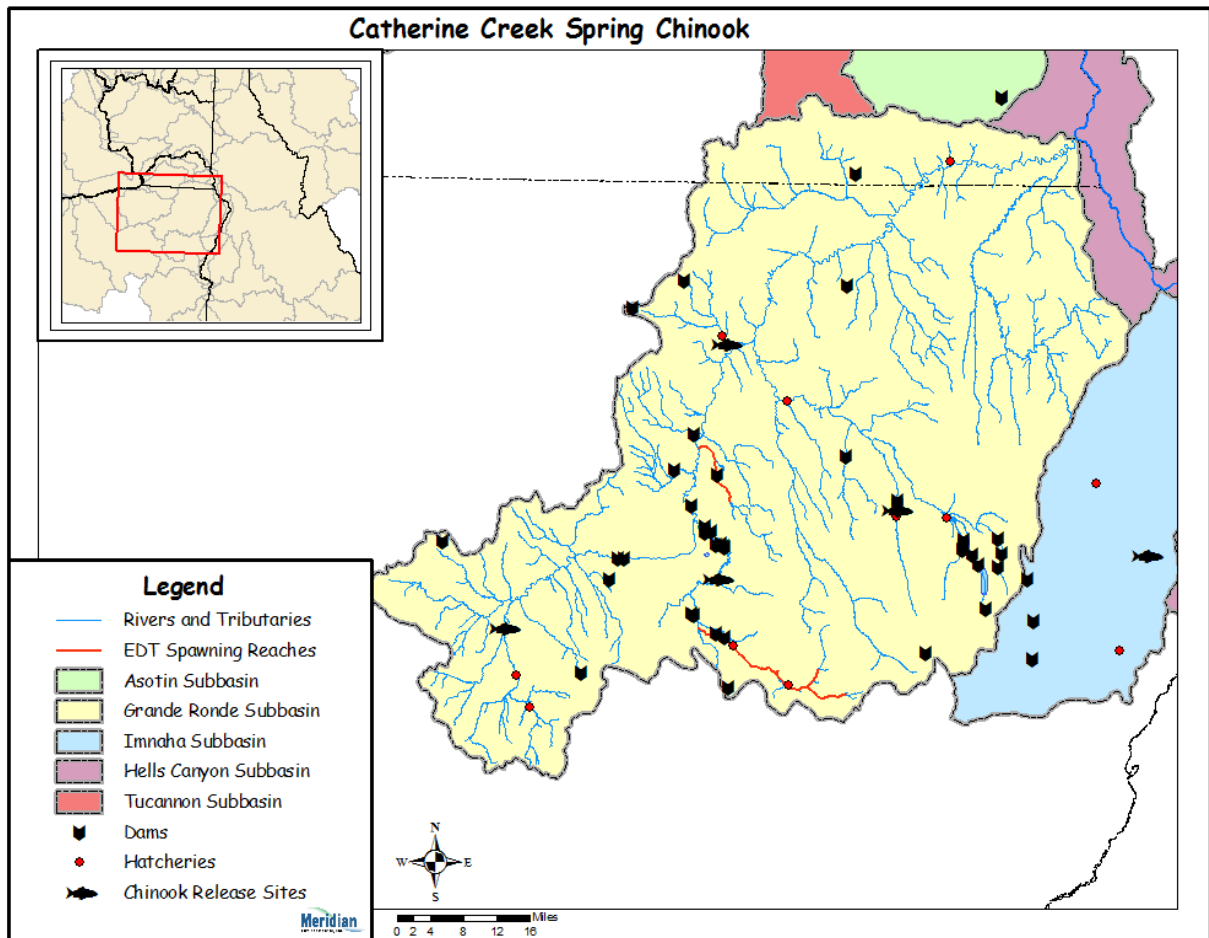


Hatchery Scientific Review Group Review and Recommendations

Grande Ronde-Catherine Creek Spring Chinook Population and Related Hatchery Programs

January 31, 2009



1 Grande Ronde Catherine Creek Spring Chinook

The Grande Ronde Catherine Creek 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 Catherine Creek population is a spring run, and is one of seven extant populations in the Grande Ronde/Imnaha River MPG. The population includes Chinook spawning in Catherine and Indian creeks, and a small portion of the mainstem Grande Ronde.

The Interior Columbia Technical Recovery Team (ICTRT) has classified this population of Chinook as “Large” 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. For abundance and productivity measures, the ICTRT considers Catherine Creek as an “Intermediate” population with a target abundance and productivity of 750 and 1.8, respectively. This is because habitat associated with Indian Creek and the mainstem Grande Ronde River was not included in their analysis.

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 Catherine Creek is unknown, but was likely in the thousands. Spawning likely took place primarily in the mainstem Grande Ronde and Catherine Creek.

2 Current Conditions

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

Recently (1955-2005), the ICTRT reports that the abundance of 3+ spring Chinook for this subbasin has ranged from 27 to 2,947 fish, with a recent 10-year geometric run size of 89. Natural-origin spawners have comprised a total of 83% 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 Carson and Rapid rivers. The last release of Rapid River/Carson stock occurred 1989 and Rapid River stock in 1990.

2.1 Current Population Status and Goals

This section describes the current population, status, and goals for Catherine Creek Spring Chinook.

- ESA Status: Grande Ronde Catherine Creek Spring Chinook are part of the Snake River Spring/Summer Chinook ESU.

- Population Description: The Grande Ronde Catherine Creek population is considered by the ICTRT to be an “Intermediate” population for abundance. For the HSRG review, the population has been classified as Contributing.
- Recovery Goal for Abundance: 750 wild spawners
- Productivity Improvement Expectation: Increase productivity to achieve the ICTRT 1.8 R/S value
- Habitat Productivity and Capacity: Productivity 2.5; Capacity 500

2.2 Current Hatchery Programs Affecting this Population

The Grande Ronde Spring/Summer Chinook hatchery program may release up to 150,000 juveniles each year. The current target release is 130,000 smolts due to space limitations. Fish are generally released at approximately 20 fpp. All juveniles are marked with adipose fin-clip, coded wire-tags, elastomer tags or a combination of the three. Smolts are acclimated at raceways located in the subbasin. The juveniles are allowed to volitionally emigrate from the raceways starting in late March, but are then forced out in mid-April. Wild juvenile fish (500) were used as broodstock for the captive brood component, although the captive brood is currently phasing out (the last parr were collected in 2006). These fish were reared at the Manchester Research Station and/or Bonneville Hatchery. Adults for the conventional program are collected at a weir on Catherine Creek and held at Lookingglass Hatchery. Egg-incubation and juvenile rearing also occurs at this hatchery. The program has an R/S value of 6.0.

Estimated number of hatchery strays affecting this population:

- Hatchery strays from in-basin integrated programs: 216 fish.
- Hatchery strays from in-basin segregated and out-of-basin hatchery programs: 15 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 1.2 to 2.3. Average abundance of natural origin spawners (NOS) would increase from approximately 181 fish to approximately 296 fish. Harvest contribution of the natural and hatchery populations would go from approximately 144 fish to approximately 43 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. Their strategy for Catherine Creek spring Chinook salmon is meant to maintain existing natural spawning populations as well as use hatchery-origin Chinook salmon in an attempt to augment natural production. Currently this integrated hatchery program is not being operated consistent with the HSRG-defined standards of a Primary population or Contributing population (currently pHOS is 51% and PNI is 0.37). 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 Catherine Creek population is to release up to 150,000 smolts (20 fpp) derived from anadromous returns, natural-origin returns to Catherine Creek and captive broodstock. The program is partial fulfillment of the LSRCP adult return goal of 9,070 adult spring Chinook to the project area. Currently the program is releasing 130,000 smolts. The captive broodstock component is being phased out. Adults for the conventional program are collected at a weir on Catherine Creek and held at Lookingglass Hatchery. Egg-incubation and juvenile rearing also occurs at this hatchery. Smolts are acclimated and released at raceways located in the subbasin.

There appears to be considerable uncertainty about habitat capacity in various Grande Ronde watersheds. The habitat capacity provided to the HSRG is currently estimated at 500 adults. If accurate, this limited capacity 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.

The managers are conducting research using parent/progeny genotyping to determine relative reproductive success of natural- vs. hatchery-origin spawners.

Recommendations

The HSRG identified two possible solutions for this program. If the population is designated as Contributing, the current program of 130,000 smolts could be maintained with a PNI of 0.52. This program would use 50% natural-origin broodstock (pNOB of 0.5) and would require removing 55% of hatchery fish at the weir or through selective fisheries.

If the population is designated as a Primary, a program of 75,000 smolts could be released with a PNI of 0.69. The program would use 55% natural-origin broodstock (pNOB of 0.55) and would require removing 70% of returning hatchery-origin adults at the weir or through selective fisheries.

To meet mitigation goals established by the managers, the reduction of approximately 75,000 smolts from this program to meet the standards for a Primary population could be re-allocated to additional production in Lookingglass Creek without affecting current goals for that population.

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 Catherine Creek can make to recovery.

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 Catherine Creek 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	130.0	55%	0%	51%	0.37	181	1.2	144	206
No Hatchery	None None	-	0%	0%	0%	1.00	296	2.3	43	-
HSRG Solution	Int Cons	75.6	70%	0%	25%	0.69	244	2.0	110	185
HSRG Solution w/ Improved Habitat	Int Cons	75.6	70%	0%	21%	0.72	298	2.2	117	185