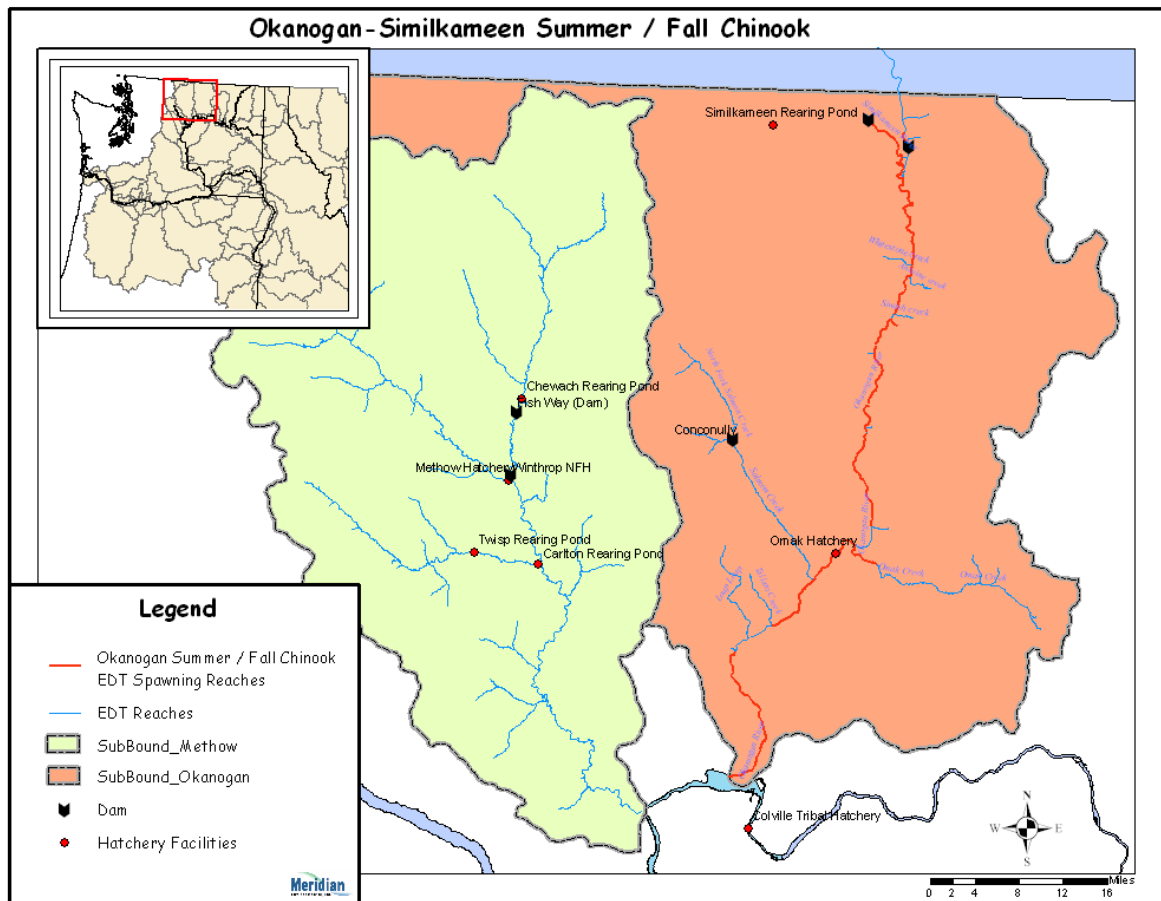


Hatchery Scientific Review Group Review and Recommendations

Okanogan Summer Chinook Population and Related Hatchery Programs

January 31, 2009



1 Okanogan River Summer Chinook

Okanogan 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).

Okanogan summer Chinook were identified as a stock based on their distinct spawning distribution, later river entry timing (July to September), spawn timing (October to November) and genetic composition. Historically, adult spawning likely occurred throughout the mainstem Okanogan and major tributaries. Summer Chinook from the Similkameen River, a major Okanogan River tributary, sampled from 1991 to 1993 were significantly different from other upper Columbia summer Chinook stocks. (<http://wdfw.wa.gov/webmaps/salmonscape/sasi>).

2 Current Conditions

Okanogan summer Chinook spawn from early October to mid-November in the mainstem Okanogan River from RM 40.3 (Riverside) to Zosel Dam (Colville Tribe 2004). Spawmed-out adult carcasses have also been found in the Similkameen River and in Canada above Lake Osoyoos. From 1992 to 2003, adult runs to the Okanogan River have ranged from 341 to 13,857 fish. The run consists of both hatchery- and natural-origin adults. In 2002, the WDFW rated this stock as Healthy (<http://wdfw.wa.gov/webmaps/salmonscape/sasi>).

The stock is considered to be mixed with composite (hatchery and natural) production. The Eastbank Hatchery still produces and releases juvenile summer Chinook to the Okanogan River each year. Fish are reared at the Eastbank Hatchery and then transferred to the Similkameen Acclimation Pond for release. Broodstock consists primarily of Methow River and Okanogan River 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: Okanogan Summer Chinook consist of a composite population of hatchery and natural-origin adults from the Methow and Okanogan Rivers.
- Recovery Goal for Abundance: Not Applicable
- Productivity Improvement Expectation: Productivity is expected to increase over time as habitat and hatchery actions designed to improve the abundance and productivity of ESA listed steelhead are implemented in the subbasin.
- Habitat Productivity and Capacity: Productivity: 6.0 ; Capacity: 10,000

2.2 Current Hatchery Programs Affecting this Population

The primary hatchery program that is currently affecting Okanogan summer-run Chinook is the Methow/Okanogan Summer Chinook (Me-Ok) (Similkameen Pond) program. A brief description of this program is presented below.

Methow/Okanogan Summer Chinook (Similkameen Pond): This integrated harvest program releases up to 576,000 (10-15 fpp) fish each year to the Similkameen River (Okanogan River tributary). Fish are acclimated prior to their release at Similkameen Pond (Rkm 5.0), and then volitionally released for two weeks before being forced from the pond. Release occurs from mid-April to mid-May with fish at ~ 10 fpp. All fish released are mass-marked with an adipose clip and coded-wire tag. Similkameen Pond has had difficulties meeting its goals due to a variety of disease (cold-water, BKD, Ich) and water quality problems. Water quality issues include water temperature, pollution and heavy loads of sediment. 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 sites (Carlton Pond, Methow River) and Similkameen. The R/S value for the Similkameen Hatchery program is 17.0. An additional 400,000 fish of similar size are released in the Methow River subbasin, where juveniles are acclimated at the Carlton Acclimation Ponds. Broodstock protocols for the Methow and Okanogan programs call for 100% of the hatchery broodstock to be collected from the natural run-at-large crossing Wells Dam. The average pNOB for brood years 1993 through 2005 (run-at-large) has been 0.56. The average PNI for this period was 0.60 (this program).

The Chief Joseph Hatchery Master Plan (Colville Tribes 2004) calls for the development of a locally-adapted broodstock of Okanogan River summer Chinook. To achieve this objective, the Colville Tribe will be constructing Chief Joseph Hatchery adjacent to Chief Joseph Dam on the Columbia River. The program will produce 1.1 million juveniles for conservation purposes and 900,000 for harvest (both will be integrated programs). Both yearling and sub-yearling juveniles will be released into the subbasin. All incubation and rearing activities will occur at Chief Joseph Hatchery and acclimation ponds (Riverside, Omak, St. Mary's Mission Pond, Ellisforde Pond and Bonaparte) located on or near the Okanogan River. Live-capture techniques will be used to collect the adult fish needed for hatchery broodstock.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from integrated in-basin programs: 2,475 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 109 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 2.4 to 3.4. Average abundance of natural-origin spawners (NOS) would increase from approximately 3,483 fish to approximately 4,549 fish. Harvest contribution of the natural and hatchery populations would go from approximately 10,227 fish to approximately 7,585 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 576,000 smolts for this program. The average release since 1989 has been 491,336 smolts. Managers have not assigned a population designation for the Okanogan summer Chinook. It is being managed as an integrated population based on an aggregate of fish returning above Wells Dam. This population could meet the standards for a Primary population; however, current practices do not allow for the management of specific populations of summer Chinook upstream of Wells Dam. Currently, the program collects broodstock from the east ladder at Wells Dam (predominantly natural-origin adults of Methow, Okanogan and mainstem Columbia River

origin). Adults are transferred to the Eastbank Hatchery, where spawning, incubation, and early rearing occur. The release objective for the program is 576,000 smolts. Presmolts are transferred from the Eastbank Hatchery to an acclimation facility on the Similkameen River (in the Okanogan system). Smolts are released in the spring following an over-winter acclimation period. Between 1992 and 2003, the average spawning escapement for the Okanogan and Similkameen rivers averaged 4,288 adults (with a range between 473 and 13,857 fish). The estimated smolt-to-adult return rate for this program is 0.9%, approximately three times higher than that observed for the Methow River summer Chinook program.

Currently, there is no ability to manage the composition of adult summer Chinook on the spawning grounds within the Okanogan system; however, the Colville Tribes are testing selective adult capture gear to target hatchery-origin fish and to collect broodstock. The estimated proportion of hatchery-origin adults in spawning areas (pHOS) averages 37 % and has ranged between 22% and 70%.

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

A program of the current size (576,000 smolts) could be operated as an integrated program consistent with the standards of a Primary population (PNI greater than 0.67). This would require collecting broodstock throughout the full run timing from fish returning to the Okanogan system instead of at Wells Dam. There are multiple options to accomplish this. For example, one option is managing pNOB at 50%, a pHOS target of approximately 25%, which would require removing at least 50% of returning hatchery fish.

A larger integrated program, also consistent with the standards of a Primary population, is possible if pNOB could be increased or pHOS could be further reduced.

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.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Okanogan 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	574.1	0%	0%	37%	0.60	3,483	2.4	10,227	-
No Hatchery	None None	-	0%	0%	0%	1.00	4,549	3.4	7,585	-
HSRG Solution	Int Both	911.2	40%	0%	29%	0.69	4,578	3.2	15,388	1,254
HSRG Solution w/ Improved Habitat	Int Both	911.2	40%	0%	26%	0.72	5,264	3.6	16,388	1,254