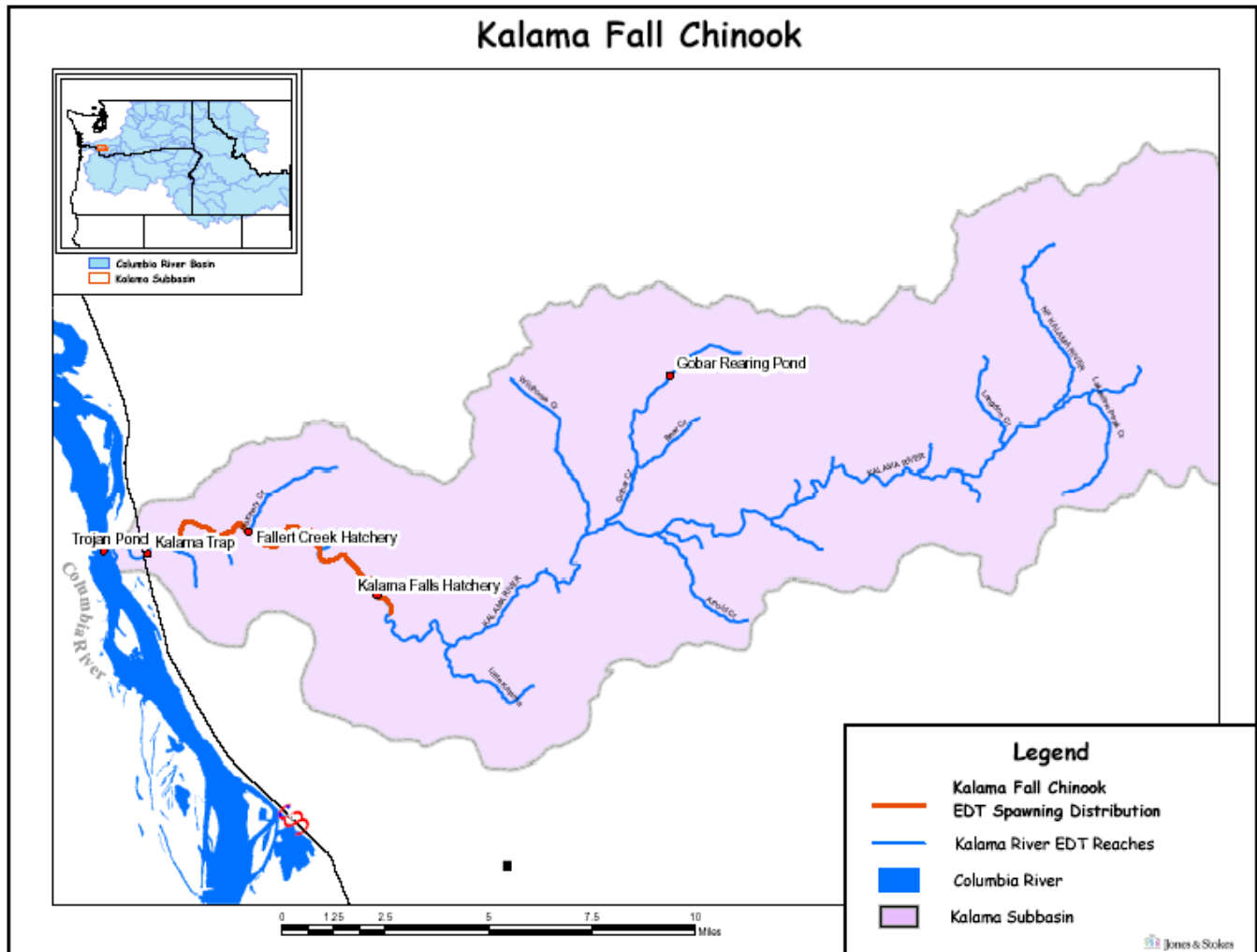


Hatchery Scientific Review Group Review and Recommendations

Kalama Fall Chinook Population and Related Hatchery Programs

January 31, 2009



1 Kalama Fall Chinook

The Kalama fall Chinook population is one of 23 fall Chinook stocks in the ESU and is designated as a Primary population (LCSR&SP 2004). Fall Chinook are native to the Kalama River and there have been few introductions of out-of-basin fish. Hatchery fish have been released in the watershed since Fallert Creek Hatchery went into production. It is probable that a significant number of natural spawners are hatchery strays, and strays from other hatcheries within the GDU are common.

2 Current Conditions

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the Kalama Fall Chinook population.

- **ESA Status:** This population is listed as threatened under the ESA and is part of the Lower Columbia Chinook ESU. It has been designated as a Primary population for ESA recovery.
- **Current Viability Rating:** Low+, with a goal of High.
- **Recovery Goal for Abundance:** 1,300 fish. The Lower Columbia recovery plan calls for habitat improvements that would increase fall Chinook productivity by about 18%.
- **Productivity Improvement Expectation:** Accounting for the current habitat productivity, operation of the current hatchery program and harvest, the adjusted productivity for the population is estimated to be 0.82 recruits/spawner.
- **Habitat Productivity and Capacity (from EDT):** Productivity 3.3; Capacity 2,370.
- **Hatchery Populations of the Same Species that may Affect This Natural Population:** Hatchery fish of Kalama origin have been released in the watershed since Fallert Creek Hatchery went into production. It is probable that a significant number of natural spawners are hatchery strays, and strays from other hatcheries within the GDU are common. The current estimate of the proportion of hatchery-origin spawners (pHOS) in the total spawning population is 69%.

2.2 Current Hatchery Programs Affecting this Population

The Kalama fall Chinook program currently releases approximately 5,000,000 fingerlings from the Fallert Creek and Kalama Falls Salmon hatcheries. Approximately 2,200 broodstock are needed to support the program.

The program is described as an integrated harvest program, and some natural-origin fish may be inadvertently collected for broodstock. The amount of such collection is unknown, because the marking/tagging level of the hatchery release does not allow identification of natural-origin fish. The HSRG's evaluation of the current program assumed that the proportion natural influence (PNI) is zero.

Broodstock for the hatchery facilities is taken from a temporary rack upstream of tidewater near Modrow Bridge. Incubation and rearing take place at both Fallert Creek and Kalama Falls. Mating protocols use pooled gametes from 5 males and 5 females. Jacks are incorporated into the broodstock at a rate of up to 2%. Approximately 90,000 juveniles are adipose-clipped and coded-

wire tagged for each release group (180,000 total). Overall survival averaged 0.05% for brood years 1995 – 1998. Hatchery returns exceed broodstock needs by approximately 2700 fish annually.

- Estimated Productivity (with harvest): 0.97
- Projected Average Natural-Origin Escapement: 600 fish.
- Average Harvest Contribution: Total fishery contribution from 1995 to 1998 was very poor, averaging approximately 850 fish per year. Fishery contributions have since improved and may now average as many as 6,500 fish annually.

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: 1,400 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 1.0 to 1.9. Average abundance of natural-origin spawners (NOS) would increase from 535 to 553. Harvest contribution of the natural and hatchery populations would go from 7,050 to 555.

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 fall Chinook. If managed as a Primary population, hatchery fish should be controlled on the spawning grounds and the hatchery program would need to be revised to a small, integrated conservation program. Even with these steps, the Primary standards would not be met.

The lower river weir, which is used for broodstock collection, is not highly effective to control composition on the spawning grounds. If managed as a Primary population, a more effective weir is needed.

Recommendations

We recommend continuing the existing program (5.0 million) as a segregated harvest program, which is consistent with a Stabilizing population designation. Managers should consider a more suitable Primary population in this area, such as the Toutle or lower Cowlitz fall Chinook.

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 Fall 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%	68%	0.00	535	1.0	536	0
	Seg Harv	5,040.0	75%						6,514	2,673
No Hatchery	None None	-	0%	0%	0%	1.00	553	1.9	555	-
HSRG Solution	Int None	-	95%	0%	41%	0.00	604	1.3	288	0
	Seg Harv	5,040.0	90%						7,015	3,196
HSRG Solution w/ Improved Habitat	None None	-	95%	0%	38%	0.00	685	1.5	326	0
	Seg Harv	5,040.0	90%						7,015	3,196