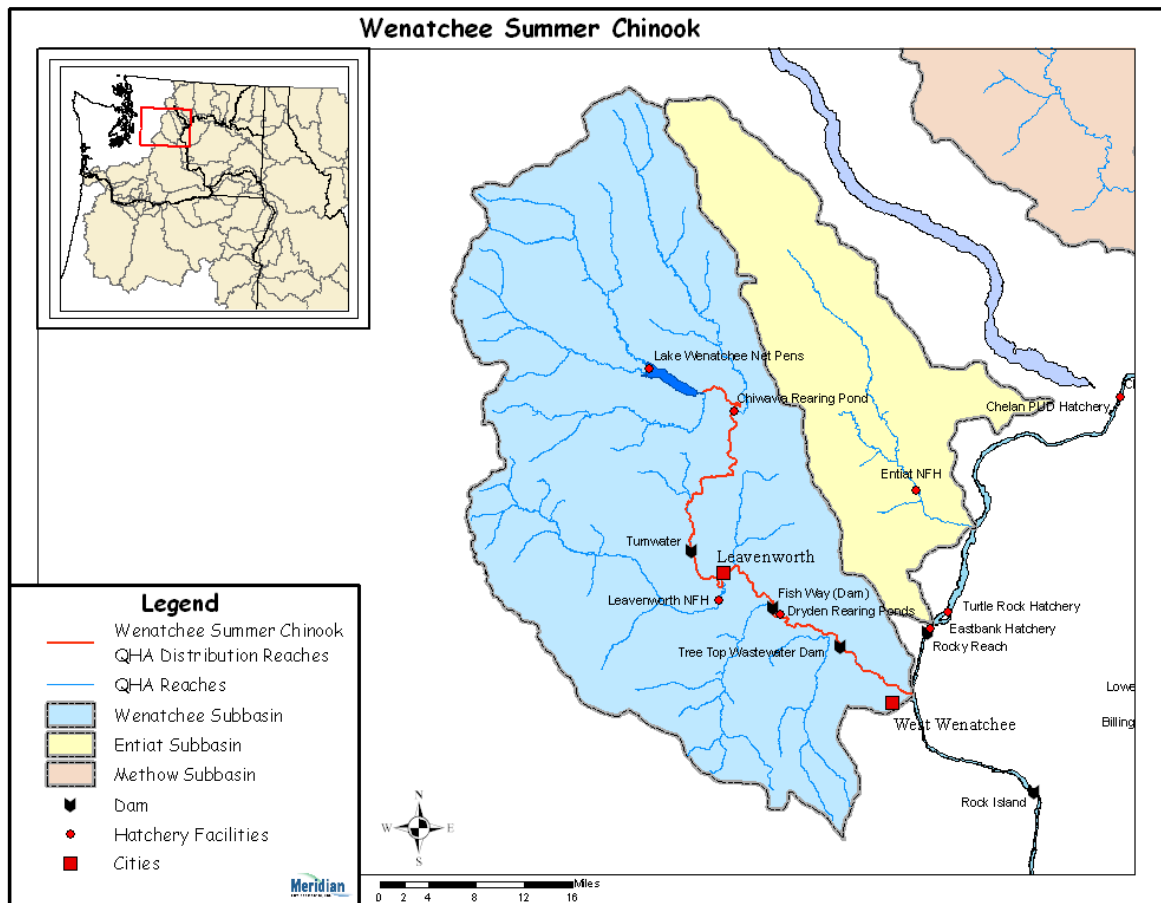


Hatchery Scientific Review Group Review and Recommendations

Wenatchee Summer Chinook Population and Related Hatchery Programs

January 31, 2009



1 Wenatchee River Summer Chinook

Wenatchee 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 that are present 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). Current distribution is shown in the map above.

Historical Chinook runs to the Wenatchee River were about 41,000 fish; however, the proportion that were summer/fall-run Chinook (late-run) is not known (UCSRB 2007). Late-run Chinook historically used the mainstem of the Wenatchee River, from its mouth to Lake Wenatchee. Tumwater Dam (RM 32.7) and Dryden Dam (RM 17.6) on the Wenatchee River are thought to have been partial obstacles to upstream passage of adults before 1957 (NPPC 2004).

2 Current Conditions

Wenatchee 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. A Wenatchee summer Chinook stock has been maintained at the WDFW Eastbank Hatchery since 1989. Yearling smolts are acclimated in the Dryden Acclimation Pond and released into the Wenatchee River.

Late-run Chinook can be found spawning in the Wenatchee River from RM 1.0 to Lake Wenatchee RM 54. It has been reported that since the early 1960s, the number of redds have decreased downstream of Dryden Dam (RM 17.5) and increased upstream of Tumwater Dam (RM 32.7) (NPPC 2004). The highest densities of redds are found near the City of Leavenworth (RM 23.9 to 26.4) and in the Tumwater Canyon (RM 26.4 to 35.6). Summer Chinook spawn in September and October.

The 10-year average summer-run Chinook adult counts at Rock Island Dam are approximately 46,000 fish, counts which both hatchery-origin and natural-origin adults and fish returning to multiple rivers. Based on redd counts, Wenatchee summer Chinook abundance ranged from about 4,000 to 9,100 from 1996 to 2001. According to the results of carcass surveys, adult escapement to the Wenatchee River consists primarily of naturally-produced fish.

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: Wenatchee 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: Increase over time as habitat actions designed to improve the abundance and productivity of ESA listed spring Chinook are implemented.
- Habitat Productivity and Capacity: Productivity: 4.25; Capacity: 13,360

2.2 Current Hatchery Programs Affecting this Population

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

Wenatchee Summer Chinook (Dryden Pond): This integrated conservation program releases a maximum of 864,000 smolts (720,000 recent average) (10 fpp-yearlings) starting in mid-April. Fish are reared at the Eastbank Fish Hatchery on well-water and then transferred in the spring to Dryden Pond for acclimation and release to the Wenatchee River (Rkm 26.0). Both NOR and HOR adults are collected at the left and right bank Dryden traps and Tumwater Dam trapping facility and transported to the Eastbank Hatchery. The program has a recruit per spawner value of 9.8.

The number of hatchery adult strays (referred to as internal or in-basin) from the Dryden Pond program spawning with natural-origin Wenatchee Summer-run Chinook is estimated at 2,193 fish. Hatchery adults from the following programs are assumed to stray to the Wenatchee River system and possibly spawn with native late-run Chinook:

- Methow Summer Chinook
- Okanogan-Similkameen Summer Chinook
- Upper Middle Columbia-Mainstem Summer Chinook (Turtle Rock)
- Upper Middle Columbia-Mainstem Columbia Summer Chinook (Wells)

Adult strays from these programs are defined as external strays (out-of-subbasin) in AHA population modeling. It is estimated that 233 external hatchery fish from these programs affect Wenatchee summer Chinook.

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 2.3 to 2.8. Average abundance of natural-origin spawners (NOS) would increase from approximately 5,321 fish to approximately 6,338 fish. Harvest contribution of the natural and hatchery populations would decrease from approximately 9,794 fish to approximately 7,805 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 not assigned a population designation for the Wenatchee summer Chinook. The current program is consistent with the standards for a Primary population. This integrated conservation program releases a maximum of 864,000 smolts (10 fpp-yearlings) starting in mid-April. 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). Broodstock is collected at Dryden and Tumwater dams and is nearly 100% natural-origin. The natural population seems to be robust and healthy and provides substantial harvest benefits. The lower river spawning (near Dryden) is comprised of greater than 50% hatchery-origin spawners; however, the highest density of redds is found higher in the basin near Leavenworth and above Tumwater Canyon. Overall, the percent of hatchery-origin spawners is approximately 20%. Approximately 15% of the returns from this program are reported to spawn outside the subbasin.

Numerous fish infected with *Saprolegnia* sp. (fungus) were observed in Dryden Pond. Managers indicated that this has been observed frequently and occurs shortly before release.

All fish are adipose fin-clipped and coded wire-tagged.

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 determine the population structure of summer Chinook in the upper Columbia River Basin.

The HSRG has no specific recommendations to improve upon the broodstock management protocols for this program. To address the fungus problem, managers should accelerate release dates, allow volitional release of early migrating smolts and/or implement other protocols to ensure production of healthy 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.

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.

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

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Wenatchee 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	Int Both	737.1	1%	0%	27%	0.79	5,321	2.3	9,794	18
No Hatchery	None None	-	0%	0%	0%	1.00	6,338	2.8	7,805	-
HSRG Solution	Int Both	737.1	1%	0%	25%	0.80	5,402	2.4	11,706	15
HSRG Solution w/ Improved Habitat	Int Both	737.1	1%	0%	22%	0.82	6,291	2.7	12,955	15