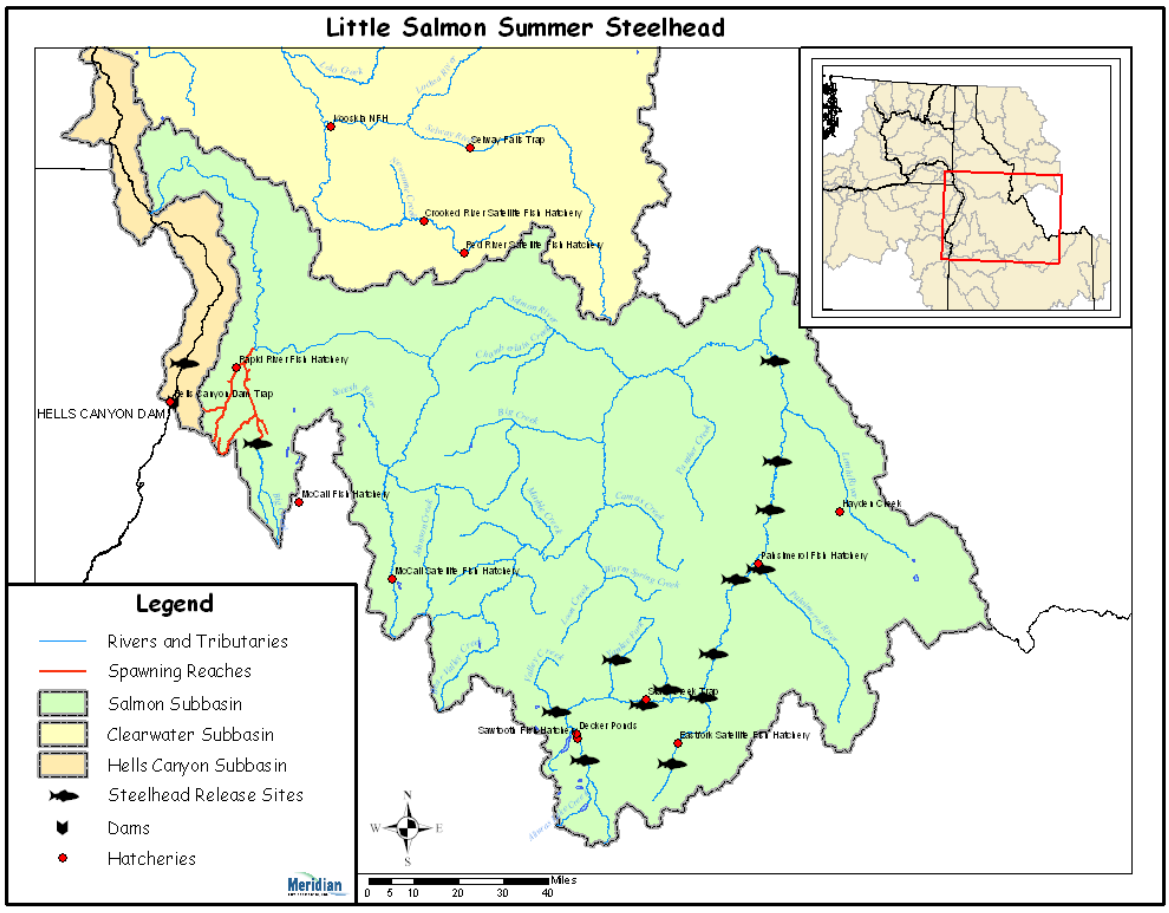
Hatchery Scientific Review Group
Review and Recommendations

Salmon River
Little Salmon Summer Steelhead A-Run
Population and Related Hatchery Programs

January 31, 2009



1 Salmon Little Salmon River Steelhead (A-Run)

The Little Salmon River steelhead population is part of the Snake River Steelhead Distinct Population Segment (DPS). The DPS contains both A and B-run steelhead. This population is an "A" run and is classified as threatened under the Endangered Species Act. The ICTRT classified this population as "Intermediate" but able to meet "Basic" abundance and productivity criteria for viability. A "Basic" population is one that requires a minimum abundance of 500 natural spawners and an intrinsic productivity greater than 1.30 recruits per spawner (R/S) to meet the 5% extinction risk criteria established by the ICTRT.

Historically, it was estimated that over two million steelhead returned to the Columbia River Basin, with about 25% of these originating from the Snake River. Ice Harbor Dam counts indicate that over 100,000 steelhead returned to the Snake River in the early 1960s. There are no reliable estimates of the percentage of fish that have returned historically to the Little Salmon River.

2 Current Conditions

This population of A-run fish includes the Little Salmon River and its tributaries, as well as steelhead-supporting tributaries to the lower Salmon River, downstream from the mouth of the Little Salmon (Whitebird Creek, Skookumchuck Creek, Slate Creek, and several smaller tributaries). Spawning occurs from mid-March through mid-June. Juveniles emigrate from the system in the spring at ages 1-4, with most emigrating at ages 2 and 3. Spawners include both natural- and hatchery-origin fish because both A-Run and B-Run hatchery fish are released into the Little Salmon River annually.

Current population abundance (number of adults spawning in natural production areas) is unknown. Natural-origin steelhead return data is available for Rapid River, a tributary to the Little Salmon River. Steelhead are trapped at the Raid River Fish Hatchery weir, are enumerated, and natural-origin fish are released into Rapid River upstream of the weir. The trapping facility includes a velocity-barrier type weir; fish cannot pass above the weir on their own volition. Annual numbers of steelhead trapped from 1965 through 2006 ranged from 11 to 221 fish.

For Snake River steelhead "A" run populations lacking in direct abundance and productivity data, the ICTRT developed preliminary estimates representing an average population of this run type using Lower Granite wild dam counts. Abundance for the average "A" run steelhead in recent years has been moderately variable. The most recent 10-year geometric mean number of natural spawners was 456 fish. The most recent 13-year SAR adjusted and delimited geometric mean of returns per spawner was 1.69. For AHA modeling, IDFG estimated natural-origin fish escapement and adjusted productivity for this A-Run steelhead population was 270 and 1.61, 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 steelhead 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 A-run steelhead 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 1.30.
- Habitat Productivity and Capacity: Productivity: 3.60; Capacity: 474

2.2 Current Hatchery Programs Affecting this Population

The three hatchery programs that may affect the Little Salmon River steelhead population are described below.

1. Salmon Little Salmon (A-Run-Pahsimeroi/Oxbow). This is a segregated harvest program that releases ~445,000 yearling summer steelhead to the Little Salmon River at or near the mouths of Stinky Springs and Hazard Creek annually. Broodstock are collected at the Pahsimeroi Hatchery weir or at the Hells Canyon Trap located downstream of the Hells Canyon Dam. Eyed-eggs and/or unfed swim-up fry are then transferred to either the Niagara Springs Hatchery or Hagerman National Hatchery for incubation and juvenile rearing. No natural-origin fish are used as broodstock for this program. All juvenile fish released are adipose fin-clipped and a portion of these are coded wire-tagged. The program has an R/S value of 12.6.

2. Salmon Little Salmon Summer Steelhead (B-Run-Dworshak-Hatchery). This is a segregated program designed to provide B-Run summer steelhead for harvest. The program releases approximately 315,000 yearling (180-250 mm) fish to the Little Salmon River and Stinky Springs each year. All juveniles released are adipose fin-clipped and a portion also receives a coded wire-tag. Broodstock are collected at Dworshak Hatchery on the Clearwater River. Eyed-eggs are then transferred to either the Hagerman or Magic Valley hatcheries for incubation and juvenile rearing. Smolts are then transported and released to target streams in April at 4.5 fish per pound (fpp). The program has an R/S value of 7.1.

3. Salmon Little Salmon Summer Steelhead (A-Run). This program is identified as an integrated supplementation program with a production target of 200,000 yearling smolts. The program is a negotiated outcome of the US v Oregon process and designed to provide conservation benefits to the Little Salmon River natural population as well as adult steelhead for harvest. Fish are released in the Little Salmon River, Stinky Springs and Hazard Creek. Broodstock for the program is collected at the Pahsimeroi Hatchery. Natural-origin adults are not incorporated in the spawning design. Egg-incubation and rearing occurs at the Hagerman National Fish Hatchery. Fish are reared to approximately 4.5 fpp and then transported and released to target streams. The program has an R/S value of 12.6.

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: 2,300 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 1.6 to 3.2. Average abundance of natural-origin spawners (NOS) would increase from approximately 270 fish to approximately 323 fish. The harvest contribution of the natural and hatchery populations would go from approximately 5,651 fish to approximately 47 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 A-run steelhead that emphasizes maintaining existing natural spawning populations as well as maintaining the current hatchery mitigation program. The population does not meet the HSRG-defined standards for either a Primary or Contributing designation (pHOS exceeds 0.10). Managers operate two segregated harvest programs for terminal harvest. The Rapid River upstream of the hatchery weir is managed for natural production and between 1965 and 2006; the return of natural-origin steelhead ranged from 11 to 221 fish.

The Little Salmon River receives steelhead plants from the Oxbow Hatchery (A-run), the Pahsimeroi Hatchery (A-run) and Dworshak National Fish Hatchery (B-run). Spawning and egg incubation to the eyed stage of development occur at broodstock collection hatcheries. Final incubation and juvenile rearing for A-run segregated programs occurs at the Pahsimeroi and Niagara Springs hatcheries and at Hagerman National Fish Hatchery. No juvenile rearing of A-run steelhead occurs at Pahsimeroi Hatchery. This is a segregated program that releases approximately 645,000 (200,000 unmarked) and 315,000 A-run and B-run smolts, respectively. All releases occur in the Little Salmon River upstream of the confluence of the Rapid River and the Little Salmon River. Beginning in brood year 2009, all releases in this population will be adipose fin-clipped.

Recommendations

The HSRG has no specific recommendations to improve this program. The HSRG notes that there is a general lack of information related to steelhead abundance, productivity, spatial structure and diversity as well as straying of hatchery fish into natural production areas. An effort should be made to improve this information base.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Little Salmon River Steelhead (A-Run). 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	-	10%	0%	68%	0.00	270	1.6	39	0
	A-Run Pahsimeroi Seg Harv	645.0	10%						4,319	243
	B-Run Dworshak Seg Harv	316.3	10%						1,293	62
No Hatchery	None None	-	0%	0%	0%	1.00	323	3.2	47	-
HSRG Solution	None None	-	10%	0%	68%	0.00	270	1.6	39	0
	A-Run Pahsimeroi Seg Harv	645.0	10%						4,319	243
	B-Run Dworshak Seg Harv	316.3	10%						1,293	62
HSRG Solution w/ Improved Habitat	None None	-	10%	0%	66%	0.00	299	1.8	43	0
	A-Run Pahsimeroi Seg Harv	645.0	10%						4,319	243
	B-Run Dworshak Seg Harv	316.3	10%						1,293	62