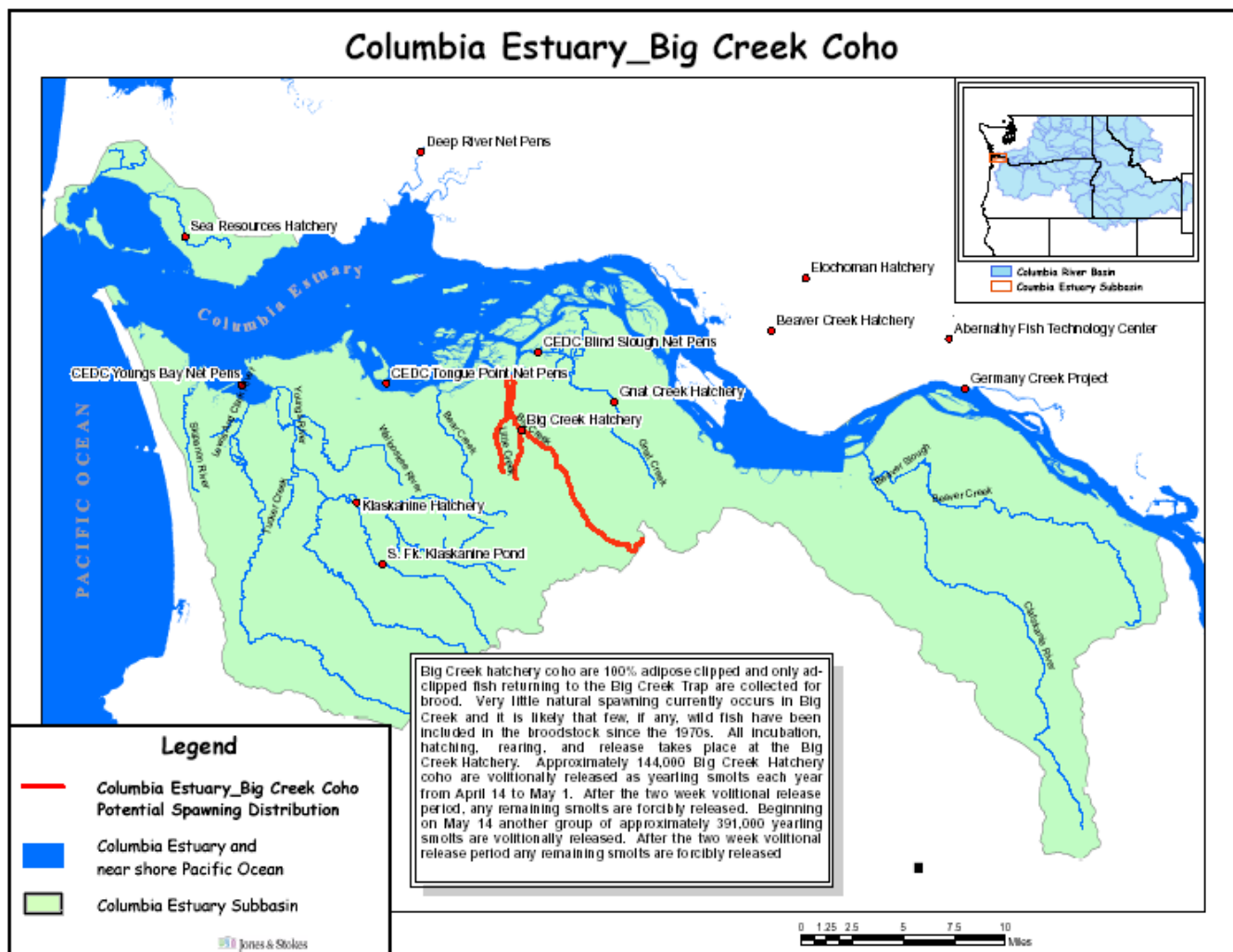


Hatchery Scientific Review Group Review and Recommendations

Columbia Estuary - Big Creek Coho Population and Related Hatchery Programs

January 31, 2009



1 Columbia Estuary- Big Creek Coho

The Columbia Estuary Big Creek Coho population is dominated by hatchery returns. Since the 1970s, it has been based on returns of hatchery-origin adults to the hatchery with few, if any, wild fish introductions into the broodstock. Currently there are few, if any, natural-origin adults returning to Big Creek or nearby streams. The purpose of the Big Creek Coho Hatchery program is to provide harvest to mitigate for loss of fisheries resulting from habitat degradation and perturbations in the Columbia River arising from hydropower and other activities.

2 Current Conditions

2.1 Current Population Status and Goals

- **ESA Status:** This population is listed as threatened. It is part of the Lower Columbia River Coho ESU.
- **Population Description:** Big Creek coho are a Primary population.
- **Current Viability Rating:** Not defined, but likely Very Low.
- **Recovery Goal for Abundance:** Not defined
- **Productivity Improvement Expectation:** Unknown
- **Habitat Productivity and Capacity:** Productivity: 5.0; Capacity: 500
- **Populations Affected by this Hatchery Population:** Winter steelhead (Scappoose/Clatskanie), winter steelhead (Youngs Bay), fall Chinook (Sea Resources), and early coho (Sea Resources). Additionally, coho releases from this program could potentially impact other populations within the Lower Columbia River steelhead DPS, Lower Columbia River Chinook ESU, and the Columbia River chum ESU.
- **Hatchery Populations of the Same Species that Affect this Population (e.g., through straying) are:** Columbia Estuary Select Area Fishery Enhancement (SAFE) Program and potentially releases from Grays River and Elochoman River programs.

2.2 Current Hatchery Programs Affecting this Population

The current hatchery program is a segregated harvest program. Broodstock is derived from adipose-clipped adults returning to the hatchery (stock 13). All spawning, incubation, and rearing is done on-site. Resulting smolts (535,000 smolts) are adipose-clipped and released as yearlings. Releases are for the most part volitional and occur in two lots (144,000 between April 14 and May 1, and 391,000 between May 14 and 28). Fish that refuse to leave volitionally within 14 days are force-released. Additionally, up to 10,000 eggs are made available to local high schools (Astoria, Warrenton, Knappa, and Seaside) as part of the Salmon and Trout Enhancement Program (STEP). Fish that result from the STEP program are adipose-clipped and released to Youngs Bay.

- **PNI and pHOS Estimates (include straying from all hatchery programs):** 30%
- **Estimated Productivity (with harvest and fitness factor effects from AHA):** 2.02
- **Projected Average Natural Origin Escapement:** 211
- **Average Harvest Contribution:** 5005

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 114 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 Recommendation 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 2.0 to 4.0. Average abundance of natural-origin spawners (NOS) would increase from 211 to 338. Harvest contribution of the natural and hatchery populations would go from 5005 to 80 fish.

3.2 HSRG Observations/Recommendations

In the Observation and Recommendation 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

This is designated a Primary population with a hatchery program managed for a segregated harvest. The population is unlikely to meet the Primary population standards because of limited habitat for coho. If managed as a Primary population, then hatchery fish would need to be controlled on the spawning grounds and a small conservation hatchery should be considered. Even if these steps are taken, primary standards would not be met.

Recommendations

The status of this population should be re-evaluated as it does not seem to meet the criteria for a Primary designation. It is also recommended that the existing segregated program (580,000 smolt release) be continued, which is consistent with a stabilizing designation.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Big Creek Coho. 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	-	90%	0%	30%	0.00	211	2.0	50	0
	Seg Harv	582.1	90%						4,955	1,343
No Hatchery	None None	-	0%	0%	0%	1.00	338	4.0	80	-
HSRG Solution	Int Cons	-	90%	0%	27%	0.00	206	2.0	49	0
	Seg Harv	582.1	90%						5,347	990
HSRG Solution w/ Improved Habitat	Int Cons	-	90%	0%	25%	0.00	234	2.2	56	0
	Seg Harv	582.1	90%						5,347	990