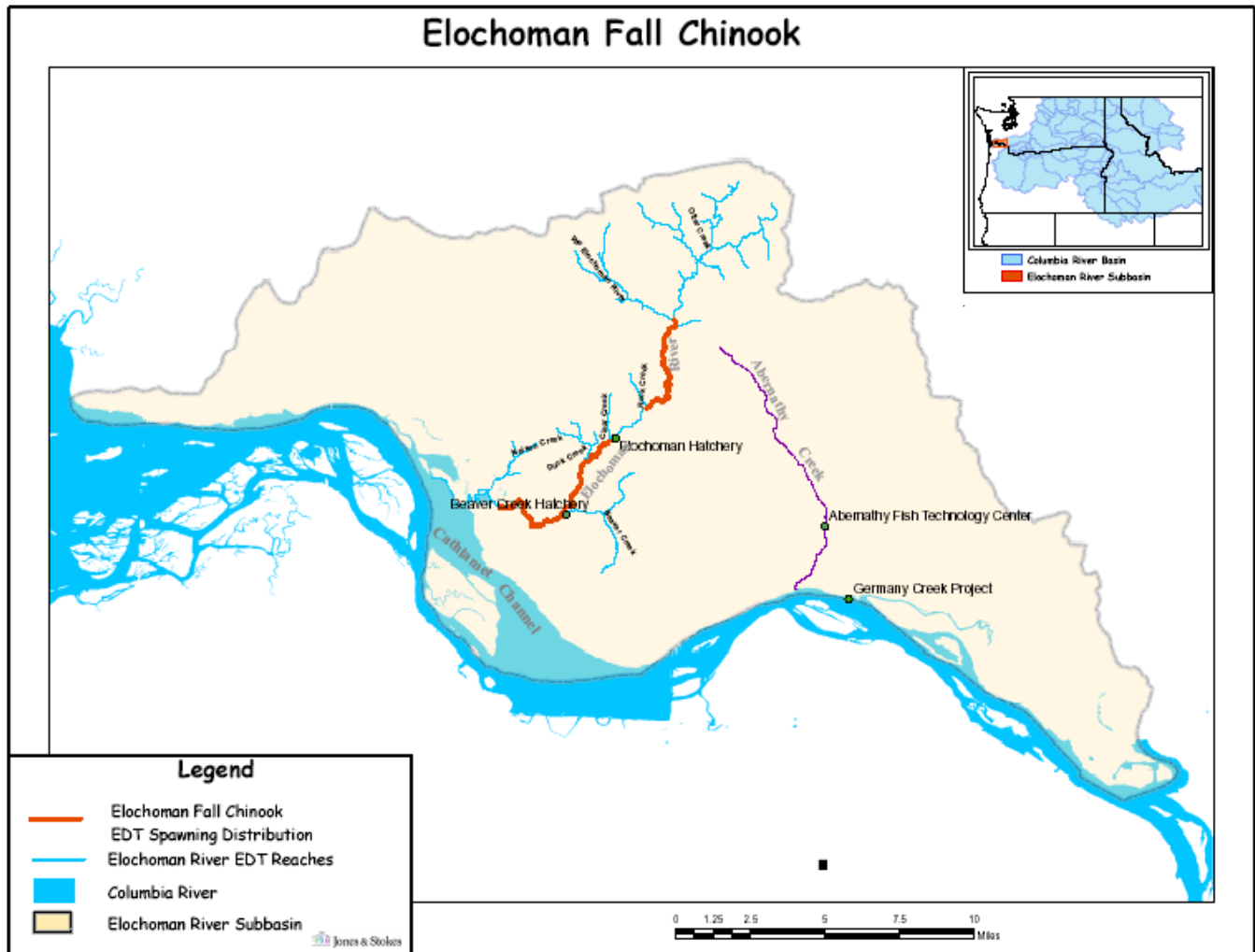


Hatchery Scientific Review Group Review and Recommendations

Elochoman Fall Chinook Population and Related Hatchery Programs

January 31, 2009



1 Elochoman Fall Chinook

WDFW has submitted natural and hatchery management draft guidelines (Fall 2003) for Elochoman fall Chinook that will be used in the interim until the TRT recommendations are developed. In 1950, estimated annual escapement of fall Chinook in the Elochoman River was 2,000 fish (WDF 1951). A weir just above tidewater is used to collect fall Chinook for the hatchery. When the hatchery has reached its egg-take goal, the remaining fish are allowed to proceed into the watershed and spawn naturally. On favorable flows, they could go as high as the dam at the hatchery at RM 9.2 and fall Chinook can spawn naturally from RM 3 to RM 11.3. Access above the Elochoman Hatchery is limited by the intake weir. Entry of adults into the subbasin occurs from early September to November. Natural escapement estimates for the Elochoman River have averaged 636 fish during 1987 through 2000. Spawning occurs from late September to mid-November with a peak usually in mid-October. The portion of naturally produced fish in the broodstock program is unknown.

2 Current Conditions

2.1 Current Population Status and Goals

- **ESA Status:** This population is listed as threatened and is part of the Lower Columbia Chinook ESU.
- **Population Description:** There are two populations in the coastal portion of the ESU, Grays River and Elochoman/Skamokawa. Both are designated as Primary populations (LCSR&SP 2004). The Elochoman River likely contained the most significant historical coastal fall Chinook population, but has a history of hatchery transfers from other lower Columbia basin streams.
- **Current Viability Rating:** Low+, with a goal of High. The goal of High was established to address ESU and coast strata risks in meeting tule fall Chinook recovery criteria.
- **Recovery Goal for Abundance:** 1,400 naturally spawning fish.
- **Productivity Improvement Expectation:** The recovery plan (LCSR&SP 2004) provides an expectation of an approximately 10% improvement in productivity and capacity for this stock.
- **Habitat Productivity and Capacity (from EDT):** Productivity 3.03; Capacity 1,706.

2.2 Current Hatchery Programs Affecting this Population

The program currently releases approximately 2,000,000 fingerlings on-station into the Elochoman River. Broodstock for this program was introduced from the Spring Creek National Fish Hatchery and has been maintained using numerous stocks. The stock is considered to be highly mixed due to these transfers. Broodstock is captured at a weir in the lower Elochoman River and is thought to contain some natural-origin fish. The percent of natural-origin fish is uncertain, since the lack of marking in the past has not allowed identification of natural-origin adults, although it is estimated at 6%. Incubation and rearing occur on-station at the Elochoman Hatchery. A mass marking (adipose fin clip) program was started with release year 2006.

The program is described as an integrated harvest program that includes natural-origin fish as broodstock, estimated to comprise 6% of the hatchery spawning population. The current estimate of the proportion of hatchery-origin spawners (pHOS) in the total spawning population is 65%, resulting in a low proportionate natural influence (PNI) of 0.08. The estimated adjusted

productivity (with harvest and fitness factor effects) is estimated to be 0.76. The projected average natural-origin escapement is 220 fish annually. The projected annual harvest contribution is 4,600 fish. Hatchery returns are projected to exceed broodstock needs by approximately 2,700 fish annually.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 514 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 232 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 Recommendations 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 0.9 to 1.9. Average abundance of natural-origin spawners (NOS) would increase from 380 to 540. Harvest contribution of the natural and hatchery populations would go from 4,749 to 542.

3.2 HSRG Observations/Recommendations

In the Observations and Recommendations 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 incorporate all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

Observations

This population is affected by out-of-basin strays, the most genetically different originating from the Rogue stock (Youngs Bay release). It was observed that the existing weir cannot remove sufficient strays to meet the primary population standards.

A significant management issue for this population is how to separate out-of-basin strays from Elochoman hatchery returns for an integrated broodstock program. One solution is to uniquely tag, but not adipose clip, fish from the Elochoman Hatchery so they can be distinguished on return and not subject to selective harvest. The current size of the program is inconsistent with its designation as a Primary population. The HSRG observed the hatchery facility to be in poor condition.

Recommendations

This Primary population is important to the ESU. The HSRG recommends that managers operate the hatchery as a much smaller, integrated, conservation program (190,000 uniquely tagged, but not adipose clipped, for selected harvest) to sustain the population until fitness and natural potential has improved to sustain the population. Rebuild the lower river weir to more effectively remove strays (90% efficiency) and collect broodstock, and update the hatchery facility.

To achieve recovery goals for this Primary population, reduced harvest impacts on natural fish, habitat improvements and changes in the current hatchery operations are necessary. The HSRG recommends that every possible step be taken to achieve the abundance goal for this population.

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 Elochoman Fall 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 Harv	2,072.1	88%	0%	61%	0.09	380	0.9	4,749	2,742
No Hatchery	None None	-	0%	0%	0%	1.00	540	1.9	542	-
HSRG Solution	Int Cons	188.4	90%	95%	1%	0.96	923	2.5	701	447
HSRG Solution w/ Improved Habitat	Int Cons	188.4	90%	95%	1%	0.96	1,087	2.8	779	447