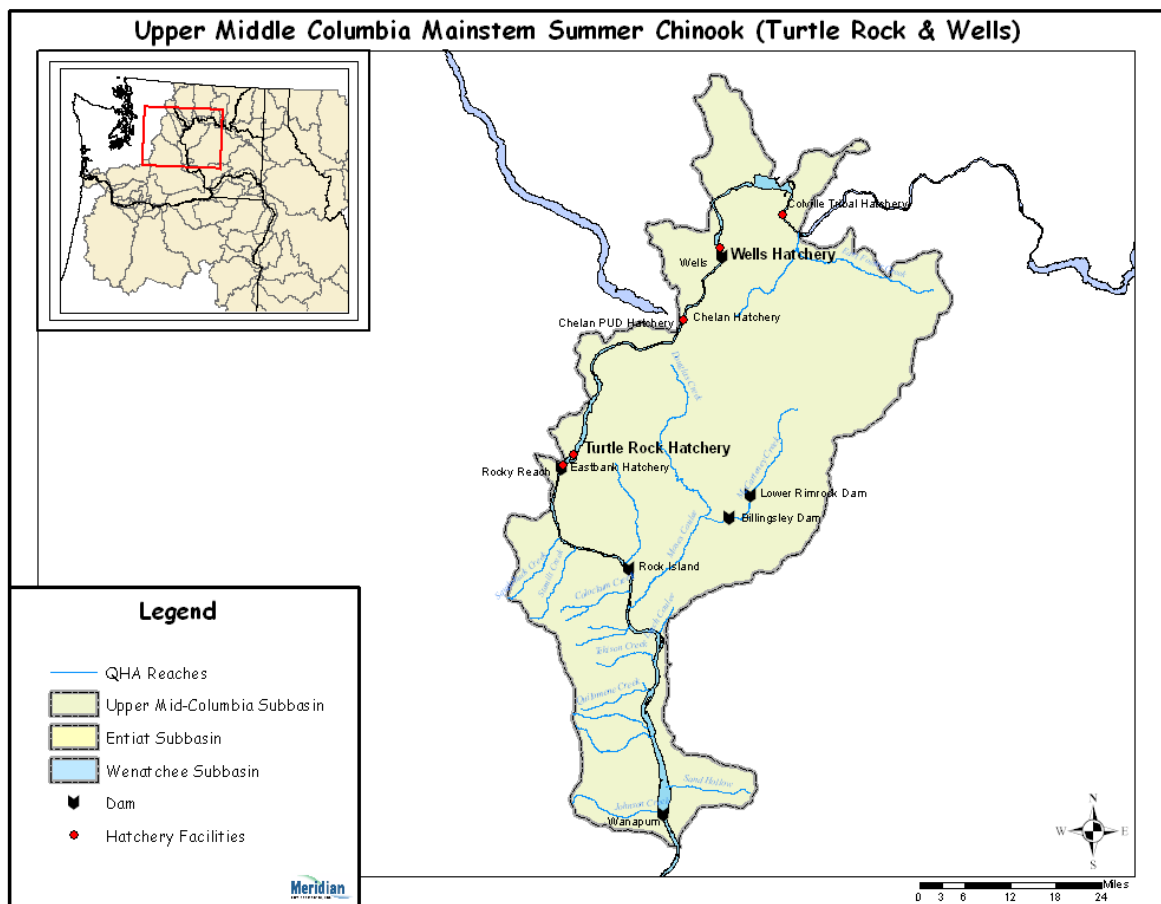


Hatchery Scientific Review Group Review and Recommendations

Upper Middle Columbia Mainstem Hatchery Summer Chinook Population and Related Hatchery Programs

January 31, 2009



1 1 Upper Middle Columbia Mainstem Hatchery Summer Chinook

The Upper Middle Columbia Mainstem Hatchery Summer Chinook population is a hatchery population that is not included as part of the Upper Columbia Summer/Fall-run Chinook ESU. This population has no viability or recovery goals. The population includes hatchery-origin fish from the Wells and Turtle Rock hatchery programs.

2 Current Conditions

The program collects hatchery-origin adult summer Chinook at Wells Hatchery (near Wells Dam). Broodstock consists primarily of hatchery-origin adults, but some natural-origin fish have been collected. The primary consideration in broodstock collection is to achieve a minimum escapement of 2,000 adults and jacks past Wells Dam each year. If adult escapement targets are not achieved, hatchery production would be curtailed or eliminated. Marked strays from hatchery programs outside of the mid-Columbia are not used as hatchery broodstock when it appears that the percentage of strays exceeds 5% of broodstock. The program has a release goal of 840,000 juvenile summer Chinook from Wells Hatchery and 1.278 million juveniles from Turtle Rock Hatchery.

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for this hatchery population.

- ESA Status: Not Listed
- Population Description: These are segregated harvest programs that are maintained through the collection of hatchery-origin adults at Wells Dam.
- Recovery Goal for Abundance: Not Applicable
- Productivity Improvement Expectation: Not Applicable
- Habitat Productivity and Capacity:
Mainstem population: Productivity: 5.0; Capacity: 6,000
Wells Hatchery population: Productivity: 0; Capacity: 0

2.2 Current Hatchery Programs Affecting this Population

Two primary hatchery programs make up this population. Each is briefly described below.

1. Wells Hatchery Summer Chinook: The program is described as an integrated harvest type designed to mitigate for the effects of Wells Dam operations on fisheries. The program releases 840,000 juvenile summer Chinook. The release includes 320,000 yearling at 10 fpp (R/S of 16.5) and 484,000 sub-yearlings (242,000 at 50 fpp, R/S of 1.2 and 242,000 at 25 fpp, R/S unknown to date). Fish are reared on a seasonally varying combination of ground water and river water and released volitionally to the Columbia River. All released fish are mass-marked. Incubation and rearing activities are performed on-station. Broodstock are collected from fish entering the facility ladder (77% of total) and at Wells Dam (east ladder).
2. Turtle Rock via Wells Hatchery: This program is defined as a segregated harvest program, with a production goal of 1.078 million sub-yearlings and 200,000 yearlings (8 fpp). Included in the sub-yearling release is a group of 450,000

accelerated sub-yearlings that are reared at the Eastbank Hatchery and force-released from the Turtle Rock Hatchery when they reach 25 fpp. Non-accelerated sub-yearlings (628,000 fish release) are transferred as emergent fry to Eastbank Hatchery rearing units. They are then transferred as unfed fry to the Turtle Rock annex facility where they are reared to 80 fpp. In early May, they are transferred to the Turtle Rock Island facility for final rearing and are force-released in early July at approximately 55 fpp. For the yearling production, emergent fry are transferred and reared at the Rocky Reach Annex rearing units to ~ 40-50 fpp, transferred in late October to the Turtle Rock Island facility where they are reared from late October to April, and then force-released in mid-April at ~8 fpp. All yearling fish are mass-marked (coded wire-tagged and adipose fin-clipped); 200,000 from each of the sub-yearling groups are marked (coded wire-tagged and adipose fin-clipped); the remainder are given only an adipose clip. The average weighted recruits per spawner value for the sub-yearling and yearling program combined is 4.1. Broodstock for the program are collected at Wells Hatchery.

Broodstock protocols for both the Wells Hatchery and Turtle Rock Hatchery programs call for 10% of the hatchery broodstock to be natural origin fish.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated programs: 0 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 1,270 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 1.3 to 2.8. Average abundance of natural-origin spawners (NOS) would increase from approximately 1,372 fish to approximately 2,394 fish. Harvest contribution of the natural and hatchery populations would go from approximately 6,232 fish to approximately 3,908 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 mainstem Columbia summer Chinook. 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 goal, managers have established a mitigation goal of approximately 2 million smolts (combined programs described below). Chinook have been observed spawning in the mainstem upstream of Rocky Reach Dam although little is known about the abundance, productivity or composition of this population. Anecdotal information of spawning below Wells Dam Hatchery, Chief Joseph Dam, and mainstem spawning was provided by the managers, but the magnitude is unknown. Under current conditions, we cannot assess whether this population meets the standards for a Primary or Contributing population.

This population is being managed as an integrated population (10% pNOB) based on an aggregate of fish returning above Wells Dam. Currently, adult composition on the spawning grounds is not being managed. Broodstock for the Wells and Turtle Rock programs is collected at Wells Hatchery from mid-July through early September. There are no adult collection facilities at the Turtle Rock release site. The current production reared and released at Wells Hatchery consists of 320,000 yearlings and 484,000 sub-yearlings which are all adipose fin-marked with a portion coded wire-tagged. In addition, 200,000 yearlings and 1,100,000 sub-yearlings are reared and released at Turtle Rock. All Turtle Rock yearlings are marked and coded wire-tagged, but only a portion of the sub-yearlings (200,000) are marked and tagged. Future plans for Turtle Rock production are to transition from subyearlings to 600,000 yearlings, to be acclimated and released at the confluence of the Chelan and Columbia rivers.

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 previously collected genetic data to help determine if the mainstem spawning aggregate is a distinct population of summer/fall 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. The HSRG identified two potential options for managing the Wells on-station and Turtle Rock/Chelan programs depending upon the designation of the mainstem spawning component:

1) If the mainstem spawning aggregate is not considered a distinct population, the Wells on-station program could be managed as a segregated population and provide broodstock for the Turtle Rock/Chelan releases. The Wells and Turtle Rock/Chelan programs would be based on hatchery-origin fish returning to Wells and would need to be segregated from the distinct population(s) above Wells Dam.

2) If the mainstem spawning aggregate is a distinct population, then the Wells on-station program should be managed as an integrated program. This requires an assessment of potential productivity and capacity of natural-origin mainstem spawners. This information should be used to develop appropriate PNI values consistent with the standards for a Contributing or Primary population. Broodstock for the Wells on-station release should be collected throughout the run and should be managed consistent with the population designation. Broodstock for the Turtle Rock/Chelan could be derived from excess hatchery fish returning on-station to Wells. This would be possible only after the proposed conversion from sub-yearlings to yearlings and the resulting reduction in broodstock needs at the Turtle Rock/Chelan release site.

In order to reduce the potential for straying, adult collection capabilities should be included in the proposed program at Chelan River. In addition, managers should monitor straying from the proposed Chelan program.

Managers should consider collecting broodstock from throughout the fall run, at least into mid-October. Prior to the transition from Turtle Rock releases to Chelan, the entire release at Turtle Rock should be adipose fin-clipped.

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 the Upper Middle Columbia Summer Chinook Hatchery Population. 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%	43%	0.00	1,372	1.3	2,240	-
	Wells Seg Harv	803.0	45%						2,365	95
	Turtle Rock/Chelan Seg Harv	1,277.9	0%						1,627	-
No Hatchery	None None	-	0%	0%	0%	1.00	2,394	2.8	3,908	-
HSRG Solution	Int Both	803.0	80%	0%	43%	0.54	2,231	2.2	6,496	337
	Wells Seg Harv	-	0%						-	0
	Turtle Rock/Chelan Seg Harv	600.4	0%						5,171	0
HSRG Solution w/ Improved Habitat	Int Both	803.0	80%	0%	39%	0.56	2,590	2.4	7,012	337
	Wells Seg Harv	-	0%						-	0
	Turtle Rock/Chelan Seg Harv	600.4	0%						5,171	0