

## JIMAR ANNUAL REPORT FOR FY 2011

P.I. NAME: Kevin Weng

NOAA OFFICE (Of the primary technical contact): NMFS/PIFSC

NOAA SPONSOR NAME: Sam Pooley

PROJECT PROPOSAL TITLE: Integrative modeling in support of the Pelagic Fisheries: spatially disaggregated population dynamics models for pelagic fisheries (PFRP Modeling Project):

FUNDING AGENCY: NOAA

NOAA GOAL (Check those that apply):

To protect, restore, and manage the use of coastal and ocean resources through ecosystem-based management

To understand climate variability and change to enhance society's ability to plan and respond

To serve society's needs for weather and water information

To support the nation's commerce with information for safe, efficient, and environmentally sound transportation.

Mission Support

PURPOSE OF THE PROJECT (One paragraph):

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. The work emphasizes collaboration with other PFRP projects. The specific objectives were to continue improve and maintain the movemod diffusion and advection modeling software and run the movemod model with new and existing data sets.

PROGRESS DURING FY 2011 (One-two paragraphs):

Include a comparison of the actual accomplishments to the objectives established for the period, along with reasons for the slippage if established objectives were not met

Dr. Tim Sippel has been working on utilization of a database to standardize electronic tagging data storage and formats, which was developed by colleagues in California ([www.tagbase.org](http://www.tagbase.org)). The purpose is to facilitate more efficient data analysis which has broad appeal, including for projects like the PFRP Modeling Project. Johnnoel Anchetta from PFRP plans to contribute to the database framework as well.

Dr. John Sibert worked with Dr. Inna Senina and Dr. Patrick Lehodey (CLS, France) to apply the PFRP-sponsored SEAPODYM spatial ecosystem model of tuna population dynamics to the evaluation of space-based policies for conservation of bigeye tuna in the equatorial purse seine fishery. PFRP

graduate student Eun Jung Kim (University of Hawaii, Oceanography Department) continued development of a model to quantitatively capture the effects of fish aggregating devices (FADs) on the movement of skipjack tuna population. This model had been successfully tested in simulation. Additional work by Kim is underway to compute estimates of drifting FAD density in the WCPO using particle tracking software.

Skipjack, yellowfin and bigeye tagging and fishing effort data from the Secretariat of the Pacific Community were updated through 2010. The new data are aggregated at both 1° and 0.5° resolution.

The current movemod source code is available on the PFRP Subversion repository. Plans for creating an open-source project to maintain the movemod software were put on hold for want of financial support.

#### PLANS FOR THE NEXT FISCAL YEAR (One paragraph):

A paper describing the efficacy of spatial policies of bigeye conservation will be presented to the WCPFC Science Committee in August 2011 and will be revised for publication in the primary literature. The revised tagest software will be used to reanalyze data from HTTP1. The movemod software will be applied to the revised SPC tagging data. The FAD model will be used to analyze skipjack tagging data from the SPC.

#### LIST OF PAPERS PUBLISHED IN REFERRED JOURNALS DURING FY 2011 OTHER PAPERS, TECHNICAL REPORTS, ETC. PUBLICATION COUNT

#### GRADUATES:

Names of students graduating with MS or PhD degrees during FY 2011; Titles of their Thesis or Dissertation

None

#### AWARDS:

Name of JIMAR employees or project receiving award during the period, and Name of award

None

#### PERSONNEL (on Subcontracts):

For projects that awarded subcontracts in the fiscal year, please provide the number of supported postdocs and students from each subgrantee.

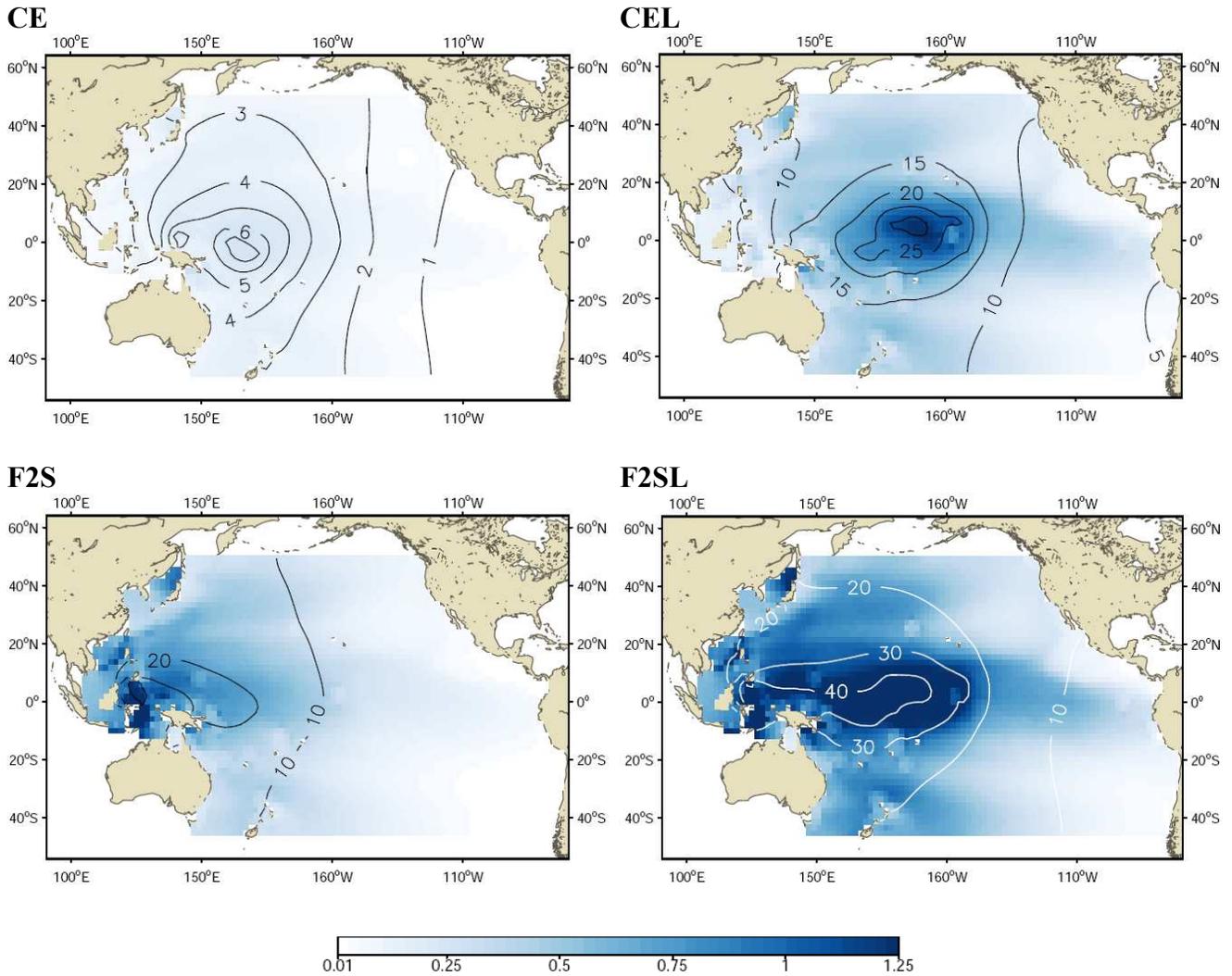
None

#### ACRONYMS:

SPC (Secretariat of the Pacific Community)

WCPO (Western Central Pacific Ocean)

WCPFC (Western Central Pacific Fishery Commission)



**Figure 5.** Changes in the distribution of adult bigeye density in the Pacific Ocean under different scenarios at the end of the simulation 1980-2003. **CE**: areas closed to purse seiners and loss of fishing effort; **CEL**: areas closed to purse seiners and loss of fishing effort with additional closure of area II to longline fishing; **F2S**: with no closure but FADs use prohibited and FAD effort displaced to free schools; **F2SL**: 'F2S' but with additional closure of area II to longline fishing. The color background gives the density in kg km<sup>-2</sup> and the isopleths are the percentage change in biomass relative to the reference simulation with actual fishing effort, scenario '0'.