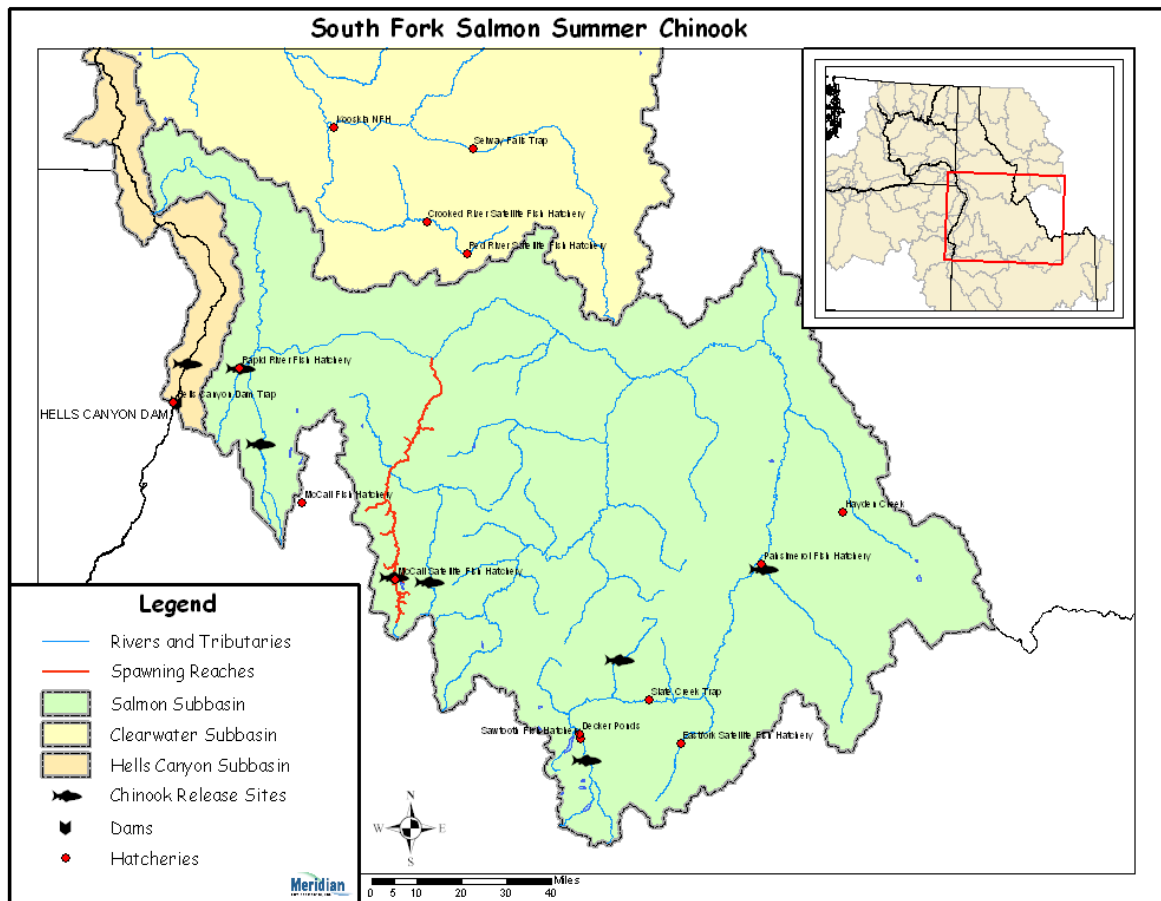


Hatchery Scientific Review Group Review and Recommendations

Salmon South Fork Summer Chinook Population and Related Hatchery Programs

January 31, 2009



1 Salmon South Fork Summer Chinook

The South Fork Salmon Chinook population is part of the Snake River Spring/Summer Chinook ESU and is listed as threatened under the Endangered Species Act. The Interior Columbia Technical Review 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 the South Fork Salmon River is unknown, but was probably in the thousands.

2 Current Conditions

Adult summer Chinook returns to the subbasin consist of both natural- and hatchery-origin fish from both segregated and supplementation programs. Natural- and hatchery-origin components of this population are listed as Threatened. This population includes the South Fork mainstem, Poverty Flat and Stolle Meadows, and extends the full length of the South Fork Salmon River and to contiguous minor downstream tributaries to the Little Salmon River. Spawning occurs from mid-August through late October. Juveniles emigrate from the system in the spring as yearlings.

Current (1957 to 2001) natural abundance (number of adult spawning in natural production areas) has ranged from 224 (1995) to 5,290 fish in 1960. Abundance in recent years has been variable. The most recent 10-year geomean number of natural spawners was 556 (NOAA Draft Recovery Plan).

AHA modeling data submitted by IDFG estimates current adult escapement and adjusted productivity for the natural-origin population at 670 and 1.27, respectively.

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 a Stabilizing population designation.
- **Recovery Goal for Abundance:** The ICTRT defined the South Fork Salmon River 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: 3.0; Capacity: 2,150

2.2 Current Hatchery Programs Affecting this Population

There are two hatchery programs that potentially affect this population: the South Fork Salmon River segregated mitigation program and the Johnson Creek integrated conservation/supplementation program.

This South Fork Salmon River program (McCall Fish Hatchery) was established as a harvest mitigation program and is funded by BPA through the Lower Snake River Compensation Program. This segregated program releases approximately 1.0 million smolts to the South Fork Salmon River at Knox Bridge each year. All yearling smolts are adipose-fin clipped with a portion coded wire and PIT-tagged for evaluation purposes. Adult summer Chinook salmon are trapped at the satellite facility on the South Fork Salmon River approximately 42 km east of Cascade, ID. Spawning takes place at the trap site with incubation and rearing occurring at the McCall Fish Hatchery on the Payette River in McCall.

The program was founded with adult summer Chinook salmon collected between 1974 and 1979 at Ice Harbor, Little Goose, and Lower Granite dams. Adults were collected from the summer run period at the dams to obtain fish that were locally adapted to the South Fork Salmon River. Early collections established an egg bank program prior to the completion of the hatchery. Between 1976 and 1980, smolts produced from these early collections were planted in the South Fork Salmon River upstream of the present location of the weir. Since 1981, all adults used for broodstock purposes have been collected at the South Fork Salmon River weir. The program has an R/S value of 6.0.

The South Fork Salmon River summer Chinook program has been part of the Idaho Supplementation Study (ISS). In 1991, IDFG, the Nez Perce Tribe, the Shoshone-Bannock Tribes, and the USFWS initiated a large-scale Chinook salmon supplementation study that was designed to continue through 2012. The project incorporates treatment and control streams in the Clearwater and Salmon subbasins. The South Fork Salmon River is a treatment stream for this program. "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. In 2007, adult treatments ended. The study will conclude in 2014 following a five-year period of "no treatment" evaluation.

The Nez Perce Tribe operates a summer Chinook conservation/supplementation program that releases 100,000 yearlings to Johnson Creek. This program is also assumed to have a R/S of 6.0. These fish are 100% marked with a visual implant tag and coded wire-tag. Additionally, an evaluation group of smolts is PIT-tagged. Adults for broodstock are collected at the Johnson Creek weir. Incubation and rearing occurs at the McCall Fish Hatchery. Johnson Creek is also a component of the ISS program. The Nez Perce Tribe also incubates approximately 300,000 hatchery-origin eyed eggs in Dollar Creek.

Managers have agreed to plan and implement an integrated Chinook salmon supplementation program in the South Fork Salmon River beginning in spawn year 2009.

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: 357 fish.

This estimate includes hatchery-origin fish on spawning grounds downstream as well as upstream of the satellite trap on the South Fork Salmon River. In 2007, a new weir and fish trap were installed. The unintentional passage of hatchery-origin adults upstream of the new weir is expected to be minimal; however, adults may stray to production areas downstream of the satellite weir. Two primary spawning areas have been identified; Poverty Flat and a section of the South Fork Salmon River immediately downstream of the adult trapping facility.

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 1.3 to 2.7. Average abundance of natural-origin spawners (NOS) would increase from approximately 670 fish to approximately 1,326 fish. The harvest contribution of the natural and hatchery populations would go from approximately 2,990 fish to approximately 265 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 South Fork Salmon River summer Chinook that emphasizes maintaining existing natural spawning populations as well as maintaining the current hatchery mitigation program. Currently this population is not consistent with the HSRG-defined standards of either a Primary or Contributing population (pHOS greater than 0.10).

The current segregated harvest program collects broodstock from rack returns at the McCall Fish Hatchery satellite on the South Fork Salmon River. Adult holding and spawning occurs at the satellite facility. Incubation and rearing occurs at the McCall Fish Hatchery. The current production target for the program is 1.1 million yearling smolts with a LSRCP-defined mitigation goal of returning 8,000 adults to the project area upstream of Lower Granite Dam. Average SAR and R/S values for hatchery-produced fish are 0.5% and 6.0, respectively.

Three major natural production areas exist within this population: Poverty Flats (approximately 18 miles below the weir), the river section immediately downstream of the weir, and Stolle Meadows (4 miles upstream of the weir). The weir was replaced in 2007 and is located approximately 50 miles upstream of the confluence with the Salmon River.

The ongoing Idaho Supplementation Study is ending in 2012. 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 2012, managers will have greater flexibility to pursue other management options.

IDFG's implementation of BKD risk management strategies, including culling, has been very successful.

Recommendations

The HSRG recommends that managers implement a two-stage stepping stone program to support the natural population and to provide harvest. The program consists of an integrated conservation component producing approximately 250,000 smolts (PNI = 0.67, pHOS = 0.15, pNOB = .30%). Initially, this component would be produced from 100% NOB but subsequent generations would be maintained by collecting 30% natural-origin broodstock and 75% hatchery-origin returns from this integrated component. Integrated adult returns not needed to maintain the integrated broodstock would be used as broodstock for the second stage harvest component to produce approximately 750,000 smolts. This maintains some genetic continuity between the harvest component and natural fish returning to the system. Smolts produced through the integrated program could be adipose fin-clipped if sufficient numbers returned to meet escapement needs, integrated broodstock needs, as well as second stage stepping stone broodstock needs. Managers should monitor this closely and revert to code wire only if insufficient adults

return to meet all needs. Smolts produced for harvest would be adipose fin-clipped. Unharvested “harvest component” fish would not be used for broodstock, released upstream of the weir, or returned to population downstream of the weir. Unharvest adults could be used for stream nutrification as appropriate.

The HSRG acknowledges that managing for the recommended PNI values may not be possible or appropriate in the near term when abundance levels are low and demographic risks to the population increase. To address this concern, managers should develop 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.

An example of such a sliding scale would look like this:

Each year, depending on NOR run size, pNOB and pHOS are allowed to “float” or slide. The HSRG assumes managers will establish an acceptable level of removal of NORs for use in the hatchery brood. This will be a fixed percentage of the total NOR return (say 40%) and will not change, regardless of NOR return. In years of high NOR abundance, this 40% could make up 100% of the needed hatchery brood (pNOB= 100%). In that case, no HORs would be used in the hatchery brood. Hatchery fish can be allowed to reach the spawning ground (pHOS) if needed to achieve an appropriate number of fish spawning naturally (demographic benefit and use of available habitat). This however, would not be required during years of very high NOR returns as both objectives (pNOB and natural spawning) may be met with NORs.

In years of low NOR abundance, the same 40% of the NOR return would be removed for use in the hatchery brood (pNOB). However, in these years, that 40% may make up only a small part of the needed brood (i.e. pNOB 10%). In these years, enough HORs should be used to achieve needed hatchery brood and additional HORs should be allowed to spawn naturally (pHOS) to achieve the minimum acceptable level of naturally spawning.

The goal of this sliding scale is to achieve an “average” PNI over time of the desired level (0.67 or 0.5) depending on the population designation even though it may not be achieved in an one year. A good way to determine the level of NORs that should be removed each year (see above) is to review the return of NORs over a long time frame and iterate what level (30, 40, 50%) are needed, on average, to achieve the desired PNI.

This recommendation results in a program consistent with a Primary population designation.

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

Table 1. Results of HSRG analysis of current condition and HSRG Solution for South Fork Salmon River 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	None None	-	0%	0%	30%	0.00	670	1.3	134	0
	Seg Harv	1,060.9	90%						2,856	2,408
No Hatchery	None None	-	0%	0%	0%	1.00	1,326	2.7	265	-
HSRG Solution	Int Cons	253.8	90%	0%	15%	0.67	1,111	2.2	705	115
	Stepping Stone/Seg Harv	752.9	90%						1,408	1,656
HSRG Solution w/ Improved Habitat	Int Cons	253.8	90%	0%	13%	0.70	1,341	2.5	751	115
	Stepping Stone/Seg Harv	752.9	90%						1,408	1,656