

## JIMAR – PFRP ANNUAL REPORT FOR FY 2007

P.I./Sponsor Name: William A. Walsh and Keith A. Bigelow (co-PIs), John Sibert

Project Proposal Title: “Investigation of Shark Bycatch in the Hawaii-based Longline Fishery, and an Extension of Analyses of Catch Data from Widely Separated Areas in the Pacific Ocean”

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

### 1. Purpose of the Project (one paragraph)

This project entails biometrical research with two overall goals. The first is to improve understanding of shark bycatch in the Hawaii-based longline fishery. The second is to elucidate variation across broad spatial scales in catch per unit effort (CPUE) for several highly migratory Pacific fishes as a contribution to the development of ecosystem-based fishery management. Improved understanding of the composition of shark bycatch may permit use of the diversity of these species as an indicator of ecosystem status, while an improved understanding of the magnitude of shark bycatch, in the aggregate and by species, is fundamental background information required to evaluate the efficacy of bycatch reduction efforts. Comparisons of catch trends across broad spatial scales may contribute to the definition of the functional sizes of Pacific Ocean ecosystems and improved ecosystem monitoring because such trends may vary both within and among species and fisheries. This second aspect represents a request for an extension of the PFRP project “Comparisons of Catch Rates for Target and Incidentally Taken Fishes in Widely Separated Areas of the Pacific Ocean”, originally submitted by William A. Walsh and Samuel G. Pooley (subsequently replaced by Keith A. Bigelow as the collaborating investigator), in order to resume uncompleted activities.

### 2. Progress during FY 2007 (One-two paragraphs, including a comparison of the actual accomplishments to the objectives established for the period and the reasons for slippage if established objectives were not met):

Substantial progress was achieved toward project goals in FY 2006. The species composition of shark bycatch was evaluated with catch data reported by the Hawaii

Longline Observer Program. The evaluations were performed by checking identifications on a species-specific basis, using a suite of objective criteria and starting with the infrequently reported species (e.g., white shark, tiger shark). The criteria for reliability included photograph(s), confirmation by a NMFS fishery biologist or Bishop Museum ichthyologist, or prior sightings of the species by the particular observer in question. The expectation in this regard was that the number of species listed in the observer database would exceed the number of reliably identified species, with misidentifications among the infrequently caught species possibly giving rise to spurious inferences regarding occurrences in the catch of this fishery. This expectation proved correct; results demonstrated that newly hired observers were responsible for a substantial (and highly disproportionate) fraction of the reported catches of rare and uncommon shark species. This finding is expected to be useful because it should lessen the possibility that rarity or absence of such species could be perceived as adverse effects of the Hawaii-based longline fishery rather than normal conditions. Results from this aspect of the project were presented as a PowerPoint presentation at the PFRP semiannual meeting in November 2006 (“Preliminary Results from Analyses of Shark Catches in the Hawaii-based Longline Fishery as Reported by Fishery Observers” by William A. Walsh and Keith A. Bigelow).

The basis for comparisons of catch rates of pelagic species in widely separated areas of the Pacific Ocean was also established in FY 2006. Observer catch data with wahoo and mahimahi from the Hawaii-based longline fishery were assessed in terms of catch rates, the magnitude and condition of bycatch, the sizes of caught fish, and data accuracy. The most surprising result was an apparent biennial cycle in wahoo, with catch rates and fish sizes varying inversely with a significant negative correlation. Results from this aspect of the project were presented as a PowerPoint presentation at the 58<sup>th</sup> International Tuna Conference in May 2007 (“Exploratory Analyses of Mahimahi and Wahoo Catch Rates in the Hawaii-based Longline Fishery”, by William A. Walsh and Keith A. Bigelow).

3. Plans for the next fiscal year (one paragraph):

Work planned for FY 2007 includes estimation of catches of blue, mako, and thresher sharks on unobserved sets by the Hawaii-based longline fleet since 1994. This task will be based upon methods developed in previous projects (i.e., fitting a statistical model to observer data, and then applying the model coefficients to logbooks in order to assess their accuracy). The wahoo and mahimahi results, along with those from other species (e.g., blue marlin) will be compared to those from other regions, including Guam and American Samoa.

4. List of papers published in refereed journals during FY 2007.

“Analyses of observed longline catches of blue marlin, *Makaira nigricans*, using generalized additive models with operational and environmental predictors”, by W.A. Walsh, E.A. Howell, K.A. Bigelow and M.L. McCracken. *Bulletin of Marine Science* 79:607–622.

5. Other papers, technical reports, meeting presentations, etc.

Two working papers (i.e., ‘Duties as assigned’) were also prepared during FY 2007. A working paper on swordfish catch rates in the Hawaii-based longline fishery (“Observed Swordfish (*Xiphias gladius*) Catch Rates in the Hawaii-based Longline Fishery, 1994–2006”) was presented by G.T. DiNardo of the NOAA Fisheries Pacific Islands Fisheries Science Center at the ISC Joint Workshop of the Marlin and Swordfish Working Groups. A second working paper for the same meeting (“Aspects of model selection for generalized linear models applied to striped marlin in the Hawaii-based longline fishery” by Jon Brodziak and William Walsh) was presented by its senior author.

I (WAW) also served as a reviewer for four journals in FY 2006: Canadian Journal of Fisheries and Aquatic Sciences; ICES Journal of Marine Science; Fisheries Research; and Bulletin of Marine Science.

6. Graduates (Names of students graduating with MS or PhD degrees during FY 2006. Provide titles of their thesis or dissertation):

None

7. Awards (List awards given to JIMAR employees or to the project itself during the period):

None

8. Publication Count (Total count of publications for the reporting period and previous periods categorized by NOAA lead author and Institute (or subgrantee) lead author and whether it was peer-reviewed or non peer-reviewed (not including presentations):

	JI Lead Author			NOAA Lead Author			Other Lead Author		
	FY05	FY06	FY07	FY05	FY06	FY07	FY05	FY06	FY07
Peer-reviewed	1	1							
Non-peer reviewed	1	2							

9. Students and Post-docs (Number of students and post-docs that were associated with NOAA funded research. Please indicate if they received any NOAA funding. For institutes that award subcontracts, please include information from your subgrantees):

None

10. Personnel:

(i) Number of employees by job title and terminal degree that received more than 50% support from NOAA, including visiting scientists (this information is not

required from subgrantees):

William A. Walsh, Ph.D., Researcher

- (ii) Number of employees/students that received 100% of their funding from an OAR laboratory and/or are located within that laboratory.

None

- (iii) Number of employees/students that were hired by NOAA during the past year:

None

11. Images and Captions. (JIMAR will be including images in the annual report. Please send two of your best high-resolution, color images (photo, graphic, schematic) as a JPEG or TIFF with a caption for each image. Hardcopies of images can be dropped off at the JIMAR office if no electronic versions are available.

Not applicable

- Caption 1:
- Caption 2:

12. For multi-year projects, provide budget for the next year on a separate page. Contact Dodie Lau to confirm whether or not your project is to receive continuation funds (e.g., year 2, year 3), and for budget preparation assistance, [lau@hawaii.edu](mailto:lau@hawaii.edu)