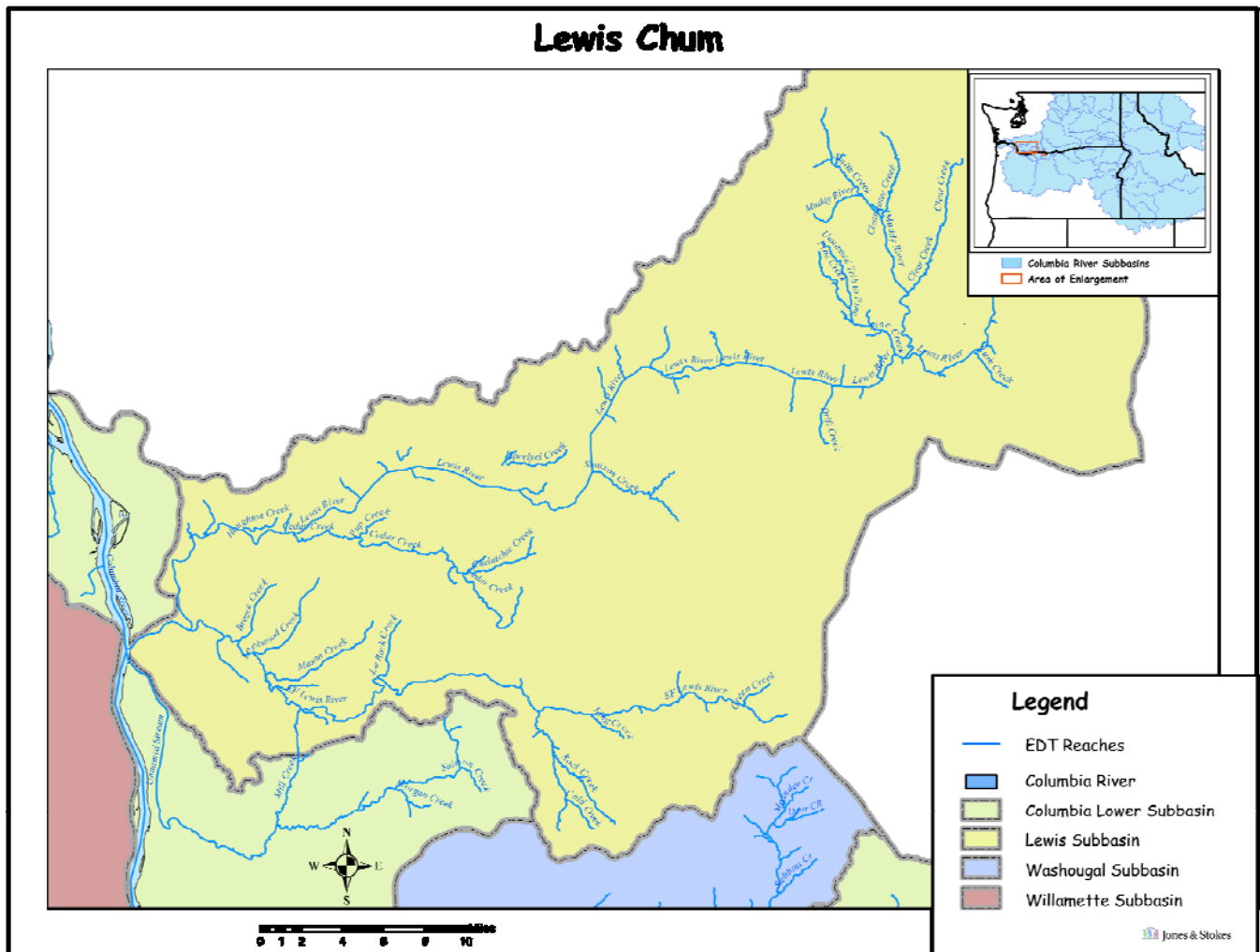


Hatchery Scientific Review Group Review and Recommendations

Lewis River Chum Population and Related Hatchery Programs

January 31, 2009



1 Lewis River Chum

This is one of 16 populations historically present in this ESU (Meyers et al. 2006). At one time over one million chum salmon returned to the lower Columbia River (McElhany 2005). Currently, few chum are observed in the Lower Columbia. Run sizes range from a few hundred to a few thousand adults. Most chum salmon in the Lower Columbia River are observed in the Grays River and a few locations further upstream.

Historical chum salmon abundance ranged from 120,000 to 300,000 fish based on available habitat and habitat modeling. Current run size is estimated to be less than 100 fish. Habitat modeling suggests a current habitat potential of over 5,000 adults. Natural spawning occurs in the lower reaches of the mainstem, North Fork, East Fork, and in Cedar Creek. Adult spawning peaks in December. All chum are naturally produced as no hatchery fry are released in the Lewis River.

2 Current Conditions

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the *natural* population.

- ESA Status: Lewis River chum salmon are part of the Columbia River Chum ESU, which was listed as Threatened under the ESA on March 25, 1999.
- Population Description: The Lewis River chum population is designated as a Primary population in the Lower Columbia Salmon Recovery and Subbasin Plan (LCSR&SP 2004). The LCSR&SP describes current viability as Very Low with a viability goal of High.
- Recovery Goal for Abundance: 1,100.
- Productivity Improvement Expectation: NA
- Habitat Productivity and Capacity (EDT based): Productivity: 2.5; Capacity: 12,860

2.2 Current Hatchery Programs Affecting this Population

No chum salmon hatchery program has ever operated in the Lewis River.

Straying of hatchery-produced chum into the Lewis River is thought to be low. The nearest hatchery program is the Duncan/Ives Island program. The effective pHOS is estimated to be ~1%. Estimated number of hatchery strays affecting this program:

- Hatchery strays from in-basin integrated hatchery program – None
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs – 60 adults

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 remain unchanged at 2.4 returns per spawner. Average abundance of natural-origin spawners (NOS) would also remain unchanged at 8,200 adults. Incidental harvest of the natural and hatchery populations remained unchanged at 167 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 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

This population is designated a Primary population.

Recommendations

The HSRG recommends that managers monitor chum salmon abundance in the Lewis River. Consider this a likely population for a small conservation hatchery program.

Implement a low cost conservation program (130,000 fed fry release) using local natural-origin broodstock as available and broodstock from natural origin returns from the Cowlitz and Kalama rivers as necessary. All hatchery-origin fish would need to be marked (adipose fin-clipped) and the proportion of hatchery fish on the spawning grounds monitored. Monitor the contribution of hatchery strays in the spawning escapement and natural production.

This, like all chum conservation programs in the lower Columbia, should include a “sunset” clause that would suspend the hatchery program after three generations, unless evidence suggests suspending releases earlier or extending the program beyond three generations would benefit the population.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Lewis River Chum. 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%	1%	0.00	8,196	2.4	167	-
No Hatchery	None None	-	0%	0%	0%	1.00	8,200	2.4	167	-
HSRG Solution	Int Cons	256.4	0%	0%	24%	0.81	9,286	2.4	251	-
HSRG Solution w/ Improved Habitat	Int Cons	256.4	0%	0%	21%	0.82	10,566	2.7	277	-