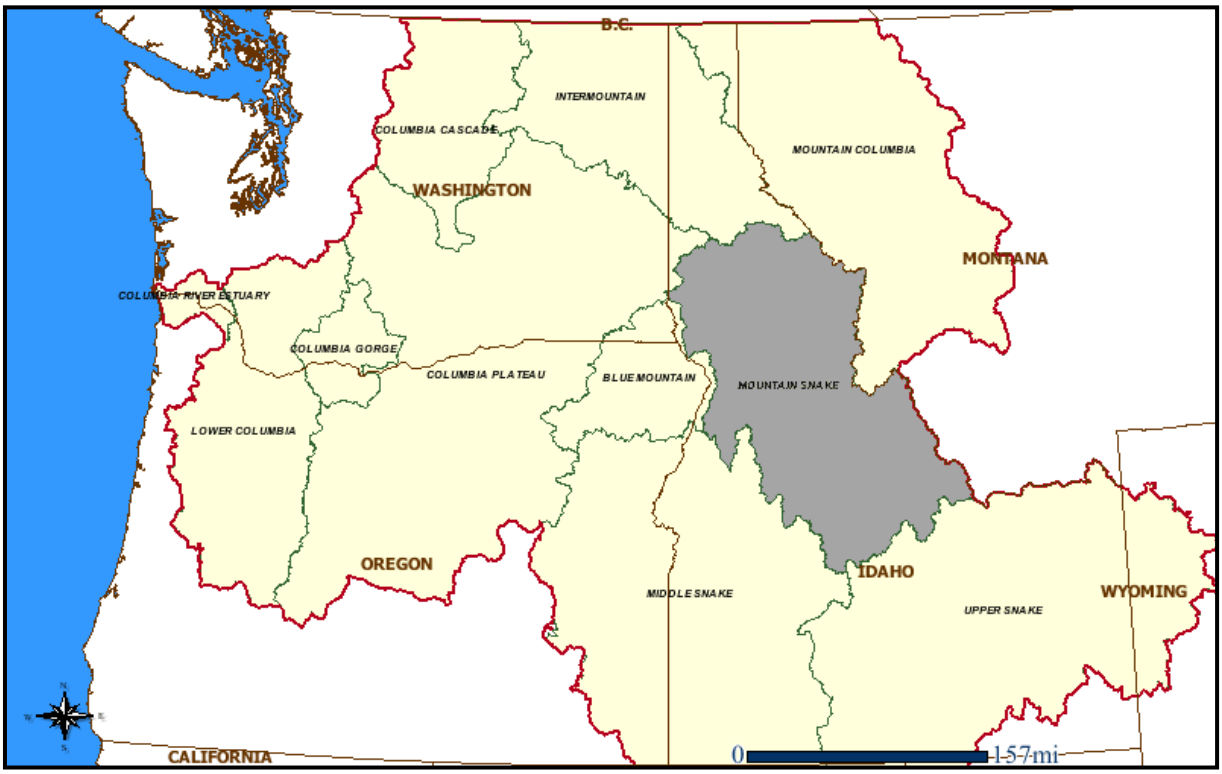
U.S. Fish and Wildlife Service - Pacific Region

Columbia River Basin Hatchery Review Team

Columbia River Basin, Mountain Snake Province

Salmon and Clearwater River Watersheds



Idaho Lower Snake River Compensation Plan State Operated Hatcheries

Clearwater, Magic Valley, McCall, and Sawtooth Fish Hatcheries

Assessments and Recommendations

Final Report, Appendix F:

Summary of the Idaho Supplementation Studies

March 2011

Please cite document as:

U.S. Fish and Wildlife Service (USFWS). 2011. *Idaho Lower Snake River Compensation Plan State Operated Hatcheries, Clearwater, Magic Valley, McCall, and Sawtooth Fish Hatcheries: Assessments and Recommendations - Appendix F: Summary of the Idaho Supplementation Studies*. *Final Report, March 2011*. Hatchery Review Team, Pacific Region. U.S. Fish and Wildlife Service, Portland, Oregon. Available at: http://www.fws.gov/Pacific/fisheries/Hatcheryreview/reports.html.

Please cite as:

Appendix F: Summary of the Idaho Supplementation Studies

Mountain Snake Province Idaho Supplementation Studies: Spring-run Chinook Supplementation in the Salmon and Clearwater Subbasins

The Idaho Supplementation Study's Study Design

The ISS study design called for a minimum of 15 years (three generations) of research (Bowles and Leitzinger 1991). Sampling was initiated in 1991, and implementation began in 1992. Supplementation effects were to be monitored and evaluated by comparing juvenile abundance and survival, adult fecundity, age structure, and genetic diversity in treatment and control (reference) streams of similar ecological parameters, however current pilot analyses were only possible on abundance of redds due to incomplete data on other parameters. The words "reference stream" are preferred by the ISAB because perfect "control streams" are not usually feasible; however, in reference to the ISS we use their choice, i.e., "control". The study design called for three phases: **Phase I** was local broodstock development; **Phase II** was the treatment period, and **Phase III** the evaluation period. Each phase was anticipated to occur over a five-year duration, however the low adult returns experienced in the 1990s, slowed broodstock development and treatments in some study streams. This has resulted in many treatments being out-of-phase with the original study design.

Broodstock development for the ISS treatment streams did not follow the RASP guidelines of development from a local wild source. Instead, broodstocks were developed using local wild/natural adults crossed with hatchery-origin adults from the hatchery stock already being outplanted into the treatment stream at the inception of the ISS program. Progeny from these initial crosses that returned as adults were again crossed with wild/natural adults and progeny from this second set of crosses were released (all marked) as the first set of ISS smolt releases and treatments. The mixed hatchery and wild/natural heritage of the broodstocks means that a straightforward evaluation of the fitness effects of supplementation treatments will not be possible in the forthcoming **Phase III** portion of the study. Additionally, because not all hatchery-origin adults were marked at the time the ISS broodstocks were being developed, the wild/natural adults used to establish the local broodstock could have been from several sources including the indigenous wild Chinook populations, the hatchery stock used at that time in the treatment stream, or a hatchery-origin adult from another conventional hatchery that strayed into the treatment stream.

These difficulties and other critical issues raised by the ISRP in its FY2002 review of the Idaho Supplementation Studies in the Mountain Snake provincial review led the ISS staff to revisit its experimental design for the ISS effort. They have recently completed an updated experimental design and protocol for statistical analysis (Lutch et al. 2003). Protocol attempts to specifically address ISRP concerns about the staggered timetable, partial treatment streams, statistical power, and statistical analysis in the face of straying by conventional hatchery fish into reference and treatment streams.

Analytical difficulties caused by the staggered timetable have been addressed in two ways by IDFG researchers. First, all treatment streams will move into the **Phase III** evaluation portion of the study in the spring of 2004, after the last smolt releases occur. This allows 12 of the 15 treatment streams to receive enough smolt releases to be classified within the study design as having received a full **Phase**

II treatment. The remaining thee streams will be classified as having only a partial treatment. Presently only 5 of the 15 treatment streams have received a full **Phase II** treatment. Second, in conducting preliminary analyses, IDFG researchers discovered that calendar year did not provide a meaningful measure of time for statistical purposes due to the staggered timetable of **Phase II** treatments imposed by the difficulties of establishing local broodstocks (p. 14; Lutch et al. 2003). Consequently, IDFG researchers used an alternative measure of time, where positive integers (1,2,3, …8 as needed) denote the first, second, third, etc, years where supplementation produced fish could have come back and reproduced in the treatment stream (also called the Time II period). Years prior to that (Time I), where supplementation produced fish could not have come back and reproduced in the treatment stream (i.e., **Phase I** and early **Phase II** of study design), were coded as -8, -7, …., -1, and 0.

The initial ISS Experimental Design was completed and published in 1991. Baseline data collection and development of supplementation broodstocks (**Phase I**) began in 1991. Over a period of about five years, supplementation broodstocks were developed for seven hatchery trap/release locations as identified in the experimental design. These are:

Artificial Production Facilities
1. Sawtooth Fish Hatchery – Upper Salmon River
2. Pahsimeroi Fish Hatchery – Pahsimeroi River
3. McCall Fish Hatchery – South Fork Salmon River

Clearwater Fish Hatchery Satellites
4. Crooked River
5. Red River
6. Powell (Colt-killed Creek)
7. Clear Creek – Kooskia National Fish Hatchery

As adult fish began to return from the **Phase I** supplementation broodstock juvenile releases, the project progressed into **Phase II**. **Phase II** utilizes the returning adults to supplement natural origin recruits in treatment streams and maintains supplementation broodstocks for juvenile production and release. Juvenile fish releases through brood year 1996 include 1,281,755 fish in the Clearwater River basin and 1,954,048 fish in the Salmon River basin.

This project is now transitioning from **Phase II** to **Phase III**, monitoring the effects of supplementation. In **Phase III,** juvenile releases from supplementation broodstocks are to be terminated. At present, this will occur in the spring of 2004, when the last smolt releases occur (Figure 4.1; Lutch et al. 2003). In **Phase III**, returning hatchery-origin adults from prior juvenile releases are expected to supplement spawning of natural origin recruits. Monitoring of production and productivity response variables in reference and treatment streams will occur from 2004 through 2014, or approximately for two generations. IDFG researchers felt it necessary to track the treatment (and reference) populations for a minimum of two generations in order to assess whether the abundance increase achieved during the treatment phase was maintained in the non-supplemented population. However, researchers expect to collect data beyond 2014 as well.
.

Pacific Region Fishery Resources
911 NE 11th Avenue
Portland, OR 97232
503/872.2763
E-Mail: Don_Campton@fws.gov

U.S. Fish and Wildlife Service
www.fws.gov

For Columbia River Basin Hatchery Review Information
www.fws.gov/pacific/Fisheries/Hatcheryreview/

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.

March 2011