JIMAR ANNUAL REPORT FOR FY 2011

P.I. NAME: Kevin Weng, Trevor A. Branch

NOAA OFFICE *(Of the primary technical contact)*: PIFSC

NOAA SPONSOR NAME: Sam Pooley

PROJECT PROPOSAL TITLE: Biological, economic, and management drivers of fishery performance: a global meta-analysis of tuna and billfish stocks

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)*:
Describe the current status and trends in biomass and fishing mortality of tunas and billfishes around the world. Evaluate the association between biological, economic, and management characteristics and differences in current stock status. Measure the impact of different management actions on fishing mortality rates for stocks experiencing overfishing (Fmsy, the fishing mortality greater than that which would produce maximum sustainable yield). Publish the results in the scientific literature.

PROGRESS DURING FY 2011 *(One-two paragraphs)*:
Compiled stock assessments for all available stocks of tunas and billfishes (20 stocks, 8 species), calculated biomass relative to Bmsy (biomass producing maximum sustainable yield). Compiled economic data on ex-vessel prices, and biological data on natural mortality, trophic level, generation length, regional fisheries management organization, maximum length, and other potential explanatory factors. We are conducting analyses and checking with our RFMO partners to make sure that all of our information is up to date, and preparing analyses.

There has been some slippage in our timeline for completion since two other research groups have projects similar to our proposed projects (one published as Collette et al. 2011 Science doi: 10.1126/science.1208730). We therefore plan to expand our project beyond the initial proposal to include additional and more advanced analyses, including the estimation of lost yield due to underfishing and overfishing.

PLANS FOR THE NEXT FISCAL YEAR *(One paragraph)*:
Estimate yield lost due to overfishing (biomass less than Bmsy) and to underfishing (biomass greater than Bmsy and fishing mortality less than Fmsy). Compare biomass trends with CPUE trends plotted in Myers and Worm (2003), who estimated a 90% decline in tunas by 1980. Conduct regressions to determine which factors (RFMO, economic, biological), if any, explain differences in stock status.

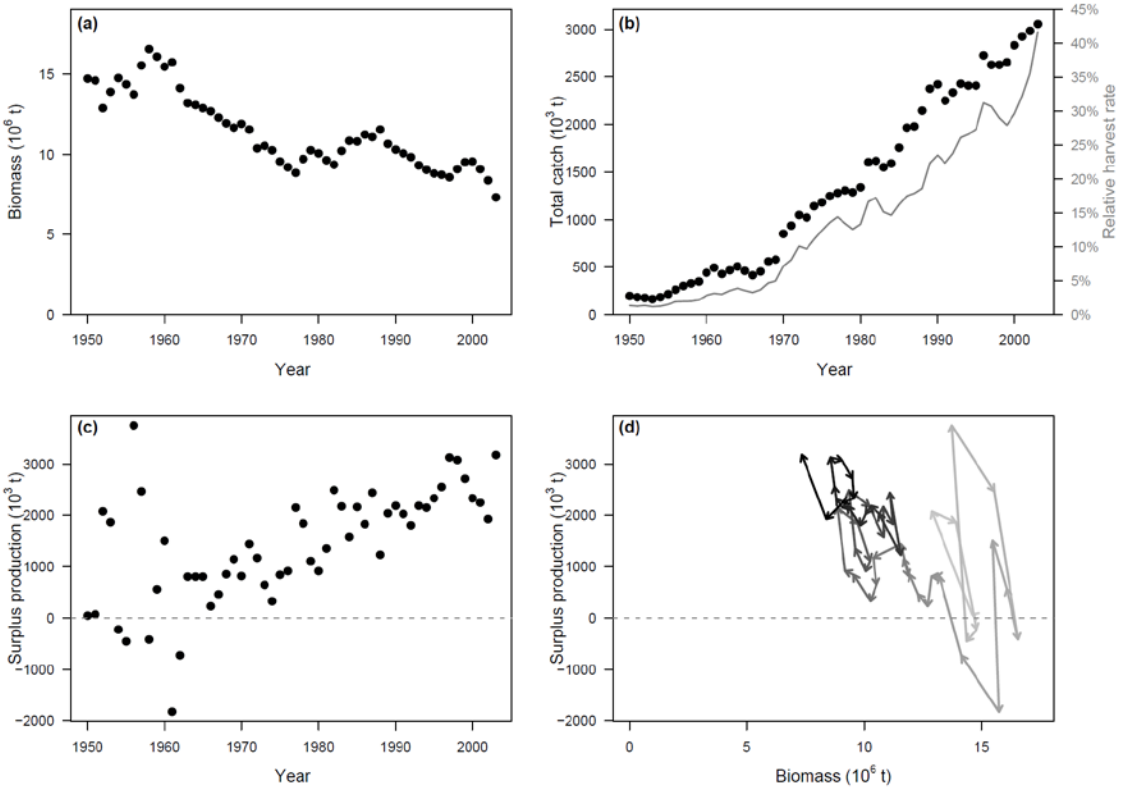
LIST OF PAPERS PUBLISHED IN REFERRED JOURNALS DURING FY 2011
OTHER PAPERS, TECHNICAL REPORTS, ETC.
PUBLICATION COUNT
No paper published during FY 2011 directly related to this project. Three papers peripherally related to this project are described.

GRADUATES:
Names of students graduating with MS or PhD degrees during FY 2011; Titles of their Thesis or Dissertation
None

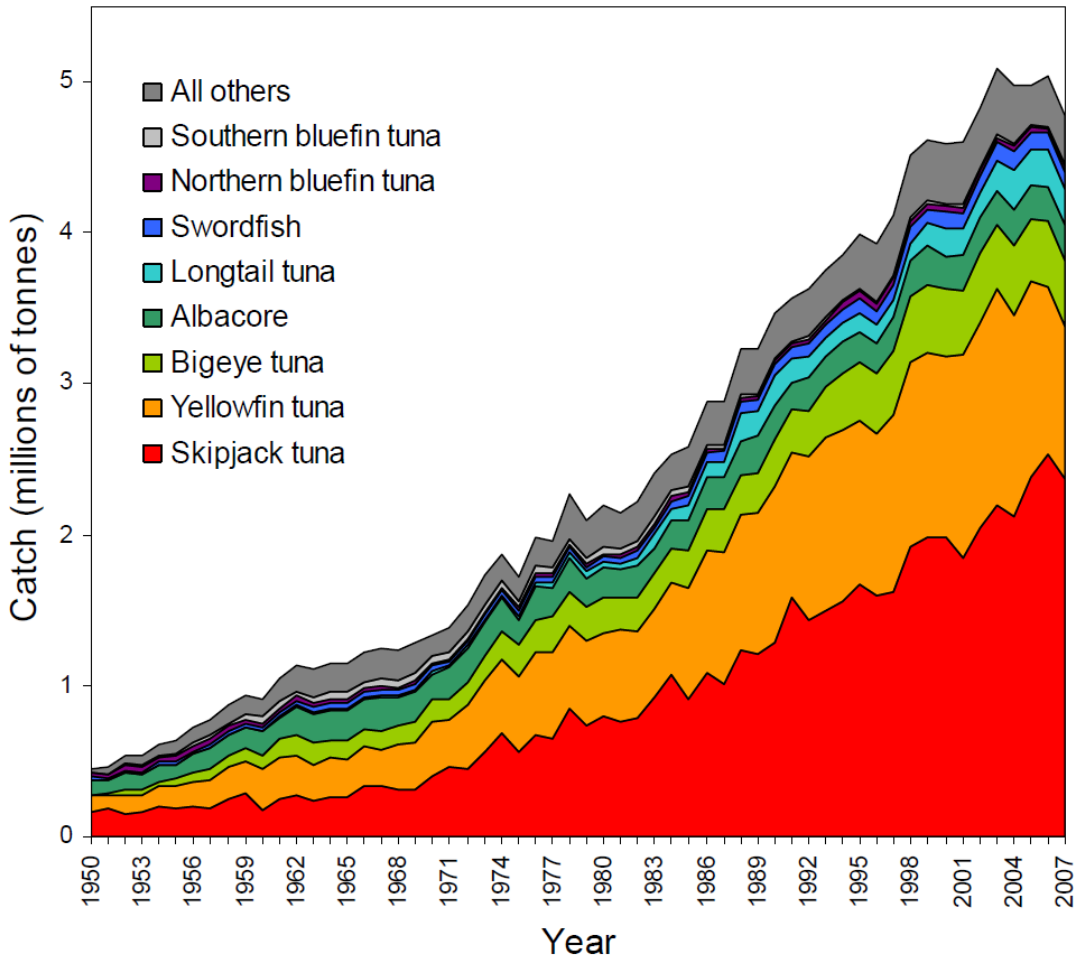
AWARDS:
Name of JIMAR employees or project receiving award during the period, and Name of award
Trevor Branch, Ray Hilborn, Olaf Jensen jointly received the Ecological Society of America "2011 Sustainability Science Award" for the paper Worm et al. (2009) "Rebuilding Global Fisheries" published in Science. This award is for the peer reviewed paper published in the past five years that makes the greatest contribution to the emerging science of ecosystem and regional sustainability through the integration of ecological and social sciences. We are currently using and expanding the stock assessment database compiled in that paper, as the basis for this current project.

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

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: (a) trends in biomass of all tunas and billfishes compiled; (b) total catch (circles) and relative harvest rate (gray line, catch relative to biomass index); (c) aggregate surplus production by year; (d) relationship between surplus production and biomass (light gray = earliest years). Note: all relations are draft and subject to change; "biomass" in this figure is a mixture of total biomass and spawning biomass, which needs revision.



- Caption 2: Catches of open ocean tunas and billfishes from the FAO catch database. Similar results are seen when catches in our stock assessment database are plotted.

ACRONYMS:
Please provide the complete descriptions for any acronyms used in any areas of the report. For example: UH (University of Hawaii)
Bmsy: Biomass producing maximum sustainable yield
Fmsy: fishing mortality producing maximum sustainable yield.