

## SALMON TECHNICAL TEAM REPORT ON THE APPLICATION OF GENETIC STOCK IDENTIFICATION IN OCEAN SALMON FISHERIES

The Salmon Technical Team (STT) is unable to provide specific comments regarding the proposed pilot study because the purpose, nature, and scope of the study are not clearly articulated.

The STT recommends that individuals familiar with fishery management needs and sampling programs be active participants in deliberations regarding practical considerations involved in the use of genetic techniques in the management of ocean salmon fisheries.

### **Council Guidance on Research Projects**

The Council adopted Operating Procedures (COP 18) which establish the protocol for Industry Sponsored Salmon Test Fishery Proposals in November 1999, and amended it in September 2004 (excerpt below). Under this protocol,

- Proposals are to be submitted approximately three weeks prior to the November Council meeting.
- Proposals are to be screened for content.
- Screened proposals are to be provided to the Scientific and Statistical Committee (SSC), STT, and Salmon Advisory Subpanel (SAS) for review and comment at the November Council meeting.
- The SSC, STT, and SAS are to provide written comments to the Council at the March Council Meeting and the Council determines which proposals are to be included in the options provided for public comment.
- The Council decides which proposals are to be incorporated into its recommended regulations at its April meeting.

The Council's protocol also outlines the required content of proposals.

### **STT Comments Regarding GSI-Based Study**

The STT provides these comments to inform the Council of considerations that should be taken into account in designing research projects.

**1) The objectives of the study must be clearly defined in both general requirements and statistical specifications.**

## General Requirements:

Desired stratification: Times, areas, fishery (sport, troll), gear (e.g., lure restrictions), contribution type (e.g., all ages, age-specific, legal versus sub-legal sized fish)

## Statistical specifications:

The desired level of precision could be expressed in either absolute or relative terms. Absolute precision expresses the tolerance for error of the estimated contribution of the stock of interest in terms of percentages, regardless of the magnitude of the contribution; for example, estimate the contribution plus or minus 5%. In contrast, relative precision expresses the tolerance for error of the estimated contribution of the stock of interest in terms of a percentage of the true value; for example, estimate the contribution plus or minus 5% of the true value. Obviously, clarity of the target would have a great effect on the level of precision required. If the need is to estimate the contribution of a stock that comprises a small fraction of the total exploited population, a small absolute error would represent a large relative error. With relative error, the level of required precision increases (and with it sampling sizes) as the fraction comprised of the stock of interest decreases.

In addition to these general statistical requirements, the precision and accuracy of the methods for analysis of sampling data need to be taken into account. For example, the genetic baseline to be employed, uncertainty surrounding the capacity to correctly identify fish to their parental populations, and uncertainty surrounding the ability to correctly identify ages of fish (if required).

Depending on these factors and the desired stratification, the required sample sizes to attain the desired level of precision and accuracy of the stock contribution estimates can be determined. Sample sizes would be expected to vary substantially depending on the expected contribution of stocks/ages of interest to target strata, with largest samples required for strata with smallest contributions.

## **2) Logistical Considerations:**

- (1) The study design and methods employed to collect tissue samples must be designed to generate reliable data suitable for the purpose for which the results are intended to be applied (e.g., time-area stratifications). Depending on the desired objectives, it is likely that vessels will need to be chartered to collect sufficient samples for analysis.
- (2) Tissue collected from each individual fish (e.g., punches taken from a fin, and scales taken if age data are required) should be kept separate and preserved for later processing. Individual samples must also be logged with appropriate information to identify the time, location, etc. Using genetic stock identification (GSI) methods, tissue could be collected without sacrificial sampling, so impacts on natural stocks could be reduced to hooking mortality losses.

- (3) Fish with clipped adipose fins (adipose fin clips are still sequestered to indicate the presence of a coded-wire tag (CWT) for the areas likely to be involved in the study for California Chinook), should be retained, tissue for GSI analysis collected, and CWTs extracted. This would provide a means to validate the capacity of GSI and scale aging methods to correctly identify fish from a given stock and age.
- (4) The length of time between tissue collection and availability of results should be recorded and evaluated to provide insight into the potential to apply GSI methods on a real-time basis.
- (5) Because of inter-annual variability in relative abundance of stocks contributing to target fishery strata, the study should be conducted for a minimum of three years.
- (6) Note that a variety of additional methods could be employed to collect data that would be useful for comparative analysis. For example, trollers could be provided with tissue collection kits and receive training in collection procedures, or dockside sampling could be employed to collect data for comparison with contribution estimates resulting from the tissue collected from the chartered vessels.

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