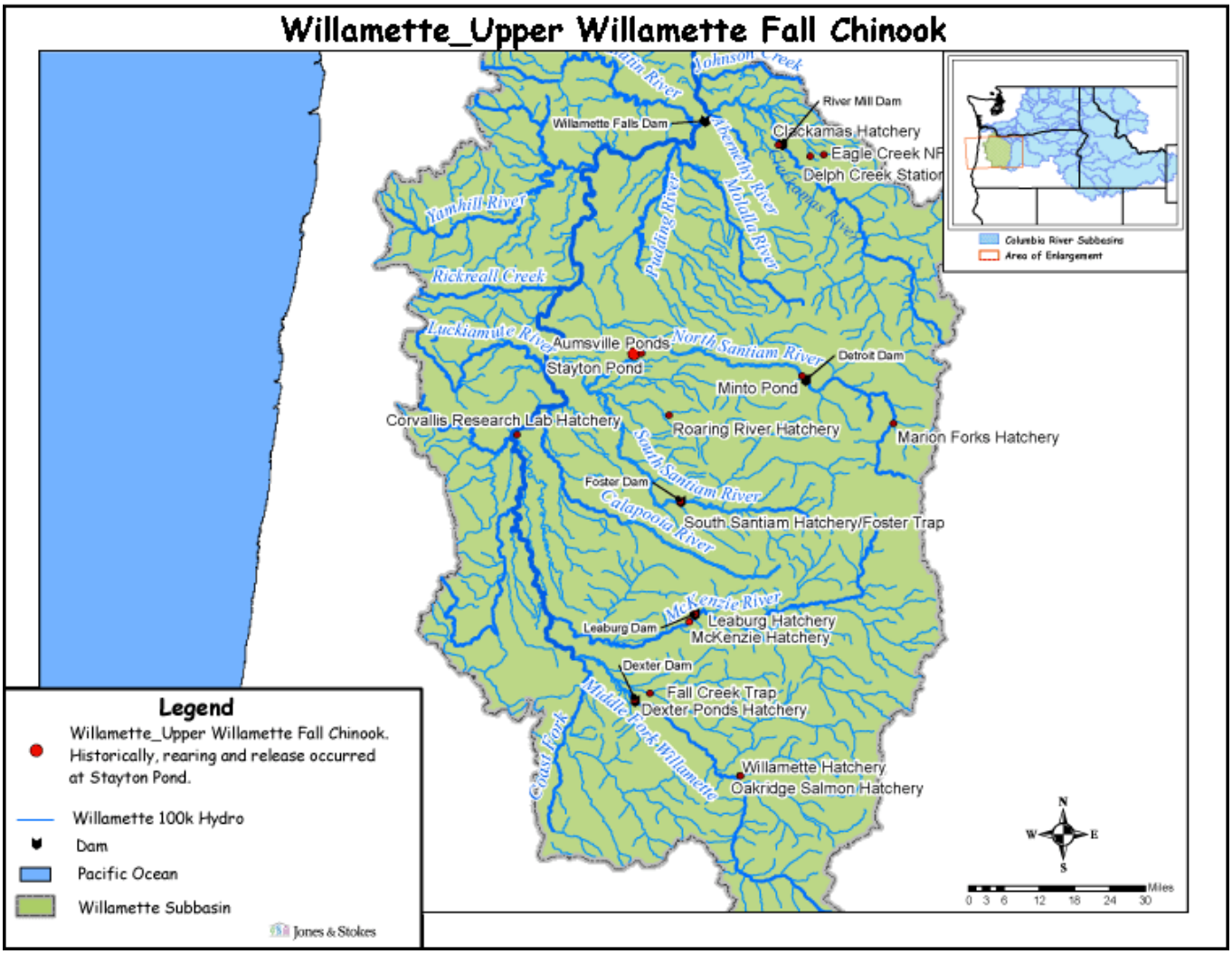
# Hatchery Scientific Review Group
# Review and Recommendations

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

**January 31, 2009**



# 1 Upper Willamette Fall Chinook Salmon

This population consists of introduced tule fall Chinook salmon naturally produced in Willamette River tributaries above Willamette Falls. Prior to laddering of Willamette Falls (RM 23), passage of returning adult salmon was only possible during winter and spring high flow periods. Fall Chinook were not present above Willamette Falls before ladder installation and hatchery introductions of fall-run Chinook into upstream tributaries. Summer flows in the Willamette are higher and cooler than before 13 multipurpose USACE dams were constructed. When combined with passage improvements at Willamette Falls and hatchery inputs, this improved water quality has helped establish upriver runs of fall Chinook that were not present historically (Altman, Henson, and Waite 1997; Subbasin Plan).

Fall Chinook spawn in the lower reaches of the major eastside Willamette tributaries and the mainstem Willamette River. Systematic aerial inventories of fall and spring Chinook salmon spawning within the Santiam River watershed began in 1970. During these inventories, it was difficult to distinguish between spring Chinook and the introduced fall Chinook salmon redds, because so much introgression of spawning fall Chinook has occurred into areas once used by spring Chinook salmon (U.S. Army Corps of Engineers 2002). It is likely that only redds observed in the uppermost reaches (upstream of Stayton on the North Santiam River) were attributed to spring Chinook salmon (Subbasin Plan).

This population exhibits an ocean-type life history. Adult fall Chinook spend a relatively short time in freshwater. They enter the Willamette River in July and August, overlapping the tail end of the spring-run Chinook, with peak returns in September. Spawning commences in September and October. Chinook fry emerge in the spring. Juvenile fall Chinook spend relatively little time in the natal tributaries; they begin moving downstream toward the estuary during the spring and summer. Recent (2000 to 2006) average adult fall Chinook fish counts at Willamette Falls were 1,190 fish.

# 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: The Upper Willamette fall Chinook are not part of any Chinook salmon ESU.
- Population Description: The Upper Willamette fall Chinook population has not been assigned a population designation.
- Recovery Goal for Abundance: NA.
- Productivity Improvement Expectation: Unknown.
- Habitat Productivity and Capacity (e.g., from EDT): Productivity 1.5; Capacity 100 (assigned for this review).

## 2.2 Current Hatchery Programs Affecting this Population

Currently, there are no fall Chinook hatchery programs in the Willamette River basin. The last release was in the mid-1990s from Stayton Pond (South Santiam satellite acclimation facility); ODFW discontinued releasing hatchery fall Chinook in 1996. These releases of the tule fall Chinook ranged from 5 to 12 million smolts annually.

Estimated number of hatchery strays affecting this population:

- The extent of straying of hatchery Chinook from lower Columbia hatcheries into the upper Willamette is unknown. It is likely to be low.

# 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.

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 population is not part of any Chinook ESU, there was no analysis done to determine the effects of removing hatchery influence on this population.

## 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.

**Observations**

This population was not historically present in the Upper Willamette and is not part of any Chinook salmon ESU.

**Recommendations**

The HSRG has no recommendations for this population.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Upper Willamette 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% | 0% | 0.00 | 0 | 0.7 | 0 | - |
| | | | | | | | | | | |
| No Hatchery | None None | - | 0% | 0% | 0% | 0.00 | 0 | 0.7 | 0 | - |
| HSRG Solution | None None | - | 0% | 0% | 0% | 0.00 | 1 | 1.0 | 1 | - |
| | | | | | | | | | | |
| HSRG Solution w/ Improved Habitat | None None | - | 0% | 0% | 0% | 0.00 | 7 | 1.1 | 3 | - |
| | | | | | | | | | | |