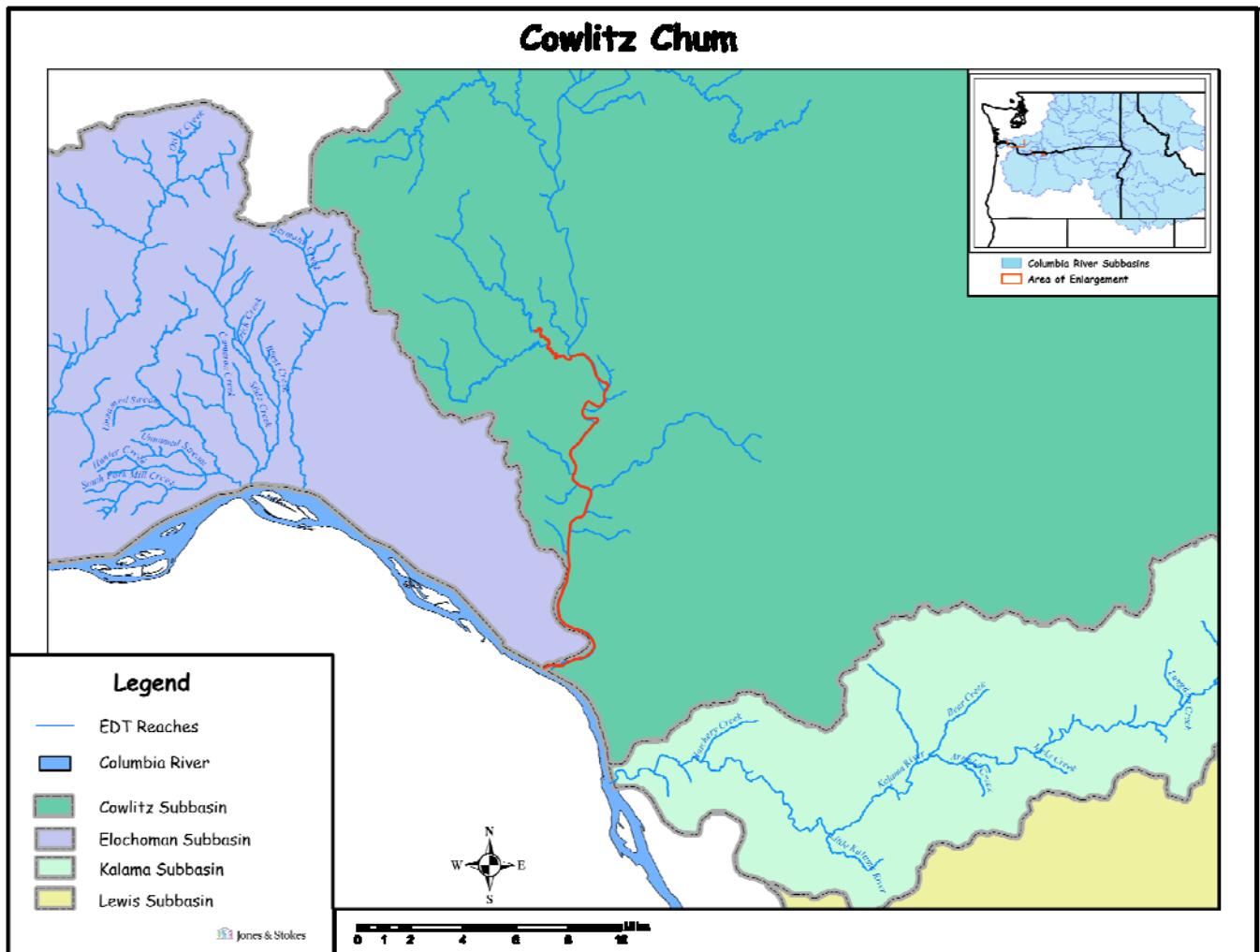


# Hatchery Scientific Review Group Review and Recommendations

## Cowlitz Chum Salmon Population and Related Hatchery Programs

January 31, 2009



# 1 Cowlitz Chum Salmon

This is one of 16 populations historically present in this ESU (Meyers et al. 2006). At one time over one million chum salmon returned to the lower Columbia River (McElhany 2005); currently few chum are observed. Run sizes range from a few hundred to a few thousand adults. Most chum salmon in the Lower Columbia River are observed in the Grays River and a few locations further upstream.

In 1951, 1,000 chum salmon were counted in the Cowlitz River. Historical chum salmon abundance ranged from 300,000 to 500,000 fish based on available habitat and habitat modeling. This estimate includes production from the mainstem, the lower Coweeman and Toutle rivers, and Ostrander Creek. Estimates of current run size are not available. Approximately 10 adults are recovered at the Cowlitz Hatchery each year.

There are two patterns of run timing in the Cowlitz River. The “summer run” enters the river in early summer and spawns higher in the watershed than the late time “fall run” of chum. Historically, chum spawned upstream of the Mayfield Dam site as well as in the lower tributaries of the Cowlitz River. It is unclear how the mainstem dams in the Cowlitz affected this run timing trait.

## 2 Current Conditions

### 2.1 Current Population Status and Goals

- **ESA Status:** This population is listed as threatened. The natural and hatchery populations of Cowlitz River chum salmon are included in the Columbia River Chum ESU.
- **Population Description:** The Cowlitz River chum population is designated as a Contributing population (LCSR&SP 2004).
- **Current Viability Rating:** Very Low, with a goal of Medium
- **Recovery Goal for Abundance:** 600
- **Productivity Improvement Expectation:** Unknown
- **Habitat Productivity and Capacity (from EDT):** Productivity 1.6; Capacity 7,038
- **Populations Affected by this Hatchery Population:** NA
- **Hatchery Populations of the Same Species that may Affect this Natural Population:** The nearest hatchery programs that may affect this population are the Gray River and the Duncan/Ives Island programs.

### 2.2 Current Hatchery Programs Affecting this Population

No chum salmon hatchery program has ever operated in the Cowlitz River. Straying of hatchery-produced chum into the Cowlitz River is thought to be low. The effective pHOS is estimated to be 2%.

Estimated number of hatchery strays affecting this program:

- Hatchery strays from in-basin integrated hatchery program – None
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs – 60 adults

### 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 slightly from 1.5 to 1.6 returns per spawner. Average abundance of natural-origin spawners (NOS) would remain the same at 2,640 adults. Incidental harvest of the natural and hatchery populations remained unchanged at 54 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 designated a Contributing population that appears to have habitat potential to be productive and abundant. There are no hatchery releases in the Cowlitz River.

**Recommendations**

The HSRG recommends that managers monitor the abundance of natural-origin chum.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Cowlitz Chum. 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%	2%	0.00	2,641	1.5	54	-
No Hatchery	None None	-	0%	0%	0%	1.00	2,639	1.6	54	-
HSRG Solution	None None	-	0%	0%	9%	0.00	2,814	1.5	57	-
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	8%	0.00	3,503	1.6	71	-