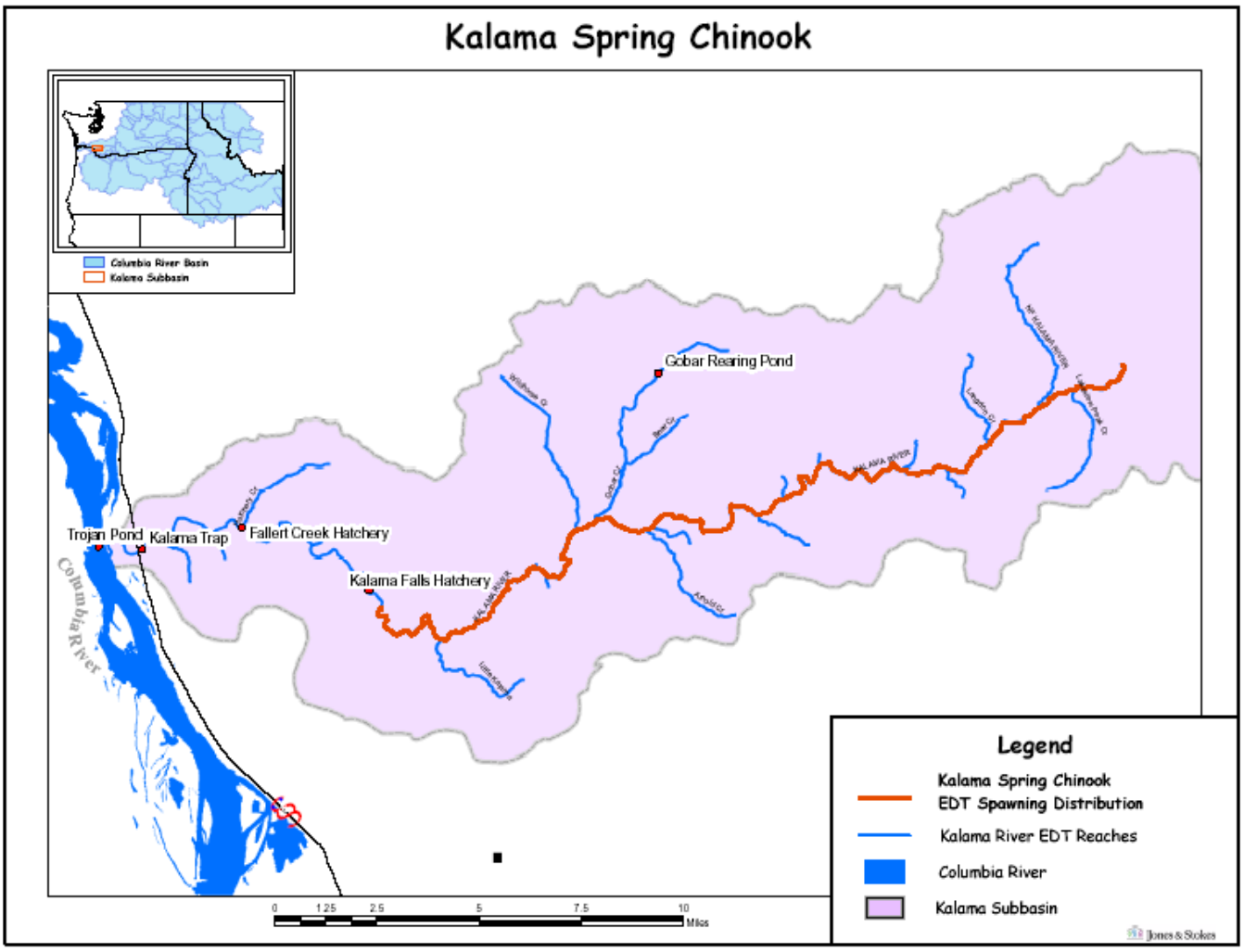
Hatchery Scientific Review Group
Review and Recommendations

Kalama Spring Chinook
Population and Related Hatchery Programs

January 31, 2009



1 Kalama Spring Chinook

Kalama River spring Chinook are part of the Lower Columbia Chinook ESU and are listed as threatened under the ESA. The population is one of the nine spring Chinook populations in the ESU and is designated as a Primary population (LCSR&SP 2004). Spring Chinook are indigenous to the Kalama River, but the historical significance of this population is uncertain. Access to the best spring Chinook spawning habitat historically was blocked by Lower Kalama Falls. A natural spawning population exists, concentrated on the mainstem between Kalama Falls and Fallert Creek hatcheries, but it is believed to be largely comprised of hatchery-origin fish.

2 Current Conditions

2.1 Current Population Status and Goals

- ESA Status: This population is listed as threatened and is part of the Lower Columbia Chinook ESU.
- Current Viability Rating: Low-, with a goal of High
- Recovery Goal for Abundance: 1,400
- Productivity Improvement Expectation: The recovery plan (LCSR&SP 2004) does not indicate any significant habitat productivity improvement is to be expected for this stock.
- Habitat Productivity and Capacity (from EDT): Productivity 1.76; Capacity 945

2.2 Current Hatchery Programs Affecting this Population

The program currently releases approximately 500,000 from Fallert Creek Hatchery and Gobar Pond. All releases are adipose-marked and approximately 250,000 are adipose-marked and coded-wire tagged. Approximately 300 broodstock, collected at the ladder at Kalama Falls Hatchery, are needed to support the program.

The Kalama River hatchery broodstock was originally taken from Cowlitz and Carson hatchery stocks in the 1970s. Since then, this stock has been propagated largely from returns to the hatchery; however, eggs and adults have been brought in from numerous lower Columbia hatcheries including Eagle Creek and Willamette (Oregon), Cowlitz and Little White Salmon Rivers.

The program uses single family pairing. Few jacks are incorporated into the broodstock. Average smolt to adult survival for the hatchery program has been 0.17% for brood years 1990 through 1998. The HGMP for this program indicates that contribution to fisheries has been extremely low, with total annual catch from the program averaging less than 300 fish for return years 1995 through 2001.

The current hatchery program is described as an integrated harvest program. However, since no natural-origin fish are included in the hatchery broodstock, the current proportionate natural influence (PNI) is zero. The current estimate of the proportion of hatchery-origin spawners (pHOS) in the total spawning population is 52%. Hatchery returns are projected to exceed broodstock needs by approximately 1,200 fish annually.

- Estimated Productivity (with harvest): 0.54.
- Projected Average Natural-Origin Escapement: 146 fish

- Average Harvest Contribution: 1,149 fish

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 267 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 69 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 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 0.5 to 1.1. Average abundance of natural-origin spawners (NOS) would decrease from approximately 160 to approximately 40. Harvest contribution of the natural and hatchery populations would go from approximately 1,700 to 25.

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 population has been designated a Primary population; however, it is unlikely to meet the Primary population standards, because of limited habitat for spring Chinook. The upper Kalama basin offers the better spring Chinook habitat and currently natural fish are passed upstream to spawn. Marked fish of hatchery origin are not passed into the basin above Kalama Falls.

If managed as a primary population it may require an interim, small conservation program to preserve the population because of limited habitat productivity and capacity.

Recommendations

We recommend maintaining the current segregated harvest program (500,000 release), which is consistent with the designation as a stabilizing population (rather than a primary population).

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 Kalama 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	-	0%	0%	61%	0.00	154	0.5	96	0
	Seg Harv	501.3	80%						1,606	772
No Hatchery	None None	-	0%	0%	0%	1.00	41	1.1	25	-
HSRG Solution	None None	-	95%	0%	49%	0.00	68	0.5	42	0
	Seg Harv	501.3	95%						1,606	973
HSRG Solution w/ Improved Habitat	Int Harv	-	95%	0%	45%	0.00	80	0.6	50	0
	Seg Harv	501.3	95%						1,606	973