JIMAR – PFRP ANNUAL REPORT FOR FY 2007

P.I./Sponsor Name: John Sibert, Michael P. Seki and Jeffrey J. Polovina

Project Proposal Title: Oceanographic Characterization of the American Samoa Longline Fishing Grounds for Albacore, *Thunnus alalunga*

Funding Agency: NOAA

NOAA Goal (Check those that apply):

X To protect, restore, and manage the use of coastal and ocean resources through ecosystem-base 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)

The American Samoa domestic longline fishery has undergone extraordinary growth, particularly in the fleet composition of large vessels (>20 m in length) that have fueled a fivefold increase in fishing effort and landings from 1999 to 2001. The most intense period of the expansion occurred during 2001, when the total number of hooks set increased tenfold from 860 thousand during 2000 to 8.6 million in 2002. The target species of the longline fleet is albacore tuna, *Thunnus alalunga,* which dominates the catch. The fisheries performance for albacore peaked with 334 thousand fish caught during 2002, which was followed by a steep decline in 2003-2005 and a modest come back in 2006. Oceanographically there has been little study regarding the pelagic habitat in the American Samoa region. The current research undertakes the task of characterizing the pelagic habitat and fishing grounds occupied by the American Samoa longline fishery through the use of satellite oceanographic remote sensing and *in situ* shipboard surveys. Coupled with the oceanographic assessment will be fishery information to develop a functional understanding of the spatial and temporal occupation and movement tendencies of large South Pacific albacore and the role of the environment on longline gear performance and catch. These data include albacore depth distribution and gear performance obtained from commercial longlines instrumented with time-depth-temperature recorders (TDRs) and the set level catch information from the American Samoa fishery logbook program.

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):

Analyses of data from the second year of the project (FY06) have been completed. Results of analyses completed during FY07 seem to confirm that anticyclonic eddies in the American Samoa fishing grounds are predominantly formed from SECC waters. On the average, SECC waters contain higher micronekton biomass than SEC waters, but nekton biomass does not seem to be related to either micronekton biomass or water characteristics. ADCP current data indicates that the vertical extent of mesoscale eddies formed in the region is maximum 200 m in depth or less. Nekton biomass seems to be related to current magnitudes in the upper 200 m, while relationship between current magnitudes and micronekton biomass is not evident. Nekton aggregations were observed almost exclusively between 200 and 300 m below the surface (Fig. 1), coinciding with the depths where tagged albacore spent most of their time during the first survey of the area, (March, 2004; first year of the project). These depths also correspond to depths of a thin, persistent micronekton layer which shows acoustic characteristics consistent with relatively higher biomass of crustaceans, found to be preferred by albacore, relative to those in the shallow and deep scattering layers.

Currents show evidence of persistent subsurface jets, predominantly at 150 m, 200-300 m and at 500-600 m depths, presumably formed by island or other topographic effects. Highest currents in the fishing grounds, exceeding .5 cm/s, were observed south of Tutuila during nighttimes, at 150-200 m depth (Fig. 2). These currents are propagating southwest in the region where the highest micronekton biomass were observed consistently during both years of the observations.

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

Results obtained from data collected during the second oceanographic cruise (conducted in FY6) will be prepared for publication in a peer review journal.

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

Domokos, R., M. P. Seki, J. J. Polovina, and D. R. Hawn. Oceanographic Investigation of the American Samoa albacore (*Thunnus alalunga*) habitat and longline fishing grounds**.** *Fish. Ocean.,* In press

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

Domokos, R., J. J. Polovina, and M. P. Seki. Oceanographic Influences on Albacore Catch Rates in the American Samoa Longline Fishery. EOS, Trans. Am. Geophys. Union, Vol. 87, no. 36, suppl., Sep 2006

Domokos, R., J. J. Polovina, and M. P. Seki. Oceanographic Influences on Albacore and its Forage in the American Samoa Longline Fishing Grounds. Presented at PFRP annual winter PI meeting, Nov. 14-17, 2006, Honolulu, HI.

6. Graduates (Names of students graduating with MS or PhD degrees during FY 2007. 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	0	1			
Non-peer reviewed						1			

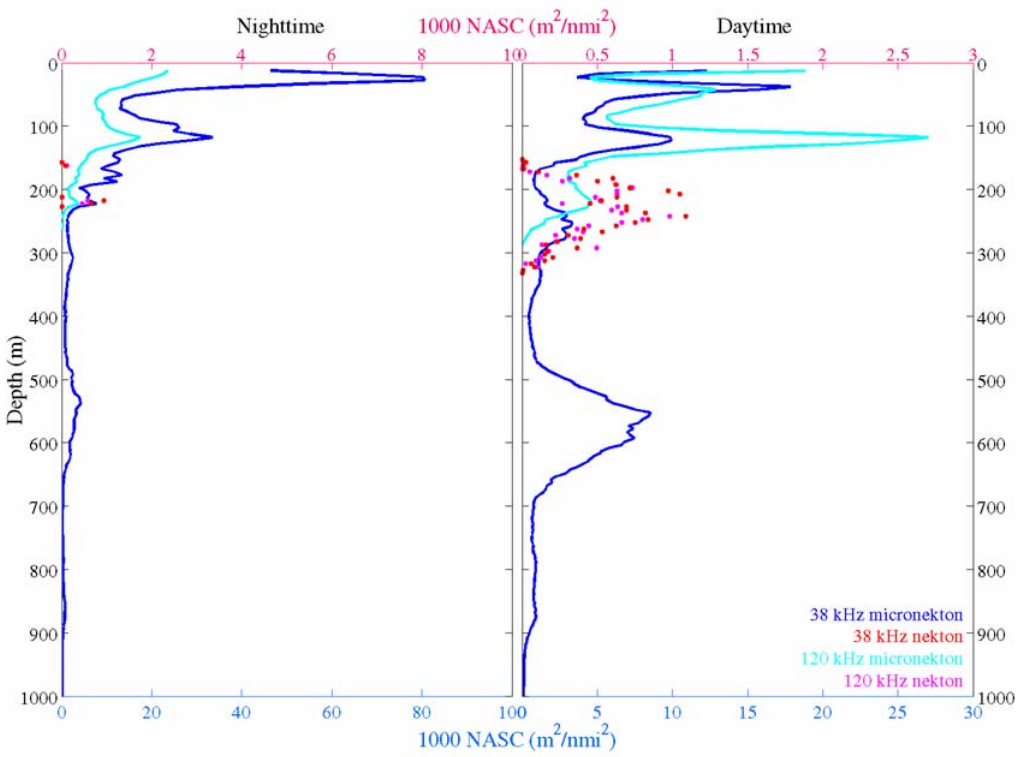
9. Students and Post-docs (Number of students and post-docs that were associated with NOAA funded research. Please indicate if they received any NOAA funding. For institutes that award subcontracts, please include information from your subgrantees):
None

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):
None

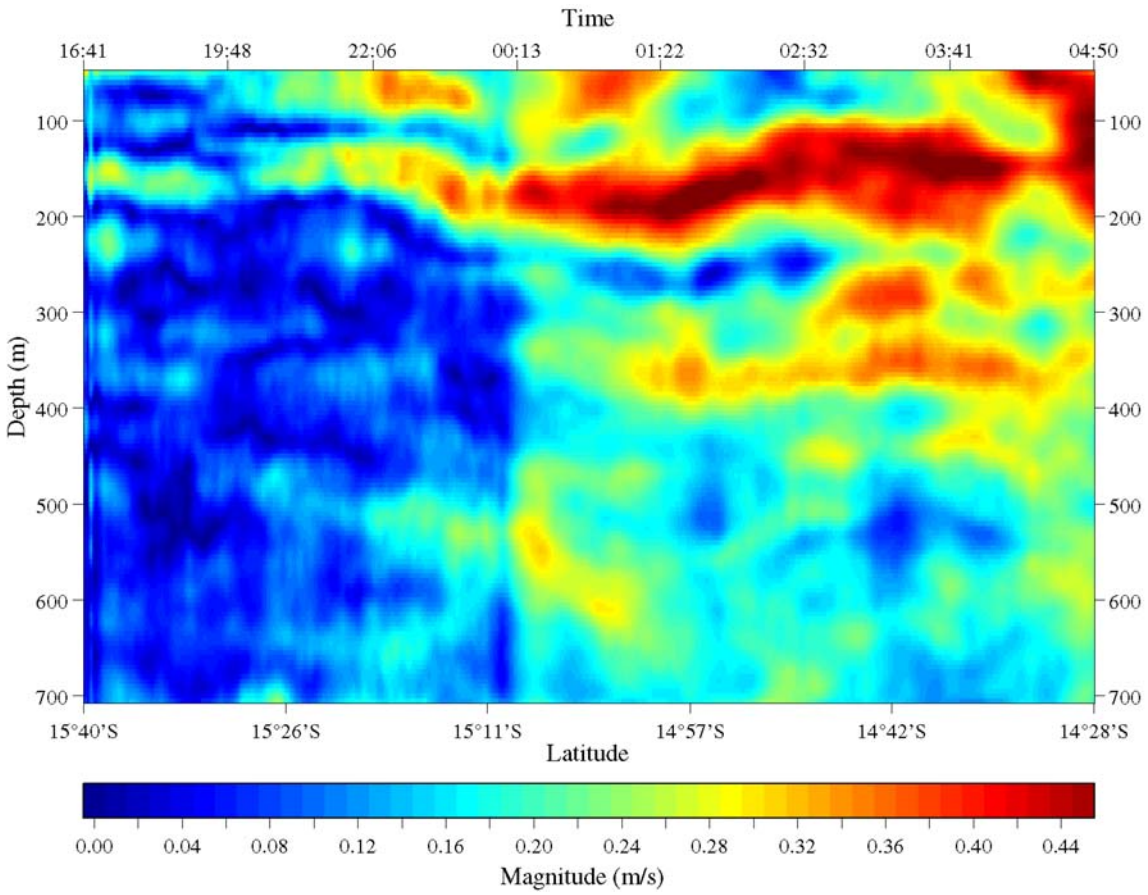
(ii) Number of employees/students that received 100% of their funding from an OAR laboratory and/or are located within that laboratory.
None

(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 of TIFF with a caption for each image. Hardcopies of images can be dropped off at the JIMAR office if no electronic versions are available.



● Caption 1: Horizontally averaged Nautical Area Scattering Coefficients (NASC) for micronekton (blue and turquoise lines, bottom axis) and nekton (red and pink dots, top axis) at 38 kHz (blue and red) and 120 kHz (turquoise and pink) frequencies, separated for daytime (left panel) and nighttime (right panel).



● Caption 2: Net current magnitudes along a south to north transect approaching the island of Tutuila from the south. Note the relatively strong subsurface jet between 100 and 200 m depth north of 15º15'S.