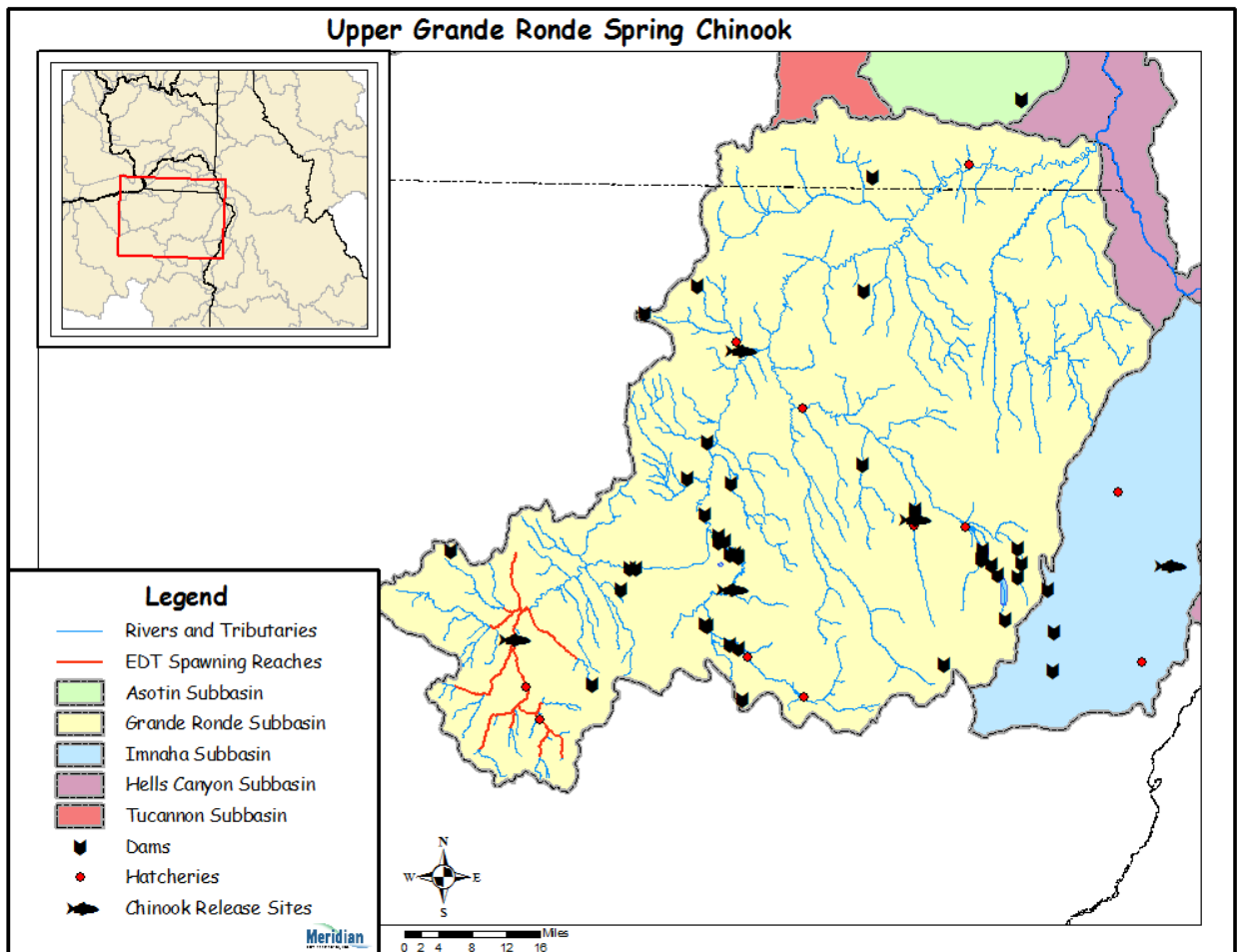


Hatchery Scientific Review Group Review and Recommendations

Upper Grande Ronde Spring Chinook Population and Related Hatchery Programs

January 31, 2009



1 Grande Ronde Upper Grande Ronde Spring Chinook

The Grande Ronde Upper Grande Ronde Spring Chinook population is part of the Snake River Spring/Summer Chinook ESU that is classified as threatened under the Endangered Species Act. This ESU has five major population groupings (MPGs), including: Lower Snake River, Grande Ronde/Imnaha, South Fork Salmon River, Middle Fork Salmon River, and the Upper Salmon River group. The ESU contains both spring and summer run Chinook.

The Grande Ronde- Upper Grande Ronde population is a spring run, and is one of seven extant populations in the Grande Ronde/Imnaha River MPG. This population includes fish spawning in the Upper Grande Ronde River and Sheep Creek.

The ICTRT has classified this population of Chinook as a “Large” population in size based on its historic habitat potential. A “Large” population is one that requires a minimum abundance of 1,000 wild spawners and an intrinsic productivity of 1.6 recruits per spawner (R/S) to be viable at the 5% extinction risk threshold.

Historically, it is estimated that anywhere from 2-3 million spring/summer Chinook returned to the entire Snake River each year (NPPC 2004). The portion returning to the Grande Ronde Upper Grande Ronde is unknown, but was likely in the thousands. Spawning likely took place primarily in the mainstem Upper Grande Ronde River.

2 Current Conditions

Upper Grande Ronde spring Chinook spawn in the upper mainstem and in Sheep Creek. Population diversity and abundance has likely been reduced due to habitat degradation, harvest, and juvenile and adult mortality associated with passage through federal Columbia River hydropower system.

Recently (1953-2003), the ICTRT reports that abundance of 3+ spring Chinook for this subbasin has ranged from 3 to 855 fish, with a recent 10-year geometric run size of 38 fish. Natural-origin spawners have comprised a total of 77% of total spawners over the last 10 years. Out-of-ESU hatchery strays to the subbasin have averaged approximately 18%. The strays were primarily from the Carson and Rapid rivers; fish which haven't been released in the subbasin since 1994.

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for the Upper Grande Ronde Spring Chinook.

- **ESA Status:** Upper Grande Ronde Spring Chinook are part of the Snake River Spring/Summer Chinook ESU which is listed as Threatened.
- **Population Description:** The Grande Ronde Upper Grande Ronde population is considered by the ICTRT to be a “Large” population. For the HSRG review, the population has been classified as Stabilizing.
- **Recovery Goal for Abundance:** 1,000 wild spawners
- **Productivity Improvement Expectation:** Increase productivity to achieve the ICTRT R/S value of 1.6.
- **Habitat Productivity and Capacity:** Productivity: 1.0; Capacity: 300

2.2 Current Hatchery Programs Affecting this Population

The Grande Ronde Spring/Summer Chinook hatchery program may release up to 250,000 juveniles each year. The program has both a captive broodstock and conventional program. Fish are generally released at approximately 20 fpp. All juveniles are marked with adipose fin-clips, coded wire or elastomer tags, or a combination of the three. A portion of the fish production is acclimated at raceways located in the subbasin and operated by the CTUIR. Juveniles are allowed to voluntarily emigrate from the raceways starting in late March, but are then forced out in mid-April. Approximately 500 wild juvenile fish are used as broodstock for the captive brood component. These fish were reared at the Manchester Research Station and/or Bonneville Hatchery. The captive brood program is phasing into a safety net approach with juveniles reared to adults at Bonneville Hatchery. Details of the safety net program are not fully developed. Adults for the conventional program are collected at a weir on Upper Grande Ronde and held at Lookingglass Hatchery. Spawning, egg-incubation and early rearing also occurs at this hatchery. Acclimation and release occurs at the Upper Grande Ronde acclimation site. Both components have an R/S value of 5.0.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated programs: 387 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 10 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 0.4 to 0.9. Average abundance of natural origin spawners (NOS) would decrease from approximately 94 fish to approximately 0 fish. Harvest contribution of the natural and hatchery populations would go from approximately 200 fish to 0 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

Managers have identified both conservation and harvest objectives for this population. Near-term objectives are concentrated on conservation. Their strategy for Upper Grande Ronde spring Chinook salmon is meant to maintain a natural spawning population using captive brood and conventional integrated conservation programs. Currently the integrated conservation program is not being operated consistent with the HSRG-defined standards of a Primary or Contributing population (currently pHOS is 77%, pNOB is 5%, and PNI is 0.06). Based on population productivity and capacity information provided to the HSRG, substantial habitat improvements will be required to support this population. The hatchery program is operating as a safety net and it appears that this population would be extirpated without hatchery intervention. The managers have designed and are implementing sliding scale broodstock protocols that are designed to achieve the standards of a Primary population.

The total production objective for the upper Grande Ronde is to release 250,000 smolts (20 fpp) derived from both anadromous returns and captive broodstock. The program is partial fulfillment of the LSRCP adult return goal of 9,070 adult spring Chinook to the project area. Adults for the conventional program are collected at a weir on Upper Grande Ronde and held at Lookingglass Hatchery. Spawning, egg-incubation and early rearing also occurs at this hatchery. Acclimation and release occurs at the Upper Grande Ronde acclimation site.

While partial adult escapement information is available from a downstream weir, there is a lack of information about this population in their primary spawning location in Vey Meadows.

The captive broodstock has experienced high BKD mortality from sourcing broodstock from juvenile collection. To address this problem, managers have begun sourcing part of the captive broodstock from eggs taken from the conventional program.

There appears to be considerable uncertainty about habitat capacity in various Grande Ronde watersheds. The habitat capacity and productivity provided to the HSRG is currently estimated at 300 adults and 1.0 recruits per spawner, respectively. If accurate, this limited capacity and productivity significantly limits the ability to achieve conservation goals. Cold water at Lookingglass Hatchery may limit the size of fish at release and may have a negative effect on survival.

Recommendations

This program should continue to operate as a safety net until habitat is improved to a point where it can support a natural population. In years when adult escapement is low (e.g., less than 50 fish), managers should incorporate all returning natural-origin adults into the hatchery broodstock. These recommendations are meant to provide an interim conservation strategy until habitat issues are addressed. When population productivity and capacity have increased, the managers will need to develop plans to transition to a properly integrated program (e.g., $PNI \geq 0.50$).

Managers should implement other means to improve the success of the conventional program (and reduce the reliance on the captive brood program) such as (1) evaluating the potential to increase adult returns by releasing larger smolts; (2) sizing acclimation facilities to meet program needs; (3) investigating holding adults destined for natural spawning at the existing acclimation site for release into the natural environment just prior to spawning; (4) injecting adults with antibiotics; (5) using salmon carcasses or carcass analogs for nutrient enhancement; and (6) using another means of identifying the origin of adults other than adipose fin-clipping. Until the conventional program is self-supporting, fish can be released without being marked.

The HSRG recommends that the managers review the existing habitat potential (productivity and capacity) as it will influence the type of program appropriate to the conditions and the contribution the Upper Grande Ronde can make to recovery. In addition, managers should investigate options to improve survival, such as increasing smolt size at release. A plan to increased size at release would need to consider potential changes to biological factors important to natural reproduction of hatchery-origin spawners. However, the advantage of increased survival could be realized by meeting abundance goals while releasing fewer fish and removing fewer natural-origin fish for broodstock.

The HSRG recommends that managers continue to implement their successful broodstock BKD management strategy, which includes culling.

Table 1. Results of HSRG analysis of current condition and HSRG Solution for Upper Grande Ronde 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 Cons	251.0	50%	0%	77%	0.06	94	0.4	198	314
No Hatchery	None None	-	0%	0%	0%	1.00	0	0.9	0	-
HSRG Solution	Int Cons	251.0	50%	0%	77%	0.06	105	0.5	144	361
HSRG Solution w/ Improved Habitat	Int Cons	251.0	50%	0%	75%	0.06	118	0.5	146	361