

## RRS Project Review

**Project ID:** 1989-096-00<sup>1</sup>

**Title:** Genetic Monitoring and Evaluation (M&E) Program for Salmon and Steelhead

**Short Description:** Initiated in 1989, this study monitors genetic changes associated with hatchery propagation in multiple Snake River sub-basins for Chinook salmon and steelhead; Little Sheep Creek (Imnaha Basin) for steelhead, and Catherine Creek, Lostine River, and the Upper Grande Ronde for Chinook salmon. It also derives estimates of reproductive success for individual families and groups of fish. The study has two components: gene frequency monitoring over time, and reproductive success in hatchery and wild fish. Results should aid in addressing critical uncertainty and genetic risk associated with the use of supplementation in recovery.

**Sponsor:** NOAA / ODFW

**BiOp association:** 2008 FCRPS

RPA 62.5 Investigate feasibility of genetic stock id techniques,  
RPA 63.1 Measure effect of safety-net & conservation hatchery programs  
RPA 64.1 Estimate relative reproductive success (RSS) of hatchery  
RPA 64.2 Determine if artificial production contributes to recovery

**Is this an Accord project?** No

**Budget (2008 to present):**

BPA	Total	\$ 4,569,415 (M&E = \$4,008,614)
	FY16	\$ 488,167
Cost share		
NOAA		\$ 367,527 (2009-2014)
Pacific Salmon Commission		\$ 38,000 (2008-2009)

**Proposal from last Categorical Review:**

<https://www.cbfish.org/Proposal.mvc/Summary/RMECAT-1989-096-00>

**Most recent Council recommendation:**

<https://www.cbfish.org/Assessment.mvc/CouncilRecommendationAssessmentSummary/Assessment/1989-096-00-NPCC-20110125>

\*\*Sponsor has not addressed Council/ ISRP qualifications to date (August 2016) – the results report and recommendation of future work, outcome of Lower Snake Comp Review process, and the hatchery

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<sup>1</sup>This is not one of the six exclusively RRS projects, but it has RRS linkages.

effects evaluation process described in programmatic recommendation #4 were due by the end of CY2014 – this remains an outstanding issue.

**Date of most recent annual report available on Pisces/cbfish?** January 2016, “Monitor and Evaluate the Genetic Characteristics of Supplemented Salmon and Steelhead”

<https://pisces.bpa.gov/release/documents/DocumentViewer.aspx?doc=P148017>

**Short summary of project reporting compliance:** This project involves two agencies, each with their own contract(s), working collaboratively. A single, joint authored annual report is generated for the contract period. Contract management and project performance for each agency has been excellent. To date, at least 13 peer-reviewed scientific papers have been published using information from this project.

**Summary of the scope of the project as it was reviewed by Council:** Initiated in 1989, this study monitors genetic changes associated with hatchery propagation in multiple Snake River sub-basins for Chinook salmon and steelhead. It also derives estimates of reproductive success for individual families and groups of fish.

The information obtained from this study directly addresses a critical knowledge gap identified by comanagers, that is, under what conditions does hatchery supplementation provide a sustained contribution to natural production? This type of monitoring work is now an essential part of hatchery reform and the goal of using widespread hatchery propagation in recovery of natural populations. This study was designed as a two-tiered approach: gene frequency monitoring over time (Tier 2), and a direct examination of reproductive success (RS) in hatchery and wild fish (Tier 3). Tier 2 sites use changes in gene frequencies through time in hatchery, natural and wild Chinook salmon and steelhead populations to evaluate the genetic effects of hatchery supplementation on a broad geographic scale. Tier 3 sites involve direct measures of the relative reproductive success of hatchery fish spawning in the wild by using parentage analysis to construct pedigrees (see study sites below). These methods were explained in detail in the proposal recommended and approved by the ISRP, BPA, and the NPCC.

**Summary of the scope of the project now:** Scope has not appreciably changed since the last review.

**Has the scope of this project changed significantly since it was reviewed?** No

**ISRP/AB Critical Uncertainties Appendix D review:**

<http://www.nwcouncil.org/media/7149871/isabisrp2016-1appendixd.pdf#page=107>

**Comments:** Since its inception in 1989, this project has made and continues to make significant contributions toward increasing understanding of the potential effects of hatchery programs on the genetic structure of adjacent conspecific populations and in supplemented populations. Another important finding of this study is that RRS research based on juveniles may be comparable and statistically more robust than adults. Results show cases where hatchery fish seem to have contributed to natural production and cases where the genetic effects of the hatchery supplementation are less

apparent. Detection of long-term trends in genetic diversity requires time series that are decades long and may need to continue as long as salmon populations are not self-sustaining.

**Questions to all project sponsors with RRS studies:**

- How does this project inform (1) the Council’s Research Plan and (2) the Council’s Fish and Wildlife Program objectives?
- Can any results from this study be extrapolated to other geographic locations or other populations?
- How does the Idaho Supplementation Study inform this project?
- Does this project have any of the following elements:
  - (a) A scientific question
  - (b) A hypothesis
  - (c) A specific time frame within which to answer the question posed
- How was it determined which species or geographic area to study?
- How does this effort work or collaborate with other RRS projects on aspects of the study (methodology, data and conclusions)?
- How does **density dependence** factor in to this study moving forward?

**Questions relative to this project:**

- Is the Tier 3 work, RRS, complete? If not, when is it anticipated to reach completion?
- The ISAB remarks that this project has made “significant contributions” toward increasing the understanding of potential effects of hatchery programs. What are those “significant contributions?”
- How long is it anticipated to confirm the finding that RRS based on smolt production is comparable to RRS based on adult returns?
- What are the major findings after 27 years of this research?
- The Council recommendations regarding this project have not been addressed-what is the plan for addressing them?