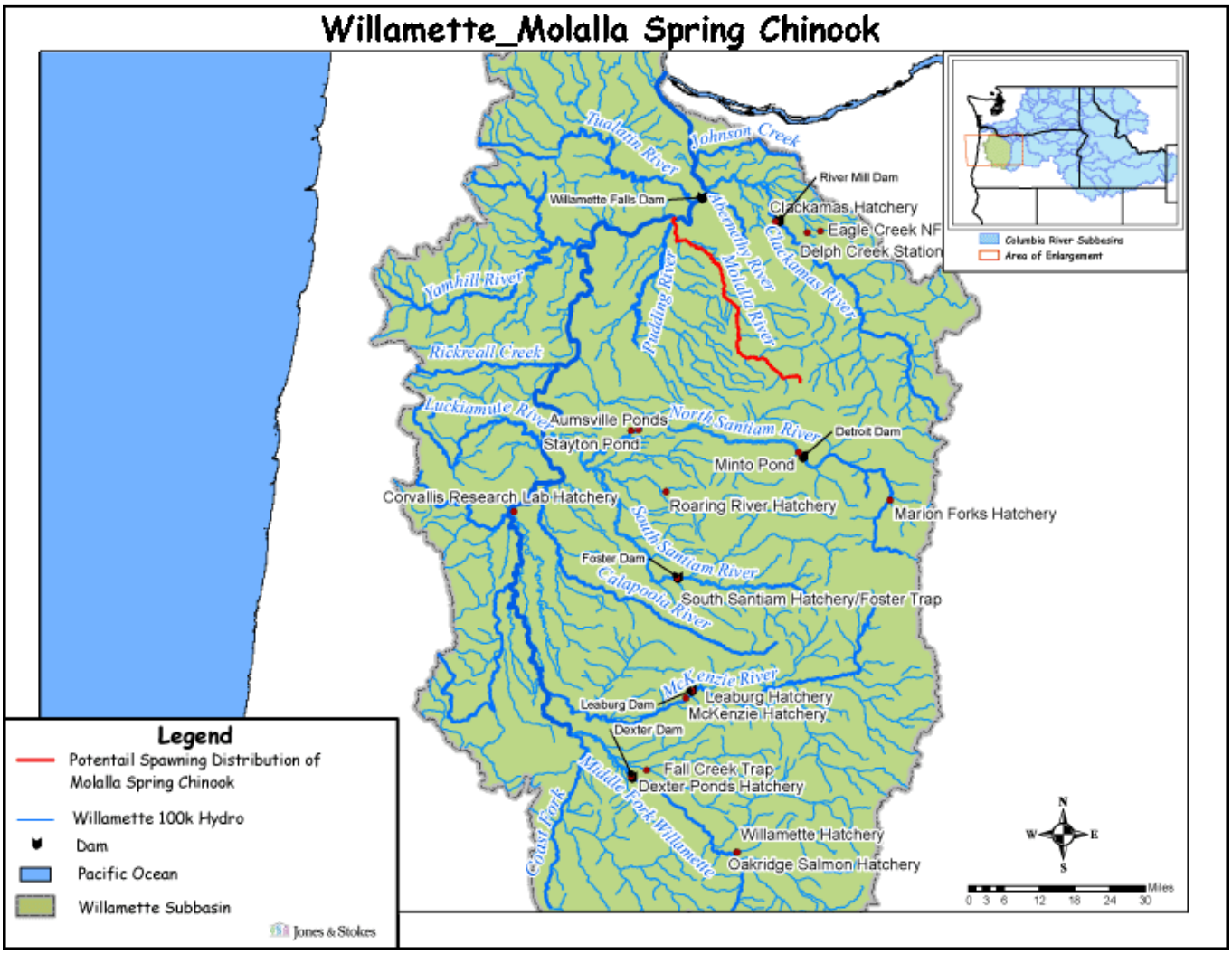
Hatchery Scientific Review Group
Review and Recommendations

Willamette – Molalla Spring Chinook Salmon
Population and Related Hatchery Programs

January 31, 2009



1 Molalla Spring Chinook Salmon

This population is part of the Upper Willamette River Chinook ESU. Historically, there were seven demographically independent populations of spring Chinook salmon in this ESU: Clackamas, Molalla/Pudding, Calapooia, North Santiam, South Santiam, McKenzie, and Middle Fork Willamette—all eastside tributaries (Meyers et al. 2003). The Molalla natural spring Chinook population is believed to be extirpated, or nearly so (U.S. Army Corps of Engineers 2002) (Subbasin Plan).

There is very little information on the historical run size or distribution of the Molalla spring Chinook population. By 1903, the abundance of spring Chinook salmon in the subbasin had already decreased dramatically (Myers et al. 2004). Surveys in 1940 and 1941 recorded 882 and 993 spawning spring Chinook salmon, respectively (Parkhurst et al. 1950). Surveys in the 1940s observed 250 spring Chinook salmon in Abiqua Creek, a tributary to the Pudding River (Parkhurst et al. 1950). In 1947, Mattson (1948) estimated the run size to be 500. It was estimated in the 1950s that there was sufficient habitat in the Molalla River subbasin to accommodate at least 5,000 fish (Parkhurst et al. 1950).

The historical run of spring Chinook in the Molalla and Pudding watersheds was believed to have declined to the point where it could no longer sustain a viable population during the 1960s (Cramer et al. 1996). Hatchery releases of spring Chinook have been made in the Molalla watershed since 1981 in an attempt to restore the population, although there is no evidence that this population has become self-sustaining (U.S. Army Corps of Engineers 2000). There have been no recent observations of spring Chinook in the Pudding River watershed (Oregon Department of Fish and Wildlife 1999a).

A 2002 survey of 16.3 miles of stream in the Molalla found 52 redds. However, 93% of the carcasses recovered in the Molalla in 2002 were fin-clipped and of hatchery-origin (Schroeder et al. 2002). Fin-clip recovery fractions for spring Chinook in the Willamette tend to underestimate the proportion of hatchery-origin spawners, so the true fraction is likely to be near 100% (Subbasin Plan).

Recent spawning surveys (2002-2005) indicate a relatively low density of spawning in the Molalla (1.3 to 4 redds per mile) (McElhany et al. 2007 review draft). Of those fish returning, nearly all are of hatchery origin. Pre-spawning mortality in 2003 in the Molalla was estimated at 69% (9 of 13 female carcasses recovered still contained eggs and therefore indicated pre-spawning mortality). Taken together, these data indicate little, if any, natural production of spring Chinook in the Molalla.

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: Molalla spring Chinook are part of the Upper Willamette River Chinook Salmon ESU, which was listed as threatened under the ESA in March 24, 1999 (64 CFR 14308).
- Population Description: The Molalla spring Chinook population has not been assigned a designation. NOAA Fisheries has indicated that recovery of the ESU will require all remaining populations to be viable, including the Molalla. NOAA Fisheries also indicates

that offsite habitat mitigation for effects of the Corps' Willamette Basin dams likely will be directed into the Molalla watershed.

- This population is considered extirpated or nearly so by the TRT. For the HSRG review, observations and recommendations were developed based on the managers designation of the population as Stabilizing or Contributing.
- Recovery Goal for Abundance: Unknown.
- Productivity Improvement Expectation: Unknown.
- Habitat Productivity and Capacity: Productivity 1.10; Capacity 100.

2.2 Current Hatchery Programs Affecting this Population

The hatchery program releasing spring Chinook in this basin (South Santiam Hatchery) is an integrated harvest and conservation program that incorporates natural-origin fish returning to Foster Dam (South Santiam River) into the broodstock. Under this program, approximately 100,000 1+yearlings are released into the Molalla River in March (HGMP 2004).

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 286 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 69 fish, resulting in 87% of the natural spawning population being made up of hatchery fish from the South Santiam River.

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 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 0.4 to 0.9. Average abundance of natural-origin spawners (NOS) would decrease from 43 fish to 0 fish. Harvest contribution of the natural and hatchery populations would go from 195 fish to zero.

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

The historical habitat in the Molalla River supported a significant sustainable natural population of spring Chinook. Currently, the productivity of the habitat is uncertain, but it is not sufficiently productive to support a self-sustaining natural population. Hatchery releases of South Santiam stock appear to be largely supporting the population. Annual stocking of this non-local stock may be contributing to the poor natural productivity in the Molalla River. Reintroduction and recovery are unlikely to be successful without habitat improvements.

This hatchery program provides modest harvest benefits.

Recommendations

Decisions about a spring Chinook hatchery program for the Molalla River depend first on how the managers designate the population: as either Contributing or Stabilizing. If it is designated as Stabilizing, the HSRG has no specific recommendations to modify the current hatchery program.

If managers believe the population is important to ESU recovery, then a Contributing designation may be appropriate. Under this designation, managers should consider the following two options along with habitat improvements and fishery protection:

(1) Initiate a short-term reintroduction program using local broodstock and terminate the annual releases of South Santiam Chinook; or

(2) Implement a no hatchery alternative until sufficient abundance and genetic information is collected. Terminate the stocking of South Santiam Chinook and close Chinook fishing to protect any natural-origin fish.

The HSRG recommends that managers continue to implement their apparently successful BKD strategies, which include culling.

Table 1. Results of HSRG analysis of current conditions and HSRG solution for Molalla Spring 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	99.1	0%	0%	86%	0.00	43	0.4	195	0
No Hatchery	None None	-	0%	0%	0%	1.00	0	0.9	0	-
HSRG Solution	Int Both	99.1	0%	0%	86%	0.00	43	0.4	195	0
HSRG Solution w/ Improved Habitat	Int Both	99.1	0%	0%	84%	0.00	47	0.5	196	0