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July 9, 2003

MEMORANDUM

TO: Fish and Wildlife Committee Members

FROM: Mark Fritsch

SUBJECT: Review of Idaho Supplementation Studies (IDFG/IOSC # 1989-098-00; USFWS # 1989-098-01; NPT # 1989-098-02 and #1996-043-00; SBT # 1989-098-03)

Action

On March 23, 2003 the sponsors of the Idaho Supplementation Studies (ISS) submitted to the Council responses to address the conditions that were placed on the above projects as part of Fiscal Year 2002 Programmatic Issues for the Mountain Snake Province[1]. On May 22, 2003 the ISRP completed its review of the submittal (Document ISRP-2003-8). At your meeting on July 15, 2003 Council staff will provide recommendations regarding to resolve the programmatic issues.

Recommendation

Council staff recommends funding of the Idaho Supplementation Studies for one year subject to the ISRP stated requirements for carcass data collection in 2003, evaluation of DNA-based assessment of treatment and control populations, and development of a final design for Phase III. Further, the analysis following the 2003 field season and the final design of the Phase III segment be reviewed and approved before June 30, 2004.

Background

The goal of the Idaho Supplementation Studies (ISS) Project is to evaluate supplementation as a recovery/restoration strategy for depressed stocks of spring and summer chinook salmon. The project is a multi-agency effort, covering streams throughout the Salmon River and Clearwater River basins, working to define the potential role of chinook salmon

[1] Programmatic Issue 10

supplementation and identify genetic and ecological impacts to existing natural populations. The original study design called for a minimum of 15 years (three generations) of research. Initial data collection was started 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 streams. 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 (during which supplementation ceased). 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

On April 2, 2002, the Council made funding recommendations for projects in the Blue Mountain and Mountain Snake Provinces. The Mountain Snake Province includes the Clearwater and Salmon subbasins. A principle effort in these basins is the initiative under the Idaho Supplementation Studies (ISS). As part of this review and funding decision the Council provided a conditional funding recommendation for the following ISS projects:

- Project 1989-098-00, *Idaho Supplementation Studies* (IDFG, Salmon Subbasin).
- Project 1989-098-01, *Evaluate Supplementation Studies in Idaho Rivers* (USFWS, Clearwater Subbasin).
- Project 1989-098-02, *Evaluate Salmon Supplementation Studies in Idaho Rivers* (NPT, Salmon Subbasin).
- Project 1989-098-03, *Salmon Supplementation Studies in Ida*ho (SBT, Salmon Subbasin)
- Project 1990-055-00, *Steelhead Supplementation Studies in Idaho Rivers* (IDFG/IOSC, Clearwater Subbasin)[2]
- Project 1996-043-00, *Johnson Creek Artificial Propagation Enhancement Project* (NPT, Salmon Subbasin).

The ISRP final report for the provincial review (ISRP Document 2001-12A), provided a "not fundable until the ISRP concerns are adequately addressed" recommendation. The ISRP comments indicated that the experimental design had not been adhered to and requested that the following elements be adequately addressed prior to a favorable recommendation.

> 1. A written protocol for complete statistical analysis, certified by an independent statistician team should be presented to Council during the contracting period. The ISRP is not comfortable with the implications that "problems" with the study design can be "fixed" during the statistical analysis stage. Considerable thought and effort should be placed in planning the statistical analyses of these potentially controversial data before

[2] This project was lumped the other projects, and despite its name this is only partially an ISS study. The project proposal includes long-term monitoring which is outside the strict ISS umbrella of projects.

final decisions are made on criteria for stopping supplementation and before data are available.

2. The protocol for statistical analysis must indicate how straying of hatchery fish into "control streams" and "partial treatments" will be analyzed. For example, the response to the ISRP preliminary review indicated that the straying rate of hatchery fish into the Secesh River from 1996 - 2001 varied from 0.83 % to 14.71 %. This is in fact, de facto supplementation. It is unclear to the ISRP how partial treatment and de facto supplementation of control streams will be addressed in the statistical analysis of the ISS.

3. Development of a specific stream-by-stream protocol and timetable for implementation of Phase III of the ISS. Included in this is the immediate cessation of supplementation activities in Johnson Creek (see comments below on proposal 1996-043-00) and inclusion of Johnson Creek once again as a control stream in the ISS experimental design.

The Council recommended that the sponsors for all projects listed above provide the material as suggested by the ISRP in points 1 through 3 above. The exceptions are that the sponsors need not use an "independent statistician team," and that the recommendation to halt supplementation activities in Johnson Creek and returning it to "control" stream status is not required. The Council recommended that the Johnson Creek cooperators (Nez Perce Tribe, Idaho Department of Fish and Wildlife; U.S. Fish and Wildlife Service, and Shoshone-Bannock Tribe) specifically detail how they agreed to move Johnson Creek from a control stream in the ISS study to one that is supplemented. This confirmation must include: (1) the understanding of the cooperators in 1996 regarding the use of this stream in the ISS study design; and (2) any agreements reached at that time regarding the magnitude of the Johnson Creek supplementation program, and any current agreement about the magnitude of the program currently underway. This information needs to be provided to the Council prior to the step two submittal[3].

On March 23, 2003 the sponsors of the Idaho Supplementation Studies submitted responses addressing the Council's conditions that were placed on the projects as part of Fiscal Year 2002 Programmatic Issues for the Mountain Snake Province[4].

On May 22, 2003 the ISRP completed its review of the submittal and provided their review (ISRP document 2003-8). The ISRP recommended that the Idaho Supplementation Study be funded for one year subject to the collection of carcass data in 2003 for all the study streams. In addition, the ISRP requested additional review of the pilot analysis following the 2003 field season. This review should also include the review of the final design of the Phase III prior to the 2004 field season.

[3] The Council's Issue Summary for the Blue Mountain and Mountain Snake Provinces Mountain Snake also provides a extensive and detailed recommendation regarding the conditional approval of project #1996-043-00 that are explicitly linked to the above recommendations associated with the ISS initiatives.
[4] Programmatic Issue 10

Analysis

A. Council staff recommends that during 2003 the sponsors conduct an analysis and develop an updated final design for the start of Phase III in 2004.

B. Council staff recommends that extended collection of carcass data be required in 2003 on all ISS study streams for better estimation of abundance of strays, ISS supplementation fish and production fish.

During the initial two phases of this program the sponsors attempted to collect data on several parameters (e.g. juvenile emigration/abundance, parr density/abundance) to allow for analysis. A recently completed project analysis of the project's effects, conducted by the sponsors, was limited to redd density, because that parameter had the most complete data. It was found that these data were complete for only a few of the study streams where carcass data had been collected annually. Data were (and throughout the project analysis document) incomplete on the other streams. The ISRP thought that the ability to meaningfully analyze the ISS utilizing one parameter (i.e. abundance of redds), at the end of Phase III depends on complete carcass surveys in all streams. In addition, a determination is needed regarding the merits of collecting data on other parameters (e.g. juvenile emigration/abundance, and parr density/abundance), and leave redd abundance adjusted for the effect of strays[5] as a measure of treatment effect.

The project analysis indicated that supplemented streams have experienced an increase in density relative to control streams. An issue in the analysis of the results is the "de facto supplementation" from the straying of non-ISS fish into study streams. The assumption, as taken in the project analyses, is that the "de facto supplementation" affects the redd density on all streams equally and the effects of strays will stay the same in the future. The ISRP is concerned that this assumption seems to be far from the original objectives of the ISS, such as the comparison of several important parameters of naturally producing fish (that had no supplementation during Phase II or Phase III) with the profiles of naturally producing fish (that had supplementation in Phase II, but no supplementation in Phase III). The current and future "de facto supplementation" and limitation to density of redds severely compromises the chances of meeting the original objective of the ISS study. The ISRP suggests that an alternative should be investigated for the design and analysis of Phase III so that there are no "controls" in the ISS study, but simply streams with various levels of two types of supplementation (i.e. non-ISS strays and ISS fish).

Cost associated with the additional analysis and carcass surveys are to be completed with the existing budgets for the projects.

C. Council staff recommends that DNA-based assessment of ISS treatment and control populations be evaluated and addressed as part of the final design for Phase III.

[5] The dependency of the project's analysis on redd densities revealed and confirmed, where the most complete carcass data were available, that their was a substantial level of straying (i.e. non-ISS chinook carcass) in ISS study streams during carcass surveys.

The ISRP raised concerns over the varying level of straying and the effects on the primary objective of the study. The ISRP suggested the use of a tool, such as DNA-level microsatellite analysis. This analysis could be used to identify parentage relationships between spawning adults, outmigrating smolts, and adults that return to spawn in the next generation to assess the effect of the non-ISS strays on the study design and objectives. In addition, a subset of this analysis could separate ISS fish from natural-origin fish in the same system using the same methods.

Project sponsors needs to evaluated this assessment in the context of the current status of the tissue samples taken in association to the ISS project to determine if collections are sufficient to allow this type of DNA analysis. If there are additional needs the project sponsors need to assess the overall project and identify locations, opportunities schedules and budgets that will provide for this analysis and present their justification as part of the final design for Phase III.

1. Council staff recommends funding of the Idaho Supplementation Studies for one year subject to the ISRP stated requirements for carcass data collection in 2003, evaluation of DNA-based assessment of treatment and control populations, and development of a final design for Phase III. Further, the analysis following the 2003 field season and the final design of the Phase III segment be reviewed and approved before June 30, 2004.

It seems unlikely that the ISS will contribute compelling evidence for or against supplementation as it had originally envisioned. Due to the lack of complete data sets on juvenile production, DNA sampling, age-structured data and accounting for strays in all streams, the ISRP is concerned that the original experimental design has been compromised to the extent that alternative approaches to Phase III should be considered. In Phase III, the design calls for stopping supplementation with ISS fish. The sponsors should consider the merits of changing the design in Phase III (e.g. stopping "de facto supplementation", pursue different statistical strategies). The ISS sponsors should also investigate the effect of possible changes in the design of Phase III including the possibility of continued supplementation by ISS fish in some streams[6].

The project nears an important juncture in Spring 2004, when it transitions from Phase II treatments into the Phase III evaluation period. The ISS sponsors need to develop a final design for Phase III, and it should be reviewed and approved before the 2004 field season. The analysis following the 2003 field season and the final design of the Phase III segment be reviewed and approved before June 30, 2004. Out-year costs will be addressed as part of this review and approval of Phase III.

Additional funds, if needed, will be pursued through the within-year reallocation process.

[6] Continued supplementation in Johnson Creek and other streams might contribute important information concerning the complex interactions between naturally produced fish, strays, and ISS fish. Determination is needed to the current status of Project 1996-043-00, *Johnson Creek Artificial Propagation Enhancement Project*, as it relates to the original intent of the project.