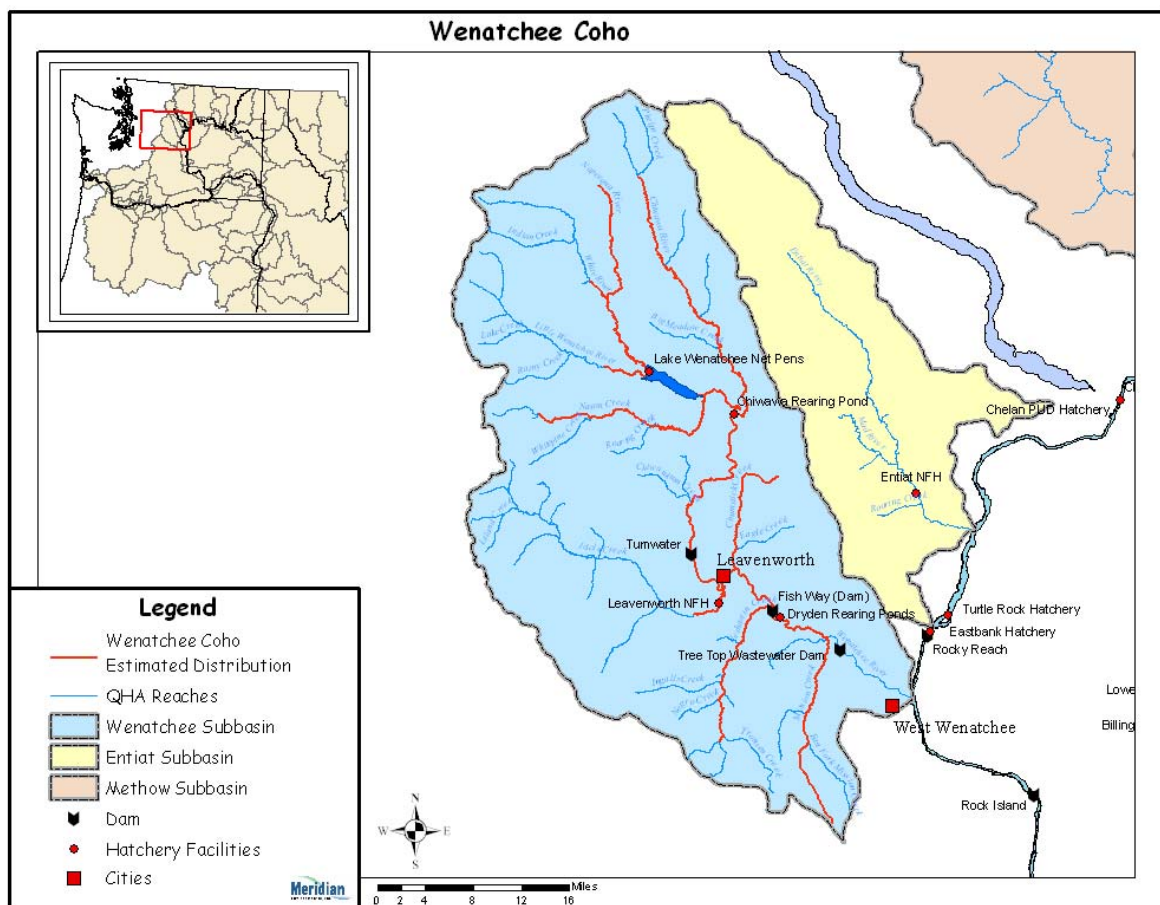


Hatchery Scientific Review Group Review and Recommendations

Wenatchee River Coho Population and Related Hatchery Programs

January 31, 2009



1 Wenatchee River Coho

The natural population of Wenatchee River coho was extirpated prior to 1950, but has been reintroduced by the Yakama Nation. Historically, it was estimated that from 6,000 to 7,000 coho spawned in the Wenatchee River subbasin (NPPC 2004). Spawning likely took place in the mainstem Wenatchee River, Icicle Creek, Nason Creek, the Little Wenatchee River, Beaver Creek and other small tributaries.

2 Current Conditions

Wenatchee coho spawn in the mainstem Wenatchee River (Cashmere to Lake Wenatchee), Little Wenatchee River, Nason Creek, Beaver Creek, Icicle Creek, Peshastin Creek, Mission Creek, and Chiwaukum Creek.

Coho salmon return to the subbasin in mid-September through late November. Spawning generally begins in October and continues into December. Because of cold water temperatures at this time, coho may be targeting areas of warmer groundwater for redd construction. Juvenile (yearling) coho begin migrating out of the system between March and April.

Current coho production consists primarily of hatchery fish, but some natural production is also occurring as a part of reintroduction efforts. The first generation of naturally-produced juveniles in the subbasin emigrated in 2002. Coho run-size to the subbasin has been between 350 and 5,000 adults.

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: Mixed stock of both hatchery and limited natural production. The HSRG has classified this population as Stabilizing.
- Recovery Goal for Abundance: Not applicable
- Productivity Improvement Expectation: Unknown until more years of data becomes available on program success. Habitat in the Wenatchee River is expected to improve from actions designed to increase the abundance and productivity of listed steelhead and spring Chinook.
- Habitat Productivity and Capacity: Productivity: 1.49; Capacity: 2,093

2.2 Current Hatchery Programs Affecting this Population

The Yakama Nation coho reintroduction program releases juvenile hatchery coho into the Wenatchee River.

Little White Salmon/Willard National Fish Hatchery (Yakama Coho): Broodstock for the Wenatchee River component of this program may be collected at Dryden Dam, Tumwater Dam or the Leavenworth National Fish Hatchery. Spawning takes place at the Entiat National Fish Hatchery. Egg incubation may occur at the Peshastin Incubation Facility or at the Entiat National Fish Hatchery. Juvenile rearing can occur at the Cascade and Willard fish hatcheries. Approximately 1.1 million fish are released each year to the Wenatchee River, Nason Creek, Coulter Creek, Beaver Creek and Icicle Creek. Fish are 100% coded-wire tagged but not adipose fin-clipped.

The current program is part of a four phase reintroduction program that includes two broodstock development phases along with two natural production phases. A 10- to 15-year habitat improvement phase is also planned. The current program has an R/S of 8.0.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 4,888 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs : 4 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. Our analysis estimated that Adjusted Productivity (with harvest and fitness factor effects from AHA) would increase from 0.5 to 1.1. Average abundance of natural-origin spawners (NOS) would decrease from approximately 775 fish to approximately 73 fish. Harvest contribution of the natural and hatchery populations would go from approximately 3,575 fish to approximately 34 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

The purpose of this program is to reestablish naturally reproducing coho salmon in the Wenatchee River, with numbers at or near carrying capacity, that provide opportunities for significant harvest for Tribal and non-Tribal fishers. Historically, the Wenatchee River supported a coho population of between 6,000 and 7,000 fish. The current program is part of a four-phase reintroduction program that includes two broodstock development phases along with two natural production phases. The natural sustainability of this population is uncertain given the early stage of the reintroduction program.

In the broodstock development phase, the program transitioned from the use of lower Columbia River hatchery stocks to a Wenatchee River hatchery stock. This goal has been achieved. Once the hatchery stock is established, natural production phases will outplant juveniles into key coho habitat in the Chiwawa, White, and Little Wenatchee rivers, as well as Nason Creek. Juvenile releases during this phase would total approximately 1.1 million smolts. Broodstock protocols for this phase would achieve a PNI of approximately 10% (pNOB = 10%, pHOS = 90%). The next support phase would reduce production to approximately 800,000 smolts with broodstock protocols to achieve a PNI of approximately 32% (pNOB = 35%, pHOS = 65%). The final support phase would reduce smolt production to approximately 400,000 fish, with broodstock protocols to achieve a PNI > 0.5 (pNOB = 80%, pHOS = 60%). The final phase would eliminate hatchery releases altogether.

Currently, the program produces one million smolts released at Leavenworth NFH and multiple sites above Tumwater Dam. Broodstock for the current program is collected at Dryden Dam, Tumwater Dam and the Leavenworth NFH. Juveniles are reared out of basin and smolts are acclimated and released in basin.

This appears to be a well thought-out reintroduction program that emphasizes developing locally adapted populations, first in the hatchery and then in the natural environment. Preliminarily, the program appears to be successful. However, planning to allow a high proportion of hatchery spawners in the second support phase provides no opportunity for the population to adapt to the local environment. A PNI greater than 0.5 is necessary for the natural environment to drive adaptation and increase fitness. Excess hatchery origin fish could be available for harvest, donation to food banks or stream nutrification.

Recommendations

Managers should identify additional rearing locations in the upper Columbia River.

The program should be phased to achieve a PNI of 0.5 as rapidly as possible.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Wenatchee Coho. 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	1,048	30%	0%	83%	0.04	775	0.5	3,575	1,041
No Hatchery	None None	-	0%	0%	0%	1.00	73	1.1	34	-
HSRG Solution	Int Cons	1,048	30%	0%	83%	0.04	775	0.5	3,575	1,041
HSRG Solution w/ Improved Habitat	Int Cons	1,048	30%	0%	82%	0.04	861	0.6	3,615	1,041