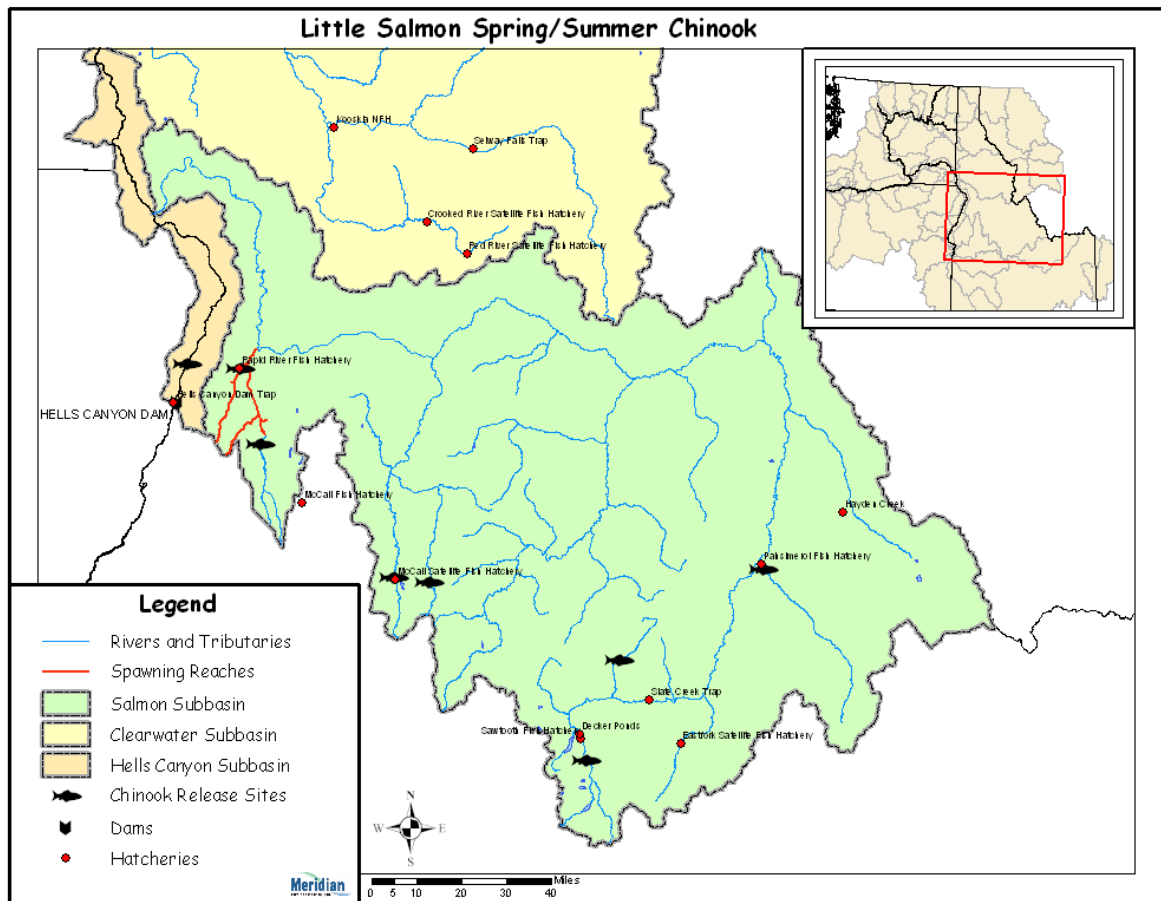


Hatchery Scientific Review Group Review and Recommendations

Little Salmon River Spring/Summer Chinook Population and Related Hatchery Programs

January 31, 2009



1 Little Salmon River Spring/Summer Chinook

The Little Salmon Chinook population is part of the Snake River Spring/Summer Chinook ESU. The Little Salmon River population is a spring/summer run and is one of four extant populations in the South Fork Salmon MPG. The natural population is classified as threatened under the Endangered Species Act. Rapid River Hatchery, located on a tributary to the Little Salmon River, produces a stock of spring Chinook salmon that are not considered part of the Snake River spring/summer Chinook salmon ESU. The Interior Columbia Technical Review Team (ICTRT) listed this population as “Intermediate” based on its historic habitat potential. However, the ICTRT stated that for meeting abundance and productivity viability criteria, this stock can be considered a “Basic” population. A “Basic” population is one that requires a minimum abundance of 500 wild spawners and an intrinsic productivity greater than 2.3 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 (NPCC 2004). The portion returning to the Little Salmon River is unknown but was probably in the thousands. Spawning likely took place in the Little Salmon River, Rapid River and Whitebird and Slate creeks.

2 Current Conditions

Adult spring/summer Chinook returns to the subbasin consist primarily of hatchery origin fish, from a segregated hatchery program at the Rapid River Hatchery. Spring Chinook were brought to the Little Salmon River by IDFG as mitigation for the lost run and fishery in the Snake River from construction of the Hells Canyon Complex. Rapid River, a tributary of the Little Salmon, has a small natural run of summer Chinook. Rapid River has high quality habitat that is protected because the basin is part of the Wild and Scenic Rivers system. Habitat conditions in the Little Salmon River subbasin have been severely degraded by agriculture activities and the presence of State Highway 95 that runs along the lower 55 kilometers of the stream. There are over 1,500 water diversions in the watershed. Additionally, the headwaters of the Little Salmon are currently blocked to anadromous fish by a series of rock falls.

Spawning occurs from mid-July through late October only in the lower portion of the river. Upstream habitat is blocked. Juveniles leave the system as yearlings starting in early March and continue into the spring.

Redd count trend information is not collected for this population. Fish counts at the Rapid River Hatchery velocity barrier indicate that run size back to the basin is highly variable, ranging from less than 1,000 to over 12,000 fish and is dominated by hatchery-origin fish. Since 1995, all natural-origin fish have been passed upstream of the hatchery velocity barrier.

AHA modeling data submitted by IDFG estimates current adult escapement and adjusted productivity for the natural-origin population at 174 and 0.55, respectively. The model also estimates that 235 hatchery-origin spring and summer 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:** 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 Stabilizing. The population currently meets the broodstock criteria for this population designation.
- **Recovery Goal for Abundance:** The ICTRT defined the Little Salmon River Chinook population as “Intermediate/Basic” and identified a minimum abundance threshold of 500 natural-origin adults.
- **Productivity Improvement Expectation:** The ICTRT productivity standard associated with a population defined as “Basic” is 2.21.
- **Habitat Productivity and Capacity:** Productivity: 1.30; Capacity: 1,250

2.2 Current Hatchery Programs Affecting this Population

The Rapid River Fish Hatchery was constructed in 1964 by the Idaho Power Company as part of its hatchery program to mitigate for losses of anadromous fish associated with the construction and operation of the Hells Canyon Complex. Originally the Rapid River Hatchery was an experimental facility for artificially propagating spring Chinook salmon, summer steelhead, and to a lesser extent, fall Chinook salmon. After unsuccessful attempts, efforts to rear steelhead and fall Chinook salmon at Rapid River were abandoned, the facility was dedicated to spring Chinook salmon production. Following implementation of the Hells Canyon Settlement Agreement in 1980, the role of Rapid River Fish Hatchery was defined as a production facility for 2 million Rapid River spring Chinook salmon smolts and 1 million Snake River spring Chinook salmon smolts annually. The hatchery is located on Rapid River, a tributary to the Little Salmon River, 11.3 kilometers from Riggins. An adult trap, located 2.4 kilometers downstream of the main hatchery, is used for trapping hatchery spring Chinook salmon and monitoring wild steelhead, hatchery steelhead strays, wild spring/summer Chinook salmon and bull trout.

In most years, spring Chinook salmon are trapped at Hells Canyon Dam to supplement the Rapid River Fish Hatchery program. Trapping takes place four days per week and usually occurs from early May through mid-July. Spring Chinook salmon trapped at Hells Canyon are transported to Oxbow Fish Hatchery for temporary holding before being transported to the Rapid River Hatchery for holding and spawning. During years when the number of collected green eggs exceeds Rapid River’s incubation capacity, green eggs are transferred to Oxbow for incubation.

IDFG’s current production plan, in cooperation with the Nez Perce Tribe, is to release approximately 3 million yearling Chinook salmon smolts annually (2.3 million to Rapid River, approximately 200,000 to the Little Salmon River, and approximately 500,000 to the Snake River downstream of Hells Canyon Dam). Actual release numbers have varied, averaging approximately 2.3 million smolts for brood years 1993 through 2005. All adult trapping, holding, spawning, incubation, and rearing occurs at the Rapid River facility. All fish are adipose fin-clipped and a portion coded wire and PIT-tagged for

evaluation purposes. The average SAR R/S for the hatchery program is 0.4% and 6.0, respectively.

Spring Chinook salmon broodstock development for Rapid River Fish Hatchery occurred from 1964 through 1969 when wild spring Chinook salmon adults were trapped at Oxbow and Hells Canyon dams and transferred to Rapid River Fish Hatchery. There are no records to suggest that spring Chinook salmon from other locations contributed to the development of this broodstock. The one exception is the probable contribution of wild Rapid River summer Chinook salmon. Before mass marking of all hatchery-reared spring Chinook salmon smolts began in 1992, returning adults were indistinguishable from wild summer Chinook adults. IDFG's subjective efforts at temporal segregation of the two groups were probably incomplete. Results of genetic analysis of marked hatchery adults (spring Chinook salmon) and unmarked natural adults (summer Chinook salmon) returning to Rapid River in 1997 suggest that the two stocks are no longer genetically distinct (Moran 1998).

The Rapid River Hatchery program is not part of the Idaho Supplementation Study.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: zero fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 235 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 0.6 to 1.2. Average abundance of natural-origin spawners (NOS) would decrease from approximately 174 fish to approximately 146 fish. The harvest contribution of the natural and hatchery populations would go from approximately 7,461 fish to 29 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 Little Salmon River 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 0.1). The Little Salmon River spring/summer Chinook is managed primarily for harvest.

The current segregated spring Chinook harvest program collects broodstock from rack returns at the Rapid River Fish Hatchery. All adult holding, spawning, incubation and rearing occur at this location. Additional adult trapping and egg incubation occur at the Oxbow Fish Hatchery near Oxbow Dam on the Snake River. The current Idaho Power Company mitigation target for the program is 3.0 million yearling smolts. IDFG and the Nez Perce Tribe have agreed to a release strategy of 2.3 million smolts to Rapid River, approximately 200,000 to the Little Salmon River, and approximately 500,000 to the Snake River downstream of Hells Canyon Dam. Average SAR and R/S values for hatchery-produced fish are 0.4% and 6.0, respectively.

IDFG's implementation of BKD risk management strategies, including culling, has been very successful. The program produces a large number of hatchery fish not needed for broodstock that could be used for nutrient enhancement.

Recommendations

Managers should use available carcasses from adult collection and spawning operations for nutrient enhancement.

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

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Little Salmon River 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%	52%	0.00	174	0.6	35	0
	Seg Harv	2,736.6	95%						7,204	2,686
	Snake Mainstem (Oxbow) Seg Harv	299.5	95%						222	565
No Hatchery	None None	-	0%	0%	0%	1.00	146	1.2	29	-
HSRG Solution	None None	-	0%	0%	50%	0.00	196	0.6	39	0
	Seg Harv	2,736.6	95%						7,584	2,931
	Snake Mainstem (Oxbow) Seg Harv	299.5	95%						234	595
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	47%	0.00	227	0.6	45	0
	Seg Harv	2,736.6	95%						7,584	2,931
	Snake Mainstem (Oxbow) Seg Harv	299.5	95%						234	595