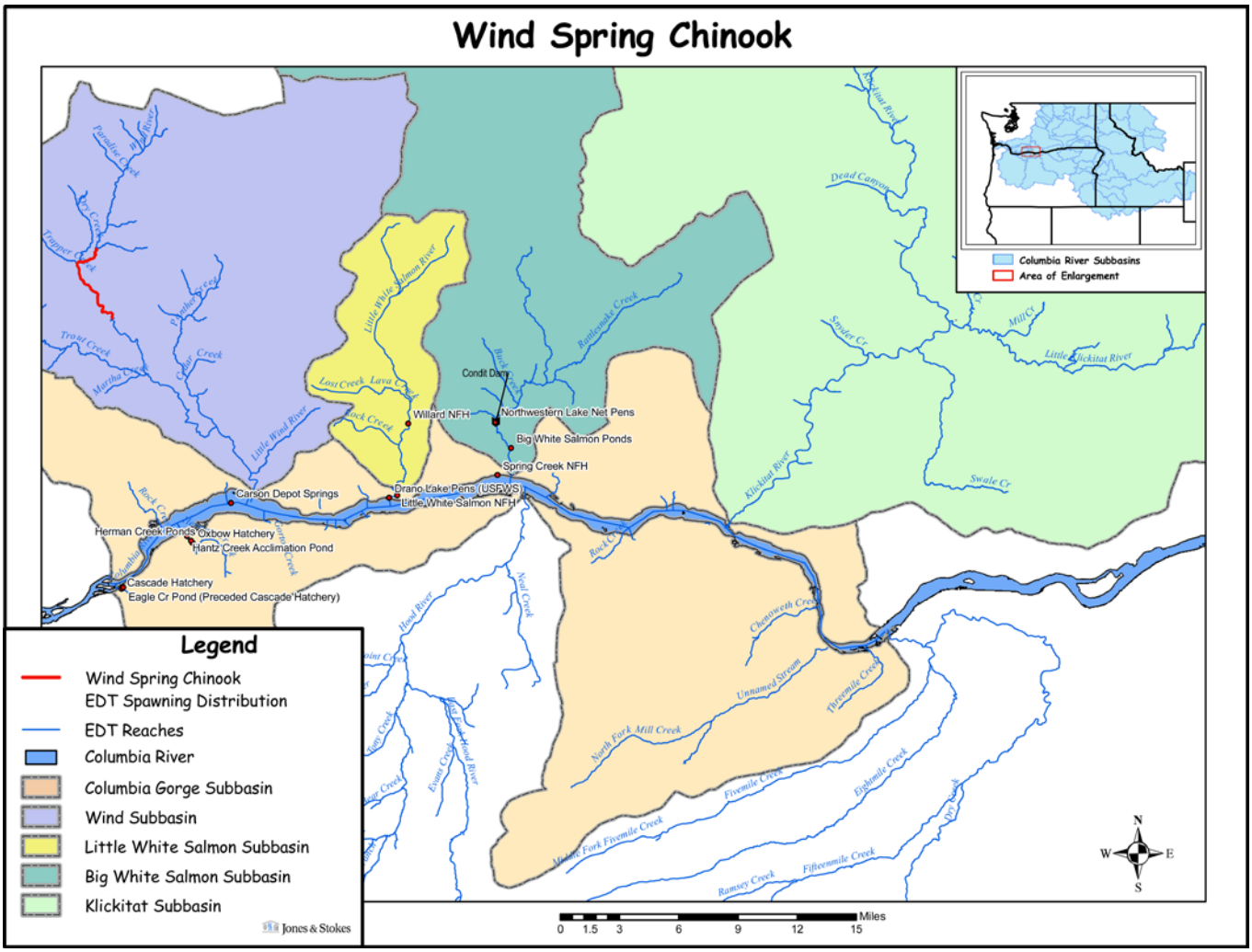
Hatchery Scientific Review Group
Review and Recommendations

Wind River Spring Chinook
Population and Related Hatchery Programs

January 31, 2009



1 Wind River Spring Chinook

Spring Chinook are not native to the Wind River basin. The current population is sustained through hatchery production and any natural spawners are hatchery-origin fish. This is a non-native stock with composite production.

Spring Chinook in the Wind River are Carson National Fish Hatchery (NFH) fish that spawn naturally or are strays from other hatchery programs. Hatchery strays account for most spring Chinook spawning.

The Carson stock is a mixture of spring Chinook from the Snake River and the mid- and upper-Columbia that were collected at Bonneville Dam in the 1970s for use as broodstock at the hatchery (SaSSI 2005). Allozyme analysis has shown that Wind River spring Chinook from the Carson Hatchery resemble upper Columbia spring Chinook stocks in the Wenatchee, Entiat and Methow basins (Marshall et al. 1995).

Escapement data from 1986 to 2003 indicates a trend of increasing total escapement of spring Chinook in the Wind River (SaSSI 2005). Wind River spawning escapements from 1970-2002 ranged from 26 in 1995 to 1,936 in 1971. The average fish per mile from 1970-1984 was 21; fish per mile ranged from 4-112.

Spring Chinook enter the Wind River from late March through June and spawn from early August through mid-September. Most spawning takes place in the mainstem Wind River above Shipherd Falls from about RM 15 upstream to the mouth of Paradise Creek (SaSSI 2005). Spawner ages range from 3-year old jacks to 6-year old adults, with 4- and 5-year olds usually the dominant age class (averages are 58.5% and 38.0%, respectively). Fry emerge between November and March, depending on time of egg deposition and water temperature. Spring Chinook fry spend one full year in fresh water and emigrate in their second spring as age-2 smolts (Subbasin Plan 2004).

The stock status was not rated in 2005, because natural production is extremely low. Substantial numbers of spring Chinook spawners are observed annually; however, it is believed that spawner abundance is a reflection of the date when Carson NFH gates are closed each year. When this occurs, hatchery-origin spring Chinook are no longer able enter the hatchery; Wind River spawner numbers are thought to be a reflection of this factor, rather than of a population abundance trend. Indications are that the productivity of these spawners is negligible, perhaps as low as 2 smolts per female SaSSI 2005).

The NMFS Status Assessment for the Wind River indicated a 0.01 risk of 90% decline in 25 years and a 0.03 risk of 90% decline in 50 years; the risk of extinction in 50 years was 0.0. Smolt density model predicted natural production potential for the Wind River was 157,533 smolts. Juvenile production from natural spawning is presumed to be low; the population is not considered self-sustaining (Subbasin Plan 2004).

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: Wind River Spring Chinook are not part of any Chinook ESU (HGMP 2004).
- Population Description: The Wind River spring Chinook population is not designated. In 2002, the Wind River Spring Chinook stock was considered Healthy (WDFW 2007). The stock status was not rated in 2005 because natural production is extremely low (SaSSI 2005).
- Recovery Goal for Abundance: None.
- Productivity Improvement Expectation: None.
- Habitat Productivity and Capacity (e.g., from EDT): Productivity 2.9; Capacity 196.
- Populations Affected by this Hatchery Program Include: Wind River Spring Chinook.

2.2 Current Hatchery Programs Affecting this Population

Carson NFH's spring Chinook salmon program is a segregated harvest program that was initiated in 1955. Carson NFH operates as part of the Columbia River Fisheries Development Program under U.S. *v.* Oregon and is funded through the Mitchell Act, a program to provide for the conservation of Columbia River fishery resources. The purpose of the hatchery is to successfully rear and release 1,420,000 spring Chinook salmon smolts for release on-station in the spring. Smolts are mass-released directly into the Wind River at 18 fish/pound or larger to minimize interaction with other fish populations. The Yakama Nation has expressed interest in the practice of scatter planting juvenile fish throughout the watershed for supplementation. These releases contribute to important terminal area tribal ceremonial and subsistence fisheries and non-tribal sport fisheries while providing for adequate escapement for hatchery production. The average number of hatchery-origin adults returning to the hatchery was 4,173 from 1980 through 2001 (HGMP 2004). The average egg-to-smolt survival was 86.8% from 1990 through 2001 (HGMP 2004). The average smolt-to-adult survival and recruits-per-spawner was 0.23 and 2.68, respectively, from 1982 through 1995 (HGMP 2004).

Spring Chinook are not native to the Wind River basin; the current population is sustained through hatchery production and any natural spawners are hatchery-origin fish. Production from these hatchery spawners has been observed to be very low, i.e., <2.0 smolts per female (D. Rawding, WDFW, pers. comm.).

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: NA.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 868 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 1.4 to 2.7. Average abundance of natural-origin spawners (NOS) would increase from 120 to 132. Harvest contribution of the natural and hatchery populations would go from 1,863 to 18.

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 Wind River spring Chinook population is undesignated (NA), as there is no natural population in the watershed. The hatchery program is used to supply 250,000 smolts to the Walla Walla River.

Brook trout observed in the Carson NFH spring water supply are a potential source of disease organisms (e.g., the BKD organism) for fish reared at the hatchery. This is a particular concern if fish or eggs are to be transferred from the Carson NFH to facilities or sites in other watersheds.

Recommendations

Due to disease concerns, the HSRG recommends eliminating brook trout from the hatchery's water supply. If this is not possible, then managers could carry out a regular program to keep the trout population in the hatchery's spring water supply at the lowest levels possible.

The HSRG supports the USFWS program to PIT-tag a representative portion of the spring Chinook it releases. The purpose of this program is to develop in-season management information. All fish currently are mass-marked and a portion is coded-wire tagged to monitor harvest contribution, stray rates and to provide other relevant biological information.

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 condition and HSRG Solution for Wind River 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	None None	-	0%	0%	73%	0.00	120	1.4	16	0
	Seg Harv	1,145.0	80%						1,847	671
No Hatchery	None None	-	0%	0%	0%	1.00	132	2.7	18	-
HSRG Solution	None None	-	0%	0%	76%	0.00	124	1.4	17	0
	Seg Harv	1,404.4	80%						2,202	1,116
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	75%	0.00	137	1.5	18	0
	Seg Harv	1,404.4	80%						2,202	1,116