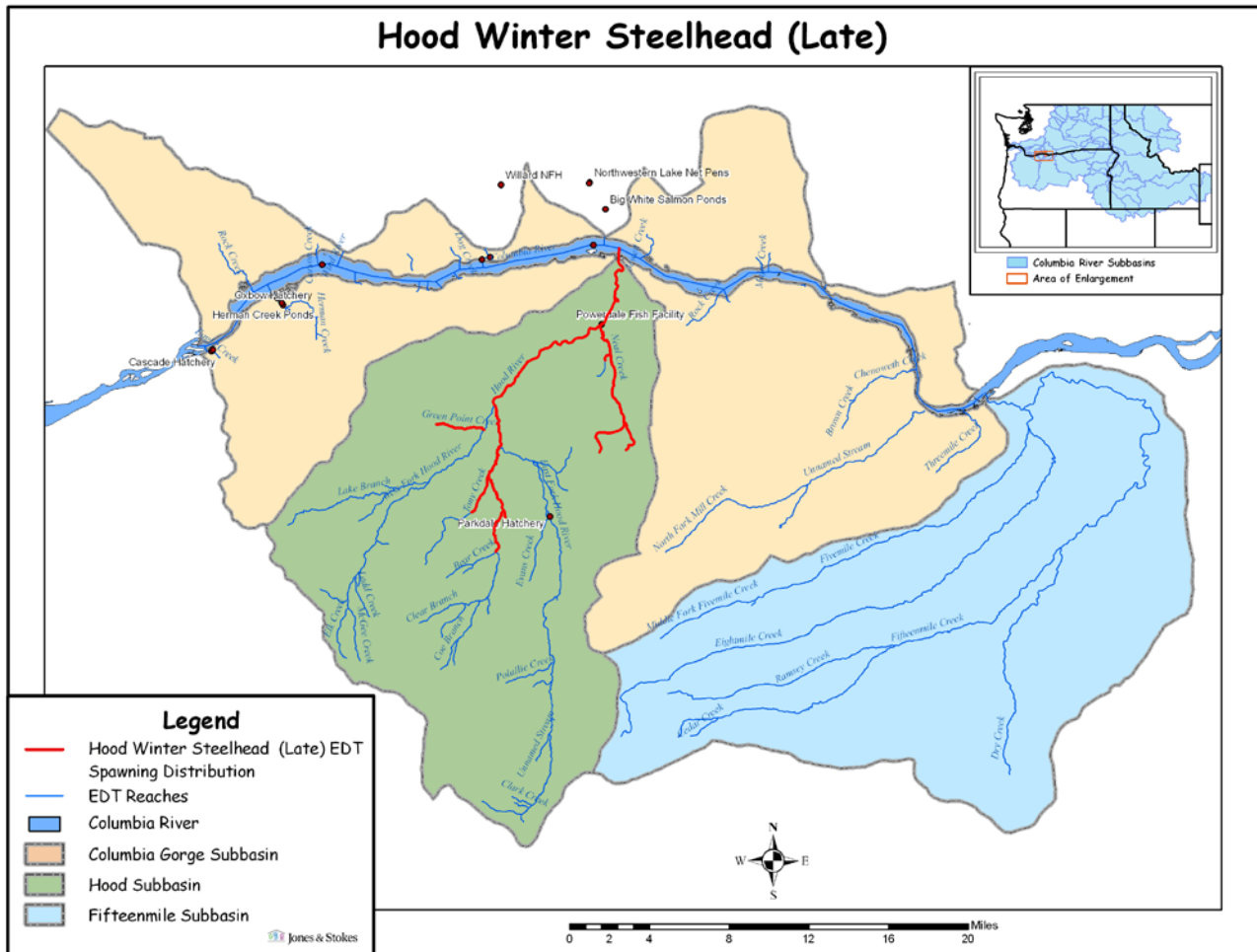


# Hatchery Scientific Review Group Review and Recommendations

## Hood River Winter Steelhead Population and Related Hatchery Programs

January 31, 2009



# 1 Hood River Winter Steelhead

Steelhead return to the Hood River at 2 to 6 years of age, with most fish returning at age 4. Adults typically spend from 1 to 3 years in the ocean, with an average of 2 years. About 6% of returning steelhead adults are repeat spawners. Smolts range in age from 1 to 3 years with most spending 2 years of their life in freshwater (E. Olsen 2003). Escapement to the Powerdale Dam trap ranged from 206 to 1,017 wild, 108 to 917 Hood River stock subbasin hatchery, and 1 to 38 stray hatchery winter steelhead for the 1991-1992 through 2000-2001 run years (E. Olsen 2003).

Winter steelhead spawn primarily in the Hood River mainstem, Middle Fork, and East Fork. Winter steelhead are not found in the West Fork Hood River because Punchbowl Falls prevents their access (Olsen et al. 1992). Spawning occurs from February 15 to June 15. The median spawning period for winter steelhead is about two weeks later than for summer steelhead.

A substantial increase in smolt to adult survival is expected as a result of the Powerdale hydropower project ceasing to divert flow from the river (personal communication, ODFW, August 2007). Diversion during spring out-migration was eliminated in 2004. Diversion was eliminated year round in the fall of 2006 when debris torrents damaged the diversion channel and penstocks.

Winter and summer steelhead are native to the Hood River subbasin (Kostow 1995). The combined escapement for both winter and summer steelhead (excluding known hatchery fish) averaged around 1,000 fish during the 1950s and 1960s (Howell et al. 1985). Native summer steelhead escapement was 181 in 1997 and may have been as low as 80 in 1998 (Chilcote 1997).

## 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:** Hood Winter Steelhead are part of the Lower Columbia River Steelhead DPS which was listed as Threatened under the ESA in 2006.
- **Population Designation:** The Hood Winter Steelhead is designated as a Primary population in the Lower Columbia Salmon Recovery and Subbasin Plan (LCSR&SP, 2004).
- **Current Viability Rating:** The LCSR&SP describes current viability of the Hood Winter Steelhead as Unknown with a viability target of High.
- **Recovery Goal for Abundance:** A viability goal of 1,400 adults was identified in the LCSR&SP, and a potential abundance of 2,800 adults was identified. Current abundance is 436 adults.
- **Productivity Improvement Expectation:** Unknown.
- **Habitat Productivity and Capacity (from EDT):** Productivity: 2.0; Capacity: 2,345

### 2.2 Current Hatchery Programs Affecting this Population

The Hood River winter steelhead supplementation project, contained within the Hood River Production Program, began in 1991 with an angler broodstock collection program for wild winter

steelhead from the lower mainstem Hood River. Beginning in 1992, all Hood River winter steelhead broodstock were collected from wild Hood River stock captured at the Powerdale Fish Facility (RM 4.0). Broodstock collection by angling was not very successful. The Powerdale facility was more effective. Each year since 1992, broodstock has been sub-sampled from throughout the Hood River wild winter steelhead run, which passes the dam en route to the natural spawning areas above the dam. All fish passing the dam are collected in the trap. Candidates for broodstock are selected randomly throughout the run. Broodstock guidelines call for collecting no more than 25% of the run for broodstock needs. The broodstock consists of 100% natural origin fish; no hatchery origin adults are used.

The factors limiting supplementation in the Hood River subbasin are small wild populations and new broodstocks that must consist substantially of wild fish. There is also a limit on the take of wild fish for broodstock. These factors produce very small broodstocks that introduce potential random deviation from the phenotypic distributions of the wild fish (HGMP 2000).

Construction of the improved Powerdale fish collection facility was completed in 1997. Fish are captured after they ascend a fish ladder and jump over a finger weir into an 8- by 50-foot channel. Fish are manually crowded into a fish lift where they are brought into the sorting and processing building. From here they are routed into an anesthetic tank prior to any handling. Those selected for broodstock are loaded into a portable fish transportation tank while still anesthetized (HGMP 2000).

Winter steelhead broodstock collected in 1998, 1999, and 2000 numbered 41, 61, and 40 respectively. All of the collected brood were wild fish volunteering to the Powerdale fish trap (HGMP 2000). A total of 82 adults were collected for brood in 2004 (Parkdale Fish facility annual Report 2004). Green eggs are currently being transferred to Oak Springs Hatchery on the Deschutes River for hatching and rearing to smolt stage. Planned smolt releases are 25,000 in the Middle Fork Hood River at the Parkdale facility and 25,000 into the East Fork Hood River using portable acclimation tanks. Actual release levels averaged 43,000 yearlings (range 4,200-61,000) from 1993 to 1999. Releases are trucked from Oak Springs Hatchery to sites on the East Fork Hood and Middle Fork Hood for acclimation in early April at ~5-6 fpp. The smolts are allowed to acclimate and volitionally migrate until mid-May. Any non-migrants are collected and trucked to lower ¼ mile of the Hood River for release.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated hatchery program: 438 fish
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 1 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 (proportionate natural influence) 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 1.4 to 1.6. Average abundance of natural-origin spawners (NOS) would decrease from approximately 866 to approximately 736. Harvest contribution of the natural and hatchery populations would go from approximately 485 fish to approximately 123 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 has been designated as a Primary population. There has been a long-term hatchery influence in this basin. There is currently an integrated conservation program releasing 50,000 smolts operating in the basin. The effectiveness of this program is currently being studied. This population could contribute to recovery as a Primary population.

The purpose of the hatchery program is to meet important research objectives and contribute to harvest and conservation goals. The integrated hatchery program is operated consistent with the standards for a Primary population. Broodstock management and experimental objectives require maintaining the current capabilities afforded by the Powerdale weir.

The HSRG has concerns with the potential for pathogen transfer (and stress) and straying associated with the practice of incubating and rearing fish outside of the Hood River subbasin.

Rearing facilities in the Hood River would require an undefined warm water source to achieve a one-year-old smolt release.

The HSRG had questions about survival effects of marking methods chosen to uniquely identify hatchery steelhead and considerations made when making this decision.

**Recommendations**

The recommendation is to continue the program as currently operated; however, the research objectives and evaluation program depend on the continued operation of the Powerdale facility.

The preferred solution for broodstock management and continued research would be to maintain a single weir location in the lower river rather than multiple sites higher in the watershed. Specific points to consider include the potential to operate a fish friendly collection facility, sample the entire returning fish population, and continue monitoring and evaluation activities at a site proven to be reliable.

A weir structure at the Powerdale location would continue to provide value to overall stock management through the ability to: 1) collect broodstock, 2) evaluate life cycle productivity, 3) monitor hatchery fish reproductive success (maintaining the pedigree study), and 4) remove hatchery strays. The HSRG recognizes that any decision regarding the future of facilities and operations at the Powerdale location must consider potential downstream passage issues for juvenile salmonids, ecological effects of the dam and other priorities in the watershed.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Hood River 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	Int Cons	49.2	0%	0%	29%	0.78	866	1.4	485	0
No Hatchery	None None	-	0%	0%	0%	1.00	736	1.6	123	-
HSRG Solution	Int Cons	49.2	0%	0%	29%	0.78	867	1.4	485	0
HSRG Solution w/ Improved Habitat	Int Cons	49.2	0%	0%	25%	0.80	1,045	1.6	515	0