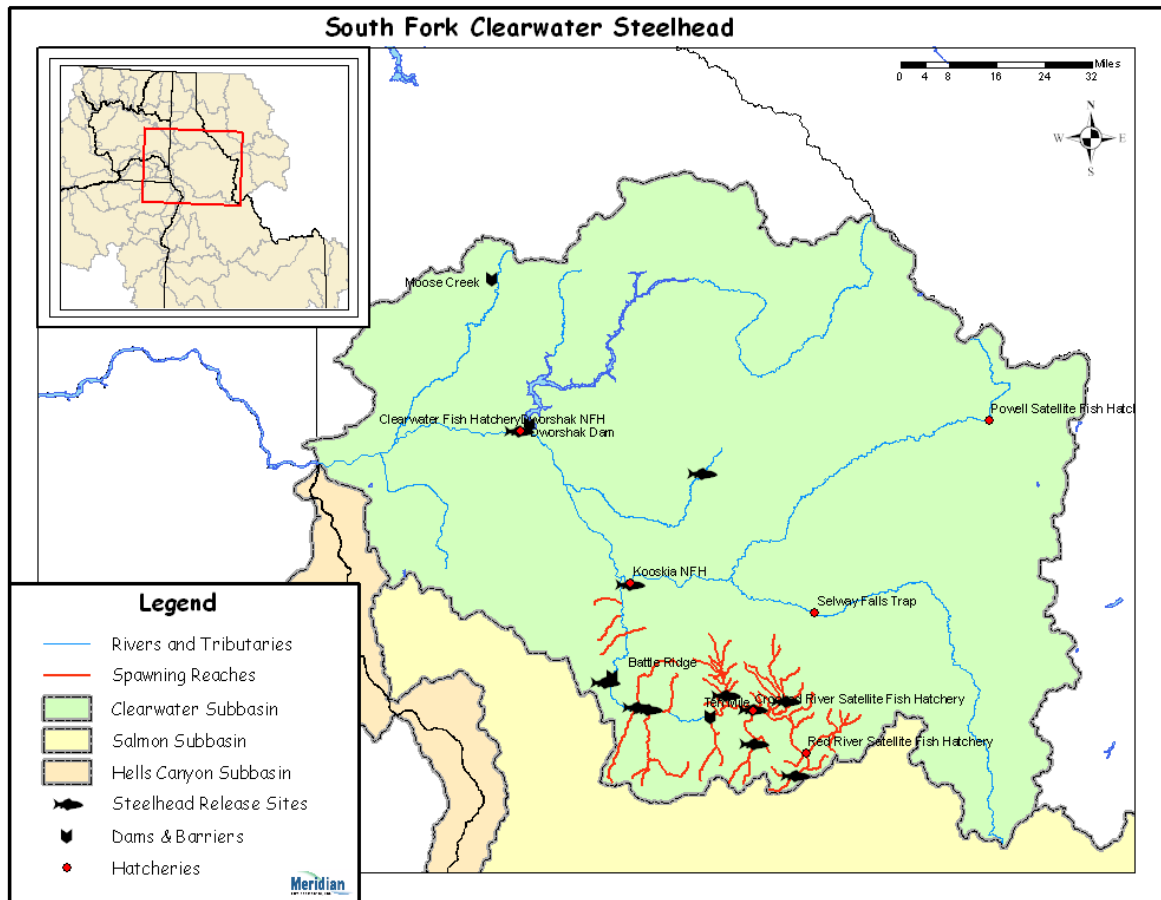


Hatchery Scientific Review Group Review and Recommendations

South Fork Clearwater Summer Steelhead (A and B-run) Population and Related Hatchery Programs

January 31, 2009



1 South Fork Clearwater Summer Steelhead (A+B-run)

The South Fork Clearwater 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 was listed as a threatened under the ESA on August 18, 1997; this status was reaffirmed on January 5, 2006.

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 South Fork Clearwater population is a B-run population found in the South Fork Clearwater River and its tributaries upstream of Mill Creek. Like all populations in the MPG, the South Fork Clearwater River population occupies areas upstream from the historical Lewiston Dam, in place from 1927 to 1973. The dam was fitted with a fish ladder, which provided marginal passage for migrating steelhead adults and smolts (Cramer et al. 1998). Unlike Chinook salmon, steelhead were able to maintain access to the Clearwater River subbasin during the dam's existence, and therefore are included in the DPS.

The Interior Columbia Technical Recovery Team (ICTRT) classified the South Fork Clearwater population as "Intermediate" based on historical habitat potential (ICTRT 2005). An "Intermediate" population is one that requires a minimum abundance of 1,000 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. .

According the Draft Snake River Steelhead Recovery Plan, Snake River Basin steelhead trout enter fresh water from June to October and spawn during the following spring from March to May. 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.

There are no estimates of historical steelhead abundance in the South Fork Clearwater River subbasin. Fish passage in the South Fork Clearwater River has been intermittently blocked or impaired by several dams. The greatest impacts to the indigenous population were from Harpster Dam which spanned River Mile 22 from 1910 through 1963, when it was removed. It completely blocked steelhead passage upstream of the dam from 1911 to 1935 and from 1949 to 1963 (Cramer et al. 1998, as cited in ICTRT 2006).

2 Current Conditions

The current summer steelhead population in the South Fork Clearwater is derived from resident rainbow trout; juvenile stocking from Dworshak Hatchery stock (B-run), adults

¹ Artificial propagation programs for steelhead in the Clearwater River subbasin are based on the North Fork Clearwater stock that was trapped below Dworshak Dam when its construction blocked access to the North Fork in 1969.

that were trapped at Lewiston Dam, and possibly residualized endemic *O. mykiss*. While steelhead spawning has been documented in all of the major spawning areas to the South Fork Clearwater River (Newsome Creek, Johns Creek, the upper South Fork Clearwater River, and the American River) (ICTRT 2006), current abundance (number of adults spawning in natural production areas) is unknown.

In response to this lack of abundance data, the ICTRT developed a generic dataset for B-run steelhead populations to be used for a preliminary assessment of abundance productivity risk (ICTRT 2005). The dataset was derived by distributing the natural-origin steelhead counted annually at Lower Granite Dam equally across the nine extant B-run populations found above the dam. Abundance for the generic B-run steelhead in recent years has been moderately variable; the most recent 10-year geometric mean number of natural spawners was 272 fish. From 1986-1998, returns per spawner for the generic “B” run steelhead dataset ranged from 0.24 (1990) to 6.63 (1998). The most recent 13-year SAR adjusted and delimited geometric mean of returns per spawner was 0.85.

Recent year natural spawners include returns originating from naturally spawning parents. Some strays may also be spawning naturally, as well as hatchery-origin adults returning to the watershed. The proportion of spawners originating from naturally spawning parents is unknown.

Hatchery facilities in this population zone include adult collection facilities and acclimation ponds on Red River and Crooked River.

For AHA modeling, IDFG estimated natural-origin fish escapement and adjusted productivity for this population to be 195 and 0.61, respectively.

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the South Fork Clearwater 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.
- **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 South Fork Clearwater River A/B-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: 1.5; Capacity: 350

2.2 Current Hatchery Programs Affecting this Population

The Dworshak National Fish Hatchery and Clearwater Fish Hatchery operate hatchery programs in the South Fork Clearwater River population zone. All fish are derived from B-run broodstock collected at Dworshak NFH on the North Fork (the Clearwater Hatchery does not have an adult collection facility). Once eggs have reached the eyed-stage of development, they are transferred from the Dworshak to the Clearwater Fish Hatchery.

The Clearwater Hatchery maintains satellite facilities at Crooked River and Red River. Weather permitting, adult collection racks operate at both locations during March and April, although these adults are not transferred to the Clearwater Hatchery to develop broodstock. Instead, hatchery steelhead (adipose fin-clipped) are returned to the river downstream of both weir sites, and supplementation adults (unclipped hatchery-origin adults) may be passed upstream or returned to the river downstream of weir sites. Natural-origin fish are passed upstream of both weirs.

Smolt releases (adipose fin-intact) in this population zone are as follows:

- Newsome Creek, 100,000 – Dworshak NFH rearing
- American River, 100,000 – Dworshak NFH rearing
- Meadow Creek, 25,000 – Clearwater Fish Hatchery rearing
- Crooked River, 83,000 – Clearwater Fish Hatchery rearing
- Red River, 150,000 – Clearwater Fish Hatchery rearing
- Mill Creek, 25,000 – Clearwater Fish Hatchery rearing
- TOTAL ADIPOSE FIN INTACT RELEASES: 483,000

Smolt releases (adipose fin-clipped) in this population zone are as follows:

- South Fork Clearwater River Red House Hole, 400,000 – Dworshak NFH rearing
- Crooked River, 150,000 – Clearwater Fish Hatchery rearing
- Red River, 100,000 – Clearwater Fish Hatchery rearing
- South Fork Clearwater River Red House Hole, 260,000 – Clearwater Fish Hatchery rearing
- TOTAL ADIPOSE FIN-CLIPPED RELEASES: 910,000

Both programs have an R/S of 35.0.

According to the ICTRT, the contribution of supplementation releases and unharvested marked hatchery fish to natural production is unknown; however, it is not suspected to have a selective impact on this population. The number of out-of-DPS strays in the population likely is zero or negligible.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 4,626 to the S.F. Clearwater and 865 to Crooked River
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 3,702 to the S.F. Clearwater and 90 to Crooked River

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) for the Upper South Fork would increase from 0.6 to 1.2. Average abundance of natural-origin spawners (NOS) would decrease from approximately 195 fish to approximately 52 fish. The harvest contribution of the hatchery populations would go from approximately 1,497 fish to approximately 15 fish. Estimated Adjusted Productivity for the Crooked River would increase from 0.9 to 1.2. Average abundance of NOS would decrease from 195 fish to 59 fish. The harvest contribution of the population would decrease from 368 fish to 17 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 South Fork Clearwater River A/B-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 is not meeting the HSRG-defined standards for either a Primary or Contributing population designation (pHOS exceeds 0.10).

Managers have identified both conservation and harvest objectives for the South Fork Clearwater River. This strategy involves a segregated hatchery program with direct release of adipose fin-clipped smolts into South Fork Clearwater River sites and releasing unmarked smolts into the terminal tributaries of the South Fork (Newsome Creek, and Red, American and Crooked rivers).

As currently operated, Dworshak NFH and Clearwater Fish Hatchery produce smolts that are outplanted in the South Fork Clearwater population. Approximately 1.4 million steelhead smolts are planted annually. Of these, approximately 35% (483,000) are released with adipose fins intact. The remaining 65% (910,000) are adipose fin-clipped and released to address harvest mitigation objectives.

Production goals for the proposed harvest program in the lower South Fork Clearwater total 910,000 smolts. Of these, 400,000 smolts are produced at Dworshak and 510,000 are produced at Clearwater Hatchery. All of these fish will be adipose fin-clipped.

Currently, there is no way to control the composition of natural spawners except upstream of adult collection weirs on Crooked River and Red River. The HSRG noted that the adult trapping facility at the Crooked River site offers the best potential to trap returning adults because of its location low in the Crooked River. The Red River weir is higher in the tributary and significant spawning areas are reported below the weir.

Hatchery-origin returning adults (produced annually from Dworshak National Fish Hatchery broodstock), fail to return to terminal release sites (Crooked River and Red River) at levels adequate enough to replace the program.

Recommendations

The HSRG recommends terminating use of Dworshak B-run steelhead releases in the upper South Fork Clearwater River upstream of and including Newsome Creek. The HSRG recommends developing an integrated program with adults collected at the Crooked River site. A production level of approximately 125,000 smolts derived from adults returning to the Crooked River facility would be sufficient to supply eggs for programs releasing smolts in these areas. Phase 1 of the program would focus on developing a locally derived hatchery broodstock based on returns trapped at Crooked River. Phase 2 of the program would transition to 100% natural-origin broodstock. Hatchery adults, in excess of broodstock needs, would be allowed to spawn naturally. With a PNI of 0.5, this population component would be managed consistent with the standards of a Contributing population. Phase 3 of the program could have the potential to replace all or part of the broodstock for the harvest programs in the lower South Fork Clearwater River in the vicinity of Red House Hole. Managers should investigate options to source broodstock from additional locations to the Crooked River adult collection site.

Dworshak B-run steelhead releases should be limited to the lower South Fork Clearwater River in the vicinity of the current release site at Red House Hole. The managers should monitor straying from these releases into the upper watershed to confirm that the contribution to natural spawning meets the standards of a Contributing population (less than 10%). To the extent that the program is successful in the upper watershed, it should replace all or a portion of these Dworshak releases that occur in the lower South Fork Clearwater.

The managers should coordinate the programming of all salmon populations reared in the Clearwater Fish Hatchery, Dworshak NFH, Kooskia NFH and Nez Perce Tribal Hatchery to maximize the benefits of available water supply, appropriate water temperature, and rearing containers. Operating these four major hatcheries as a coordinated system would facilitate the movement of programs/populations between and among the different hatcheries. This would maximize survival by producing fish in good condition for release at the appropriate life stage.

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 South Fork Clearwater 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	Upper SF Int Harv	399.8	10%	0%	91%	0.00	195	0.6	1,497	515
	Crooked River Int Harv	84.2	20%	0%	79%	0.56	195	0.9	368	26
	Seg Harv	911.3	10%						10,173	484
No Hatchery	None None	-	0%	0%	0%	1.00	52	1.2	15	-
	None None	-	0%	0%	0%	1.00	59	1.2	17	-
HSRG Solution	Upper SF Int Harv	248.3	10%	0%	94%	0.00	212	0.6	955	320
	Crooked River Int Harv	123.9	20%	0%	85%	0.54	191	0.9	515	70
	Stepping Stone/Seg Harv	911.3	10%						10,173	484
HSRG Solution w/ Improved Habitat	Upper SF Int Harv	248.3	10%	0%	93%	0.00	233	0.7	961	320
	Crooked River Int Harv	123.9	20%	0%	69%	0.59	156	1.0	505	70
	Stepping Stone/Seg Harv	911.3	10%						10,173	484