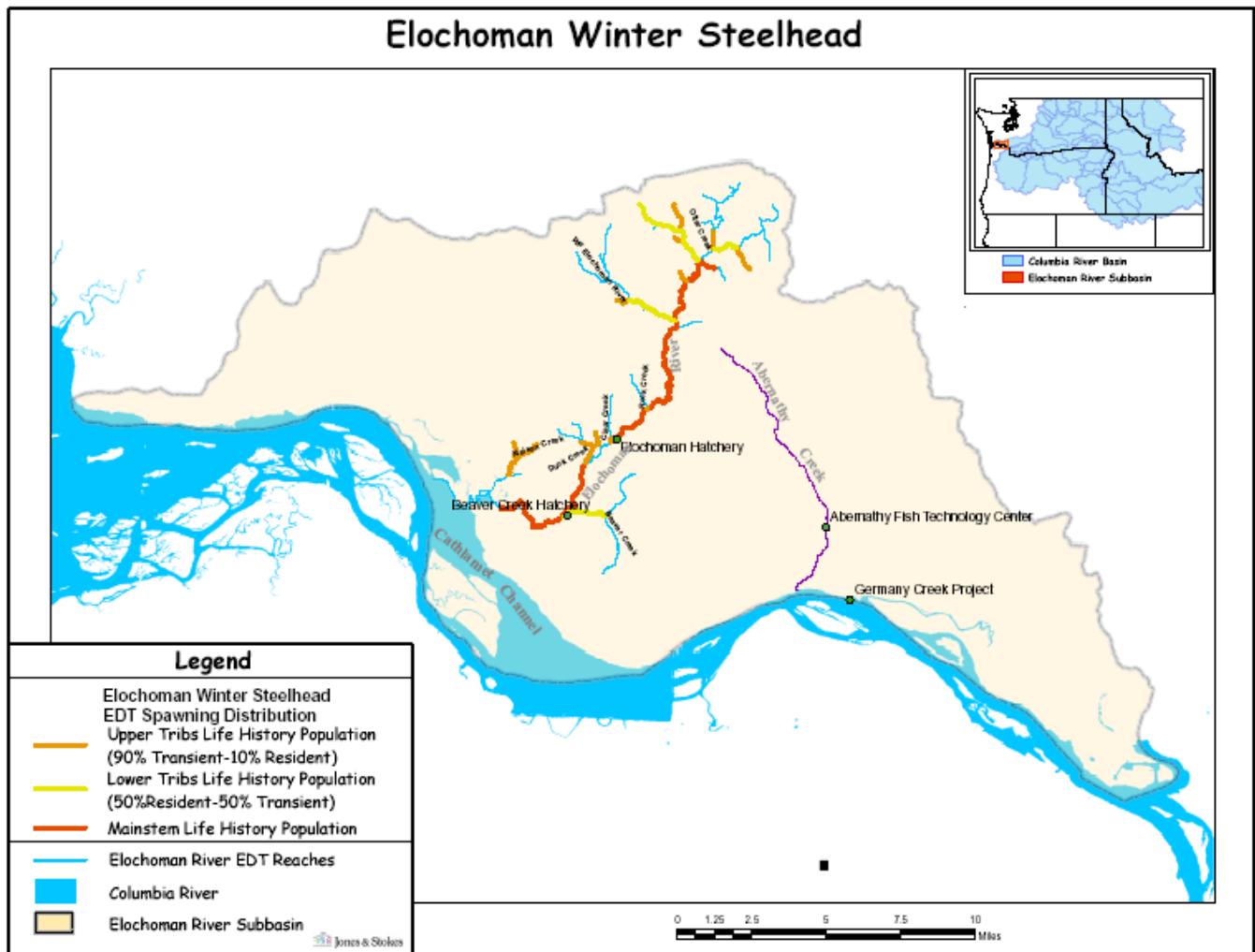


Hatchery Scientific Review Group Review and Recommendations

Elochoman River Winter Steelhead Population Population and Related Hatchery Programs

January 31, 2009



1 Elochoman River Winter Steelhead

Elochoman winter steelhead were identified as a stock based on their distinct spawning distribution. Most spawning takes place in the Elochoman River and tributaries such as Beaver, Duck, Clear, Rock and Otter creeks. Spawning also occurs in the North, East and West forks of the Elochoman from March through early June. Stock status was rated Depressed in 2002 because of chronically low escapements. An escapement goal of 626 fish has been established for this stock. Despite the improvement in 2000, escapements have been low since 1991.

Genetic sampling was conducted in 1995; however, comparisons of allele frequencies between this stock and other lower Columbia steelhead stocks for determining stock distinctiveness are not very informative (Myers et al. 2002).

2 Current Conditions

2.1 Current Population Status and Goals

The Elochoman River currently has three steelhead populations comprised of a late winter natural steelhead run, an early winter hatchery steelhead population (introduced Chambers Creek stock) currently managed as a segregated-harvest program, and a summer steelhead population (introduced Lewis River stock, via Skamania) also managed as a segregated-harvest program.

- **ESA Status:** This population is part of the Southwest Washington DPS, which is not listed under ESA. This DPS includes all natural-origin steelhead in the Columbia-Estuary-Washington province, Willapa Bay tributaries and Grays Harbor tributaries.
- **Population Description:** Elochoman River steelhead are classified as a Contributing stock to ESU viability.
- **Current Viability Rating:** 400 adults.
- **Recovery Goal for Abundance:** 700
- **Productivity Improvement Expectation:** 8 to 10% has been discussed
- **Habitat Productivity and Capacity (from EDT):** Productivity: 7.49; Capacity: 515

2.2 Current Hatchery Programs Affecting this Population

There are currently two hatchery steelhead programs in the Elochoman River, an early winter run and a summer run program. Both are segregated harvest programs.

Early Winter Steelhead Program:

- Eyed-egg objective of broodstock collected in Elochoman is 200,000 eyed eggs of which 90,000 are released as smolts in the Elochoman
- 50,000 eyed eggs transferred to Grays River Hatchery for a 40,000 smolt release
- 5,000 smolts outplanted into Coweeman River
- 15,000 smolts transferred to Coweeman Pond for acclimation and release into Coweeman River
- Hatchery-produced fish in excess of release and transfer goals are outplanted to lakes in Wahkiakum County

- Current R/S for hatchery-produced fish is estimated to be an average of 23.5 recruits/spawner. This works out to a SAR of $\approx 1.8\%$.
- Mean terminal harvest in Elochoman River on early-run winter hatchery steelhead: 1,486 adults/year (range: 302-2,928 adults; 1990/91-2002/03; HGMP)
- Mean numbers of adult returns back to hatchery: 190.5 adults (range: 52-402 adults; 1990/91-2002/03; HGMP)
- All hatchery-origin adults trapped at the hatchery are spawned (this is an interpretation from HGMP)

Coweeman Early Winter-Run hatchery steelhead outplants (from Elochoman)

- Average harvest = 92.5 fish/year (1993/94-2002/03; HGMP)
- Average harvest SAR = 0.31% smolt to adult harvest return

Grays River Winter-Run hatchery steelhead transfers and releases

- Average harvest = 233 fish/year (1990/91-2002/03; HGMP)
- Average harvest SAR = 0.58% smolt to adult harvest return

Summer Steelhead Program (Merwin):

- No historic run of summer steelhead in the Elochoman River
- ESA status – not listed and not a candidate for listing
- No viability abundance goal for summer steelhead in Elochoman River
- Hatchery population is an introduced Lewis River stock where 35,000 eggs are collected, incubated and reared at the Merwin Hatchery to 22 fish per pound (fpp). They are marked and then transferred to the Elochoman Hatchery (in early October) for final rearing and volitional release at 5 fpp in late April and May. The stock is currently managed as a segregated-harvest program.
- Mean terminal harvest in Elochoman River on summer-run hatchery steelhead: 239 adults/year (range: 89-518 adults; 1992/93-2002/03; HGMP)
- Current SAR for “smolt-to-harvest” in Elochoman River: 0.70% smolt-to-adult harvest return
- Current R/S for hatchery produced fish is estimated to be an average of 12.0 recruits/spawner based on 25 adults necessary to produce a release of 30,000 smolts.

Hatchery populations of the same species that could affect this population (e.g., through straying) would include any Columbia Basin stock that might stray into the Elochoman River as they migrate through the lower mainstem Columbia. Several of the closest hatchery populations include the Cowlitz and the Kalama river programs.

Estimated number of hatchery strays affecting this program:

- Hatchery strays from in-basin integrated hatchery program – from AHA summary: N/A
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs – from AHA summary: 138

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 Adjusted Productivity (with harvest and fitness factor effects from AHA) would increase from 4.6 to 7.0. Average abundance of natural-origin spawners (NOS) would increase from 348 to 459. Harvest contribution of the natural and hatchery populations would go from 1,751 to 34.

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 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 incorporates all factors affecting productivity (i.e., habitat quality, hatchery fitness effects, and harvest rates).

Observations

The late winter component has been designated a Contributing population and these guidelines are currently being met. There is no native summer steelhead population in this basin. There are two segregated hatchery programs, an early winter (90,000 smolts) and a summer steelhead program (30,000 smolts). The summer hatchery program is less productive (smolt to adult survival rate) than the winter hatchery program.

The HSRG suggests that managers consider the ecological effect on this population. While these outplants do not appear to be having a genetic effect, considering Kostow's data for summer steelhead, the HSRG urges caution (Kostow 2003, 2004, 2006).

Recommendations

The current programs are consistent with the designation as a Contributing population. The HSRG has no specific recommendations to modify this program. If the barrier dam were more effective, it is possible that the program would meet the genetic guidelines for a primary population.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Elochoman Winter Steelhead. 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	75%	0%	6%	0.00	348	4.6	26	0
	Seg Harv	90.7	75%						1,486	44
	Summer Stlhd Seg Harv	30.9	0%						239	1
No Hatchery	None None	-	0%	0%	0%	1.00	459	7.0	34	-
HSRG Solution	None None	0.0	90%	0%	4%	0.00	374	5.1	28	0
	Seg Harv	90.7	75%						1,486	105
	Summer Stlhd Seg Harv	30.9	0%						239	1
HSRG Solution w/ Improved Habitat	None None	0.0	90%	0%	4%	0.00	434	5.9	32	0
	Seg Harv	90.7	75%						1,486	105
	Summer Stlhd Seg Harv	30.9	0%						239	1