JIMAR ANNUAL REPORT FOR FY 2011

P.I. NAME: Kevin Weng, Inna Senina, Francois Royer, Patrick Lehodey

NOAA OFFICE (Of the primary technical contact): PIFSC

NOAA SPONSOR NAME: Sam Pooley

PROJECT PROPOSAL TITLE: Integrating conventional and electronic tagging data into the spatial ecosystem and population model SEAPODYM

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 purpose of the project is to integrate conventional and electronic tagging data within SEAPODYM habitat-based population dynamics model. It is proposed to develop a fully-operational model allowing assimilation of both fishing and tagging data, and to validate it performing two case studies, with a focus on Pacific skipjack and yellowfin tuna populations.

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

The tasks and planned activities for the **Year 1** of the project were

1. Compilation of tagging datasets for skipjack and yellowfin tunas and preparation of the data in the format for SEAPODYM

NIFSF provided two datasets: 1) detailed fishing data from pole-and-line vessels, aggregated in 0.25degree and 1week resolution; 2) conventional tagging data. Also, SPC collaborators provided us with conventional tagging data collected from campaigns covering 2006-2011 time period. Yellowfin data are available for

longer period starting from 1998 and larger spatial domain including releases in the Eastern Pacific ocean. Some detailed fishing data are available, complete dataset containing high resolution fishing data is under preparation.

All tagging data were first compiled into a single dataset in the format required by SEAPODYM. This format allows an easy extraction of tagging records by size cohorts and by season. Aggregation into size (mapped into age) cohorts is necessary for incorporation of tagging data in age-structured SEAPODYM, so that the information about movement at size shown by the tags can be directly used for estimation of habitat parameters (see Fig. 1).

2. Development and implementation of the method for assimilation of tagging data, both electronic and conventional

Two different methods for estimating SEAPODYM parameters from tagging data were implemented and successfully tested with electronic and/or conventional tagging data: 1) tagged cohort simulator (based on both electronic and conventional tags); 2) predicting preferred habitat from residence time computed directly from electronic tagging data. Both methods were validated with actual (not artificial) datasets on smaller domains. Third method, consisting in estimation of movement fields from conventional tagging data is still under development. We envisage the preparation of the article describing and comparing all three methods used with SEAPODYM.

3. Preparing physical and biogeochemical forcing, MTL outputs and overall model configuration

High resolution data: biogeochemical (VGPM), physical and biological forcing (MERCATOR-Seapodym) were prepared for the entire Pacific Ocean domain on a resolution of $\frac{1}{4} \times 7$ day and the period 1998-2010. Extensive comparisons with other forcing datasets and available observations (climatology) were done in order to validate environmental data.

PLANS FOR THE NEXT FISCAL YEAR (One paragraph):

Unfortunately, as it became known recently, due to reduction of PFRP budget in the fiscal year 2011, the funding for the second year of the project will not be provided. Although this fact will not stop ongoing developments, the planning of future activities is not clear at this stage.

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

*complete excel attachment (JIMAR publications request) None

GRADUATES:

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

n/a

AWARDS:

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

n/a

PERSONNEL (on Subcontracts):

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

IMAGES AND CAPTIONS:

We will also be including images for the annual report. Please send two of your best high-resolution, color images (photo, graphic, schematic) as a **JPEG or TIFF (300 dpi)** with a caption for each image. If you do not have an electronic version of the image, a hardcopy version may be dropped off at the JIMAR office located in the Marine Sciences Building, Room 312



• Caption 1: Example of skipjack conventional tagging data (2006-2011) aggregated into cohorts by size for the use in SEAPODYM. Note that for the cohort of smaller tunas (25-35cm) the time at liberty not greater that 120 days was set to show only the tags, which belong to the cohort. The number of tagged tuna of 25-35cm and greater than 55cm are 563 and 640 correspondingly. The mean displacements are 170nmi and 300nmi and standard deviations are 238 and 525 correspondingly.

ACRONYMS:

Please provide the complete descriptions for any acronyms used in any areas of the report. For example: UH (University of Hawaii)

CLS (Collecte et Localisation par Satelites, Toulouse, France) NIFSF (National Research Institute of Far Seas Fisheries, Shimizu, Japan) SEAPODYM (Spatial Ecosystem And POpulation DYnamic Model) SPC (Secretariat of the Pacific Community, Noumea, New Caledonia) VGPM (Vertically Generalized Production Model, authors Behrenfeld and Falkowski)