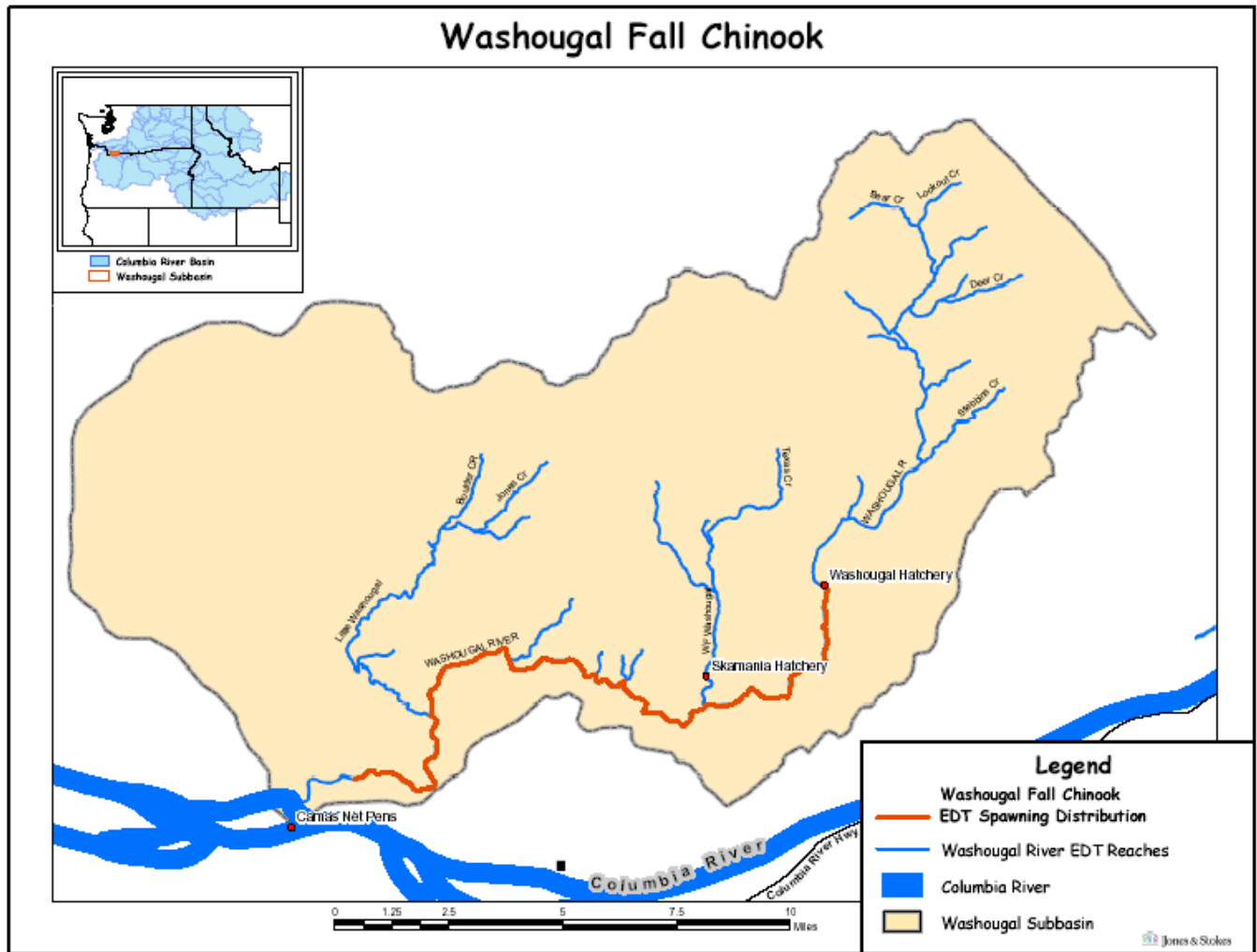


# Hatchery Scientific Review Group Review and Recommendations

## Washougal Fall Chinook Population and Related Hatchery Programs

January 31, 2009



# 1 Washougal Fall Chinook

The Washougal River fall Chinook natural spawners are a mixed stock of composite production. Natural spawning does occur, but these fish are identified as hatchery strays. Washougal River fall Chinook spawn in the area from Salmon Falls (RM 14.5) downstream approximately 4.0 miles. Natural spawning occurs in the Washougal River slightly later (October to November) than other lower Columbia River tule fall chinook stocks. Natural escapement is estimated using spawning ground counts within selected index areas. Natural spawn escapements from 1967-1991 averaged 1,832 with a low return of 70 in 1969 and a peak return of 4,578 in 1989. Since 1971, the annual natural escapement has averaged 2,157 fish. SaSSI (2002) listed the Washougal River fall Chinook natural spawn stock status as healthy, based on escapement trend. Although final escapement objectives have not been established by the NMFS through a recovery plan, WDFW (2003) has established interim minimum escapement objectives. The minimum fall Chinook MSY escapement goal is 3,000 adult spawners from the mouth of the Washougal River to the Washougal Salmon Hatchery (HGMP 2004).

## 2 Current Conditions

### 2.1 Current Population Status and Goals

The Washougal fall Chinook population is included in the Lower Columbia ESU. Fall Chinook are native to the Washougal River, but substantial numbers of hatchery Chinook have been released into this watershed from the Grays, Elochoman, Toutle, Kalama, and Bonneville (Oregon) hatcheries. This population may, therefore, be a mixture of native and hatchery fish.

- **ESA Status:** This population is listed as threatened.
- **Population Description:** The Washougal fall Chinook population is designated as Primary (LCSR&SP 2004).
- **Current Viability Rating:** Low.
- **Recovery Goal for Abundance:** 5,800 natural spawning fish.
- **Productivity Improvement Expectation:** The recovery plan provides for productivity improvement and habitat capacity expectations of 4.3 R/S and 2,544 fish, respectively.
- **Habitat Productivity and Capacity (from EDT):** Productivity 3.84; Capacity 2,271.
- **Populations Affected by this Hatchery Population:** Through straying and other interactions, this hatchery population has the potential to affect native populations in the Coastal and Cascade components of the Lower Columbia Chinook Salmon ESU.
- **Hatchery Populations of the Same Species that Affect this Population:** Tule fall Chinook programs operating in the Elochoman, Cowlitz, and Kalama rivers in Washington, as well as the Big Creek program in Oregon, have the potential to produce strays that could enter the Washougal River and affect the local population. Spring Creek National Fish Hatchery and Bonneville Fish Hatchery Tule fall Chinook releases have the potential to affect this population/program, as well.

### 2.2 Current Hatchery Programs Affecting this Population

- **Projected pHOS Estimates (includes strays from all hatchery programs):** 57%. The current number of stray fall Chinook in the Washougal River is estimated at 947.

- Estimated Adjusted Productivity (with harvest and with fitness factor effects from AHA): 0.96.
- Projected Average Natural-Origin Escapement: 567 fish

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: NA
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 853 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 Observation 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 1.0 to 2.0. Average abundance of natural-origin spawners (NOS) would increase from 578 to 693. Harvest contribution of the natural and hatchery populations would go from 7,368 to 694.

#### 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**

This is a Primary population intended to be managed as an integrated harvest program (4.0 million). This program produces a high proportion of the naturally spawning population. WDFW is proposing to construct a weir at RM 3.0 to address the stray issue.

### **Recommendations**

This Primary population is important to the ESU. The HSRG suggests a stepping-stone approach for the hatchery. The integrated program would release 650,000 fish (adipose-clipped and tagged). The segregated component would release 920,000 fish (adipose-clipped and a portion tagged). The HSRG identified surplus from this program that could provide a source for a segregated, harvest program of 2.1 million fish to be released from net pens in the Columbia estuary (see Youngs Bay Fall Chinook report for details). This approach would increase harvest and achieve natural population objectives. Facility provisions need to be evaluated to accommodate a stepping-stone program. In addition, a lower river weir is needed to manage composition on the spawning grounds consistent with the standards of a Primary population.

The HSRG recommends that managers implement a BKD control strategy for their spring and summer/fall Chinook hatchery programs where BKD has proved a recurring problem. Ideally, the strategy should include culling (destroying) eggs/progeny from hatchery- and natural-origin brood that are found to be infected with the BKD agent. However, because brood fish with high levels of the BKD agent are more likely to transmit the agent to their progeny than brood with lesser levels of the agent, the culling of eggs/progeny from infected brood fish, should, at the very least, be applied to those with high levels of the BKD agent (e.g., ELISA OD value of 0.4 and above when broodstock are not in short supply and ELISA OD value of 0.6 and above when broodstock are in short supply). In addition, in programs using ESA-listed natural-origin brood fish, the culling of their eggs/progeny may, at the managers' discretion, be dispensed with. However, the ESA-listed broodstock should be injected, pre-spawning, with an appropriate antibiotic (preferably, azithromycin at 40 mg/kg fish), and the resulting eggs should be surface-disinfected with an iodophor. All pre-spawning brood injections may be limited to females, ESA-listed or otherwise.

Finally, eggs and hatchlings derived from broodstock found to be heavily infected with the BKD agent should be incubated/reared in isolation from those obtained from broodstock with no or lesser levels of the BKD agent. In addition, the hatchlings should be reared at the lowest possible densities (below current standards), and, at the first signs of infection with the BKD agent, they should be treated with orally administered erythromycin (100 mg/kg fish) for 28 days. The treatment should be repeated if there is evidence that the BKD agent has persisted in the hatchlings.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Washougal 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 None	-	0%	0%	54%	0.00	578	1.0	579	0
	Seg Harv	4,002.6	86%						6,789	3,863
No Hatchery	None None	-	0%	0%	0%	1.00	693	2.0	694	-
HSRG Solution	Int Harv	1,123.2	92%	95%	1%	0.88	1,070	2.7	2,588	468
	Stepping Stone Seg Harv	919.0	90%						1,356	1,582
HSRG Solution w/ Improved Habitat	Int Harv	1,123.2	92%	95%	1%	0.90	1,276	2.9	2,686	1,252
	Stepping Stone Seg Harv	919.0	90%						1,356	1,582