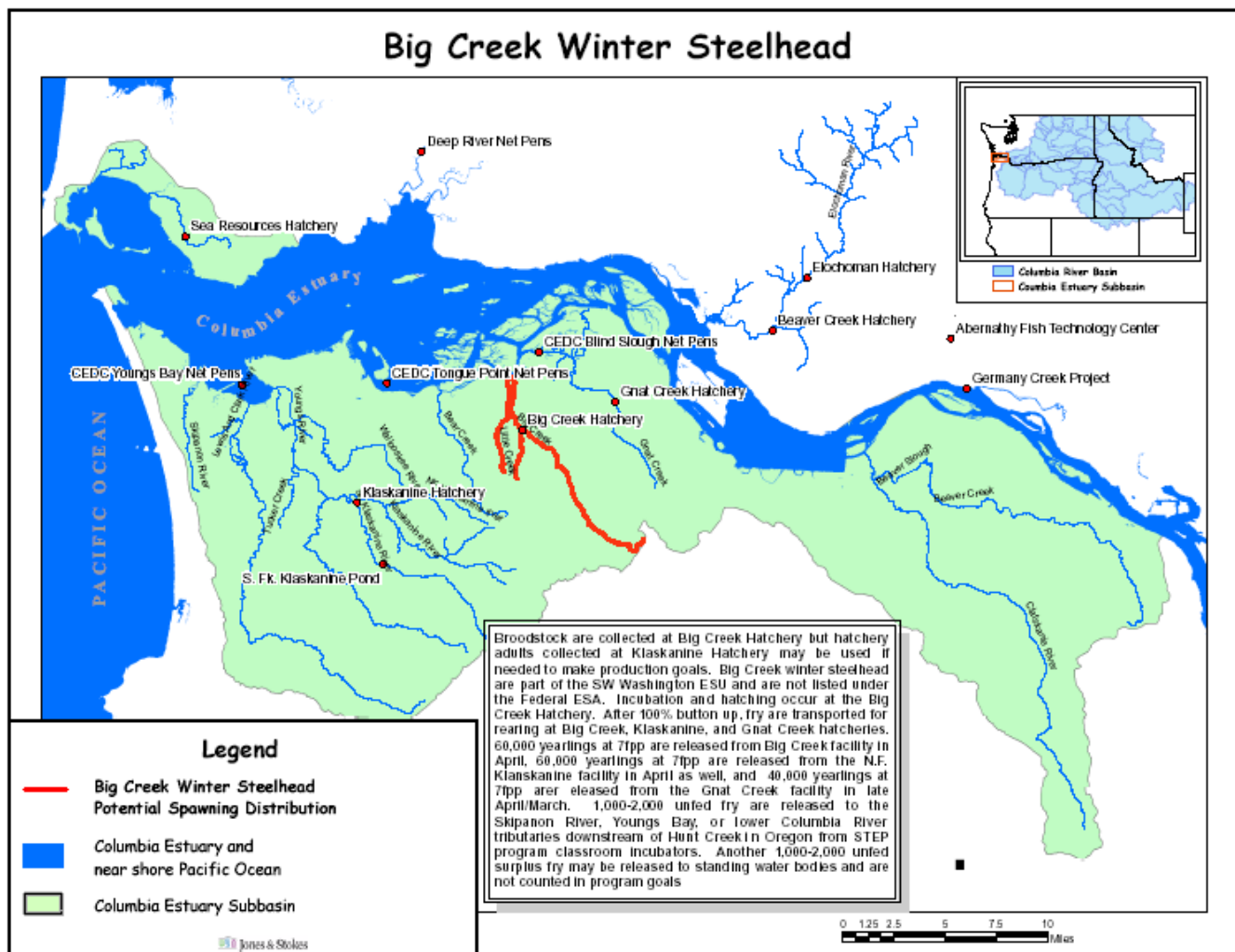


Hatchery Scientific Review Group Review and Recommendations

Big Creek Winter Steelhead Population Population and Related Hatchery Programs

January 31, 2009



1 Big Creek Winter Steelhead

The Big Creek winter steelhead population has been greatly influenced by long-term, annual releases of domesticated hatchery steelhead. Currently, only unmarked steelhead are passed above the hatchery weir; a high proportion of these fish are likely misidentified hatchery-origin fish. There may be 12-16 miles of degraded steelhead habitat in Big Creek above the hatchery weir. Natural production in Big Creek is currently being evaluated under a three-year study by CREST. Conservation or population management objectives for natural Big Creek steelhead are not available. Big Creek stock is used to supplement populations in Gnat Creek and the Klaskanine River.

2 Current Conditions

2.1 Current Population Status and Goals

Big Creek steelhead are part of the Southwest Washington Coast ESU and are not ESA-listed. The HSRG is not aware of any management objective for natural production of Big Creek steelhead. Natural production is uncertain, but expected to be low.

- ESA Status: This population is not listed.
- Population Description: Minor population greatly influenced by long-term hatchery propagation
- Current Viability Rating: Likely Very Low. The CREST study may provide future information on smolt production relative to adult spawning population.
- Recovery Goal for Abundance: NA
- Habitat Productivity and Capacity: Productivity: 4.0; Capacity: 100 assigned for this review

2.2 Current Hatchery Programs Affecting this Population

The current program produces 60,000 marked smolts of Big Creek stock that are released at 7 fpp on-station in April. Broodstock is collected at Big Creek Hatchery with occasional contribution of broodstock from Klaskanine Hatchery when returns to Big Creek are insufficient. Approximately 60,000 fingerlings at 14 fpp are transferred to Klaskanine Hatchery for later release in the Klaskanine River. Up to 40,000 fingerlings at 14 fpp are transferred to Gnat Creek Hatchery for later release in Gnat Creek. Small numbers of eggs are provided to STEP and USFWS for research.

- PNI and pHOS Estimates (include straying from all hatchery programs): pHOS is estimated at 3%.
- Estimated productivity (with harvest and fitness factor effects from AHA): 2.8 for the natural population
- Projected Average Natural Origin Escapement: 56 natural-origin adults
- Average Harvest Contribution: 426 fish

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin segregated and out-of-basin hatchery programs – 16 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 2.8 to 3.6. Average abundance of natural-origin spawners (NOS) would increase from approximately 56 fish to approximately 73 fish. Harvest contribution of the natural and hatchery populations would go from approximately 426 fish to approximately 7 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 population is considered a Stabilizing population. There is a 60,000 segregated winter steelhead smolt program here.

Recommendations:

The HSRG recommends continuing the current smolt program. Continue the CREST study to evaluate natural production potential upstream of the hatchery weir. It is likely that many unmarked steelhead are misidentified hatchery fish. It is recommended that real-time scale analysis should be employed to ensure misidentified, unmarked hatchery steelhead are not passed upstream.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Big Creek Winter Steelhead. 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	-	95%	0%	3%	0.00	56	2.8	6	0
	Seg Harv	60.0	95%						420	205
No Hatchery	None None	-	0%	0%	0%	0.00	73	3.6	7	-
HSRG Solution	None None	-	98%	0%	2%	0.00	64	3.2	7	0
	Seg Harv	60.0	98%						420	217
HSRG Solution w/ Improved Habitat	None None	-	98%	0%	2%	0.00	75	3.6	8	0
	Seg Harv	60.0	98%						420	217