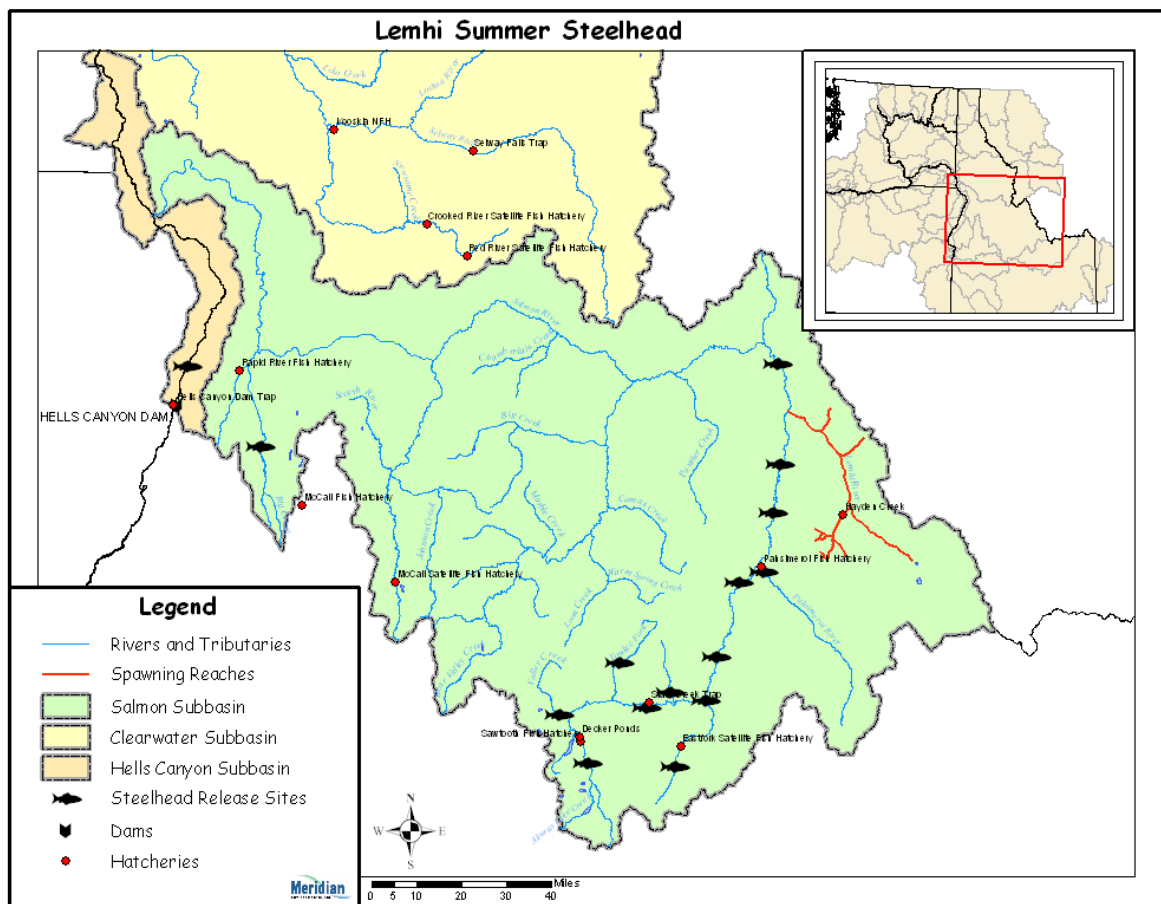


Hatchery Scientific Review Group Review and Recommendations

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

January 31, 2009



1 Salmon Lemhi River Summer Steelhead (A-Run)

The Lemhi 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 identifies this population as “Intermediate”. 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 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 Lemhi River.

2 Current Conditions

The area used by this population includes all tributaries to the Salmon from the mouth of the North Fork Salmon River to the mouth of the Lemhi, as well as the Lemhi River drainage. It should be noted that steelhead currently found in the Lemhi River drainage are presumably derived primarily from several hatchery stocking efforts. 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 hatchery fish are released into the Lemhi River each year.

Current population abundance (number of adults spawning in natural production areas) is unknown. 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, while the most recent 13-year SAR adjusted and delimited geometric mean of returns per spawner was 1.69. Steelhead parr density in the Lemhi River has generally been less than ten age-1 parr per square meter from 1995-2002 (NPCC 2004).

For AHA modeling, IDFG estimated that natural-origin fish escapement and adjusted productivity for this population was 371 and 0.80, 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 Lemhi 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: 1.8; Capacity: 1,139

2.2 Current Hatchery Programs Affecting this Population

There is a segregated hatchery program that releases 120,000 yearling (4.5 fpp) A-run steelhead to the Salmon River in April. All juvenile fish are adipose fin-clipped before being released to the stream near Red Rock. Broodstock are collected at the Pahsimeroi Hatchery weir and then transferred to either the Clearwater or Magic Valley hatcheries for incubation and rearing. No natural-origin fish are used as broodstock for this program. Juvenile fish are then transported from the rearing hatcheries to the release sites in the spring. 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: 432 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 0.8 to 1.6. Average abundance of natural-origin spawners (NOS) would increase from approximately 371 fish to approximately 408 fish. The harvest contribution of the natural and hatchery populations would go from approximately 855 fish to approximately 59 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 Lemhi River A-run steelhead that emphasizes maintaining existing natural spawning populations 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 management 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 Lemhi River.

There is an unacclimated release of A-run steelhead to the Salmon River downstream of the Lemhi River (Red Rock) that originates from adults trapped at the Pahsimeroi Hatchery. The number of yearling smolts released is 120,000 (4.5 fpp). The composition of spawners in the habitat is unknown. Currently no programs release steelhead directly into the Lemhi River.

Recommendations

If this population is to be managed as a Primary or Contributing population, the ability to control spawner composition in the Lemhi River would be necessary. That could be achieved by installing a weir in the lower Lemhi River. If a weir is not constructed and a conservation strategy is still desired, the continued off-site release of steelhead in the Salmon River downstream of the mouth of the Pahsimeroi would jeopardize the success of this strategy. Acclimatization of smolts prior to release is also recommended to reduce straying and ecological risks (e.g., residualism and predation).

If an integrated program and weir are pursued - - 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.

The HSRG notes that there is a general lack of information about steelhead abundance, productivity, spatial structure and diversity. An effort should be made to improve this information base. Installation of a weir would provide a mechanism for this data collection.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Lemhi River 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%	23%	0.00	371	0.8	54	0
	Seg Harv	119.7	10%						801	46
No Hatchery	None None	-	0%	0%	0%	1.00	408	1.6	59	-
HSRG Solution	None None	-	0%	95%	1%	0.00	354	1.4	51	0
	Seg Harv	119.7	10%						801	46
HSRG Solution w/ Improved Habitat	None None	-	0%	95%	1%	0.00	489	1.6	71	0
	Seg Harv	119.7	10%						801	46