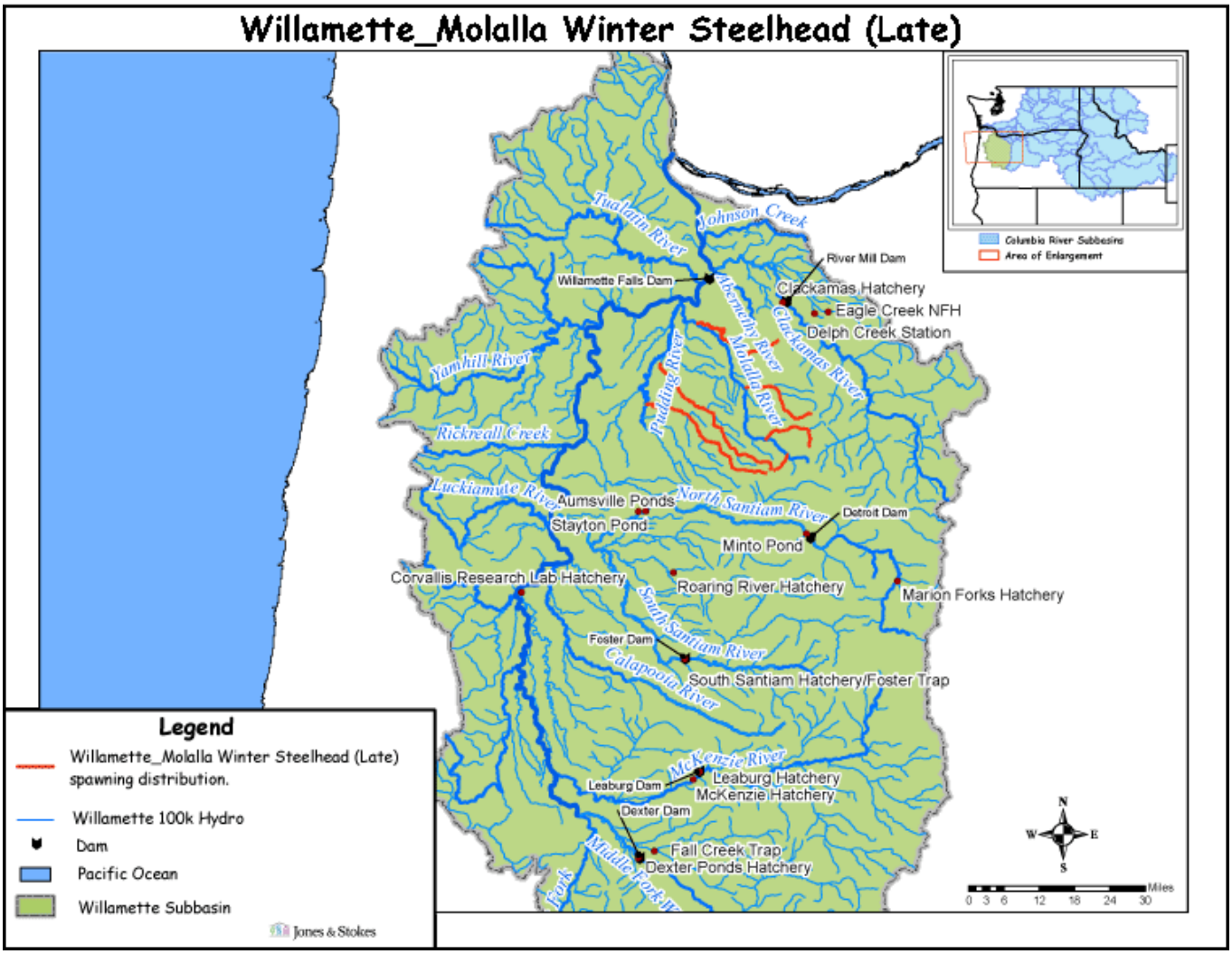
Hatchery Scientific Review Group
Review and Recommendations

Willamette – Molalla Winter Steelhead (Late)
Population and Related Hatchery Programs

January 31, 2009



1 Molalla Winter Steelhead (Late)

This population represents native late-run winter steelhead spawning in the Molalla River subbasin. The Molalla winter steelhead (late) population is one of four populations (Molalla, North Santiam, South Santiam, and Calapooia) comprising the Upper Willamette Steelhead ESU.

Land use and road building have limited anadromous fish access to many higher order tributaries in the Molalla and Pudding rivers. No large mainstem fish barriers are present on the Molalla River; however, dams and diversions on the Pudding River system may impede fish passage due to inadequate and/or outdated fish ladders. On a stream mile basis, this impairment is significant, although small high order streams that comprise most of the blocked area were not highly productive winter steelhead habitats. ODFW (2005) reported that virtually the entire historically significant steelhead habitat remains accessible. Habitat degradation due to land use has reduced water quality and the availability of suitable rearing habitat for steelhead in the Molalla River (McElhany et al. 2007 review draft).

Recent escapement estimates for Molalla River steelhead are in the low thousands of fish (Goodson 2005). In general, several hundred fish returned annually to the Molalla River, except in the mid-1990s when escapement dipped below 100. There is considerable uncertainty concerning the accuracy of the following abundance estimates because they are based on spawning surveys conducted for a small portion of the steelhead habitat within the basin. The Molalla late winter steelhead population is relatively large, with a natural-origin spawner long-term (1980-2005) geometric mean of 1,233 fish and a recent (1990-2005) geometric mean of 937 fish (McElhany et al. 2007 review draft). In recent years, the geometric mean of recruits per spawner was 1.378, with a hatchery fraction of zero. These values are in the viable to very low risk minimum abundance threshold (MAT) category.

Pre-harvest viability curve analyses suggest that the population is probably viable if harvest levels remain at current rates (average post-1990 mortality rate = 0.10) (McElhany et al. 2007 review draft). The escapement viability curves suggest that the harvest pattern observed over the course of the time series (which included a period of time when the mortality rate was 0.23) is not likely sustainable by the population.

Native late-run winter steelhead in the Willamette Basin are distinguished from non-native early winter steelhead by the date of passage at Willamette Falls—February 15. Fish ascending the falls after February 15 are considered native late-run steelhead (McElhany 2003b). Recent analyses of returning steelhead adults indicate that Upper Willamette River late-winter steelhead mature at four different ages: Age 4 (48%), Age 5 (41%), Age 6 (10%) and Age 7 (6%) (McElhany et al. 2007 review draft). Winter steelhead egg incubation rates vary with water temperature, with eggs hatching anywhere between 18 and 101 days (U.S. Army Corps of Engineers 2002). Native upper Willamette winter steelhead fry emerge predominately in June (ODFS 1990-Subbasin Plan). Although there is some variability, most winter steelhead spend two years in the spawning watershed or downstream reaches before out- migrating (Wevers et al. 1992). Winter steelhead smolts migrate over Willamette Falls beginning in early April and extending through early June, with peak migration in mid-May (U.S. Army Corps of Engineers 2002). Mean lengths of naturally produced smolts sampled at Willamette Falls from 1976 to 1978 ranged from 170 millimeters to 220 millimeters. Larger smolts migrated significantly earlier than smaller smolts (Buchanan et al. 1979).

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 Winter Steelhead (late) are part of the Upper Willamette River Steelhead DPS, which was listed as Threatened under the ESA on March 25, 1999; the threatened status was reaffirmed January 5, 2006.
- Population Description: The Molalla Winter Steelhead (late) population has not been assigned a designation by the TRT. This population was given a Primary designation for the HSRG review.
- Recovery Goal for Abundance: Unknown
- Productivity Improvement Expectation: Unknown
- Habitat Productivity and Capacity (e.g., from EDT): Productivity: 6.5, Capacity: 1,528

2.2 Current Hatchery Programs Affecting this Population

There are currently no steelhead hatchery programs in the Molalla River subbasin. The Molalla River has received hatchery plants of three distinct runs of steelhead: native late-run winter steelhead, introduced early-run winter steelhead (from the Lower Columbia River), and introduced Skamania Hatchery summer-run steelhead (Chilcote 1997). Releases of the early-run steelhead into the Molalla River were discontinued in 1997 (Chilcote 1997), although some natural production of early-run winter steelhead may still occur. Overall, hatchery contribution to escapement has been near 40%, although currently it is near 0%. Genetic analyses indicate a close genetic affinity between winter steelhead populations in the Santiam, Molalla (North Fork), and Calapooia rivers. Steelhead that are the progeny of summer-run and early winter-run steelhead are genetically distinct from presumptive native steelhead. Differences in spawn timing among these run-times may limit (but not eliminate) the potential for interbreeding.

Since Willamette Falls was laddered in the early 1900s, hatchery stocks of summer and early-run winter steelhead have been introduced into the upper Willamette River from other ESUs. In 1982, it was estimated that 15% of the late-run winter steelhead ascending Willamette Falls were of hatchery origin (Howell et a. 1985). All of the hatchery programs for steelhead were discontinued in the late 1990s, except for summer steelhead programs in the North Santiam, South Santiam, McKenzie, and Middle Fork Willamette rivers, where winter steelhead are not native. Currently the only strays into the Molalla River are likely from summer steelhead programs in the McKenzie and Santiam Rivers.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 6 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).

No hatchery programs for steelhead currently operate in the Molalla River and it is estimated that steelhead from out-of-basin programs make less than a 1% contribution to the natural spawning populations in the basin. Given these assumptions, there would be no change to productivity, natural-origin spawning, or harvest for the Molalla River winter steelhead population under our No Hatchery scenario.

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 appears to meet the standards for a Primary population designation. There is no hatchery program in this subbasin.

Recommendations

Periodically monitor the contribution of hatchery strays to the natural population.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Molalla 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%	0%	1.00	1,712	5.1	53	0
No Hatchery	None None	-	0%	0%	0%	1.00	1,714	5.2	53	-
HSRG Solution	None None	-	0%	0%	0%	1.00	1,712	5.1	53	0
HSRG Solution w/ Improved Habitat	None None	-	0%	0%	0%	1.00	1,925	5.7	59	0