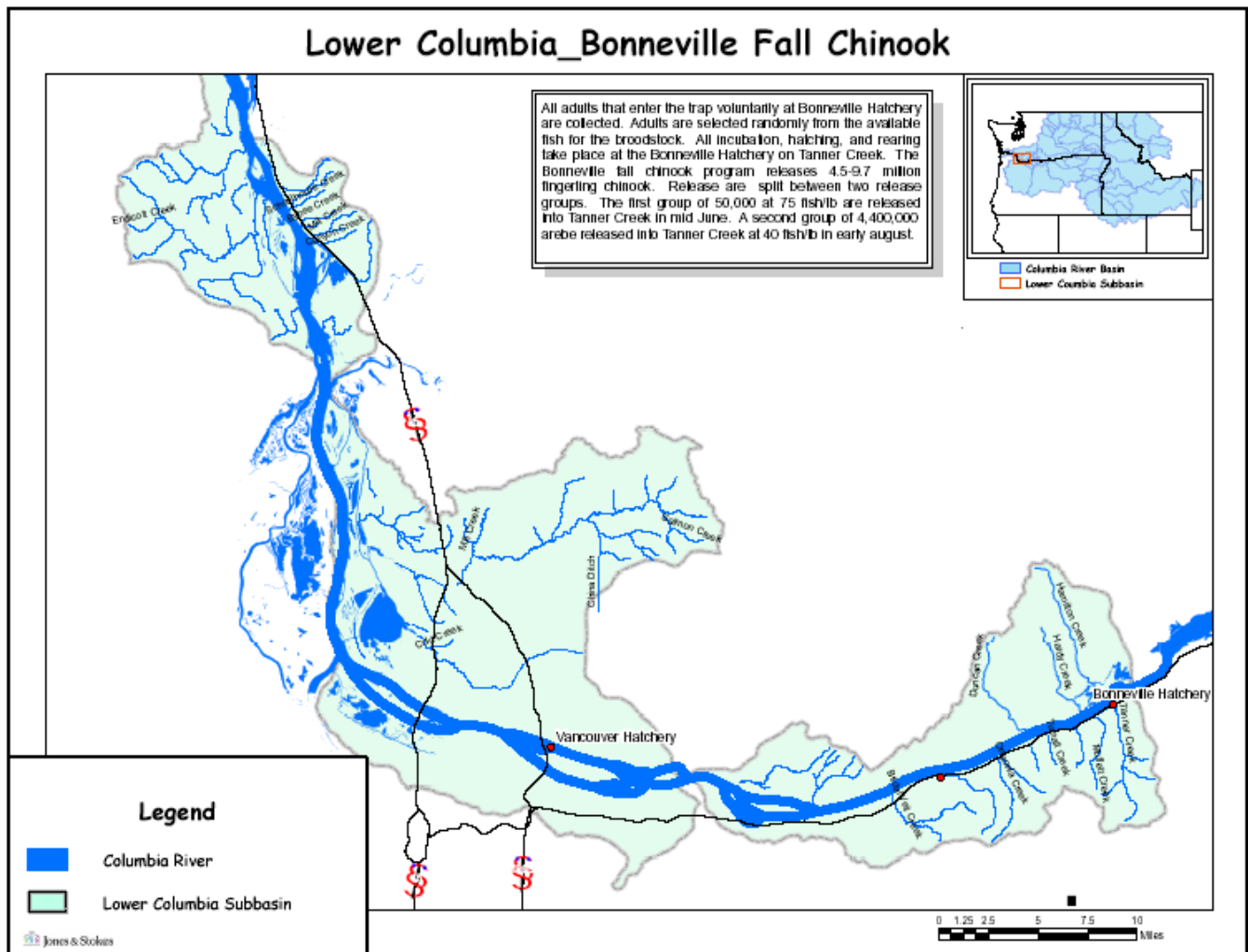


# Hatchery Scientific Review Group Review and Recommendations

## Lower Columbia Bonneville Fall Chinook Population and Hatchery Program

January 31, 2009



# 1 Lower Columbia Bonneville Fall Chinook

The lower Columbia Bonneville fall Chinook population is a hatchery population that is not included as part of the Lower Columbia River Chinook ESU. This population has no viability or recovery goals.

## 2 Current Conditions

### 2.1 Current Population Status and Goals

The lower Columbia Bonneville fall Chinook population is a hatchery population that is not included as part of the Lower Columbia River Chinook ESU. The population is maintained from returns of hatchery-origin adults to the Bonneville hatchery.

- ESA Status: This population is not listed.
- Population Description: This is a hatchery population maintained through hatchery returns. There is no natural population associated with the Bonneville Hatchery program. This is a segregated hatchery population and as such, there is no associated natural productivity or capacity.
- Current Viability Rating: Because there is no natural population, there is no current or future viability rating.
- Recovery Goal for Abundance: NA.
- Productivity Improvement Expectation: NA.
- Habitat Productivity and Capacity (from EDT): NA.

### 2.2 Current Hatchery Programs Affecting this Population

The program attempts to meet harvest goals through the release of approximately 4.5 million fingerlings at the Bonneville Hatchery. Releases currently are not mass marked with an adipose clip, but a total of 100,000 fish are coded-wire tagged. Managers planned to initiate mass marking with the 2007 release. The Bonneville Hatchery program is a segregated harvest program and broodstock is maintained from fish returning to the facility. Some natural-origin fish may be inadvertently collected for broodstock at the hatchery trap.

The hatchery program began in 1977 with the capture of adult fall Chinook passing Bonneville Dam and returning to the Bonneville Hatchery, as well as fish from the Priest Rapids Hatchery. The fall Chinook collected at Bonneville Dam were destined for spawning areas in the Columbia River above John Day Dam and were identified as up-river brights (URB). In addition to facility returns, broodstock have been imported from Priest Rapids Hatchery when escapement was not met locally.

Incubation, rearing and release for this program occur at Bonneville Hatchery. Broodstock also supports the Ringold Springs and Umatilla River programs. Mating protocols use single family pairing, but a few jacks are used for spawning. Total survival from the Bonneville Hatchery program averaged 0.23% from brood years 1989 through 1997. On average, the program contributes approximately 5,200 fish annually to harvest. Hatchery escapement slightly exceeds the broodstock needs for the existing programs.

Estimated number of hatchery strays affecting this population: NA

### 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).

Since this is a hatchery population, that analysis is not applicable. However, impacts to other natural spawning populations are a concern and will be described in reports for those populations. The effect of no fall Chinook production at the Bonneville Hatchery would be a decrease in harvest contribution from approximately 6,500 to zero. In addition, harvest would be lost from any program supported by Bonneville Hatchery returns.

#### 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**

This is an out-of-ESU population released into the lower river. This program is used to supply upriver bright releases upstream of Bonneville Dam.

Information about the scale and distribution of straying from this hatchery population was limited. Because this stock is from outside the lower Columbia River ESU, the size of the program (approximately 4.5 million fish), and the limited marking to date, there is a great deal of uncertainty as to whether program fish are adequately segregated from naturally spawning aggregates within the ESU or from fall Chinook populations above Bonneville Dam.

Co-managers are evaluating the option of exchanging upriver bright production at Bonneville with Spring Creek tule production. Switching production from upriver brights to tules would be consistent with HSRG principles.

## **Recommendations**

Continue the program as operated, but with 100% adipose fin-marking, increased coded-wire tagging, and increased monitoring to determine the actual contribution of hatchery strays to lower river tule populations. This recommendation applies, whether current broodstock is retained or production is switched to a segregated tule program. .

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 conditions and HSRG solution for Lower Columbia Bonneville 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										
	Seg Harv	4,493.1	90%						6,446	2,490
No Hatchery										
HSRG Solution										
	Seg Harv	4,493.1	90%						6,446	2,490
HSRG Solution w/ Improved Habitat										
	Seg Harv	4,493.1	90%						6,446	2,490