

Pelagic Fisheries Research Program

Integrative modeling in support of the Pelagic Fisheries Research Program: spatially disaggregated population dynamics models for pelagic fisheries

Progress Report

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Background

The general objective of this research is to integrate the results of different components of the Pelagic Fisheries Research Program into a consistent framework that integrates knowledge of fish movement and population dynamics, the fishing process, economics and oceanography. The primary focus is the development of spatial models of pelagic fish population dynamics that explicitly include movement, mortality, and fisheries.

General Project Status

A post-doctoral fellow, Dr. M. Shiham Adam, a native of the Republic of Maldives, joined the PFRP as a JIMAR visiting scientist in May 2000. He is familiar with tagging data and will be expected to conduct much of the hands-on spatial analysis of the HTTP tag recapture data.

Progress on 1999-2000 Goals:

1. Conclude analysis of SPC RTTP yellowfin and skipjack tagging data and apply results to the analysis population exchanges within the WPRFMC area.

No significant progress.

2. Conclude analysis of north Pacific skipjack migration in collaboration with scientists from TNFRI (Tohoku National Fisheries Research Institute, Japan) and NRIFS (National Research Institute of Far Seas Fisheries, Shimizu, Japan).

No significant progress.

3. Conclude analysis of yellowfin and bigeye movements using data from the Cross Seamount tagging project.

"Exchange Rates of Yellowfin and Bigeye Tunas and Fishery Interaction Between Cross Seamount and Near-shore FADs in Hawaii" originally presented at the Symposium on Tuna Fishing and FADs, Martinique, 19 October 1999 for publication in Aquatic Living Resources. This paper is the first attempt at a spatially resolved analysis of the tag recapture data from the Cross Seamount tuna tagging study and will form the basis for further analysis of the recapture data from the Hawaii Tuna Tagging Program.

4. Continue analysis of tag recaptures from Hawaii regional tuna tagging project using both bulk transfer and diffusion models.

Completed a draft of a manuscript entitled "Possible Models for Combining Tracking Data with Conventional Tagging Data" for publication in the Tagging Symposium volume. The paper presents a statistical model applicable to single fish tracks that simultaneously estimates the geolocation error of the tag and population scale movement parameters.

5. Continue to improve numerical approximations to the partial differential equations used to model fish movement.

No significant progress.

6. Begin to incorporate models of effort distribution into models of the Hawaii pelagic fishery.

No significant progress.

7. Continue development of habitat-based movement models. If feasible, output from oceanographic models to simulate "real time" observations of temperature and oxygen fields.

No significant progress.

Goals for 2000-2001:

Goals for 2000-2001 will be essentially the same as goals for 1999-2000. More progress is anticipated as Dr. Adam's involvement in the work increases.