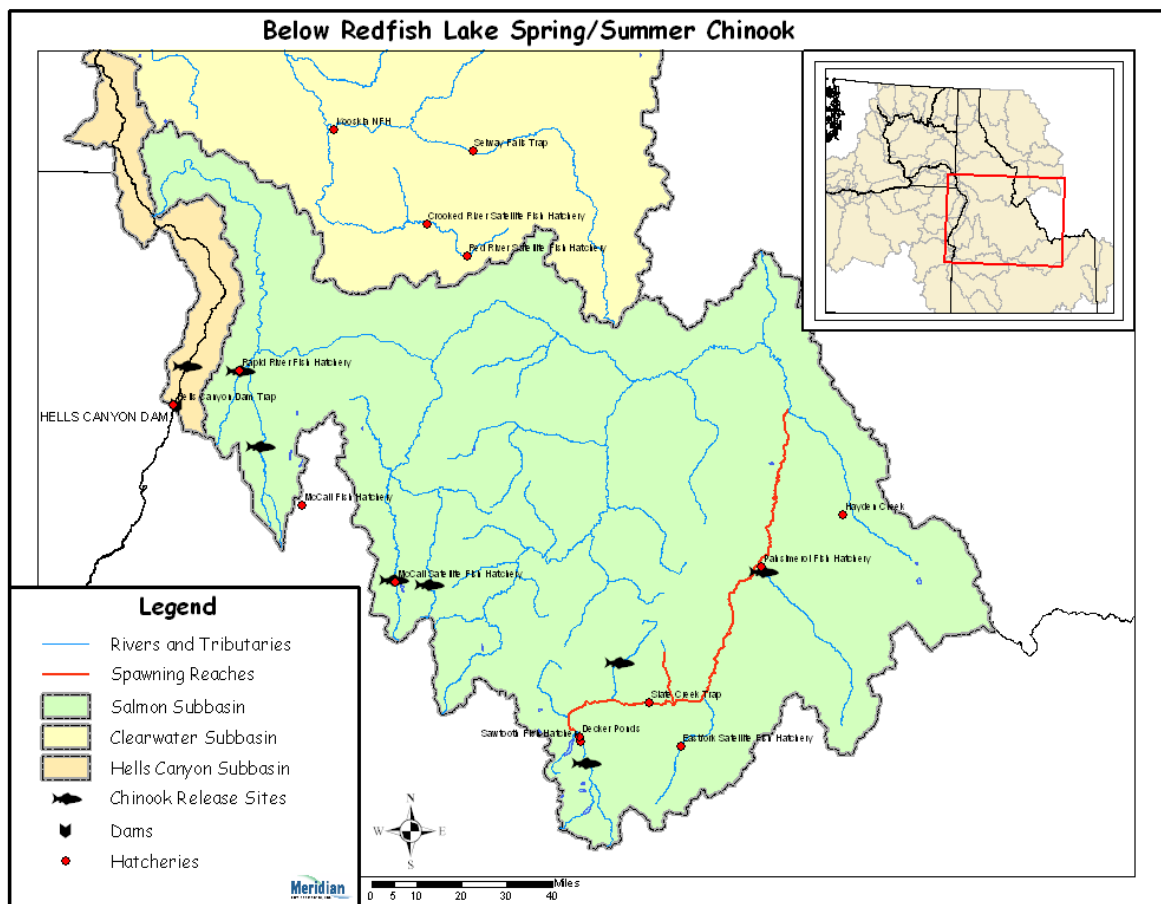


# Hatchery Scientific Review Group Review and Recommendations

## Lower Salmon Mainstem (~Below Redfish Lake) Spring/Summer Chinook Population and Related Hatchery Programs

January 31, 2009



# 1 Salmon Below Redfish Lake Spring/Summer Chinook

The Lower Salmon River Chinook population is part of the Snake River Spring/Summer Chinook ESU. This population includes both spring and summer run fish and is classified as threatened under the Endangered Species Act. The Interior Columbia Technical Recovery Team (ICTRT) listed this population as “Very Large” based on its historic habitat potential. A “Very Large” population is one that requires a minimum abundance of 2,000 natural spawners and an intrinsic productivity greater than 1.34 recruits per spawner (R/S) to be viable.

Historically, it is estimated that from 2-3 million spring/summer Chinook returned to the entire Snake River each year (NPPC 2004). The portion returning to the Salmon River below Redfish Lake is unknown but was probably in the tens of thousands.

## 2 Current Conditions

Adult spring/summer Chinook returns to the subbasin consist of both natural-origin and stray hatchery-origin fish. With the exception of Rapid River stock, natural- and hatchery-origin Chinook in the Salmon River drainage are listed as Threatened. This population includes fish spawning in the mainstem of the upper Salmon River from the mouth of the Lemhi River to Redfish Lake Creek, as well as tributaries including Thompson and Squaw creeks. These areas include nearly contiguous spawning aggregates of fish with both summer and spring adult run-timing. Spawning takes place from mid-July through late October. Juveniles leave the system as yearlings starting in early March and continuing into the spring.

Current (1957 to 2005) population abundance (number of adults spawning in natural production areas) has ranged from 11 fish in 1995 to 4,888 fish in 1957. Abundance in recent years has been highly variable. The most recent 10-year geometric mean number of natural spawners was 123 fish (NOAA Draft Recovery Plan).

AHA modeling data submitted by IDFG estimate current adult escapement and adjusted productivity for the natural-origin population at 97 and 0.69, respectively. The model also estimates that 10 hatchery-origin spring and summer Chinook stray into this population each year. There is no hatchery program associated with this population.

### 2.1 Current Population Status and Goals

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

- **ESA Status:** Snake River Spring/Summer Chinook are listed as threatened under ESA.
- **Population Description:** For the purpose of this review, the HSRG assigned this population as Contributing. The population currently meets the broodstock criteria for this population designation.
- **Recovery Goal for Abundance:** The ICTRT defined the Lower Mainstem Salmon River spring/summer Chinook population as “Very Large”, and identified a minimum abundance threshold of 2,000 natural-origin adults
- **Productivity Improvement Expectation:** The ICTRT productivity standard associated with a population defined as “Very Large” is 1.34.
- **Habitat Productivity and Capacity:** Productivity: 1.5; Capacity: 2,000

## 2.2 Current Hatchery Programs Affecting this Population

There is no hatchery program that releases juveniles into this portion of the Upper Salmon River. According to AHA modeling results, it is likely that spring and summer hatchery adults from the following programs may stray and therefore spawn with this natural population:

- Salmon/ Little Salmon Spring Chinook (Rapid River Hatchery)
- Salmon/ East Fork/South Fork Johnson Creek Summer Chinook
- Salmon/ SF Salmon Summer Chinook (McCall Hatchery)
- Salmon Pahsimeroi Summer Chinook (Pahsimeroi Hatchery)
- Salmon/ Upper Salmon Mainstem (Sawtooth Hatchery)

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 0 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 10 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 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 that Adjusted Productivity (with harvest and fitness factor effects from AHA) would increase from 1.0 to 1.4. Average abundance of natural-origin spawners (NOS) would increase from approximately 186 fish to approximately 621 fish. The harvest contribution of the natural and hatchery populations would go from approximately 20 fish to 68 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**

Managers have identified a strategy for Lower Mainstem Salmon River Chinook salmon that emphasizes maintaining existing natural spawning populations. Currently this population is consistent with the HSRG-defined standards of a Contributing population in terms of hatchery influence (pHOS less than 0.1), although abundance levels are low.

#### **Recommendations**

The HSRG recommends that managers continue to monitor status and trend information for this natural population as well as the proportion of hatchery fish in natural production areas.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Salmon River Spring Chinook Below Redfish Lake. 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%	4%	0.00	186	1.0	20	0
No Hatchery	None None	-	0%	0%	0%	0.00	621	1.4	68	-
HSRG Solution	None None	-	0%	0%	5%	0.00	211	1.0	23	0
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	2%	0.00	658	1.4	72	0