

## JIMAR ANNUAL REPORT FOR FY 2008

P.I./SPONSOR NAME: Heidi Dewar, Jeffrey Polovina, John Sibert

NOAA OFFICE (Of the primary technical contract): PIFSC

PROJECT PROPOSAL TITLE: Long-Term Deployment of Satellite Tags on Swordfish using the California Harpoon Fleet

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

PURPOSE OF THE PROJECT (One paragraph):

The management of swordfish in the Pacific is hampered by the lack of data on stock structure and essential habitat in part because of the difficulties associated with studying these large, active and aggressive fish. Electronic tags, such as the pop-up satellite archival tags, have been useful for examining the stock structure and habitat use of other pelagic fish. The goals of this project were 4 fold. First, to determine the feasibility of using the California harpoon fleet to deploy pop-up satellite tags over long time periods. To do this, tags are deployed over periods of up to 6 months. The second is to test the retention rates with two different dart types. The third is to use any data obtained to determine whether the region off California is in fact a region of mixing as suggested previously and examine essential habitat in different oceanographic regions. Finally, given the diving patterns of swordfish and associated difficulty of using light to determine latitude and longitude, efforts will focus on using hydrographic features including SST to estimate locations between tag and pop-up.

PROGRESS DURING FY 2008 (One-two paragraphs, including a comparison of the actual accomplishments to the objectives established for the period, and the reasons for the slippage if established objectives were not met):

In the past year a total of 8 satellite tags were deployed by harpooners in the Southern California Bight. The harpoon fishery off California has a relatively high degree of variability and last year fewer fish were harpooned than usual. The entire fleet harpooned

less than 100 fish which is why we were not able to get out all our tags. Of the eight tags deployed, three released early, two were recaptured (one after almost four months) and two of the remaining 3 reported to satellite. The tags were deployed with a mix of the two dart types. It is however, too early to determine which provides the highest retention rates, although the one tag that was recovered after nearly 4 months was secured using the large white dart with the highest surface area.

In addition to the tagging, we continue to make progress with efforts to confirm anecdotal reports that the California Bight is a region of mixing between fish coming from the west and the south. At this point the focus is on sample collection. We have been collecting otoliths, parasites, tissue for DNA and isotope analysis and just recently starting documenting morphological differences and the occurrence of cookie cutter shark scars on swordfish. Based on the distribution of cookie cutter sharks one would expect more scars on fish from the west than the south. A large number of samples were collected last year and we continue to work those up for ultimate processing.

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

In 2008 we plan to complete the satellite tag deployments. Eight tags will be deployed in the Southern California Bight for periods of 6 months with the help of two experienced harpooners. Additional efforts will focus on deploying both pop-up satellite tags and archival tags north of Point Conception, California where no data for swordfish are currently available. Information on behaviors from this region will advance our understanding of how vertical habitat use is influenced by oceanography. This area is also known for its swordfish and leatherback sea turtle interactions and additional information on habitat use may help in developing more adaptive management strategies for swordfish fisheries. In addition to the tagging efforts, data synthesis will begin for all tags deployed in this study. We will use the temperature and depth data recorded by the tags to describe the basic habitat of swordfish and examine shifts with oceanography. The same data will be used to characterize the water column in an effort to better define movement patterns between tag and release. In addition, a graduate student of Jeff Polovina will use the data for her Ph.D. work in a Seapodum pelagic ecosystem model focusing on swordfish, the longline fishery, and loggerhead sea turtles. Separate but complementary efforts will continue to document whether the Southern California Bight is in fact a region of mixing of swordfish of western and southern origin. Sample collection and documentation of external differences will continue throughout the season with the help of the two fleets. We will also begin analysis of otoliths for trace elements and tissues for isotope ratios in an effort to confirm reports and find a chemical signature to identify each group. This is the first step towards quantifying temporal and spatial patterns in mixing.

The uncommitted Balance will go to

The purchase of 5 PSAT tags

Reimburse the fishermen for deploying the remaining PSAT tags (8-11 tags)

To pay for isotope analysis and measurement of trace elements in otoliths

To purchase some miscellaneous supplies

LIST OF PAPERS PUBLISHED IN REFERRED JOURNALS DURING FY 2008, in the following format: (Author or authors with last name and initials, publication year: Article title. *Journal name*, volume, page range.) For example: Charney, J.G., and A. Eliassen, 1964: On the growth of the hurricane depression. *J. Atmos. Sci.*, 21, 68-75.  
 None from PFRP funded research

OTHER PAPERS, TECHNICAL REPORTS, ETC.: None from PFRP funded research

GRADUATES (Names of students graduating with MS or PhD degrees during FY 2008; Titles of their Thesis or Dissertation): None from PFRP funded research

AWARDS (List awards given to JIMAR employees or to the project itself during the period): None

PUBLICATION COUNT (Total count of publications for the reporting period and categorized by NOAA lead author and Institute (or subgrantee) lead author and whether it was peer-reviewed or non peer-reviewed (not including presentations):  
 None from PFRP funded research

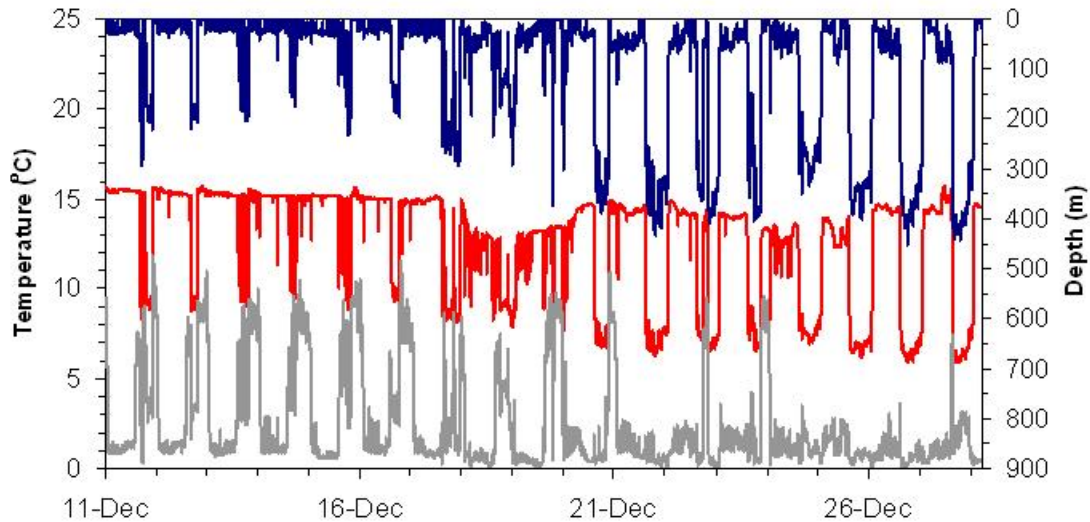
	JI Lead Author	NOAA Lead Author	Other Lead Author
Peer Reviewed			
Non-Peer Reviewed			

**PERSONNEL:**

For projects that awarded subcontracts in the fiscal year, please provide the number of supported postdocs and students from each subgrantee. None in past fiscal year

**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):

## 17 Days in the Life of a Swordfish



- Caption 1: An archival records showing seventeen days in the life of a swordfish including depth (blue), temperature (red) and light level (grey). This fish was tagged off California and recaptured off Hawaii nearly 4 months later. Note the transition in behavior around the middle of the record. At the beginning of the record the swordfish makes only brief forays below the thermocline. At the end of the record the more typical swordfish behavior is observed with animals leaving the surface at sunrise and generally not returning back to the surface until around sunset. Note the differences in the light record which indicates the day night cycle.



- Caption 2: This picture of a swordfish shows two features which are thought to be associated with fish of western origin, the wrinkly skin (these fish are known as wrinkle bellies) and a cookie cutter shark scar.