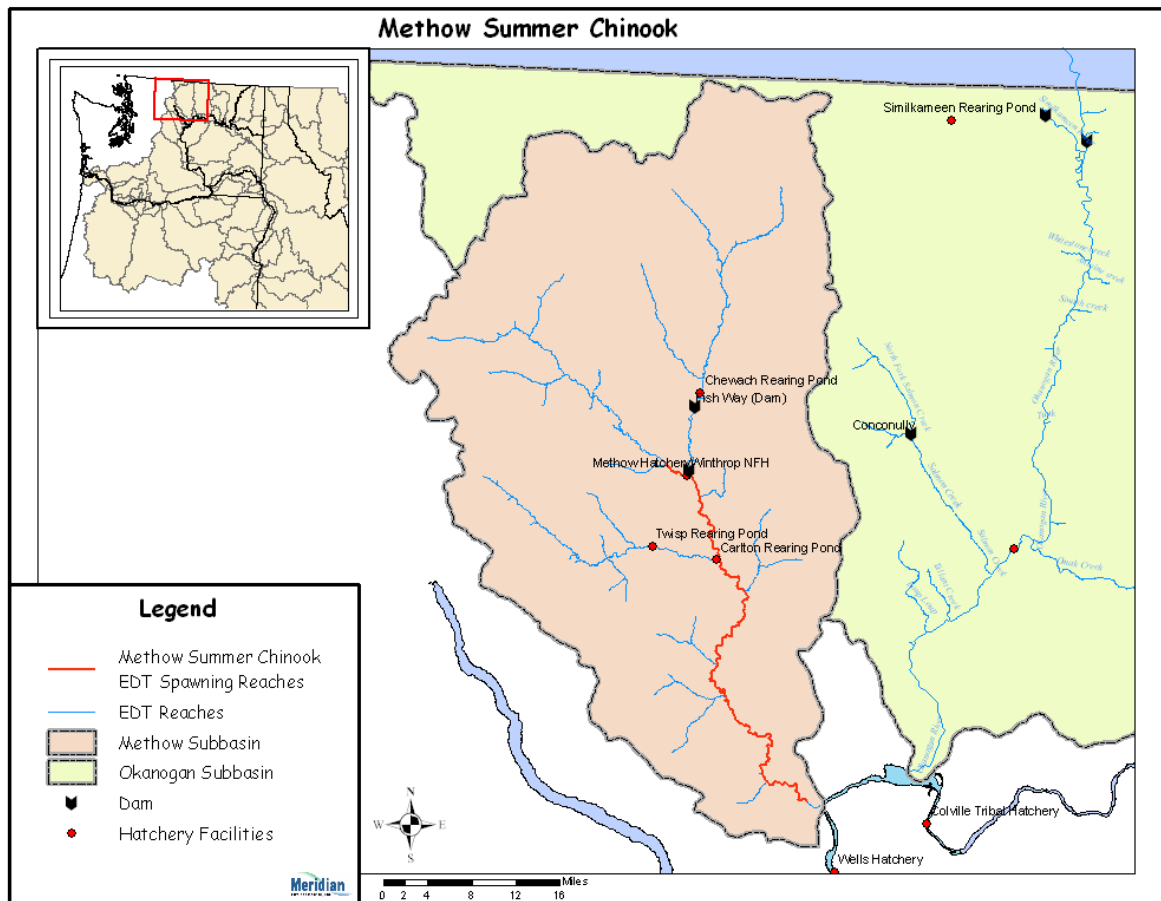


# Hatchery Scientific Review Group Review and Recommendations

## Methow Summer Chinook Population and Related Hatchery Programs

January 31, 2009



# 1 Methow River Summer Chinook

Methow summer Chinook are considered part of the Upper Columbia River summer/fall-run Chinook ESU that includes all late-run summer and fall, ocean-type Chinook salmon in the mainstem Columbia River and its tributaries between Chief Joseph and McNary dams (excluding Marion Drain). NMFS concluded that at the time of their review, this larger ESU did not merit protection under ESA (NMFS 1995 and 50 CFR Parts 222, 226, and 227).

Methow summer Chinook are considered a unique stock based on their distinct spawning distribution, later river entry timing (July), spawn timing (September to November) and genetic composition. Most spawning occurs in the mainstem Methow River from the mouth to the Chewuch River (<http://wdfw.wa.gov/webmaps/salmonscape/sasi>).

This Chinook stock is genetically very divergent from all upper Columbia Basin spring Chinook populations. They are relatively similar to Wenatchee summer Chinook.

There is no reliable estimate of historical Methow summer Chinook production, as it is not clear these fish were present in the system. The stock is a mixture of native Chinook and Chinook from the Grande Coulee Fish Maintenance Project.

## 2 Current Conditions

Methow summer Chinook spawn in late September to early November in the mainstem Methow River from the confluence of the Chewuch River to the mouth of the Methow. From 1986 to 2003, adult run size to the Methow River has ranged from 332 to 4,630 fish. Average adult return for this period has been ~1,300 fish. In 2002, the WDFW rated this stock as Healthy.

The stock is considered a mixed stock with composite (hatchery and natural) production. Winthrop and Leavenworth National Fish hatcheries have in the past released Chinook salmon captured at Wells Dam to the Methow River. The Eastbank Hatchery still produces and releases juvenile summer Chinook to the Methow River each year.

### 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: Methow summer Chinook are thought to be mixture of native summer Chinook and Chinook from the Grande Coulee Fish Maintenance Project (1939 to 1943), which dispersed offspring of fish attempting to return to spawning grounds above Grand Coulee Dam into Upper Columbia tributaries below the dam.
- Recovery Goal for Abundance: Not Applicable
- Productivity Improvement Expectation: Productivity is expected to increase over time as habitat actions designed to improve the abundance and productivity of ESA listed spring Chinook are implemented in the subbasin.
- Habitat Productivity and Capacity: Productivity: 1,76 ; Capacity: 1,531

## 2.2 Current Hatchery Programs Affecting this Population

The primary hatchery program that is most likely to affect Methow summer-run Chinook is the Carlton Pond program. A brief description of this program is presented below.

Methow/Okanogan Summer Chinook (Me-Ok) (Carlton Pond): This integrated harvest program releases up to 400,000 (10-15 fpp) fish each year to the Methow River. Fish are acclimated prior to their release at Carlton Pond (Rkm 90.2). Fish are force-released at ~10 fpp from mid-April to mid-May from the Carlton Ponds. All fish released are mass-marked with an adipose fin-clip and coded-wire tag. An additional 576,000 fish of similar size are released outside of the subbasin in the Okanogan River subbasin (from Similkameen Pond). Adults for broodstock are collected at Wells Dam from the run at large and held/spawned at the Eastbank Hatchery. All incubation and juvenile rearing activities occur at this facility or at the two acclimation ponds (Carlton and Similkameen). Broodstock protocols for the Methow and Okanogan programs call for a goal of 100% of the hatchery broodstock to be collected from the natural run-at-large crossing Wells Dam; however, this has not been achieved. The average pNOB for brood years 1993 through 2005 (run-at-large) has been 0.56. The average PNI for this program is 0.45 (pHOS = 66%). The program has a recruit per spawner value of 4.0.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: NA
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 657 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 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 0.5 to 1.1. Average abundance of natural-origin spawners (NOS) would decrease from approximately 271 fish to approximately 108 fish. Harvest contribution of the natural and hatchery populations would go from approximately 938 fish to approximately 149 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**

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 Committee, Hatchery Sub-Committee). To achieve this managers have established a mitigation goal of 400,000 smolts for this program. The average release since 1989 has been 368,590 smolts. Managers have not assigned a population designation for the Methow summer Chinook. Managers are uncertain whether or not the Methow historically supported an independent population of summer Chinook. It is being managed as an integrated population based on an aggregate of fish returning above Wells Dam. Under current conditions, this population does not meet the standards for a Primary or Contributing population.

Current management does not allow any population structure above Wells Dam. Current management is to collect broodstock at Wells Dam comprised of an unknown mixture of natural-origin adults from the Methow, Okanogan and mainstem Columbia rivers. A proportion of this aggregate broodstock is released into the Methow River. Fish released into all tributaries are the progeny of 100% natural-origin adults comprising this aggregate broodstock. Smolt-to-adult returns in the Methow River average approximately one-third of the return rates of progeny from the same broodstock source released in the Okanogan River. The cause of this major difference is unknown. We note that a disproportional number of high BKD titer juveniles are used in the Methow program. There are no means to manage the composition of hatchery and natural-origin adult summer Chinook on the spawning grounds. Currently, hatchery-origin adults comprise approximately 66 % of the naturally-spawning population of summer Chinook in the Methow River.

At current harvest rates and existing productivity and capacity levels, it does not appear that Methow summer Chinook can be a self-sustaining population. In fact, there would be no natural spawning component present without the support of the hatchery program. An effective integrated program cannot be operated here under current conditions.

No fisheries are currently selective on summer Chinook. There appears to be an opportunity to use this method to remove hatchery fish, provide additional harvest opportunities, and improve productivity of the population.

### **Recommendations**

The HSRG recommends that managers prioritize analysis of genetic data collected to help determine the population structure of summer Chinook in the upper Columbia River Basin. Managers need to clearly define the overall summer/fall Chinook population structure above Rocky Reach Dam to maintain or increase abundance, productivity and diversity of these populations.

If it is determined that summer Chinook returning to the Methow River is a distinct population, the HSRG recommends that broodstock management strategies be implemented to meet the standards of a Contributing or Primary population. This would require an ability to collect fish returning to the Methow River, control hatchery fish on the spawning grounds, and reduce harvest rates on natural-origin fish to allow a self-sustaining population to exist. However, under the current habitat conditions, accomplishing this will require significant reductions in harvest rates and removal of hatchery strays. This would still result in a relatively small population (less than 200 natural-origin fish).

In order to improve the viability and productivity of natural upper Columbia River summer Chinook populations, the HSRG recommends immediate management of all freshwater sport fisheries as selective fisheries. The Colville Tribes' growing cultural and subsistence fishery should continue to develop its selective capacity. Research on selective gear for the commercial fishery should commence immediately.

The HSRG also recommends that fishery managers immediately review the capacity of upper Columbia River summer Chinook populations to tolerate current and future high exploitation rates and adopt fisheries management and hatchery production strategies that are compatible with species conservation and survival.

If it is determined that fish returning to the Methow River are not a distinct population but rather a component of the mainstem spawning aggregate, the HSRG recommends that the Methow could be considered a Stabilizing population and managed as a component of the Wells Hatchery program.

We encourage managers to investigate the reasons for poor survival of the Carlton Pond releases. We also encourage managers to consider collecting broodstock from throughout the full run, at least into mid-October.

The HSRG recommends that managers implement a BKD control strategy for their spring and summer/fall Chinook hatchery programs where BKD has proved a recurring problem. Ideally, the strategy should include culling (destroying) eggs/progeny from hatchery- and natural-origin brood that are found to be infected with the BKD agent. However, because brood fish with high levels of the BKD agent are more likely to transmit the agent to their progeny than brood with lesser levels of the agent, the culling of eggs/progeny from infected brood fish, should, at the very least, be applied to those with high levels of the BKD agent (e.g., ELISA OD value of 0.4 and above when broodstock are not in short supply and ELISA OD value of 0.6 and above when broodstock are in short supply). In addition, in programs using ESA-listed natural-origin brood

fish, the culling of their eggs/progeny may, at the managers' discretion, be dispensed with. However, the ESA-listed broodstock should be injected, pre-spawning, with an appropriate antibiotic (preferably, azithromycin at 40 mg/kg fish), and the resulting eggs should be surface-disinfected with an iodophor. All pre-spawning brood injections may be limited to females, ESA-listed or otherwise.

Finally, eggs and hatchlings derived from broodstock found to be heavily infected with the BKD agent should be incubated/reared in isolation from those obtained from broodstock with no or lesser levels of the BKD agent. In addition, the hatchlings should be reared at the lowest possible densities (below current standards), and, at the first signs of infection with the BKD agent, they should be treated with orally administered erythromycin (100 mg/kg fish) for 28 days. The treatment should be repeated if there is evidence that the BKD agent has persisted in the hatchlings.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Methow Summer Chinook. 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%	66%	0.00	271	0.5	375	-
	Seg Harv	340.8	0%						563	-
No Hatchery	None None	-	0%	0%	0%	1.00	108	1.1	149	-
HSRG Solution	None None	-	0%	0%	64%	0.00	299	0.6	441	-
	Seg Harv	340.8	0%						647	-
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	61%	0.00	337	0.6	497	-
	Seg Harv	340.8	0%						647	-