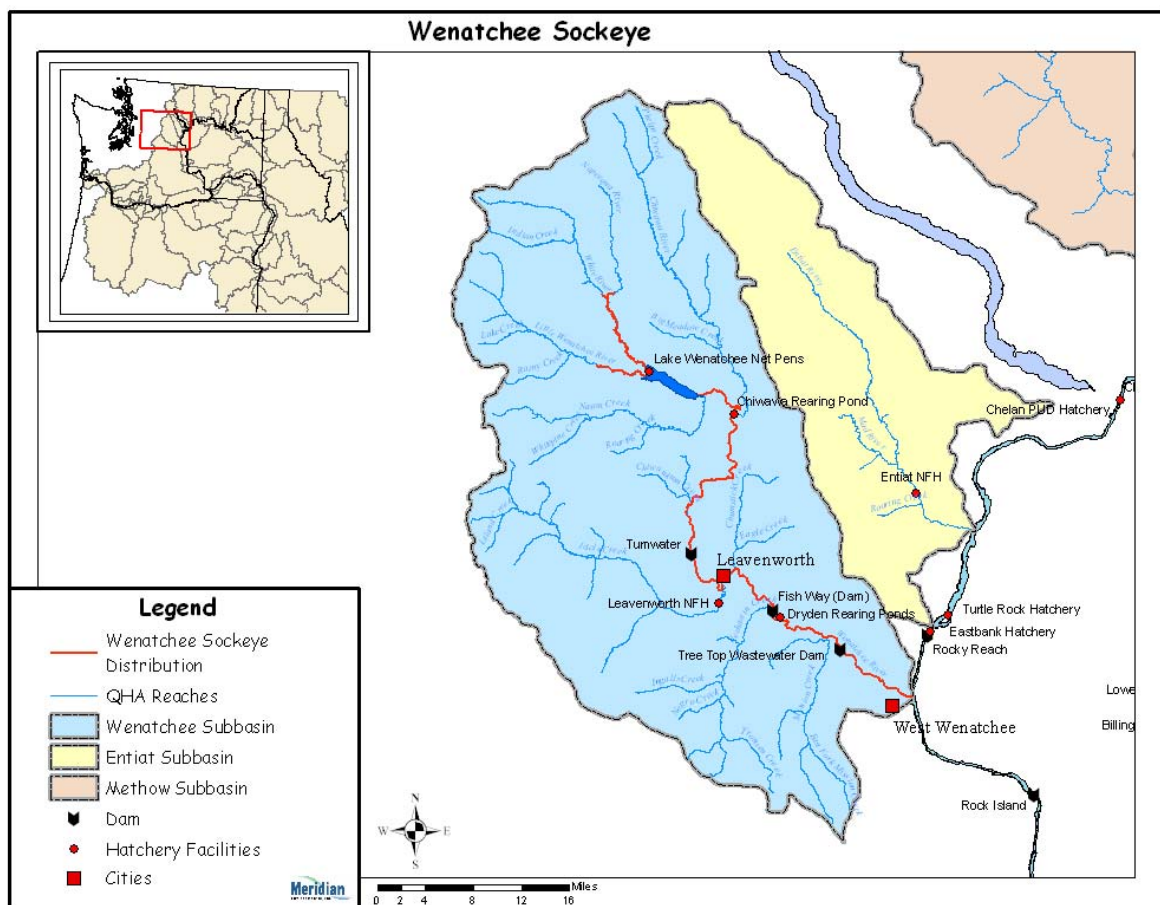


Hatchery Scientific Review Group Review and Recommendations

Wenatchee Sockeye Population and Related Hatchery Programs

January 31, 2009



1 Wenatchee River Sockeye

Wenatchee sockeye are one of the two viable sockeye populations remaining in the Columbia River. Adult sockeye spawn in the White and Little Wenatchee rivers, with juvenile rearing in Lake Wenatchee.

Historically it is believed that sockeye runs to the upper Columbia River Basin numbered in the hundreds of thousands each year. Accurate estimates of historical sockeye abundance are not available however, as these runs were substantially reduced by harvest activities by the early 20th century (NPPC 2004).

2 Current Conditions

Wenatchee sockeye adults begin entering the Wenatchee River subbasin in late June. Spawning occurs in September primarily in the lower four miles of the Little Wenatchee River and lower five miles of the White River. Some sockeye may also spawn in the Napeequa River, a small tributary of the White River. Fry enter Lake Wenatchee between March and April of the next year. Sockeye smolts leave Lake Wenatchee to begin their migration to the ocean in April as age-1 or age-2 smolts.

Counts at Rock Island Dam indicate that adult sockeye escapement past this facility has averaged ~55,000 fish since 1998. This number includes fish destined for both the Wenatchee and Okanogan rivers. A comparison of counts at Rock Island and Wells Dam (upstream of the Wenatchee River) indicates that adult sockeye escapement to the Wenatchee River is about 15,000 fish.

A total of 200,000 sub-yearling hatchery sockeye are released in July to net pens in Lake Wenatchee. Fish are released from net pens in October or November.

2.1 Current Population Status and Goals

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

- ESA Status: Not Listed
- Population Description: A composite stock of both natural and hatchery-origin fish.
- Recovery Goal for Abundance: Not Applicable
- Productivity Improvement Expectation: Unknown
- Habitat Productivity and Capacity: Productivity: 10.0 ; Capacity: 15,000 (both are iterated values)

2.2 Current Hatchery Programs Affecting this Population

A brief description of the Lake Wenatchee sockeye program is presented below.

Lake Wenatchee Sockeye: The program releases 200,000 sub-yearling sockeye to Lake Wenatchee each year. Juveniles are released to net pens in July, where they are held through late October or early November. Fish are then released from the net pens to the lake at approximately 10-25 fpp. All hatchery juveniles released are adipose fin-clipped. A portion may be marked with PIT-tags or coded-wire tags. Broodstock for the program are collected at the Tumwater Dam trapping facility from the run at large. Only wild sockeye salmon are used as broodstock. Adults are transported to net pens located in Lake Wenatchee for holding and spawning. Eggs are then transferred to the Eastbank Hatchery for fertilization and incubation. Juveniles are reared at the hatchery until they

reach 100 fpp, then are transferred to the Lake Wenatchee net-pens in July. In the past, some juvenile sockeye were released directly to the White River.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 66
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: Unknown

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 Adjusted Productivity (with harvest and fitness factor effects from AHA) would be unchanged at 10.0. Average abundance of natural-origin spawners (NOS) would increase from approximately 14,803 fish to approximately 15,030 fish. Harvest contribution of the natural and hatchery populations would be zero.

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

The Managers have stated their goal for this program as; “Increase the abundance of the natural adult population of unlisted species, while ensuring appropriate spatial distribution, genetic stock integrity, and adult spawner productivity. In addition, provide harvest opportunities in years when spawning escapement is sufficient to support harvest.” (Goal statement adopted by Habitat Conservation Plan Committee, Hatchery Sub-Committee). To achieve this, the current program collects approximately 200 natural-origin adults at Tumwater Dam on the Wenatchee River in order to produce 200,000 sub-yearling sockeye salmon (mitigation goal). Adults are transferred to net pens in Wenatchee Lake, where they are held through spawning. Egg incubation and early rearing occur at the Eastbank Hatchery.

Sub-yearlings are transferred in the summer (currently July) to Lake Wenatchee net pens where they continue rearing until their release in the fall. From this production, less than 100 to 2,500 hatchery-produced adults typically return to the lake. Between 1989 and 2005, natural-origin adult returns averaged 15,000 fish.

This program is adaptively managed, and some operational changes have been made (e.g., juvenile release modifications); however, it is unclear whether these changes have provided a benefit to the population (e.g., current hatchery fish replacement rates are not consistently greater than 1.0).

As currently operated, the program is consistent with the standards for a Primary population (PNI greater than 0.67).

Recommendations

The HSRG recommends that managers continue to monitor the relationship between hatchery replacement rates and natural replacement rates. Managers should improve methods and techniques used to assess juvenile out-migration run size from the lake as well as adult escapement in spawning tributaries.

Once new information from monitoring and evaluation becomes available, managers should assess needed changes to the program, including discontinuing the program if the performance is less than what would occur naturally.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Wenatchee Sockeye. 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	211.7	0%	0%	0.4%	1.00	14,803	10.0	-	-
No Hatchery	None None	-	0%	0%	0.0%	1.00	15,030	10.0	-	-
HSRG Solution	Int-Cons	211.7	0%	0%	0.4%	1.00	14,803	10.0	-	-
HSRG Solution w/ Improved Habitat	Int-Cons	211.7	0%	0%	0.3%	1.00	16,473	11.0	-	-