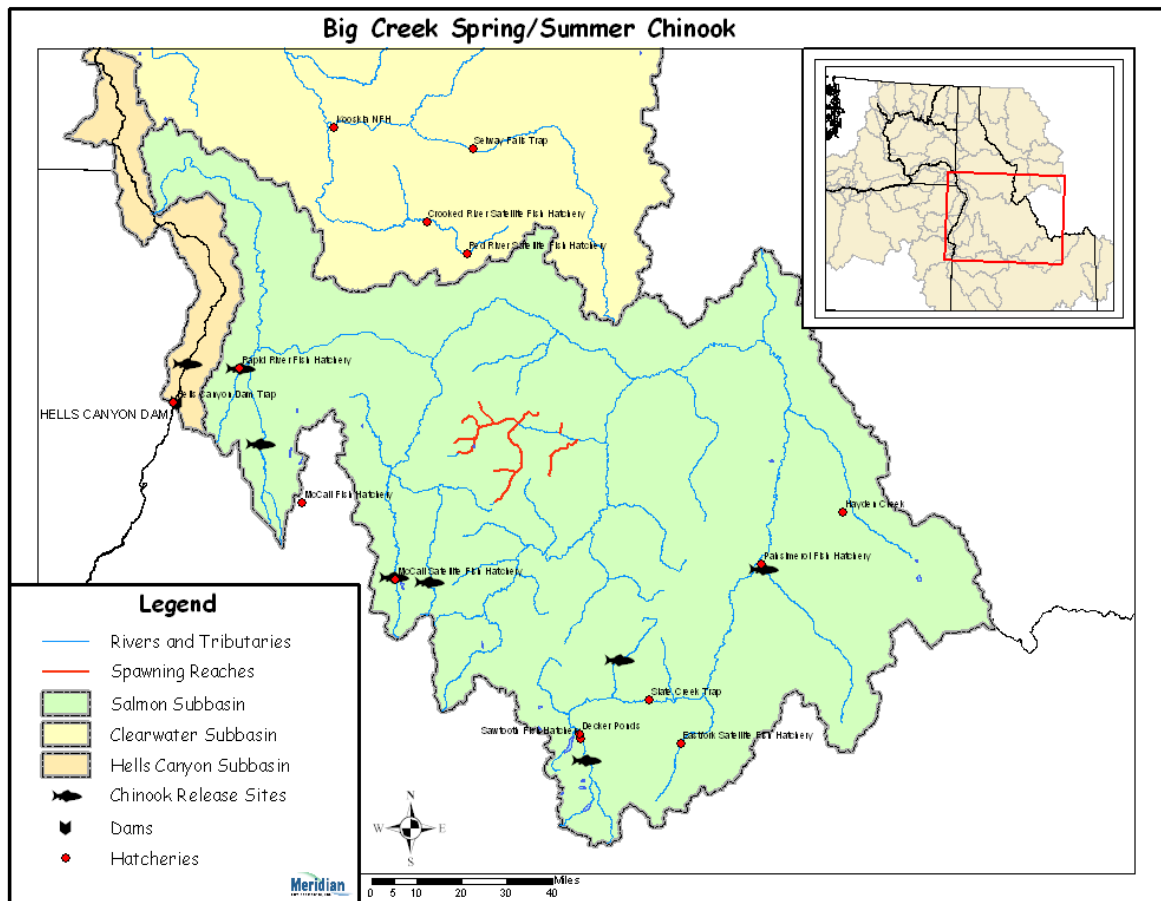


# Hatchery Scientific Review Group Review and Recommendations

## Salmon Big Creek Spring/Summer Chinook Population and Related Hatchery Programs

January 31, 2009



# 1 Salmon Big Creek Spring/Summer Chinook

This population is considered part of the Snake River Spring/Summer Chinook ESU that is classified as threatened under the Endangered Species Act. The Interior Columbia Technical Recovery Team (ICTRT) listed this population as “Large” based on its historic habitat potential. A “Large” population is one that requires a minimum abundance of 1,000 natural spawners and an intrinsic productivity greater than 1.56 recruits per spawner (R/S) to be viable.

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

## 2 Current Conditions

Adult spring/summer Chinook returns to the subbasin consist of natural-origin adults and possibly a few hatchery strays from outside the population. Both natural- and hatchery-origin components of this population (except strays from Rapid River Hatchery) are listed as Threatened. Spawning occurs from mid-July through late October in Big Creek and Monumental Creek. Juveniles emigrate from the system in the spring as yearlings. Hatchery fish have not been released to the subbasin. To date, no hatchery-origin adults have been collected during spawning surveys, although data is limited.

Current (1957 to 2004) abundance (number of adults spawning in natural production areas) has ranged from 5 fish in 1996 to 1,858 fish in 1961. Abundance in recent years has been moderately variable. The most recent 10-year geometric mean number of natural-origin spawners was 94 fish (NOAA Draft Recovery Plan).

AHA modeling data submitted by IDFG estimates current adult escapement and adjusted productivity for the natural-origin population at 468 and 1.40, respectively. Habitat in the stream is considered high quality with little impact from human development.

### 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 Primary. The population currently meets the broodstock criteria for this population designation.
- **Recovery Goal for Abundance:** The ICTRT defined the Big Creek Chinook population as “Large” and identified a minimum abundance threshold of 1,000 natural-origin adults.
- **Productivity Improvement Expectation:** The ICTRT productivity standard associated with a population defined as “Large” is 1.56.
- **Habitat Productivity and Capacity:** Productivity: 1.6; Capacity: 1,700

## 2.2 Current Hatchery Programs Affecting this Population

There is no hatchery stock associated with this Chinook population. However, IDFG operates a screw trap in Big Creek and AHA modeling indicates that some hatchery strays from the following programs have the potential to spawn in Big Creek:

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

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 0
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: four 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 1.4 to 1.5. Average abundance of natural-origin spawners (NOS) would increase from approximately 467 fish to approximately 610 fish. The harvest contribution of the natural and hatchery populations would go from approximately 51 fish to approximately 67 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).

<p><b>Observations</b></p> <p>Managers have identified a strategy Big Creek Chinook salmon that emphasizes maintaining existing natural spawning populations. Currently this population is consistent with the HSRG-defined standards of a Primary population (pHOS less than 0.05).</p> <p>There are no releases of hatchery-origin Chinook salmon within the Middle Fork Salmon River Major Population Group. The proximity of this population to the mainstem migration corridor suggests there may be a higher number of hatchery strays to this population than other Middle Fork Salmon River populations.</p> <p><b>Recommendations</b></p> <p>The HSRG recommends that managers continue to monitor status and trend information for natural populations of Chinook salmon in Big Creek as well as monitor presence/absence and the proportion of hatchery fish in natural production areas.</p>
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Table 1. Results of HSRG analysis of current condition and HSRG Solution for Big Creek Spring/Summer 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%	1%	0.00	467	1.4	51	0
No Hatchery	None None	-	0%	0%	0%	1.00	610	1.5	67	-
HSRG Solution	None None	-	0%	0%	1%	0.00	528	1.4	58	0
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	1%	0.00	743	1.6	81	0