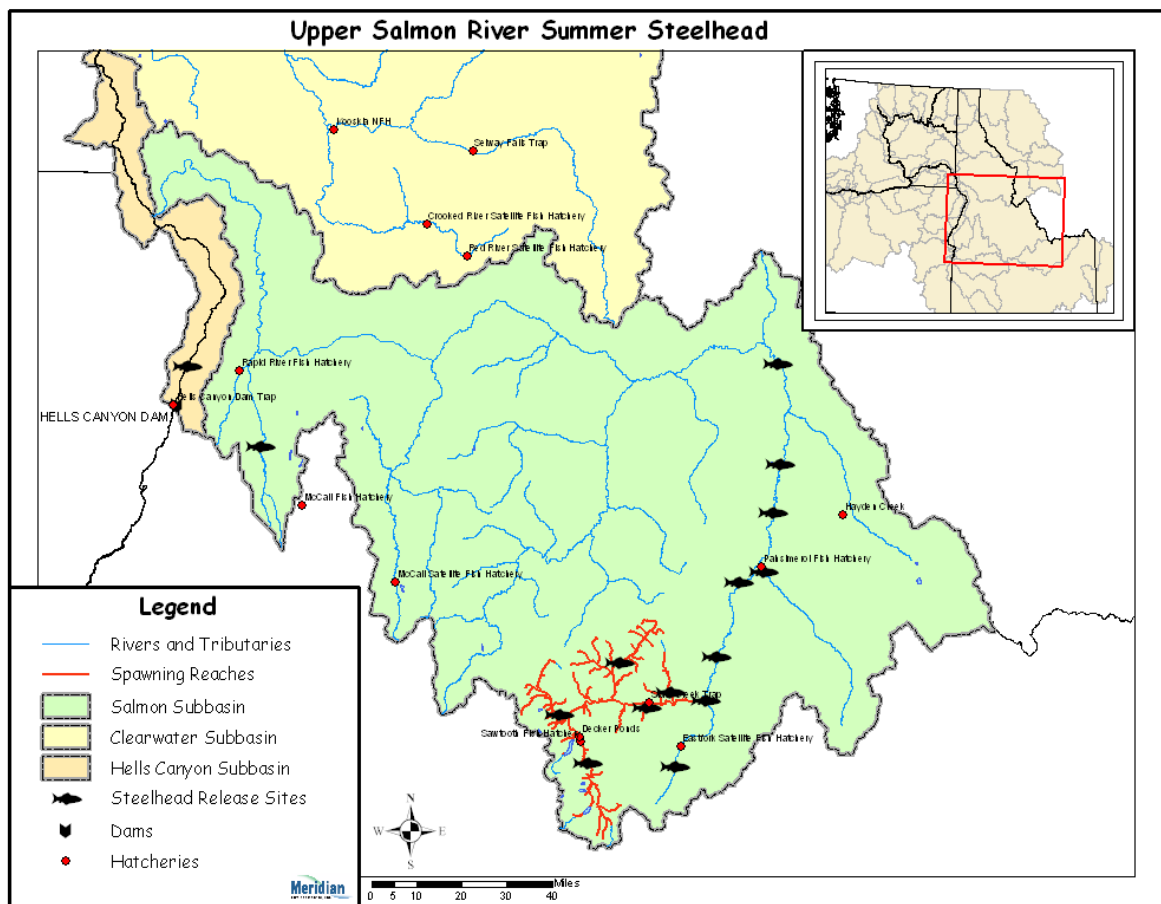


Hatchery Scientific Review Group Review and Recommendations

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

January 31, 2009



1 Salmon Upper Salmon Summer Steelhead (A-Run)

The Salmon River Upper Mainstem 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 and as “Intermediate” by the ICTRT. An “Intermediate” population is one that requires a minimum abundance of 1,000 natural spawners and an intrinsic productivity greater than 1.15 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 a 100,000 steelhead returned to the Snake River in the early 1960s. There are no reliable estimates of the percentage of fish that returned historically to the Upper Salmon River, but it was likely in the thousands.

2 Current Conditions

This population includes the Upper Mainstem Salmon River and its tributaries above the East Fork Salmon River. Primary tributaries include the Yankee Fork Salmon River, Basin Creek, and Valley Creek. Spawning occurs from mid-March through mid-June. Juveniles emigrate from the system in the spring at ages 1-4, with the majority emigrating at ages 2 and 3.

Current abundance (number of adults spawning in natural production areas) is unknown for this population. The only direct count of natural-origin steelhead occurs at the Sawtooth Fish Hatchery weir and represents adults returning to a small proportion of total habitat in the population. The average number of natural-origin returns to the Sawtooth Hatchery weir between 1986 and 2007 was 34 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 Dam natural-origin fish 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. Steelhead parr density in the upper Salmon River has generally been less than two age-1 parr per square meter from 1991 through 2002 (NPCC 2004).

For AHA modeling, IDFG estimated natural-origin fish escapement and adjusted productivity for the natural-origin A-Run steelhead population was 418 and 0.67, respectively.

Snake River steelhead and indigenous Salmon River steelhead were used to found all hatchery A-run programs in Idaho. The Pahsimeroi Hatchery program was initiated with progeny of adult steelhead trapped at Oxbow and Hells Canyon dams from 1966 through 1968. Returning Snake River stock and some indigenous Salmon River stock were trapped and used as broodstock. The Sawtooth Fish Hatchery broodstock was founded with adults that returned from hatchery-origin smolt releases (e.g., Pahsimeroi Hatchery) and from natural steelhead adults trapped at the facility. Naturally-produced steelhead adults were integrated into the hatchery broodstock until the early 1990s.

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 Upper Salmon River A-run steelhead population as “Intermediate” 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 “Intermediate” is 1.15.
- **Habitat Productivity and Capacity:** Productivity: 1.50; Capacity: 1,283

2.2 Current Hatchery Programs Affecting this Population

Four hatchery programs may affect the Upper Salmon River steelhead population. Each is described below.

1. Upper Salmon Summer Steelhead (A-Run Sawtooth/Pahsimeroi-Hatchery). Smolts released to the upper Salmon steelhead population satisfy production as well as supplementation objectives. Planned releases sum to approximately 1.28 million steelhead as described below:

- Upper Salmon River at the Sawtooth weir: 810,000 (100% adipose fin-clipped)
- Valley Creek: 50,000 (no adipose fin- clipping)
- Yankee Fork Salmon River: 330,000 (48% adipose fin-clipped)
- Slate Creek: 100,000 (40% adipose fin-clipped)

Broodstock used to generate smolts for the above releases are collected at the Sawtooth and Pahsimeroi hatcheries. No natural-origin fish are used as broodstock for this program. Spawning and early egg incubation occurs at both hatcheries. Final incubation and all rearing occur at Hagerman National Hatchery and Magic Valley Hatchery. Not all smolts releases in this population area are adipose fin-clipped. Juveniles are transported to release sites in mid-April. The program has an R/S value of 12.6.

2. Shoshone Bannock Tribes Streamside Incubator Program. Approximately 1.0 million eyed steelhead eggs from Sawtooth and Pahsimeroi fish hatcheries are transferred to streamside upwellers where they are incubated on river water to mimic natural hatch timing in the system. Eggs are planted in Yankee Fork, Basin Creek, Morgan Creek, Indian Creek and Panther Creek. The Sawtooth and Pahsimeroi hatcheries share production for this program (approximately 500,000 smolts from each facility).

3. Salmon Upper Salmon Summer Steelhead (B-Run-Dworshak Hatchery). This segregated program releases 250,000 B-Run yearling steelhead to Squaw Creek annually. Broodstock for the program is collected at Dworshak Hatchery on the Clearwater River. Egg incubation and early rearing also occurs at there. Juvenile rearing occurs at the Magic Valley Hatchery. Juveniles are transported and released into Squaw Creek and the Squaw Creek Pond in early April. All juveniles released are 100% adipose fin-clipped. The program has an R/S value of 2.5.

4. Upper Salmon Summer Steelhead (Upper Salmon B-Run Program). This program releases 60,000 yearling steelhead to the Squaw Creek Acclimation Facility annually. This is a segregated program designed to provide fish for harvest in the subbasin. All juveniles released are 100% adipose fin-clipped. Broodstock for the program is collected at the Squaw Creek Acclimation Facility. Adults that meet B-Run criteria are transferred to the East Fork Salmon River Satellite facility for spawning. Early egg incubation occurs at the Sawtooth Fish Hatchery. Final incubation and all rearing occur at the Magic Valley Hatchery. This is essentially a stepping stone program from the Dworshak program. Broodstock adults are either successful F₁ returns from the direct Dworshak smolt program or F₂ adults from locally adapted Squaw Creek (upper Salmon B) returns. This 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: 834 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 0.7 to 1.3. Average abundance of natural-origin

spawners (NOS) would decrease from approximately 418 fish to approximately 297 fish. The harvest contribution of the natural and hatchery populations would go from approximately 7,495 fish to approximately 43 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 Upper Salmon River A-run steelhead that emphasizes maintaining existing natural spawning populations as well as maintaining the current hatchery mitigation program. Currently this population does not meet the HSRG-defined standards for a Primary or Contributing population (pHOS is greater than 0.1).

The upper Salmon River (upstream of the confluence of the Middle Fork Salmon River) is managed primarily for harvest. This strategy is based on the assumption that steelhead were not historically abundant in this part of the Salmon River drainage as they were in the Middle Fork and South Fork Salmon River drainages.

The LSRCP mitigation objective for the Upper Salmon River A-run program is to return 11,660 adults from the Magic Valley Fish Hatchery program and 13,600 adults from the Hagerman National Fish Hatchery program to the project area upstream of Lower Granite Dam. Additionally, the Idaho Power Company objective is to produce 200,000 pounds of steelhead smolts (approximately 900,000 smolts) for release to Salmon River waters. Idaho Power Company production is reared primarily at the Niagara Springs Fish Hatchery. The program is in place to provide terminal harvest opportunities for steelhead. Managers have also identified tribal harvest and augmentation of natural production as objectives in three tributaries within this population zone (Valley Creek, Yankee Fork Salmon River and Slate Creek).

A-run broodstock are trapped at the Sawtooth and Pahsimeroi hatcheries. Spawning and early incubation occurs at both facilities. Final incubation and juvenile rearing occurs at Hagerman National Fish Hatchery and Magic Valley Fish Hatchery.

While production associated with broodstock programs at the Sawtooth and Pahsimeroi hatcheries undergo broad distribution, yearling releases within the upper Salmon steelhead population area include: 810,000 fish to the Salmon River at the Sawtooth Hatchery weir; 50,000 fish to Valley Creek; approximately 300,000 fish to the Yankee Fork Salmon River; and 90,000 fish to Slate Creek. For these releases, no natural-origin adults are incorporated in the spawning design. Not all smolts released within this population area are adipose fin-clipped.

The adult weir at the Sawtooth Hatchery is very effective at removing hatchery-origin adults.

The Sawtooth Hatchery also produces approximately 500,000 eyed-eggs for the Shoshone-Bannock Tribes' streamside program. Eggs are placed in streamside incubation devices in the Yankee Fork Salmon River and Basin Creek.

Two B-run steelhead programs also operate within the boundaries of this population. The Upper Salmon Summer Steelhead (B-Run-Dworshak Hatchery) program sources eggs from Dworshak National Fish Hatchery. This program releases approximately 250,000 Magic Valley Hatchery-reared smolts annually to the Squaw Creek/Pond complex. Adults that return to the terminal area are collected at the adult weir on Squaw Creek and incorporated in the upper Salmon B-program. The Upper Salmon Summer Steelhead (Upper Salmon B-Run) program produces approximately 60,000 smolts from locally adapted adults. Broodstock are either first generation adults from the Dworshak program or second generation adults from the upper Salmon River B-program. Production is occasionally higher depending on adult returns. Smolts are reared at the Magic Valley Hatchery and released to the Squaw Creek/Pond complex. Upper Salmon River B-run smolts are differentially marked from first generation Dworshak smolts. Upper Salmon River-B adults return at a higher rate than Dworshak-origin B adults (e.g., approximately three times greater).

The composition of spawners in the habitat is largely unknown within this population zone.

Adult collection efficiency at Squaw Creek is limited by facility and environmental conditions. This is preventing the transition to a locally-derived B-run from the Salmon River.

Recommendations

The HSRG recommends that the practice of importing first generation smolts of Dworshak Hatchery-origin be transitioned to a program that uses locally adapted broodstock. To accelerate this transition and provide broodstock, the HSRG recommends that (1) production originating from the locally adapted upper Salmon River broodstock be released with adipose fins intact (to increase adult returns to the terminal facility), and (2) the program be relocated to a facility with high adult collection efficiency until alternative facilities can be developed. The HSRG recommends that this locally adapted B-run broodstock be the source of all releases in the upper Salmon River subbasin.

The HSRG has no specific recommendations for programs operated in the Yankee Fork Salmon River, Valley Creek and upper Salmon River at the Sawtooth Hatchery.

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 Upper Salmon Summer 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	-	0%	0%	34%	0.00	418	0.7	61	0
	A-Run Sawtooth- Pahsimeroi Seg Harv	1,284.6	70%						6,813	2,684
	B-Run Upper Salmon Seg Harv	59.2	25%						261	6
	B-Run Dworshak Seg Harv	250.3	25%						360	43
No Hatchery	None None	-	0%	25%	0%	1.00	297	1.3	43	-
HSRG Solution	None None	-	0%	25%	34%	0.00	420	0.7	61	0
	A-Run Sawtooth- Pahsimeroi Seg Harv	1,284.6	70%						6,813	2,684
	B-Run Upper Salmon Seg Harv	134.6	25%						192	24
	B-Run Upper Salmon R Seg Harv	250.3	25%						360	43
HSRG Solution w/ Improved Habitat	None None	-	0%	25%	31%	0.00	473	0.7	69	0
	A-Run Sawtooth- Pahsimeroi Seg Harv	1,284.6	70%						6,813	2,684
	B-Run Upper Salmon Seg Harv	134.6	25%						192	24
	B-Run Upper Salmon R Seg Harv	250.3	25%						360	43