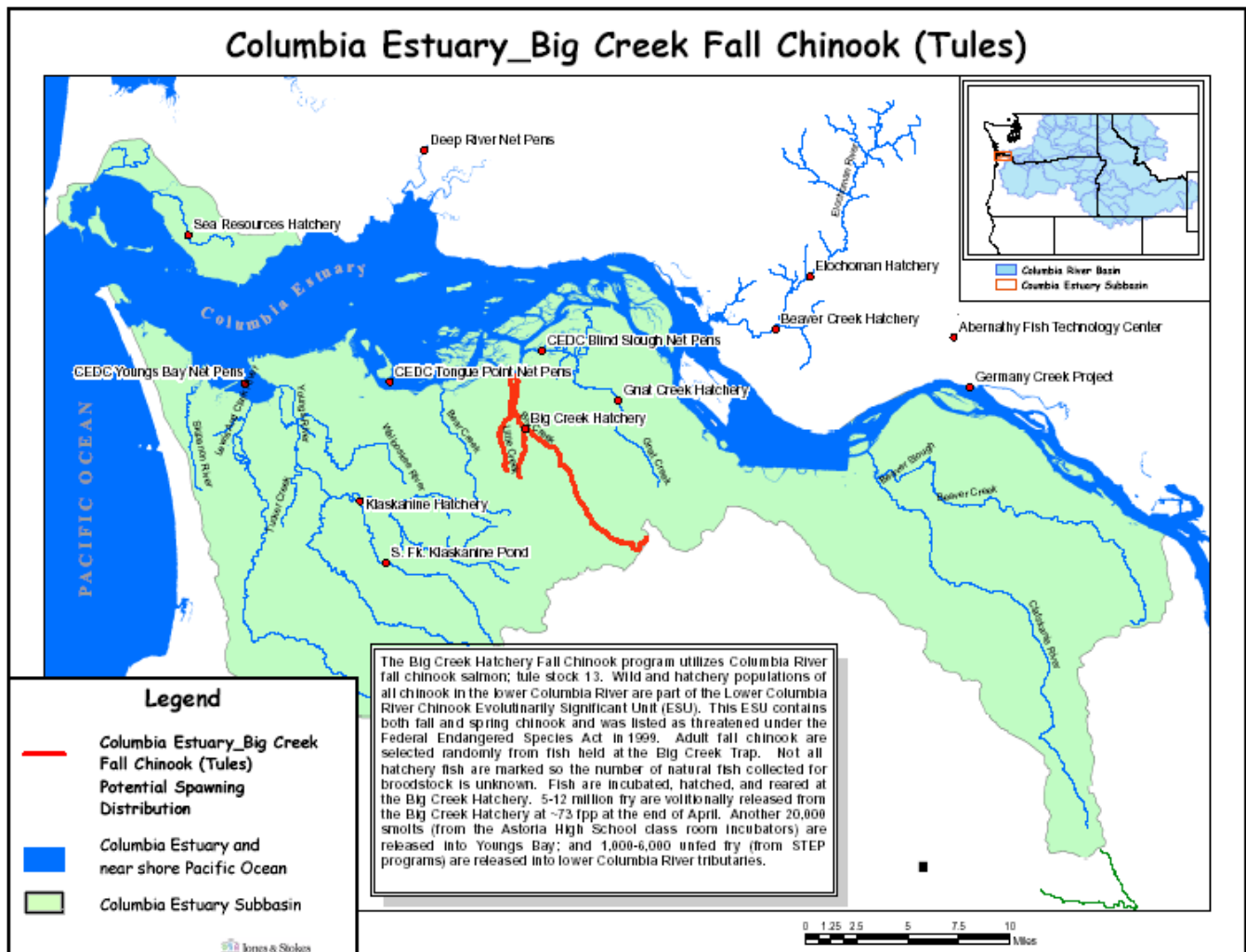


Hatchery Scientific Review Group Review and Recommendations

Columbia Estuary-Big Creek Fall Chinook (Tule-Natural) Population and Related Hatchery Programs

January 31, 2009



1 Columbia Estuary-Big Creek Fall Chinook (Tule)

Fall-run Chinook are native to the basin, with suitable habitat available for several hundred natural spawners. There is some natural spawning below the hatchery weir in Big Creek; it is thought that the majority of these fish are hatchery-origin (NOAA Salmon and Steelhead Hatchery Assessment Group 2003).

2 Current Conditions

2.1 Current Population Status and Goals

Adult escapement to Big Creek is relatively good, although redd counts indicate that there is little natural reproduction in the basin, and the majority of the fish return to the hatchery. The hatchery weir limits natural production to the less productive lower reaches of the creek (W/LCRTRT Status Evaluation 2004).

- ESA Status: This population is listed as threatened and is part of the Lower Columbia Chinook ESU.
- Population Description: The Big Creek fall Chinook population is designated as a Stabilizing population (LCSR&SP 2004).
- Current Viability Rating: Unknown, Viability Goal is Low+
- Recovery Goal for Abundance: Unknown.
- Productivity Improvement Expectation: Unknown.
- Habitat Productivity and Capacity (from EDT): Productivity 3.0; Capacity 300.
- Populations Affected by this Hatchery Population: Populations that may be incidentally affected by straying Big Creek tule fall Chinook hatchery fish include species using habitat in Big Creek and the Columbia River and estuary downstream of Big Creek.

2.2 Current Hatchery Programs Affecting this Population

The primary goal of the Columbia Estuary Big Creek fall Chinook (tule) hatchery program is to supplement harvest in commercial and recreational fisheries. Broodstock for the Big Creek Hatchery fall Chinook program is collected from adult returns trapped at Big Creek Hatchery. In the past, eggs from other Lower Columbia River tule fall Chinook hatchery broodstocks have been included in the production when adult returns at Big Creek Hatchery were insufficient. Incubation and rearing occurs at Big Creek Hatchery. This segregated harvest program releases approximately 5.4 million sub-yearling smolts annually into Big Creek. Currently, there are no available estimates of the stray rate for this program.

- The estimated productivity (with harvest) is about 5.2 R/S.
- Adults currently are not passed above the weir at Big Creek Hatchery.
- Average harvest contribution is approximately 7,500 adults.
- Currently, the majority of the production from this program is released with no external mark (i.e., fin clip). Starting with brood year 2006, production will be 100% mass-marked (adipose clip).

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin segregated and out-of-basin hatchery programs – 996 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 0.6 to 1.1. Average abundance of natural-origin spawners (NOS) would decrease from approximately 76 fish to approximately 11 fish. Harvest contribution of the natural and hatchery populations would go from approximately 7,500 fish to approximately 20 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 incorporates all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

Observations

Consistent with the designation of a Stabilizing population, there are no conservation objectives for this population. There is a non-selective commercial gill net fishery affecting this population. This population is a large contributor of out-of-basin strays, a situation that needs to be contained by increasing the terminal harvest rate, improving homing to the hatchery, installing weirs in non-target receiving streams, or reducing program size. Opportunities to improve homing appear limited; increasing the rate could be difficult because attraction flows are low at the time these fish return.

By improving homing fidelity, the rate of straying will be reduced. Additionally, increasing the terminal harvest would effectively reduce strays.

Recommendations

The HSRG recommends that managers continue the current Big Creek fall Chinook (tule) segregated harvest hatchery program (approximately 5.4 million smolts). Develop a reliable estimate of the stray rate for this program and implement actions to reduce strays in non-target streams.

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 Big Creek Fall Chinook (Tule Natural). 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	-	75%	0%	91%	0.00	76	0.6	126	0
	Seg Harv	5,826.6	75%						7,410	1,304
No Hatchery	None None	-	0%	0%	0%	1.00	11	1.1	19	-
HSRG Solution	None None	-	75%	0%	74%	0.00	116	1.0	61	0
	Seg Harv	5,826.6	90%						7,302	2,054
HSRG Solution w/ Improved Habitat	None None	-	75%	0%	72%	0.00	129	1.1	67	0
	Seg Harv	5,826.6	90%						7,302	2,054