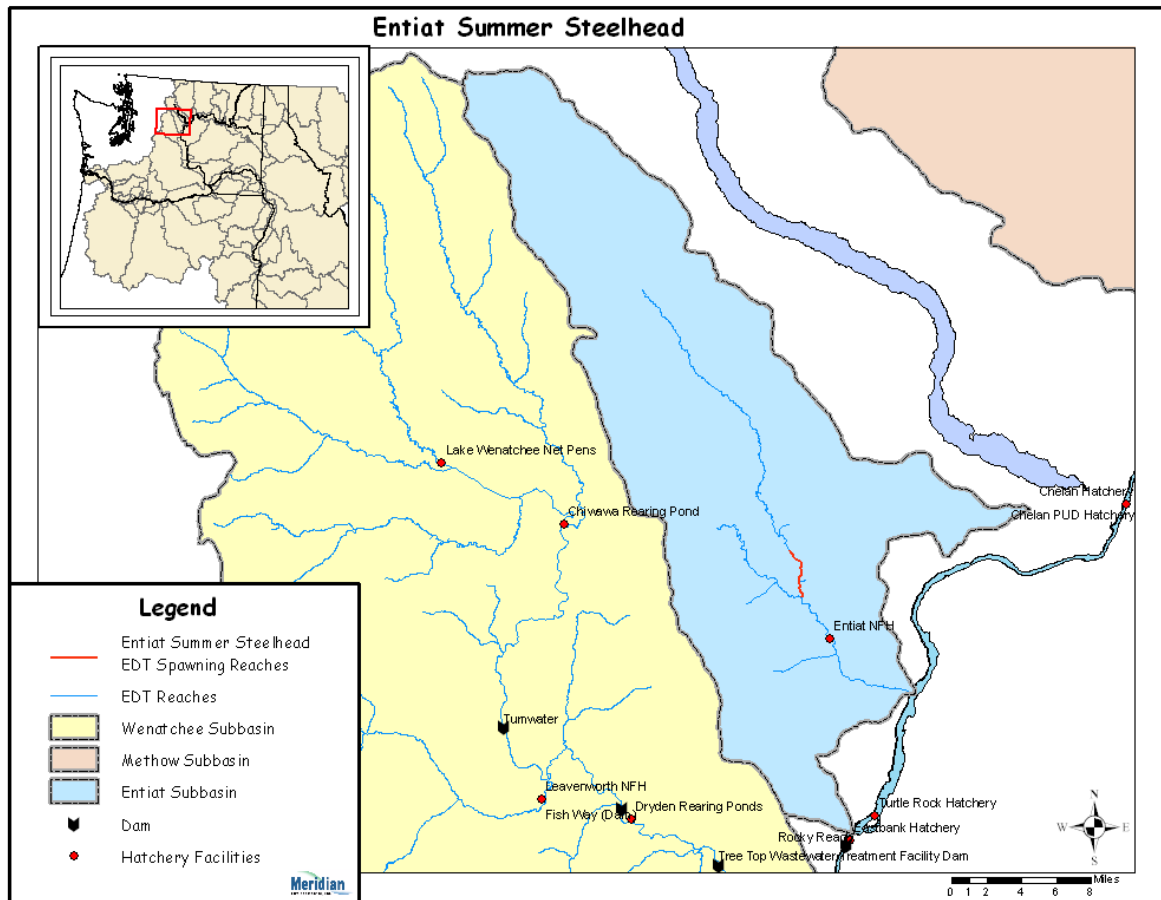


Hatchery Scientific Review Group Review and Recommendations

Entiat Summer Steelhead Population and Related Hatchery Programs

January 31, 2009



1 Entiat River Summer Steelhead

Entiat River summer steelhead are considered part of the Upper Columbia River Steelhead DPS. This DPS includes all naturally-spawned anadromous steelhead populations below natural and man-made impassable barriers in streams of the Columbia River Basin upstream of the Yakima River to the U.S.-Canada border. Courts confirmed the endangered status of the DPS in June 2007. The Entiat River population is considered a “Basic” population by the Interior Columbia Technical Review Team (ICTRT). A “Basic” steelhead population is one that must have a minimum abundance of 500 spawners and a S/S ratio of 1.3 to be viable.

Historical summer steelhead abundance in the Entiat River has been estimated at approximately 500 fish. They were thought to have spawned in the mainstem Entiat River and Mad River. Spawning may also have occurred in the lower portions of the Mud, Potato, Stormy, Tillicum and Roaring Creeks (UCSRB 2007).

2 Current Conditions

The UCSRB (2007) describes the life history of this population as follows:

Adults return to the Columbia River in the late summer and early fall. Unlike spring Chinook, most steelhead do not move upstream quickly to tributary spawning streams. A portion of the returning run overwinters in the mainstem reservoirs, passing over the Upper Columbia River dams in April and May of the following year. Spawning occurs in late spring of the calendar year following entry into the river. Currently, and for the past 20+ years, most steelhead spawning in the wild are hatchery fish. The effectiveness of hatchery fish spawning in the wild compared to naturally produced spawners is unknown at this time and may be a major factor in reducing steelhead productivity.

Juvenile steelhead rear from 1-3 years in freshwater. Steelhead adults spend 1-2 years in the ocean before returning to the Columbia River. Adult fecundity averages from 5,300 to 6,000 eggs per female.

Between 1967 and 2002, adult escapement to the Entiat River ranged from 9 to 366 fish. The running 12-year geometric mean ranged from 24 to 118 adults over this same period. At the time of listing (1997), the 12-year geometric mean for adult abundance and productivity was 101 and 0.25, respectively.

Steelhead spawn in the Entiat River from RM 0.5 to RM 28. In the Mad River, steelhead can be found spawning from RM 1.3 to 7.2. Summer steelhead have been found in Lower Tillicum, Roaring, and Stormy Creeks (UCSRB 2007).

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the natural population.

- ESA Status: Endangered
- Population Description: The Entiat River population is considered a “Basic” population by the ICTRT. A “Basic” steelhead population is one that must have a minimum abundance of 500 spawners and a S/S ratio of 1.3 to be viable. The HSRG has classified this population as Primary.
- Recovery Goal for Abundance: 500 adults

- **Productivity Improvement Expectation:** The Upper Columbia River recovery plan sets a 12-year geometric mean abundance and productivity target at 500 and 1.2 (S/S), respectively
- **Habitat Productivity and Capacity:** Productivity: 0.9; Capacity: 170

2.2 Current Hatchery Programs Affecting this Population

No hatchery summer steelhead are released in this subbasin.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 0
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 642 fish

Hatchery strays are assumed to originate from the Methow, Wenatchee and Okanogan summer steelhead programs.

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 0.4 to 1.0. Average abundance of natural-origin spawners (NOS) would decrease from approximately 84 fish to approximately 4 fish.

Harvest contribution of the natural and hatchery populations would go from approximately 8 fish to approximately 0 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 managers' 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 Entiat summer steelhead as an important population. For the purposes of this analysis, the HSRG assumed this population should be considered a Primary population. As currently managed, it is not consistent with that designation, having a pHOS greater than 5%.

Hatchery strays from Wells Hatchery and Wenatchee hatchery stocks spawn naturally in the Entiat system; however, given the current habitat capacity and productivity provided to the HSRG, this population does not appear to be sustainable under current conditions. In the absence of hatchery strays, this population may disappear.

Recommendations

In order for this population to contribute to recovery, it will require improvements to habitat productivity. Until habitat productivity improves, there is little managers can do to improve the condition of this population.

Managers should consider a safety net conservation program, including a kelt reconditioning program from natural-origin fish returning to the Entiat.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Entiat 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%	86%	0.00	84	0.4	8	0
No Hatchery	None None	-	0%	0%	0%	1.00	4	1.0	0	-
HSRG Solution	None None	-	0%	0%	63%	0.00	51	0.5	5	0
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	60%	0.00	58	0.6	6	0