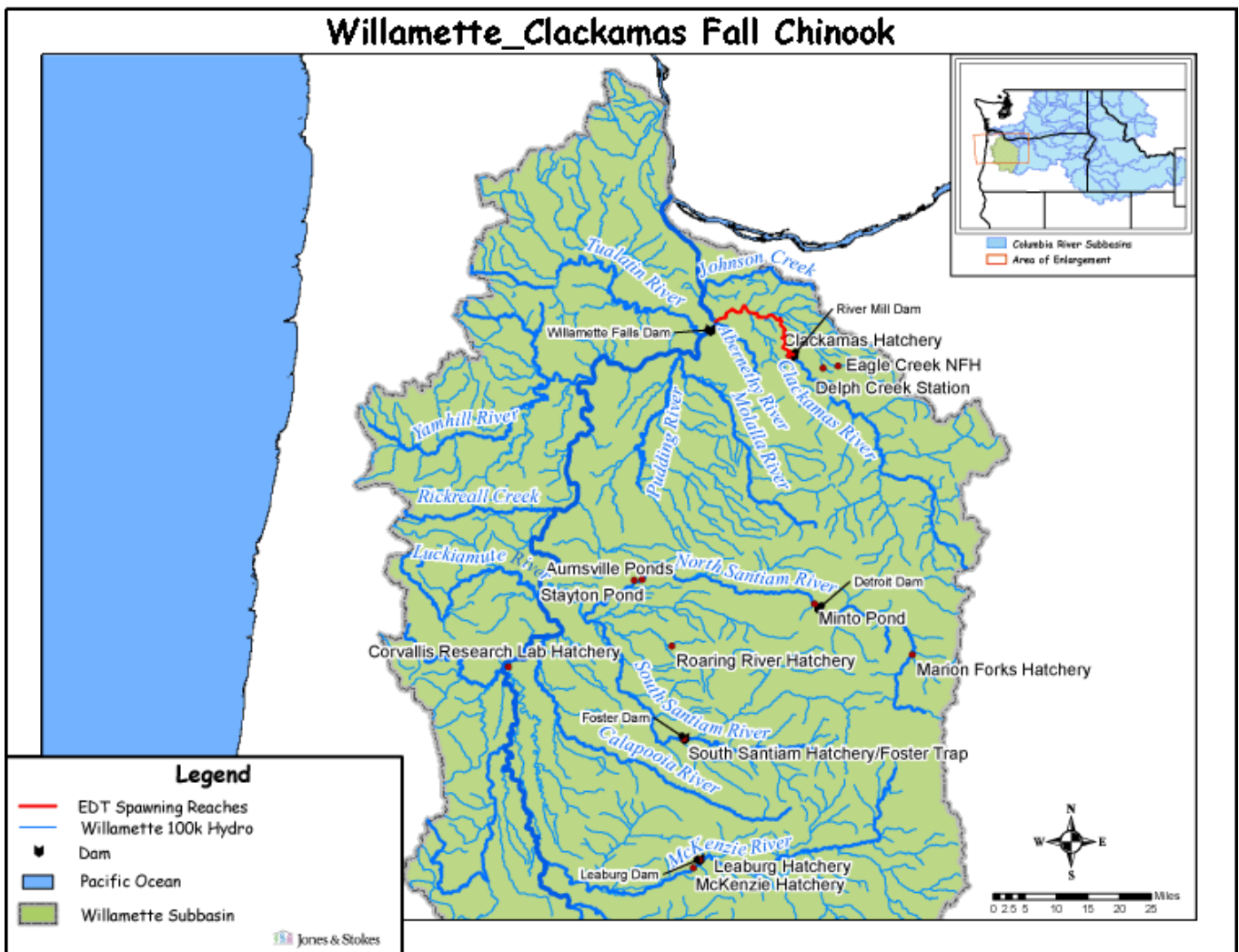


# Hatchery Scientific Review Group Review and Recommendations

## Willamette – Clackamas Fall Chinook Salmon Population and Related Hatchery Programs

January 31, 2009



# 1 Clackamas Fall Chinook Salmon

Fall Chinook in the Clackamas River are largely confined to the mainstem below River Mill Dam and the lower reaches of the major tributaries (Deep, Clear and Eagle creeks) in the lower river (personal communication, Doug Cramer, PGE). Historically they probably extended up through the Middle Clackamas reaches. Fall Chinook are native to the Clackamas River; however, the population was extirpated in the mid-1930s because of poor water quality in the lower Willamette. Access to spawning areas was also severely impeded or prevented by the Faraday and River Mill dams from 1906 to 1939. The run was reestablished from lower Columbia River hatchery stocks. Stocking ceased in the early 1980s and the run is now supported by natural production (WLC-TRT 2003; Subbasin Plan).

Fall Chinook are counted by ODFW in the lower Clackamas River. Since the mid-1960s, returns to the Clackamas River have generally declined, varying widely from a high of 1,385 fish in 1974 to a low of 20 fish in 1999. Returns over the period averaged 469 fish (Subbasin Plan). With normal environmental variation and events, it is unlikely that the current habitat can support a sustainable natural population of fall Chinook in the Clackamas River. Based on EDT habitat analysis, the major factor limiting fall Chinook production here is water temperature during the late summer and fall. Fall Chinook spawn in September, a period when water temperatures in the lower Clackamas are high enough to preclude successful spawning until they moderate in October. Sediment, habitat diversity and channel stability were also rated as important limiting factors for fall Chinook in the lower mainstem (Clackamas Subbasin Plan).

The population is part of the lower Columbia River fall Chinook group (Howell et al 1985) and is considered a tule ocean-type life history. Columbia River tule fall Chinook are an important component of commercial harvest off Oregon, Washington, and southern British Columbia. Fall Chinook are released in large numbers from several lower Columbia River hatcheries to support these fisheries, although Clackamas Chinook are natural spawners. Adults enter the river in August with peak returns in September and spawning follows shortly in September and October. Juveniles spend relatively little time in the Clackamas and begin moving downstream toward the estuary during the spring and summer (Subbasin Plan).

## 2 Current Conditions

### 2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the natural population.

- **ESA Status:** Clackamas River fall Chinook are part of the Lower Columbia Chinook ESU, which was listed as threatened under the ESA in 1994.
- **Population Description:** The Clackamas River fall Chinook population is designated as a Contributing population in the Lower Columbia Salmon Recovery and Subbasin Plan (LCSR&SP 2004). The LCSR&SP describes current viability as NA with a viability goal of Medium. The W/LC TRT identified this population as a core population (Subbasin Plan).
- **Recovery Goal for Abundance:** The abundance goal is 1,400 and the potential abundance is 2,800.
- **Productivity Improvement Expectation:** Unknown.
- **Habitat Productivity and Capacity (e.g., from EDT):** Productivity: 1.99; Capacity 933.

## 2.2 Current Hatchery Programs Affecting this Population

No hatchery programs for fall Chinook currently operate in Clackamas River; however, about 70 adult fall Chinook from other programs are estimated to stray into this system annually. Under the current scenario, pHOS is estimated at 53%, even though no hatchery fall Chinook are released in the basin. Annually, approximately 50 natural-origin adults are estimated to return to the Clackamas River.

Estimated number of hatchery strays affecting this population:

Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 71 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 0.5 to 1.0. Average abundance of natural-origin spawners (NOS) would decrease from approximately 50 fish to approximately 1 fish. Harvest contribution of the natural and hatchery populations would also go from approximately 52 fish to 1 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 incorporate all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

**Observations**

There are no hatchery programs for fall Chinook that operate in this basin. Out-of-basin strays are estimated to make up 53% of the natural spawning population. This proportion of hatchery fish on the spawning grounds would only be consistent with a population designation as a Stabilizing population.

**Recommendations**

The HSRG recommends that this population be managed for natural production as a Stabilizing population.

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 Clackamas 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	-	0%	0%	53%	0.00	50	0.5	52	-
	None									
No Hatchery	None	-	0%	0%	0%	1.00	1	1.0	1	-
	None									
HSRG Solution	None	-	0%	0%	36%	0.00	64	0.7	30	-
	None									
HSRG Solution w/ Improved Habitat	None	-	0%	0%	32%	0.00	78	0.7	37	-
	None									