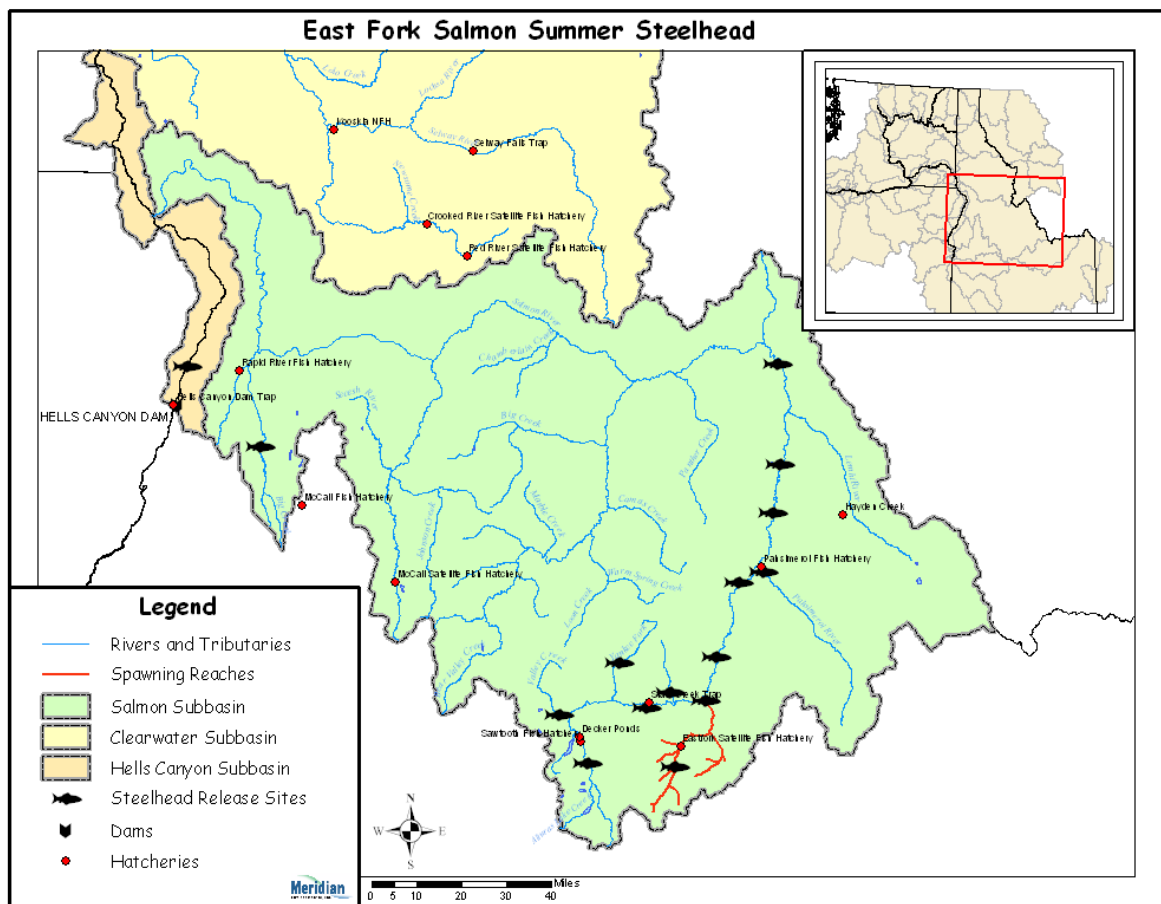


Hatchery Scientific Review Group Review and Recommendations

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

January 31, 2009



1 Salmon East Fork Salmon Summer Steelhead (A-Run)

The East Fork Salmon 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 returned historically to the East Fork Salmon River.

2 Current Conditions

This population includes the East Fork Salmon River and its tributaries, as well as the mainstem Salmon River and tributaries to the mouth of the Lemhi. 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.

Current population abundance (number of adults spawning in natural production areas) is unknown. There is a natural abundance time series for a small portion of the population. A weir, located on the East Fork Salmon River approximately 20 miles upstream of the river’s mouth, has been operated to trap adult steelhead since 1984. No abundance information is available for the reach below the weir, in Herd Creek, or in tributaries to the Salmon River within the population boundary. An average of 28 natural-origin steelhead were trapped at the weir between 1987 and 2007.

Between the late 1970s and the late 1990s, the IDFG released Dworshak-origin, B-run steelhead in the East Fork Salmon River (at the satellite weir). In the late 1990s, the IDFG discontinued this program. The B-run steelhead program was maintained but relocated to within a few hundred yards of the mouth of the East Fork. In 2001, the IDFG initiated an integrated steelhead conservation program in the East Fork Salmon River. The program was designed to produce approximately 60,000 smolts using both natural- and hatchery-origin parents. Steelhead parr density in the East Fork Salmon River has generally been less than five 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 366 and 0.61, 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 Primary. The population currently meets the broodstock criteria for a Stabilizing population designation.
- Recovery Goal for Abundance: The ICTRT defined the East Fork 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: 1.50; Capacity: 1,048

2.2 Current Hatchery Programs Affecting this Population

There are three hatchery programs that may affect the East Fork Salmon River steelhead population.

1. Salmon East Fork Salmon (B-Run Dworshak Hatchery). This segregated hatchery program may release ~325,000 yearling steelhead to the lower East Fork Salmon River in April (close to the East Fork mouth). All juvenile fish are adipose fin-clipped prior to transport and release to target streams. Broodstock for the program is collected at Dworshak Hatchery on the Clearwater River. No natural-origin adults are used for broodstock for this program. Egg incubation and juvenile rearing can occur at Magic Valley, Hagerman and Clearwater hatcheries. The program has an R/S value of 7.1.
2. Salmon East Fork Salmon Summer Steelhead (A-Run Pahsimeroi Hatchery). This segregated hatchery program releases 60,000 yearling steelhead to the mainstem Salmon River at Tunnel Rock and 120,000 yearlings at McNabb Point. All juvenile fish are adipose fin-clipped prior to transport and release to target streams. All hatchery egg incubation and rearing activity occurs at the Pahsimeroi or Sawtooth hatcheries. The program has an R/S value of 12.6.
3. Salmon East Fork Salmon Summer Steelhead (East Fork Satellite). This integrated conservation program is designed to release 60,000 yearling steelhead annually to the East Fork Salmon River at the satellite weir site (approximately 20 miles up the East Fork Salmon River). Broodstock are collected at the satellite facility trap and spawned. Egg incubation to the eyed-state of development occurs at the Sawtooth Hatchery. Final incubation and rearing occurs at the Magic Valley Hatchery. The program has a pNOB goal of 50%. A broodstock plan is in place to allow 50% of returning natural-origin adults to spawn in the habitat. Broodstock consists of hatchery-origin returns if sufficient natural-origin adults are not available. The program has an R/S value of 7.1.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 186 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 922 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 258 fish to approximately 155 fish. The harvest contribution of the natural and hatchery populations would go from approximately 2,643 fish to approximately 44 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 the Upper Salmon River A-run steelhead that emphasizes maintaining existing natural spawning populations, maintaining current hatchery mitigation programs, and using hatchery-origin steelhead 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 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. However, managers have identified conservation objectives for the East Fork Salmon River.

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 for release to Salmon River waters (approximately 900,000 smolts). Idaho Power Company production is reared primarily at the Niagara Springs Fish Hatchery.

An integrated conservation hatchery program operates in the East Fork Salmon River that has a release target of 50,000 smolts. In addition to this program, other releases within this population include: 325,000 Dworshak-origin B-run steelhead near the mouth of the East Fork Salmon River; 60,000 A-run smolts to the Salmon River at Tunnel Rock; and 120,000 A-run smolts to the Salmon River at McNabb Point. All releases are unacclimated following transport from the Magic Valley rearing facilities.

Broodstock for the East Fork integrated program is collected at the satellite weir 18 miles up the East Fork Salmon River. This is a young program (operating since 2001) and the pNOB goal of 0.5 has not been consistently met. Early incubation occurs at the Sawtooth Hatchery. Final incubation and all rearing occur at the Magic Valley Hatchery.

Broodstock for the two segregated Salmon River releases is collected at the Sawtooth or Pahsimeroi hatcheries. Early incubation occurs at both broodstock stations. Final incubation and all rearing occur at the Magic Valley Hatchery or the Hagerman National Fish Hatchery. Broodstock for the B-run release at the mouth of the East Fork Salmon River is collected at the Dworshak National Fish Hatchery in the Clearwater drainage. Early incubation occurs at the Clearwater Hatchery. Final incubation and all rearing occur at the Magic Valley Hatchery.

Recommendations

If the East Fork Salmon River component of this population is to be managed for conservation, the HSRG recommends that a weir be constructed near the mouth of the river. An integrated program of approximately 100,000 smolts could be operated consistent with a Primary population designation (PNI of 0.73, pNOB of 0.75, and pHOS of 0.28). This would require removing 75% of the integrated program adults at this weir. This program could provide broodstock for the mainstem Salmon River release at the current level of 180,000 smolts. This would replace the current A-run release program where broodstock is collected at the Sawtooth and Pahsimeroi hatcheries. All unharvested hatchery-origin adults collected at the weir (other than the integrated component) would have to be removed. The HSRG sees little likelihood that the stated conservation objectives will be met if a lower river weir is not prioritized and installed. 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. The weir in the lower river would assist in transitioning this program to a locally derived broodstock.

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.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for East Fork 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	Int Cons	49.5	20%	0%	60%	0.08	258	0.6	138	14
	B-Run Dworshak Seg Harv	324.8	10%						1,603	77
	A Run Pahsimeroi Seg Harv	180.5	10%						902	51
No Hatchery	None None	0.0	0%	0%	0%	1.00	155	1.2	44	-
HSRG Solution	Int Cons	100.1	75%	0%	41%	0.65	206	1.0	161	137
	B-Run Upper Salmon Seg Harv	324.8	90%						1,603	401
	Stepping Stone/Seg Harv	180.5	50%						902	254
HSRG Solution w/ Improved Habitat	Int Cons	100.1	75%	0%	34%	0.69	276	1.1	181	137
	B-Run Upper Salmon Seg Harv	324.8	90%						1,603	401
	Stepping Stone/Seg Harv	180.5	50%						902	254