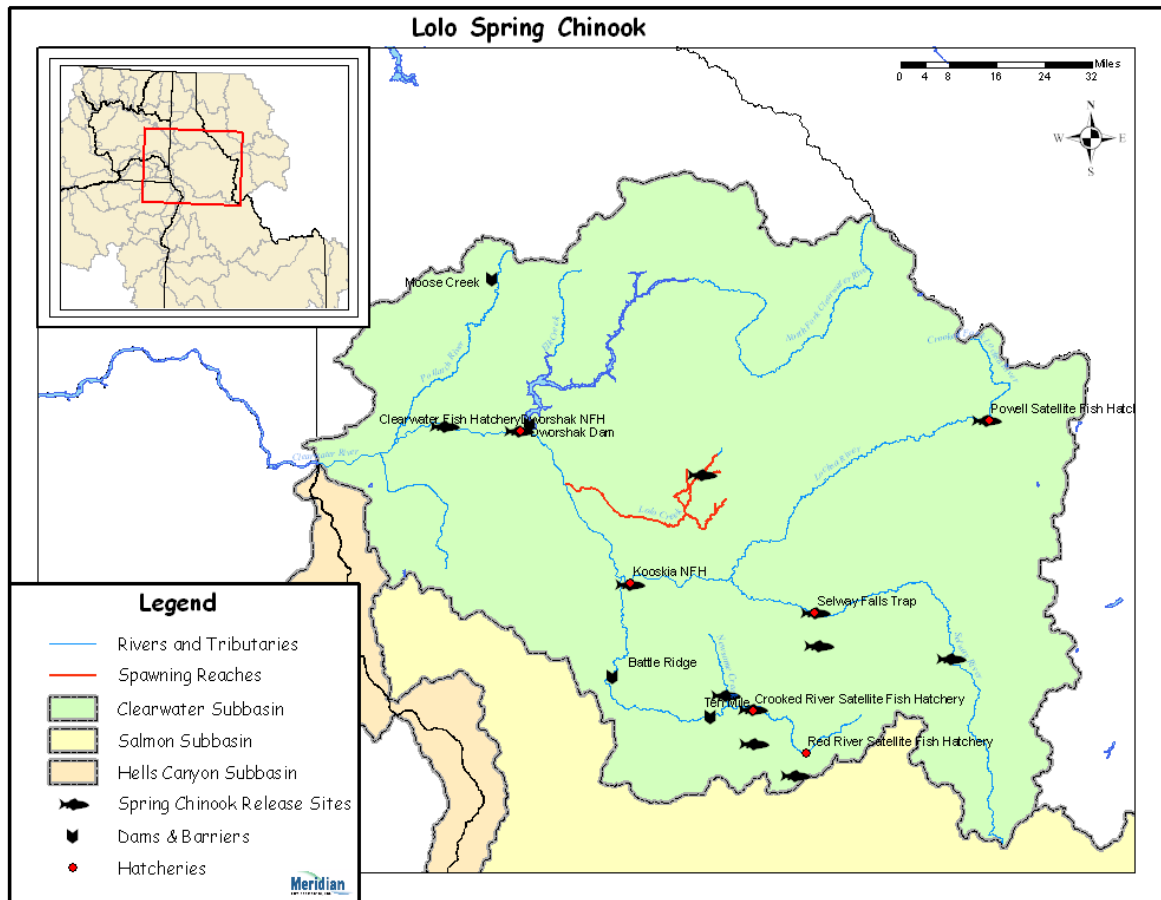


# Hatchery Scientific Review Group Review and Recommendations

## Lolo Creek Spring Chinook Population and Related Hatchery Programs

January 31, 2009



## 1 Lolo Creek Spring Chinook

The Snake River Spring- and Summer-Run ESU was listed as threatened under the Endangered Species Act (ESA) on August 22, 1992 and reaffirmed on June 28, 2005. The ESU includes those fish that spawn in the Snake River drainage and its major tributaries, including the Grande Ronde and the Salmon Rivers, and that complete their adult upstream migration (passing Bonneville Dam) between March and July. Fifteen artificial propagation programs are also included in the ESU; however, the non-indigenous hatchery spring- and summer-run Chinook stocks currently used in the Clearwater River and its tributaries, including the Lochsa River, are not considered part of the ESU (57 FR 14653).

Spring Chinook salmon were likely extirpated from the Clearwater River subbasin following the construction of Lewiston Dam in 1927. With construction of the Kooskia and Dworshak National Fish Hatcheries (NFHs) in 1967 and 1969, millions of spring Chinook were released into the Clearwater River and its tributaries, primarily as yearling smolts. Broodstock for these hatcheries came primarily from the Rapid River Hatchery (considered an upper Snake River stock), with significant contributions from Carson-stock hatcheries (Leavenworth, Little White Salmon, and Carson NFHs) and Willamette River hatcheries. More recently, these and other facilities in the basin have used adults returning to the hatcheries or satellite collection sites to supply gametes for their programs (Myers et al. 1998). The total adult return goal for Dworshak NFH and Clearwater Fish Hatchery is 21,135 spring Chinook over Lower Granite Dam. Currently Kooskia NFH and the Nez Perce Tribal Hatchery do not have established adult return goals.

Spring Chinook salmon enter the Columbia River and begin spawning migrations during April and May, reaching the Clearwater subbasin from April through July (Nez Perce Tribe and IDFG 1990). Spawning typically occurs in tributaries and headwater streams in August and September. Eggs hatch in December with emergence complete by April. Spring Chinook salmon remain in fresh water for one year, migrating to the ocean in the spring of their second year, typically from March through June. Nearly all adult spring and summer Chinook that return to the Snake River Basin result from fish that emigrate as yearlings in April-May.

Historically, Lolo Creek was a significant producer of spring Chinook salmon in the Clearwater River subbasin; however, estimates of historical run size are not available. Chapman (1981) estimated that Lolo Creek was capable of producing 84,000 spring Chinook smolts in its pristine condition.

## 2 Current Conditions

Adult spring/summer Chinook returns to Lolo Creek consist primarily of hatchery-origin fish resulting from a hatchery program operating at the Nez Perce Tribal Hatchery. The Lolo Creek hatchery-origin population is not listed under the ESA. The reintroduced spring Chinook population in Lolo Creek was originally derived from the Rapid River and other hatchery stocks reared and released at Nez Perce Tribal Hatchery. The current program is now maintained with Lolo Creek returns (to the extent possible). The majority of the natural spawning occurs within the mainstem of Lolo Creek from White Creek to Dutchman Creek; some minor spawning has occurred in the Eldorado Creek to White Creek mainstem segment.

Spawning ground surveys on two major index areas in Lolo Creek above the Musselshell/Lolo confluence showed natural spring Chinook production has fluctuated over the last 14 years. The total number of spring Chinook redds observed in the Lolo Creek drainage for the 1988-2001 spawning periods ranged from 6 redds in 1995 to 501 in 2001. During 1996, 2000 and 2001, the number of spring Chinook redds increased substantially due to an adult out-planting effort by the Nez Perce Tribe. From 2003 through 2007, adult spring Chinook returns to Lolo Creek (as enumerated at two adult weirs) averaged 331 fish, ranging from 672 in 2003 to 89 fish in 2007 (Nez Perce Tribe 2007).

AHA modeling data submitted by IDFG estimates current adult escapement and adjusted productivity for the natural-origin population at 75 and 0.60, respectively. The model also estimates that nine hatchery origin Chinook stray into this population each year.

## 2.1 Current Population Status and Goals

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

- **ESA Status:** The non-indigenous spring- and summer-run stocks currently used in the Clearwater River subbasin are not considered part of the Snake River Spring- and Summer-Run ESU, and are not listed under the ESA (57 FR 14653).
- **Population Description:** For the purpose of this review, the HSRG assigned this population as Primary. The population currently meets the broodstock criteria for a Stabilizing population designation.
- **Recovery Goal for Abundance:** Not listed, no goal.
- **Productivity Improvement Expectation:** NA
- **Habitat Productivity and Capacity:** Productivity: 1.3; Capacity: 1,500

## 2.2 Current Hatchery Programs Affecting this Population

Approximately 750 spring Chinook salmon adults are needed for broodstock for the Nez Perce Tribal Hatchery spring Chinook program. This number includes jacks and accounts for pre-spawning mortality. This brood level will provide for a target release of 75,000 pre-smolts from Newsome Creek (South Fork Clearwater River) acclimation facility, 150,000 pre-smolts from Yoosa/Camp (Lolo Creek) acclimation facilities and 400,000 parr into Meadow Creek (Selway River).

The primary hatchery program affecting the Lolo Creek population is the program operated by the Nez Perce Tribe in Lolo Creek. This program releases approximately 150,000 pre-smolts into Lolo Creek (following acclimation at the Yoosa/Camp ponds). Juveniles are not adipose fin-clipped. All pre-smolts are coded wire-tagged and about 9,000 are PIT-tagged for evaluation purposes.

Adults are collected at one of two weir sites in Lolo Creek. Generally, the number of adults that return to Lolo Creek does not meet broodstock needs; therefore, broodstock may be met with fish from other locations (e.g., Dworshak NFH). Locally trapped fish are held at the Yoosa/Camp satellite facilities until water temperatures reach elevated levels and require the transfer of fish to the Nez Perce Tribal Hatchery. Spawning, incubation, and rearing takes place at the Cherry Lane facility (Nez Perce Tribal Hatchery). The composition of adults in the broodstock as well as spawning in the habitat is unknown. The program has an R/S value of 1.0.

In 1991, the IDFG, the Nez Perce Tribe, the Shoshone-Bannock Tribes, and the USFWS initiated a large-scale Chinook salmon supplementation study. The study, designed to continue through 2014, incorporates treatment and control streams in the Clearwater and Salmon subbasins. Within this ICTRT population zone, the Chinook Supplementation Study maintains Lolo Creek as a treatment stream and Eldorado Creek as a control stream. “Treatments” include the development and release of “supplementation” smolts (hatchery x natural parents) and the release of “supplementation” adults to treatment spawning streams (50:50 hatchery: natural-origin release design). In 2004, juvenile treatments ended in all but three ISS study streams, and in 2007, adult treatments ended. The study will conclude in 2014 following a five-year period of “no treatment” evaluation.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 52
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: nine

### 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 0.6 to 1.2. Average abundance of natural-origin spawners (NOS) would increase from approximately 75 fish to approximately 294 fish.

The harvest contribution of the natural and hatchery populations would go from approximately 20 fish to approximately 32 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 Lolo Creek Spring Chinook that emphasizes maintaining existing natural spawning populations, and using hatchery-origin Chinook salmon in an attempt to augment natural production. Currently this population does not meet the HSRG-defined standards for a Primary or Contributing population (pHOS exceeds 0.1).

The hatchery program operating in Lolo Creek has a production goal of 150,000 pre-smolts. Broodstock are trapped at Yoosa/Camp satellites in the Lolo Creek drainage. Adults are held locally until rising water temperatures require their transfer to the Nez Perce Tribal Hatchery near Cherry Lane. Spawning, incubation and rearing takes place at the Nez Perce Tribal hatchery. Pre-smolts are transferred to acclimation ponds in the Lolo Creek drainage in the fall where they rear for volitional release in October. Pre-smolts are 100% coded wire-tagged and about 9,000 are PIT-tagged.

The HSRG acknowledges that managing for the recommended PNI values may not be possible or appropriate when abundance levels are low and demographic risks to the population increase. To address this concern, it is the HSRG's understanding that managers have developed a variable sliding scale for managing abundance so that in low abundance years, more hatchery-origin fish of the appropriate population component are allowed to reach the spawning grounds to reduce demographic risk to the respective populations.

The ongoing Idaho Supplementation Study is ending in 2014. Adult returns from this program ended in 2007. The current phase of the study monitors production and productivity in the absence of adult supplementation. Following 2014, managers will have greater flexibility to pursue other management options.

#### **Recommendations**

The HSRG recommends converting the current pre-smolt program to a smolt program of approximately 100,000 fish with a pNOB of 100% and a PNI of 0.67. All hatchery adults would be allowed to spawn naturally. This is expected to result in an average pHOS of 50%. This approach will increase the total spawners as well as natural-origin spawners via reproduction by hatchery-origin recruits in Lolo Creek. In the long term, this approach will provide additional fish for harvest.

The managers should coordinate the programming of all salmon populations reared in the Clearwater Fish Hatchery, Dworshak National Fish Hatchery, Kooskia National Fish Hatchery and Nez Perce Tribal Hatchery to maximize the benefits of available water supply, appropriate

water temperature, and rearing containers. Operating these four major hatcheries as a coordinated system would facilitate the movement of programs/populations between and among the different hatcheries. This would maximize survival by producing fish in good condition for release at the appropriate life stage.

The HSRG also recommends that managers continue to implement their apparently successful BKD risk management strategies, which include culling.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Lolo Creek Spring 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	Int Both	148.8	50%	0%	39%	0.00	75	0.6	20	9
No Hatchery	None None	-	0%	0%	0%	1.00	294	1.2	32	-
HSRG Solution	Int Both	99.7	0%	0%	39%	0.72	415	1.1	89	0
HSRG Solution w/ Improved Habitat	Int Both	99.7	0%	0%	33%	0.75	536	1.2	102	0