschutes River or other tributaries. Run size varies considerably from year to year, with annual wild spring Chinook numbers since 1977 ranging from 241 to 3,460 fish (French and Pribyl 2004). These numbers could increase in the near future if passage past the Pelton Round Butte Project is restored, as is called for in the recent FERC relicensing process.

Currently, the Warm Springs River produces the majority of natural spring Chinook in the system, with an estimated smolt capacity of 132,000 smolts (ODFW 1977). The number of juvenile spring Chinook migrants averaged 78,736 for brood years 1978 through 1998 (Deschutes Subbasin Plan). Adult spawner surveys by the Confederated Tribes of the Warm Springs averaged 341 redds counted per year, with a range from 62 in 1995 to 752 redds in 2001. Spawner surveys made in Shitike Creek between 1982 and 1995 reported an average of 49 adult spring Chinook (ODFW 1997).

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:** Naturally spawning spring Chinook in the Deschutes system are included in the Middle Columbia River Spring-run Chinook ESU, which was determined to not require listing under the ESA in 1998.
- **Population Designation:** Using a rating system similar to that used by the recovery planners for the lower Columbia and Willamette results in a designation of Primary for Deschutes Spring Chinook.
- **Current Viability Rating:** Unknown.
- **Recovery Goal for Abundance:** Unknown.
- **Productivity Improvement Expectation:** Unknown.
- **Habitat Productivity and Capacity (from EDT):** Productivity: 4.0; Capacity: 1300.

2.2 Current Hatchery Programs Affecting this Population

Two hatchery programs currently release spring Chinook into the Deschutes system.

A program operated by the Confederated Tribes of the Warm Springs spawns approximately 463 broodstock (1990-2001 average) with a 1990 high of 737 adults and a 1994 low of 51 adults. During the first four years of operation (1978-1981), the program collected 100% wild returns for use as broodstock and from 1978 to 1987, the proportion of wild fish in the broodstock averaged 68%. From 1993 to 2002, low wild returns resulted in hatchery collections with an average of only 3% wild returns for inclusion in the broodstock. The Hatchery Genetic Management Plan describes the program as integrated, but hatchery managers describe the program as segregated, pointing out that few wild fish are included in the broodstock. A weir near the mouth of Warm Springs Creek allows the managers to remove most of the hatchery returns to prevent them from spawning in the wild (pers. comm., Warm Springs Hatchery managers). Broodstock are collected at the Warm Springs Hatchery between May 8th and August 25th and are held until spawning. Adults are mated 1:1 and fertilized eggs are incubated with one family to each individual Heath tray. Juveniles are reared at the Warm Springs Hatchery on Warm Springs River water and are released in two separate groupings. Approximately 599,510 juveniles (1990-2001 average) are forced out of the hatchery in April at about 15 fpp (1990-2001 average), with approximately 62,674 juveniles (1990-2001 average) volitionally released in November at about 16 fpp (1990-2001 average). The program objective is to release approximately 750,000 juveniles – 90% as spring yearlings (675,000 fish) and 10% as fall subyearlings (75,000 fish).

ODFW also operates a spring Chinook program in the Deschutes subbasin at the Pelton Trap/Round Butte Hatchery, rearing and releasing Deschutes River spring Chinook (ODFW Stock 066). ODFW Stock 066 is not included as part of the Middle Columbia River Spring Chinook ESU. This program operates as a segregated harvest program collecting only Round Butte-origin adults identified by coded-wire tags returning to the Pelton Trap. The program goal is to collect 1,200 adults for releases of 320,000 smolts to the Deschutes, 125,000 smolts to the Hood, and an undetermined number of eyed eggs or unfed fry for restoration (Round Butte Spring Chinook HGMP 2004). AHA model runs indicate that this equates to 396 adults for the Deschutes River release. Mating is 1:1 and jacks are included in the broodstock. Juveniles are incubated and reared at Round Butte Hatchery until November when they are transferred to the Pelton Trap for acclimation over the winter. After 4-5 months of rearing at the Pelton Trap, the juveniles are volitionally released into the Deschutes River.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 40 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 26 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 3.2 to 3.8. Average abundance of natural-origin spawners (NOS) would increase from approximately 802 fish to approximately 1,021 fish. Harvest contribution of the natural and hatchery populations would go from approximately 1,775 fish to approximately 232 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 management goal is to sustain natural production and harvest.

Productive habitat exists above the Pelton Round Butte Project and population abundance could be increased if fish passage were provided.

The current Warm Springs integrated hatchery program (approximately 675,000 yearling smolts; 75,000 fall subyearlings) has a PNI less than 0.5, which is inconsistent with the goals for a Primary population. Straying from the Round Butte segregated program appears to be minimal. The Round Butte program is occasionally used to backfill production at Warm Springs Hatchery, but releases are differentially marked from Warm Springs stock. Round Butte stock adult returns can be effectively segregated from the Warm Spring natural and hatchery components at the Warm Springs weir.

Recommendations

Operating the Warm Springs Hatchery program as a conservation and harvest program (with a PNI greater than 0.67) by increasing the percent of natural-origin broodstock to 20 percent and operating the Round Butte segregated program at its current size (approximately 320,000 smolts) would be consistent with a Primary designation for the Deschutes spring Chinook population.

The HSRG recommends that managers continue to implement their apparently successful BKD strategies, which include culling.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Deschutes 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	746.9	95%	50%	6%	0.62	802	3.2	1,301	1,012
	Seg Harv	320.6	95%						474	255
No Hatchery	None None	-	0%	50%	0%	1.00	1,021	3.8	232	-
HSRG Solution	Int Harv	746.9	95%	50%	7%	0.75	750	3.4	1,303	1,072
	Seg Harv	320.6	95%						474	255
HSRG Solution w/ Improved Habitat	Int Harv	746.9	95%	50%	5%	0.79	922	3.9	1,342	1,072
	Seg Harv	320.6	95%						474	255