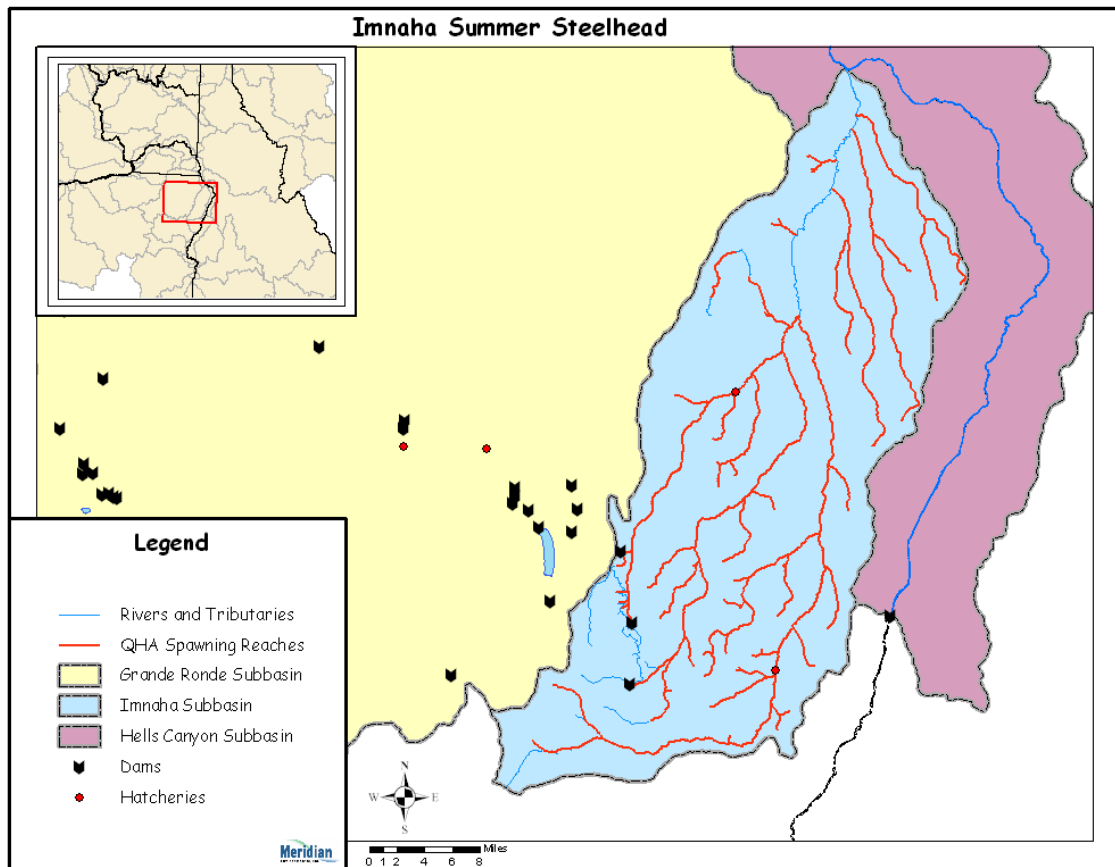


Hatchery Scientific Review Group Review and Recommendations

Innaha River Summer Steelhead Population (A-Run) and Related Hatchery Programs

January 31, 2009



1 Imnaha River Summer Steelhead

The Imnaha River steelhead population is part of the Snake River Basin Steelhead Distinct Population Segment (DPS) that includes all naturally spawned populations of steelhead in streams in the Snake River Basin of southeast Washington, northeast Oregon, and Idaho (62 FR 43937; August 18, 1997). Several artificial propagation programs are considered part of the DPS: the Tucannon River natural stock, the North Fork Clearwater River stock reared at Dworshak National Fish Hatchery (NFH) and Clearwater Fish Hatchery and released in the Clearwater and Salmon Rivers¹, East Fork Salmon River local stock, and the Little Sheep Creek/Imnaha River Hatchery steelhead hatchery programs.

The DPS has six major population groupings (MPGs): Lower Snake River, Clearwater River, Grande Ronde River, Salmon River, Hells Canyon, and the Imnaha River (ICTRT 2006), and contains both A- and B-run steelhead (based on migration timing, ocean-age and adult size).

The Interior Columbia Technical Recovery Team (ICTRT) classified the Imnaha River population as an “Intermediate” population based on historical habitat potential. A steelhead population is classified as Intermediate if it has a mean minimum abundance threshold of 1,000 naturally produced spawners with sufficient intrinsic productivity to achieve a 5% or less risk of extinction over a 100-year timeframe.

According to the Draft Snake River Steelhead Recovery Plan, Snake River steelhead enter fresh water from June to October and spawn the following spring from March to June. Emergence occurs by early June in low elevation streams and as late as mid-July at higher elevations. Snake River steelhead usually smolt at age 2 or age 3 years and reside in marine waters for 1 to 3 years prior to returning to their natal stream to spawn at 4 or 5 years of age.

2 Current Conditions

This population includes all naturally spawning fish in the Imnaha River and its tributaries. Escapement of natural and hatchery fish was monitored from 2000 to 2007 by the Nez Perce Tribe in two tributary streams, Cow Creek and Lightning Creek. Escapement to Lightning Creek ranged from 36 to 232 fish, an average of 95% (92 to 99%) of which were natural-origin spawners. Escapement to Cow Creek ranged from 27 to 128 fish, an average of 87% (73 to 95%) of which were natural-origin spawners (Nez Perce Tribe unpublished data).

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the Imnaha River steelhead population.

- **ESA Status:** The Snake River basin steelhead DPS was listed as threatened on August 18, 1997; the threatened status was reaffirmed on January 5, 2006.

¹ Artificial propagation programs for steelhead in the Clearwater River subbasin are based on the North Fork Clearwater stock which was trapped at the foot of Dworshak Dam when access to the North Fork was blocked in 1969.

- Population Description: The ICTRT classified the Imnaha River population as an “Intermediate” population based on historical habitat potential (ICTRT 2005). For the HSRG review, the population has been classified as Primary.
- Recovery Goal for Abundance: 1,500 fish
- Productivity Improvement Expectation: The 100-year geometric mean for abundance and productivity (i.e. growth rate) of steelhead in Imnaha River will be improved to exceed the 5% extinction-risk (viability) curves developed by the ICTRT (e.g., ~ 1,000 spawners at a productivity of 1.15).
- Habitat Productivity and Capacity (provided by biologist working in the Imnaha) :
Imnaha - Productivity: 3; Capacity: 1,800; Little Sheep - Productivity: 3; Capacity: 200

2.2 Current Hatchery Programs Affecting this Population

The Imnaha summer steelhead hatchery program releases up to 330,000 yearling juveniles to Big Sheep and Little Sheep creeks to return 2,000 adults for harvest, broodstock, and natural escapement. Smolts are transported from Irrigon Hatchery to the Little Sheep acclimation facility or are direct-planted in Big Sheep Creek. Co-managers determine the release size based on program performance. These range from 165,000 to 230,000 in Little Sheep Creek and from 50,000 to 100,000 in Big Sheep Creek. Releases include both fish targeted for harvest and natural production. All fish are marked with an adipose fin-clip.

Broodstock for the program is collected at the Little Sheep adult trap. Adults surplus to broodstock needs and in excess of natural spawning escapement needs are transported for release in Big Sheep Creek. Fish are spawned at the Little Sheep Creek facility and incubated initially at the Wallowa Hatchery. Eyed eggs are then transferred to the Irrigon Hatchery where all juvenile rearing occurs.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated programs: None outside the Little Sheep/Big Sheep tributaries; 212 fish in Little Sheep/Big Sheep tributaries
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 9 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 2.7 to 2.8. Average abundance of natural-origin spawners (NOS) would increase from approximately 1180 fish to approximately 1210 fish. The harvest contribution of the natural and hatchery populations would go from approximately 122 fish to approximately 125 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 Imnaha summer steelhead that emphasizes maintaining existing natural spawning populations as well as using hatchery-origin steelhead in an attempt to augment natural production. Currently the integrated hatchery program in Little Sheep Creek is not operated consistent with the HSRG-defined standards of a Primary or Contributing population.

The total production objective for this program is to release up to 330,000 smolts derived from hatchery and natural-origin returns. The program is partial fulfillment of the LSRCP adult return goal of 11,200 adult steelhead to the project area. The current program size is approximately 215,000 smolts. Broodstock for the program is collected at the Little Sheep adult trap. Adults surplus to broodstock needs and in excess of natural spawning escapement needs are transported for release in Big Sheep Creek. Fish are spawned at the Little Sheep Creek facility and incubated initially at the Wallowa Hatchery. Eyed eggs are then transferred to the Irrigon Hatchery where juvenile rearing occurs. Smolts are transported from Irrigon Hatchery to the Little Sheep acclimation

facility. This hatchery program also exports smolts (up to 50,000 for a direct plant) and pre-spawn adults to Big Sheep Creek. No hatchery program operates in the Imnaha River outside of these tributaries.

The proportion of natural-origin fish in the hatchery broodstock and proportion of the natural spawning population made up of hatchery –origin fish are managed based on a sliding scale based on the number of natural-origin adults returning to the habitat.

Recommendations

The managers should identify specific conservation objectives for the Big Sheep Creek steelhead component of the Imnaha steelhead population. In order to accomplish this, managers need to develop abundance and productivity estimates for this population component and determine the current population status. Managers should suspend the existing smolt and adult plants into Big Sheep Creek until the above has been achieved.

Once that is complete, a properly integrated program (using either adult or juvenile outplants) should be developed using the appropriate PNI, pNOB and pHOS to achieve the conservation standards developed by the managers.

Until then, the HSRG recommends that managers develop a 2-stage stepping stone program released into Little Sheep Creek only. The program would consist of an integrated conservation component producing approximately 87,000 smolts (PNI = 0.5; pNOB = 65%; pHOS = 65%). This component initially would be produced by collecting 100% of its broodstock from natural-origin returns. Subsequent generations would be maintained by collecting 65% of the broodstock from natural-origin returns and 35% from hatchery origin returns from this component. Excess hatchery-origin returns from the conservation component would provide all broodstock to maintain an additional second stage harvest component of approximately 126,000 smolts. Unharvested hatchery returns from the harvest component would not be used for broodstock. This would require differential marking of juveniles from the two programs. For example, the juveniles from the conservation program would be coded-wire tagged only, while the harvest program fish would be adipose-marked and coded-wire tagged.

This solution would require an ability to collect natural-origin adults in the appropriate number and removal of at least 70% of the unharvested hatchery-origin returns.

The HSRG notes that there is a general lack of information about steelhead abundance, productivity, spatial structure and diversity as well as straying of hatchery fish into natural production areas. Efforts should be made to improve this information base.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Imnaha Summer Steelhead. 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%	1%	0.00	1,177	2.7	122	0
	Little Sheep Int Harv	212.3	70%	0%	65%	0.13	91	1.4	1,359	387
	Seg Harv	-	0%	0%	0%				-	-
No Hatchery	None None	-	0%	0%	0%	1.00	1,208	2.8	125	-
	Little Sheep None	-	0%	0%	0%	1.00	128	2.7	13	-
HSRG Solution	None None	-	0%	0%	0%	1.00	1,195	2.8	124	0
	Little Sheep Int Harv	87.7	70%	0%	65%	0.50	90	1.8	570	116
	Stepping Stone Seg Harv	126.3	70%						802	296
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	0%	1.00	1,386	3.1	144	0
	Little Sheep Int Harv	87.7	70%	0%	61%	0.52	106	2.0	572	188
	Stepping Stone Seg Harv	126.3	70%						802	296