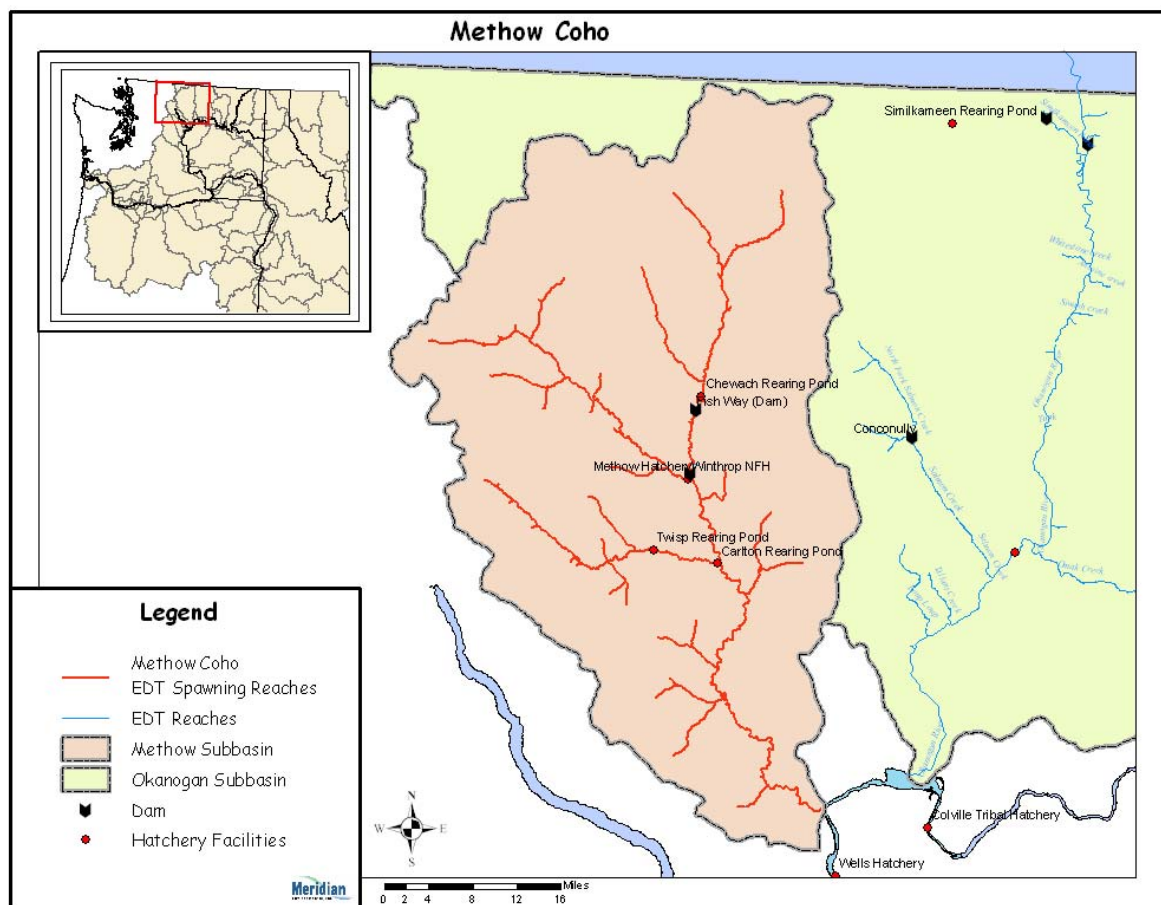


# Hatchery Scientific Review Group Review and Recommendations

## Methow River Coho Population and Related Hatchery Programs

January 31, 2009



# 1 Methow River Coho

The Methow River Coho natural population was extirpated prior to 1950, but has been reintroduced by the Yakama Nation. A major cause of the coho extirpation was likely a dam built near Pateros, Washington by Washington Water Power that blocked adult and migration from 1915-1929. Historically, it was estimated that from 23,000-31,000 coho spawned in the Methow River subbasin (NPPC 2004). Researchers reported that coho were of equal size to the spring Chinook native to the basin. Additionally, it was thought that the basin supported more coho than spring Chinook or steelhead.

## 2 Current Conditions

Methow coho spawn in the mainstem Methow River and small tributaries such as Gold Creek. As the reintroduction progresses, it is expected that coho will begin using other streams.

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 present at spawning 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 result of reintroduction efforts.

### 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 regarding program success. Habitat in the Methow is expected to improve from actions designed to increase the abundance and productivity of listed steelhead and spring Chinook.
- Habitat Productivity and Capacity: Productivity: 1.38; Capacity: 1,514

### 2.2 Current Hatchery Programs Affecting this Population

The Yakama Nation coho reintroduction program releases juvenile hatchery coho into the Methow River. A description of this program is presented below.

Little White Salmon/Willard National Fish Hatchery (Yakama Coho): Broodstock for the Methow River component of the program may be collected at Wells Dam, Winthrop National Fish Hatchery, Twisp River Adult Weir, Chewuch River Adult Weir, and Foghorn Dam. Egg incubation and rearing can occur at the Cascade Fish Hatchery, Willard National Fish Hatchery and Winthrop National Fish Hatchery. Although juvenile releases are expected to vary over time as natural production increases, the program currently releases approximately 400,000 coho to the subbasin. The current program has an R/S of 2.0.

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 – 15 year habitat improvement phase is also planned.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 92 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 49 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 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 increase from 0.5 to 0.9. Average abundance of natural-origin spawners (NOS) would decrease from approximately 83 fish to approximately 1 fish. Harvest contribution of the natural and hatchery populations would go from approximately 618 fish to zero 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 Methow River, with numbers at or near carrying capacity, that provide opportunities for significant harvest for Tribal and non-Tribal fishers. Historically, the Methow River supported a coho population of between 23,000 and 31,000 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 would transition from the use of lower Columbia River hatchery stocks to a Methow River hatchery stock. Once the hatchery stock is established, natural production phases will outplant juveniles into key coho habitat in the Methow River, Chewuch River, Twisp River, and Wolf Creek. Juvenile releases during this phase would total approximately 1.0 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 700,000 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 350,000 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 500,000 smolts released at Winthrop NFH and Wells Hatchery. Broodstock for the current program is collected at Winthrop NFH and Wells Dam, and approximately 50-75% of fish are reared in the upper Columbia River Basin.

This appears to be a well thought-out reintroduction program that emphasizes developing locally adapted populations, first in the hatchery, then in the natural environment. Preliminarily, the program appears to be having success; 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 natural environment. A PNI greater than 0.5 is necessary for the natural environment to drive adaptation and increase fitness.

### **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 Methow River 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	495	90%	0%	58%	0.02	83	0.5	618	244
No Hatchery	None None	-	0%	0%	0%	1.00	1	0.9	0	-
HSRG Solution	Int Cons	495	90%	0%	58%	0.02	83	0.5	618	244
HSRG Solution w/ Improved Habitat	Int Cons	495	90%	0%	54%	0.02	97	0.5	627	244