

# **JIMAR ANNUAL REPORT FOR FY 2007**

## **Plans for the Next Year**

### **Equatorial Oceanography**

#### **The Joint Air-Sea Monsoon Interaction Experiment: Upper Ocean Survey (JASMINE)**

**P.I.:** Peter W. Hacker [Roger B. Lukas and Eric Firing]

With the small remaining resources, we plan to complete our use of the JASMINE and recent NOAA observations for the planning and implementation of the moored array for the Indian Ocean via interaction with the CLIVAR Indian Ocean Panel, and work with the panel on an Indian Ocean data management plan and data serving partnership.

#### **Penetration of Anthropogenic CO<sub>2</sub> in the Oceans Based on Analysis of Recent WOCE/JGOFS/OACES Carbon Data Using the Remineralization Ratios Obtained by the New Three-End-Member Mixing Model**

**P.I.:** Yuan-Hui Li [Tsung-Hung Pwng]

To work on alkalinity excess in three major oceans.

### **University of Hawaii Sea Level Center**

**P.I.:** Mark A. Merrifield

We will actively work with host countries to bring at least 10 new GCOS stations into operation during FY 2008. A particular focus area is Russia and we have approached Roshydromet about a possible collaboration. We will focus on increasing the number of GCOS stations that report in near real-time by at least 15 stations over the next year. We expect that this will come about as a result of current upgrade efforts by other groups, with UHSLC assistance, in Africa, the Caribbean, and Europe. We will attempt to broker the installation of CGPS at tide gauge benchmarks in at least 10 stations in the GCOS network. In terms of research, we will submit articles to peer-reviewed journals exploring global sea level rise estimates from tide gauges, the annual climatology of extreme events at tide gauges, and an assessment of tidal vs. storm control of extreme events at tide gauges. We will also contribute our annual assessment of global sea level for the BAMS State of the Climate issue.

### **Tsunami Research**

#### **Archiving and Analysis of High-Resolution Sea Level Data from the Hawaiian Islands**

**P.I.:** Douglas S. Luther

Collection, processing, and dissemination (through ARSHSL) of rapidly sampled Hawaiian sea level will continue. Depending on the amount of effort needed to maintain the archive, enhancements to the archive will continue. These include (i) updating the archive's technical report; (ii) updating files of concatenated, quality-controlled, hourly-averaged sea level data for low-frequency studies; and, (iii) improving and automating the procedures for editing the 1-second data from 8 PTWC gauges. Under separate NOAA funding of the Hawaii-Pacific Ocean Observing and Information System (HI-POOIS) to begin in FY 2008, we will start a program to update the ARSHSL acquisition and processing code in order to provide a continuous stream of time series of low-frequency sea level from the NOS & PTWC gauges for modeling and prediction of sea level inundation hazards in the main Hawaiian Islands.

## **Inverse Algorithm for Tsunami Forecast**

**P.I.: Thomas A. Schroeder [Kwok Fai Cheung]**

Develop computer models of tsunami generation from seafloor deformation. The current approach assumes the initial tsunami waveform to be identical to the seafloor deformation and ignores the dynamics of tsunami generation. The proposed research will better model the physics of tsunami generation and improve the accuracy of the forecasts.

## **Climate Research**

### **Compilation, Digitization, and Use of Hawaii State Rainfall Records**

**P.I.: Pao-Shin Chu**

We plan to publish reports describing station name, observer name, latitude, longitude, and elevation for each gage.

### **Development of Real-Time Percipitable Water Capability Using the Global Positioning System**

**P.I.: James H. Foster**

The SkyNet network of GPS receivers will be maintained and equipment and processing software will be upgraded as necessary. LIHU will be connected to the Internet and incorporated into SkyNet. As hourly (or more frequent) data from new and existing GPS sites become available these sites will be added to the SkyNet and incorporated into the processing routines. Plans are underway to explore the retrieval of IPWV from shipboard GPS units. A data set has been collected to test this possibility. Once demonstrated, we plan to deploy this technique on transportation barges on regular inter-island routes and the soon to be operational Hawaii SuperFerry. We envision being able to expand the program onto barges traveling to and from the mainland and also onto open ocean buoys, thus generating IPWV estimates for data-sparse regions.

### **Effects of the Andes on Eastern Pacific Climate**

**P.I.: Shang-Ping Xie [Yuqing Wang]**

Recent observations suggest that tropical Atlantic climate anomalies influence the Pacific and El Nino/Southern Oscillation. We plan to use ROAM to study this Atlantic-to-Pacific influence, by analyzing existing runs and conducting sensitivity experiments as necessary. The results will help improve understanding by simulating and predicting tropical Pacific climate variability and its global influences.

### **Enhancement of Data and Research Activities for Climate Studies at the International Pacific Research Center**

**P.I.: Julian P. McCreary, Jr. [Peter W. Hacker and James T. Potemra]**

The project will continue activities addressing the three broad themes of the APDRC: data serving and management; applied research that leads to the development of climate-related products for researchers, decision makers, and the general public; and basic climate research in support of the IPRC and NOAA research goals. Activities in theme one include: operation and maintenance of the APDRC's web-based, integrated Data Server System; and data management for climate data and products. Activities in theme two include: continuation of ongoing PRIDE activities; carrying out value-added activities that produce enhanced data products; serving GODAE products for a broad range of users, focusing on satellite and model-derived products; and implementation and evaluation of high-resolution, regional models for downscaling of operational models in Pacific Islands regions. Activities in theme three include basic research toward: development and evaluation of multi-model forecasts for Pacific-Island rainfall; and development and evaluation of a Pacific upper-ocean climatology based on Argo data. We will also coordinate closely with our national and international partners on the implementation of a distributed and linked climate data server network, and continue to assist with regional coordination in support of the GCOS and GOOS programs.

## **Investigating the Transport and Transformation Mechanisms of Atmospheric Mercury in the Remote Central North Pacific Marine Free Troposphere**

**P.I.: Thomas A. Schroeder [Darryl T. Kuniyuki]**

Next year we will introduce a rain collection device, which will be located in the Hakalau forest reserve. It will be used to study trace metals and mercury deposition.

## **Profiling CTD Float Array Implementation and Ocean Climate Research**

**P.I.: Thomas A. Schroeder [Gregory C. Johnson]**

In FY 2008 collaboration with PMEL and other Argo partners will continue with testing, deployment, and performance monitoring for more floats. Ocean climate studies will continue using Argo data, including analysis of global ocean heat, and possibly freshwater, content variations.

## **Roles of Ocean-Atmosphere-Land Interaction in Shaping Tropical Atlantic Variability**

**P.I.: Shang-Ping Xie**

We plan to write up the results of the evaluation of the AR4 models for publication. We will continue to study the response to the reduced overturning circulation both in the tropical Atlantic and over the globe.

## **Pacific ENSO Applications Center**

**P.I.: Thomas A. Schroeder**

The PEAC staff is planning a visit to our Pacific clients during late summer 2007 for the following purposes.

1. assessing the impacts of the 2006-2007 Warm Event
2. evaluating our performance
3. surveying our clients to learn what new issues have arisen which PEAC may address in the future

## **The Effects of the Stratospheric Quasi-biennial Oscillation on Seasonal Predictability of Tropospheric Circulation in the Northern Hemisphere Extratropics**

**P.I.: Kevin P. Hamilton**

We will investigate how the knowledge of the QBO phase (and accurate prediction of the phase through the winter) can be used in a posteriori correction to the numerical ensemble hindcasts in HFP2. Preliminary results suggest that the skill of extratropical winter forecasts can be enhanced significantly by including the QBO information, at least in some regions.

## **Dynamics of Pacific Decadal Climate Variability and ENSO Modulation**

**P.I.: Fei-Fei Jin**

We will continue the ongoing work of coupling the new linear global atmospheric model with eddy feedback to the MOM ocean model.

## **Tropical Meteorology**

### **National Weather Service International Pacific Training Desk**

**P.I.: Thomas A. Schroeder**

Three interns are arriving in Summer and Fall 2007 with additional anticipated in 2008.

## **Fisheries Oceanography**

### **Fisheries Oceanography: Methods Aimed to Reduce Sea Turtle-Longline Interactions: Tests of Modified Baits and Fishing Gear**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, John H. Wang, Yonat Swimmer]**

Plans for 2008 include phasing out some of the sensory work (including some of the visual physiology and behavior of loggerhead and leatherback sea turtles) and continuing to work on both shark and sea turtle bycatch mitigation studies in Baja California, Mexico. We plan to expand our work in the area of shark bycatch reduction both in captive and wild situations, and are currently working to secure permits, etc., to facilitate future work in these areas. We also plan to continue to use satellite telemetry to track the movements and survivorship of sea turtles after their release from fishing gear.

### **Fisheries Oceanography: Protected Species Investigation: Marine Turtle Research Program**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, Stacy A. Kubis, George Balazs]**

Major emphasis will continue to be placed on studying the pelagic ecology and movements of sea turtles to develop management strategies to reduce fisheries bycatch. Continued research with colleagues in Nagoya, Japan and the New Caledonia project are slated for FY 2008. Loggerhead hatchlings from nesting beaches in New Caledonia were raised at the Noumea Aquarium in FY2007 and will be satellite tagged and released in FY 2008. Attachment of satellite transmitters, tracking, data management, and mapping expertise will be provided by NMFS and JIMAR as a joint effort with the aquarium.

Studies of marine turtles and their foraging grounds will continue in collaboration with faculty and students from the University of Hawaii, Hilo. These studies will investigate the diversity and abundance of forage items in coastal waters in relation to diet samples obtained from live sea turtles (via stomach flushing) and dead stranded turtles.

Stacy Kubis, JIMAR Marine Turtle Research Biologist, and George Balazs, MTRP Program Leader, will complete a NOAA PIFSC Research Plan for the Hawaiian green turtle. The plan will include recommendations for future nesting beach and ocean capture research.

Irene Nurzia-Humburg, JIMAR Marine Turtle Research Associate, will be involved with data analysis, and the planning and preparation of annual nesting beach field work at French Frigate Shoals in the Northwestern Hawaiian Islands. She will also be instrumental in the development and building of a nesting beach research program involving season-long monitoring for two years.

Captive care and rehabilitation will also continue as an important part of the stranding and salvaging research program. JIMAR biological technicians are responsible for the care of captive rehabilitated animals, and are instrumental in the administration and conduction of the stranding and salvage research program.

Ms. Kubis will model juvenile survival rates and fibropapilloma disease progression and regression using 25 years of capture data from the Pala'au, Molokai data set. She will attend a training workshop at the University of Colorado in August 2007 to learn the skills necessary to perform the analysis. The results of this work will be submitted for presentation at the 28<sup>th</sup> Annual Symposium on Sea Turtle Biology and Conservation in Loreto, Baja California, January 2008.

### **Fisheries Oceanography: Protected Species Research Program**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and George Antonelis]**

In 2008 the monk seal studies will include continued population monitoring and assessment, characterization of foraging ecology, and evaluation of health and disease. Specific goals are as follows.

- The MHI assessment effort will develop and integrate into the database GPS coordinates for all haulout sites within the MHI.
- The monk seal foraging ecology project will complete identification of all prey samples, which were collected in 2007.
- The monk seal health and disease group will continue to train field personnel and process samples, and will develop a database to integrate sample inventory, laboratory and other test results, and biological information on monk seals.

- The cetacean biology investigation will conduct small boat surveys for cetaceans in the waters of Oahu and conduct a large ship survey for cetaceans off the Big Island of Hawaii.

### **Fisheries Oceanography: Analysis on Bycatch by U.S. Pacific Islands Fisheries**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, Christofer Bogs, Marti McCracken]**

A program will be established within the Hawaii Longline Observer Program to bring back specimens for establishing length-weight relationships for species where current information is not satisfactory for accurate estimation of discards by weight. Discards for year 2006 and 2007 for the Hawaii Longline Fisheries will be estimated in terms of counts and weight. A sampling design for the American Samoa Longline Observer Program will be established and implemented. Support and enhancements to LODS will continue.

### **Fisheries Oceanography: Ecosystems Observation Research Program**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Michael P. Seki]**

Plans for the forthcoming fiscal year include continued focus on improving management of data streams and moving forward with the vision to enable datasets to feed and contribute to the Integrated Ocean Observing System. Staff will complete technical documentation for the WPacFIN Catch and Revenue Data Integration System and a procedural manual on the publication process for the Fisheries Statistics of the Western Pacific publication. TZCF characterization research will also continue. New projects include the oversight of longline logbook data entry and data quality control, and support to meet the demands of increasing requirements to monitor Hawaii's bottomfish resources. The project will also support research to assess the flux of mercury through the pelagic food web.

### **Fisheries Oceanography: Synthesis of Historical Data and Research Results on Sea Turtle Bycatch Reduction in Longline Fishing**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, Christofer Boggs, Yonat Swimmer]**

In the next fiscal year we plan to continue to work with satellite data on sea turtle movements and survivorship in an effort to determine the impact of sea turtle bycatch in longline fisheries, as well as to identify means to reduce the interactions with fishery operations. Lianne McNaughton will work with colleagues in Brazil to update data files on turtles' movements, including use of Kalman filter models to identify turtles' most probable track and the associated oceanographic variables with turtle movements. Lianne will also continue to assist with the graphics associated with the telemetry work, for inclusion in reports, presentations and manuscripts. Lynne Nakamura will continue to provide administrative and logistical support for our numerous projects associated with sea turtle bycatch data from longline fisheries.

### **Marine Resource Dynamics and Assessment Program (MARDAP): Cooperative Research**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, Michael K. Musyl, Christofer Boggs]**

Project personnel plan to publish one of several manuscripts in peer-reviewed literature detailing methodology, results, and implications for bycatch reduction using the new technique. Furthermore, as other related projects mature, it is anticipated that data from this project will be incorporated in several ongoing studies investigating vertical niche partitioning and habitat preferences by JIMAR and PIFSC investigators. Other remaining funds will be used to develop collaborative research projects and partnerships with industry.

### **Marine Resource Dynamics and Assessment Program (MARDAP): Economics of Fisheries Initiative**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Minling Pan]**

The plan for FY 2008 is to continue ongoing economic data collection programs in both Hawaii-based longline and American Samoa longline fisheries. In addition, we will conduct a cost-earning study on Hawaii small boat fisheries, launch a market study on the attributes associated with consumer choices on purchasing *ahi poke* (raw tuna

mixed with seasoning), and conduct a study on recreational fisheries to investigate the shoreline access of recreational fishing in Hawaii.

### **Marine Resource Dynamics and Assessment Program (MARDAP): Western Pacific Stock Assessment Review Process**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Gerard DiNardo]**

Assess the needs for a coordinator, and if determined necessary, hire a coordinator. Develop a schedule and guidelines for the WPSARP Workshops. Convene bottomfish data workshop in late 2007.

### **Marine Resource Dynamics & Assessment Program (MARDAP): Research Support**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Susan Kamei]**

#### *Maintenance Support*

The maintenance assistant will continue to provide JIMAR principal investigators and staff with facilities support including basic carpentry, plumbing, and general upkeep of facilities.

#### *Administrative Support*

The two administrative associates will continue to provide a wide range of administrative services, including travel coordination and administration, budget reconciliation and planning, procurement, and general correspondence and office administration.

#### *Fisheries Specialist*

The fisheries specialist will continue current activities, including daily rounds to local docks to collect logbooks, followed by a detailed review of logbooks for compliance with reporting protocols. The specialist may also collect specimens (small swordfish, etc.) and tags from fishing boats as needed. The specialist will continue to serve as a liaison in collecting and distributing information relevant to the industry.

### **Marine Resource Dynamics and Assessment Program (MARDAP): Research Support SIS**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley, Susan Kamei, Jerry Wetherall]**

#### *Web Services*

The webmaster will update the web development plan and direct the web team. She will provide online tools to enable more efficient content submission and updating by staff. She will implement a new web design providing greater home page access to information about current research activities, publications, and high priority science themes.

#### *Scientific Editing*

The scientific editor will continue to provide comprehensive professional editing services to program staff. She will update editorial guidelines and, once testing of alternative software is completed, help implement an online manuscript submission and processing system.

### **Marine Resource Dynamics Assessment Program (MARDAP): Sociocultural Profile of Pacific Islands Region Fishing Ports**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Stewart Allen]**

2007 December 1	Publish reports on Hawaii and Guam as peer-reviewed NOAA technical memoranda
2008 March 1	Complete draft report of CNMI; publish report on American Samoa
2007 July 1	Publish report on CNMI

## **Marine Resource Dynamics & Assessment Program (MARDAP): Stock Assessment Research Program**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Gerard DiNardo]**

Plans for FY 2008 include the following.

- (1) Continue the spiny and slipper lobster tagging experiments in the NWHI, and conduct the NWHI lobster resource survey in June 2008.
- (2) Plan and participate in the two joint meetings of the ISC Marlin and Swordfish Working Groups. The first is scheduled for January 2007 in Hawaii and the second for June 2008 in Japan.
- (3) Present results of lobster tagging research at the annual meeting of the American Fisheries Society in September 2007 and at the 8th ICWL.
- (4) Advance stock assessment methodologies for pelagic species in the North Pacific Ocean and insular species in the Pacific Islands Region.

## **Western Pacific Fisheries Information Network Project**

**P.I.: Thomas A. Schroeder [Michael Quach]**

In FY 2008, WPacFIN JIMAR will continue to work with and support the WPacFIN Program, specifically in American Samoa, Commonwealth of the Northern Marianas (CNMI), and Hawaii areas. In addition to the wide range of maintenance and routine functions, the staff is actively involved in WPacFIN's daily operations to meet the program's objectives and goals. The focus for the next fiscal year will be to: (1) improve the American Samoa Longline Creel Survey and commercial landings data; (2) improve the Hawaii data coverage for fishermen catch reports and fish dealer data; (3) improve the successful integration rate to create a fish catch with revenue data database for Hawaii; and (4) hire additional staff, if funding is available, to support the recently proposed amendments for the Hawaii bottomfish and non-longline pelagic commercial fisheries.

## **Data Administration of Pelagic Fisheries Data**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Karen Sender]**

Work in FY 2008 will continue efforts toward improving data management of fisheries-dependent data and supporting the national Fisheries Information System (FIS) and its Federal, State, and academic fisheries partners. These efforts will include the following.

- (1) Technical maintenance, support, and enhancement of the Hawaii and American Samoa Longline Observer Data System (LODS), comprised of a application web-site, data collection forms, a suite of data management applications, and a database, along with system modifications required to support a new model for marine mammal biological data.
- (2) Phase I development of an integrated Longline Logbook Data System (LLDS), consisting of two concurrent activities—generalization and packaging of data management modules from the existing LODS and development of requirements for the design of the parallel LLDS.
- (3) Technical maintenance and production support of the FIS InPort metadata catalog.

## **Satellite Remote Sensing Research Program**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Jeffrey J. Polovina]**

Conduct analyses and write manuscript on the horizontal and vertical habitats of bigeye tunas from pop-up archival tags.

## **Satellite Remote Sensing Research Related to the West Coast Integrated Ocean Observing System**

**P.I.: Thomas A. Schroeder [Franklin B. Schwing]**

In addition to maintaining existing data services, this project has three key priorities for the coming year.

### *(1) High Resolution Satellite Data for Coastal Applications*

As marine scientists increasingly focus on coastal issues, data providers are called upon to produce and distribute data sets capable of resolving the faster/smaller scales typical of the near-shore marine environment. CoastWatch seeks to meet these needs and will develop a number of high-resolution data products, as well as the means to distribute these effectively.

### *(2) An Improved Cloudmask for Regional Sea Surface Temperature Retrievals*

This is the first essential stage in a collaborative attempt to generate high-quality sea surface temperature data for coastal applications. Partners include the NOAA National Oceanographic Data Center and NASA's Jet Propulsion Laboratory.

### *(3) Publish Results of Integration Efforts*

A number of collaborative projects with fisheries biologists from NOAA and various academic institutions were initiated in FY 2007, with the expectation of publishing manuscripts during FY 2008. The work covers a variety of protected and managed species including green sea turtles, Laysan albatross, swordfish, salmon sharks, and a number of cetaceans.

## **Climate Change and Ecosystem Variability in the North Pacific Ocean and the Dynamics of Marine Resource Populations**

**P.I.: Thomas A. Schroeder [Franklin B. Schwing]**

The research emphasis for this project in FY 2008 will continue to focus on the following areas: 1) the characterization of ocean "hot spots" and their utilization by marine pelagic predators; 2) understanding the impact of large-scale climate variability on mesoscale ocean structure and its consequences to marine populations; 3) developing satellite-based data products that define physical and biological attributes of ocean habitat; and 4) developing indicators of climate and environmental variability that can be incorporated into ecosystem models and resource management strategies.

## **Pelagic Fisheries Research Program: Program Management**

**P.I.: John R. Sibert**

- Conduct a request for proposals and fund new projects consistent with the priorities identified in the report of the 2005 research priorities workshop, "Pacific Ocean Connections: Priorities for Pelagic Fisheries Research in the Twenty-First Century."
- Facilitate international collaboration in research on pelagic fisheries.

## **A General Bayesian Integrated Population Dynamics Model for Protected Species**

**P.I.: John R. Sibert [Mark Maunder]**

The application of the general framework to the Tern Island population of black footed albatross and the simplified general model for protected species will be completed and the results presented at the PFRP funded albatross modeling workshop to be held in Hawaii on November 7-9, 2007.

## **An Analysis of Archaeological and Historical Data on Fisheries for Pelagic Species in Guam and the Northern Mariana Islands**

**P.I.: John R. Sibert [Judith R. Amesbury and Rosalind Hunter-Anderson]**

Amesbury will interview three fishermen in Guam to add to our interviews from the CNMI. She will complete the report by June 30, 2008.

## **Comparing Sea Turtle Distributions and Fisheries Interactions in the Atlantic and Pacific**

**P.I.: John R. Sibert [Selina Heppell and Molly Lutcavage]**

Project is ending Dec. 31, 2007.

## **Describing the Vertical Habitat of Bigeye and Albacore Tunas and Post Release Survival for Marlins in the Central Pacific Longline Fisheries with Pop-up Archival Transmitting Tags**

**P.I.: John R. Sibert [Jeffrey J. Polovina and Michael P. Seki]**

Project concluded at the end of FY06. However some analyses and manuscript preparation continued through FY07.

## **Economic Fieldwork on Pelagic Fisheries in Hawaii**

**P.I.: John R. Sibert [Minling Pan]**

The plan for FY 2008 is to complete the assessment and documentation on the patterns of adoption of new technology and the resulting effects on fishing productivity in the Hawaii-based longline fishery, and also to complete the analysis on the willingness to pay for different types of activities associated with spinner dolphin excursions in Hawaii. The results from these two studies will be included in manuscripts for publication.

## **Fishery Dynamics in the Samoan Archipelago**

**P.I.: John R. Sibert [Keith A. Bigelow, Adam Langley, John Hampton]**

Plans for the last fiscal year of the project include the completion of the analyses on fishery dynamics in the Samoan archipelago. Aspects of the albacore availability due to operational and oceanographic effects and local depletion will be analyzed using various statistical models.

## **Incidental Catch of Non-target Fish Species and Sea Turtles: Comparing Hawaii's Pelagic Longline Fishery Against Others**

**P.I.: John R. Sibert [John Kaneko and Paul Bartram]**

A trip to Kaohsiung, Taiwan is being planned for the fall of 2007 to conduct interviews with fishing industry representatives and fishing vessel captains. The longline fishing gear and operational profiles for the Japanese and Taiwanese ULT frozen sashimi tuna longliners will then be summarized and included in the final project report. A draft manuscript for publication in an appropriate peer reviewed journal will be prepared comparing the catch to bycatch ratio (C/B ratio for sea turtles) for the Hawaii longline fishery generated in the first phase of the project with an updated C/B ratio for the fishery based on more current data to document and quantify the change in fishery performance in turtle bycatch reduction efforts.

## **Incorporating Oceanographic Data in Stock Assessments of Blue Sharks and Other Species Incidentally Caught in the Hawai'i-based Longline Fishery**

**P.I.: John R. Sibert [Pierre Kleiber and Hideki Nakano]**

Submit blue shark stock assessment paper to peer reviewed literature.

## **Instrumented Buoys as Autonomous Observatories of Pelagic Ecosystems**

**P.I.: Kim N. Holland [Laurent Dagorn]**

Field testing of prototype in Hawaii and refinement of the data output produced by the prototype through modification of imaging software.

## **Integrated Modeling for Hawaiian Albatross Populations**

**P.I.: John R. Sibert [Jean-Dominique Lebreton, Dan Goodman]**

Project completed.

## **Integrative Modeling in Support of the Pelagic Fisheries Research Program: Spatially Disaggregated Population Dynamics Models for Pelagic Fisheries**

**P.I.: John R. Sibert**

Post-doctoral researcher, Senina and Nielsen will both be leaving the PFRP in 2007. Some of current work will be not be complete before they both leave. However the remaining work is compatible with their new employment circumstances and some of the work can be completed remotely. A new post-doctoral researcher will be recruited.

- Conclude work on an algorithm based on the theoretical analysis of geolocation errors for application in cases where light data from tags are not available.
- Complete the initial modeling phases for combining individual and population based estimation of migration patterns.
- Begin a comparison of movement parameter estimates across species of pelagic fish derived from different tagging methods.
- Implement an optimized SEAPODYM model for yellowfin tuna (*T. albacares*) across the Pacific basin. The variable spatial resolution capabilities of SEAPODYM will be used to implement a model at 1/3 degree spatial resolution around the main Hawaiian islands for use in the Hawaii-Pacific Ocean Observing and Information System project at SOEST.

## **Modeling Longline Effort Dynamics and Protected Species Interaction**

**P.I.: PingSun Leung [Naresh Pradhan and Samuel G. Pooley]**

Project completed.

## **Modeling the Eco-physiology of Pelagic Fishes and Sharks with Archival and Pop-up Satellite Archival Tags (PSATs)**

**P.I.: John R. Sibert [Michael K. Musyl, Christina Larsen, Hans Malte, Richard C. Brill]**

Complete baseline research papers (outlined below) on horizontal and vertical movements of sharks, tunas, and billfish and performance of PSATs. Contract personnel to assist with the development of IBMs. Drs. Sims and Bernal have expressed interest in this aspect of the project. Funds requested for a Research Associate may be used for this purpose. Publicly post the PSAT Performance Database on the PFRP website (after paper detailing this work is submitted). Trials using sandbar sharks at VIMS are underway to map the EMF produced by PSAT and other electronic tags to document sharks' ability to perceive this EMF. It is anticipated that results from this study will provide insight into why some PSAT tags fail to report. Continue to explore and develop new analytical methods to use on PSAT data, particularly oceanographic information comparing vertical depth variability.

Tentative PSAT papers currently coordinated by Musyl and slated to be drafted in 2007.

- 1) *Post-Release Survivability and Movements of Blue Shark (Prionace glauca) from Longline Fishing Gear in the Central Pacific Ocean as Identified by Pop-up Satellite Archival Tags (PSATs)* by Musyl, Brill, Laurs, Foley, Bigelow, and McNaughton

status: manuscript in preparation

- 2) *Long Term Survivability of Pacific Blue Marlin (Makaira mazara) Released from Sportfishing Boats in Hawaii Determined from Pop-up Satellite Archival Tags (PSATs)* by Musyl, Moyes, Brill, West, Bright, and McNaughton

status: slated for late 2007/early 2008; data and tracks edited and collated, ran through kfsst

- 3) *Movements and Migration Corridors of Pacific Blue Marlin (Makaira mazara) in Relation to Oceanographic Conditions Determined from Pop-up Satellite Archival Tags (PSATs)* by Bigelow, Musyl, Brill, Laurs, Foley, and McNaughton

status: slated for late 2007/early 2008; data and tracks edited and collated, ran through kfsst

- 4) *Temporal and Spatial Movement Patterns in Relation to Oceanographic Conditions for Epipelagic Sharks As Revealed by Pop-up Satellite Archival Tags (PSATs) in the Central Pacific Ocean: I. Oceanic White-tip shark (Carcharhinus longimanus)* by Laurs, Foley, Nielsen, Bigelow, Musyl, Brill, and McNaughton

status: slated for late 2007/early 2008; data and tracks edited and collated, ran through kfsst

- 5) *Temporal and Spatial Movement Patterns in Relation to Oceanographic Conditions for Epipelagic Sharks As Revealed by Pop-up Satellite Archival Tags (PSATs) in the Central Pacific Ocean: II. Silky shark (Carcharhinus falciformes)* by Laurs, Foley, Nielsen, Bigelow, Musyl, Brill, and McNaughton

status: slated for late 2007/early 2008; data and tracks edited and collated, ran through kfsst

- 6) *Behaviors and Habitats of Swordfish Satellite Tagged in the Atlantic and Pacific Oceans* by Dewar, Prince, Musyl, Brill, Sepulveda, Lou, Foley, Serafy, Domeier, Nasby-Lucas, Snodgrass, Laurs, Block, and McNaughton

status: draft manuscript complete

- 7) *PSAT Performance and Meta Data Analysis Project* by Musyl, Brill, Domeier, Galuardi, Lucas, Lutcavage, McNaughton, Royer, Swimmer, and Wilson

status: manuscript in preparation

## **Oceanographic Characterization of the American Samoa Longline Fishing Grounds for Albacore, *Thunnus Alalunga***

**P.I.: John R. Sibert [Michael P. Seki and Jeffrey J. Polovina]**

Results obtained from data collected during the second oceanographic cruise (conducted in FY 2006) will be prepared for publication in a peer reviewed journal.

## **Sociological Baseline of Hawaii Longline Industry**

**P.I.: John R. Sibert [Stewart Allen]**

The project will be completed during the next fiscal year using existing funds. The fieldwork done on the fish distribution chain will be completed and the results incorporated into a final report.

## **Spatial Modeling of the Tradeoff between Sea Turtle Take Reduction and Economic Returns to the Hawaii Longline Fishery**

**P.I.: John R. Sibert [Minling Pan and Shichao Li]**

The plan for FY 2008 is to continue working on manuscripts for publication, prepare a new research proposal, and apply for a new PFRP project regarding policy choices and impacts analysis under management of overfishing and climate change for the Hawaii-based longline fishery.

## **Survivorship, Migrations, and Diving Patterns of Sea Turtles Released from Commercial Longline Fishing Gear, Determined with Pop-up Satellite Archival Transmitters**

**P.I.: John R. Sibert [Yonat Swimmer, Richard C. Brill, Michael K. Musyl, Lianne McNaughton]**

Write papers on results. Specifically, we will finish the work with Milani Chaloupka and submit to a journal by Fall 2007. We will also write up the results from the olive ridley turtle movements and FFSST with a goal of submission by December 2007.

## **Regime Shifts and Recruitment in Western and Central Pacific Ocean Tuna Fisheries**

**P.I.: John R. Sibert [David S. Kirby, Adam Langley, Valerie Allain]**

Project ends October 2007.

## **Trophic Ecology and Structure-Associated Aggregation Behavior in Bigeye and Yellowfin Tuna in Hawaiian Waters**

**P.I.: Kim N. Holland [Laurent Dagorn and David G. Itano]**

Work with Maui fishing fleet to document biology of PFADs in Maui waters. Resume tagging, and tissue and gut content sampling work on Waianae coast of Oahu.

## **Trophic Structure and Tuna Movement in the Cold Tongue-Warm Pool Pelagic Ecosystem of the Equatorial Pacific**

**P.I.: John R. Sibert [Valerie Allain, Robert Olson, Felipe Galván-Magaña, Brian Popp]**

The project has been extended until December 31, 2007. Sampling efforts have been terminated. The project extension will be dedicated to processing the remaining samples in the laboratory, data analysis, modeling, and publication of the results.

In the western and central Pacific, thanks to additional funding for the project extension, two lab assistants will examine the remaining stomach samples. Diets of the main predators from this region will be analyzed and compared to the results from the eastern Pacific. The Ecopath model developed for the western and central Pacific will be improved. The diet data from the eastern Pacific will be synthesized into peer-reviewed publications, and eventually incorporated into a new Ecopath model for the pelagic eastern Pacific.

Several papers for the different regions and comparative papers on diet and isotopes for the entire equatorial Pacific will be submitted for publication. Final results of the project will be presented during the Hawaii PFRP-PI meeting in November 2007 and the 1<sup>st</sup> CLIOTOP symposium in La Paz, Mexico, during December 2007.

## **The Associative Dynamics of Tropical Tuna to a Large-scale Anchored FAD Array**

**P.I.: Kim N. Holland [David G. Itano]**

Sonic data will be analyzed to examine aspects of time-residence, inter-FAD movement and vertical behavior of tropical tuna in close association with a large number of anchored FADs. This data will be combined with results from archival tagging data for publication and presentation at relevant meetings and conferences. Due to the low numbers of bigeye releases, the PIs are in collaboration with the National Fisheries Authority (NFA) to continue sonic tagging work in PNG, targeting bigeye tuna using domestic handline vessels. The PIs have supplied the PNG

counterparts with basic tagging equipment and VR2 receivers. The NFA will separately fund all costs for sonic tags, personnel, travel, and vessel time.

### **Synchronous Assessment of Bigeye Tuna (*Thunnus obesus*) and Micronekton Biomass, Distribution, and Movement Patterns at Cross Seamount, and the Effects of the Seamount Environment**

**P.I.: John R. Sibert [Réka Domokos, Kim N. Holland, Jeffrey J. Polovina]**

In FY 2008, a second shipboard survey will be conducted during the month of April. During this cruise, emphasis will be on optimal survey designs for biomass estimation of bigeye tuna over Cross seamount. The survey design will be based on the distribution and movement patterns of bigeye obtained from data collected during the first cruise (FY07). Data from the first cruise will be further analyzed to compare tuna and micronekton distribution and movement patterns to each other and to temperature, salinity, oxygen, chlorophylls, and currents at the seamount, obtained from the CTD and ADCP records.

### **Assessment of the Impacts of Mesoscale Oceanographic Features on the Forage Base for Oceanic Predators**

**P.I.: Jeffrey C. Drazen [Réka Domokos]**

The second year of this project will see the completion of laboratory processing of the trawl samples and data analysis. We plan to estimate micronekton biomass abundance over and around Cross seamount to assess this feature's impact. Community composition will also be examined for potential differences between seamount and open ocean sites. The samples from American Samoa will be used to describe basic community composition in this area. Acoustic methods will be used to determine the impact of each mesoscale feature on micronekton vertical distribution. Once estimates of biomass and abundance are available for each trawl they will be compared to acoustic estimates that were collected concurrently. Two manuscripts will be prepared for submission to journals, one on the impacts of Cross seamount, and the other comparing the acoustic and trawl methods.

### **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**

**P.I.: John R. Sibert [William A. Walsh, Keith A. Bigelow]**

Work planned for FY 2008 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.

### **Examining Latitudinal Variation in Food Webs Leading to Top Predators in the Pacific Ocean**

**P.I.: John R. Sibert [Jock Young, Robert Olson, Valerie Allain, Jeffrey Dambacher]**

We are now ready to enter the eastern Pacific food web data. These data are in the process of being checked for accuracy. Once these data are entered we will be in a position to make the latitudinal comparisons. We are planning a meeting in La Jolla later this year to finalize data entry. We submitted an abstract to the CLIOTOP Symposium at which we will present results and a manuscript. Jeffrey Dambacher will be reporting on the work to date at the November 2007 PFRP Principal Investigators Workshop.

## **Performance of Longline Catchability Models in Assessments of Pacific Highly Migratory Species**

**P.I.: John R. Sibert [Keith A. Bigelow, Mark Maunder, Adam Langley, Pascal Bach]**

The project will proceed with the research plan developed at the February 2007 workshop. Research will concentrate on improvements to the statistical habitat-based standardization (statHBS) model. A multiple species approach to statHBS modeling will be conducted in collaboration with Japanese colleagues. Analysis of longline monitoring studies will address depth versus habitat catchability comparisons and model validations. Contacts have been established to test the robustness of various standardization methods by applying standardization models to a simulated fish population developed for ICCAT.

## **Rescue, Compilation, and Statistical Characterization of Historic Longline Data, Pacific Oceanic Fisheries Investigation 1951-73**

**P.I.: John R. Sibert [Bert Kikkawa]**

Complete the data entry contract with DEIH and the integration of the rescued data into the data archives. If a suitable replacement for R. Skillman can't be found or development of a parallel project under the direction of PFRP staff, the remaining funds will be surrendered to PFRP.

## **Intra Guild Predation and Cannibalism in Pelagic Predators: Implications for the Dynamics, Assessment and Management of Pacific Tuna Populations**

**P.I.: John R. Sibert [Tim Essington, Mark Maunder, Robert Olson]**

The food habits database is near complete and thus far the majority of the data have been compiled from published studies, although an important aim of this study is to recover and compile raw data from historical published diet studies and unpublished raw data. Under the supervision of Dr. Robert Olson, a technician is currently digitizing historical raw diet data available from the IATTC. Further, there are additional sources of unpublished data that will be paired with our database, including the extensive dataset collected through the PFRP-funded project, *Trophic Structure and Tuna Movement in the Cold Tongue-Warm Pool Pelagic Ecosystem of the Equatorial Pacific*, P.I. Allain, Olson, Galvan, Magana, Popp; the apex predator diet database of Secretariat of the Pacific (Allain and Kirby); and the extensive shark food habits database of Enric Cortes at NOAA-SWFSC. These datasets will fill in the gaps of contemporary food habits data, particularly the sizes of tunas consumed by large-bodied predators. The modeling exercise will be greatly expanded in year two. First, we intend to make the static model dynamic, allowing for simulation of alternative fishing policy outcomes. Second, we intend to use this basic framework to apply the model to yellowfin and bigeye tuna in the Eastern Pacific Ocean.

## **Scaling Up: Linking FAD-associated Local Behavior of Tuna to Regional Scale Movements and Distribution**

**P.I.: Kim N. Holland [Laurent Dagorn]**

To commence the field work phase of this research.

## **Distribution and Use of Seafood in the Context of the Community: A Case Study of the Main Hawaiian Islands**

**P.I.: John R. Sibert [Edward W. Glazier and Stewart Allen]**

We anticipate completion of the project prior to the end of FY 2007.

## **Development of Business Card Tags: Inter-Individual Data Transfer**

**P.I.: John R. Sibert [Laurent Dagorn and Kim N. Holland]**

The plans for the second year of the project (July 1, 2007–June 30, 2008) concern testing these new tags. Five of these prototype tags will be shipped by Vemco during summer 2007 to be field tested this summer and fall at the

Hawaiian Institute of Marine Biology (HIMB). After the first test results, Vemco will send the 10 remaining prototype tags for further testing, or can also modify the specifications of these 10 tags according to first test results. Testing concerns include the following.

- Range testing of receiver tags implanted in dead fish equipped with acoustic beacons, to determine range detection, depth effects, and efficiency of the tag/beacon coupling
- Use captive sharks (or any other large-size species) in tanks and lagoons at HIMB to evaluate fish-to-fish data transfer in “good” conditions
- Test “receiver tags” on wild tunas around Hawaiian FADs or wild sharks (or any appropriate animals). Receiver tags will be placed in fish captured around Oahu, Hawaii. The objective is to observe if the receiver tags can detect other tagged fish, and signals sent by FADs or other key locations equipped with beacons. However, in this prototype stage, tags must be recovered to download stored data.

## **Climate and Fishing Impacts on the Spatial Population Dynamics of Tunas**

**P.I.: John R. Sibert [Patrick Lehodey, Olivier Maury]**

- 1) The post-doc researcher will continue to prepare and analyze physical-biogeochemical reanalyses in Noumea until February 2008. He will interpolate the 3D fields on a regular orthogonal grid.
- 2) These reanalyses will be transmitted to CLS and IRD-Sète for starting simulations with SEAPODYM and APECOSM. Model outputs will be stored on a server and tests conducted for accessing them through a web interface (OPeNDAP and Live Access Server).
- 3) Physical reanalyses will be prepared according to requirement for offline coupling with the biogeochemical model at ESSIC (Univ. Maryland) where the post-doc will move in March 2008 for six months.
- 4) A fishing database engineer will be recruited (starting Sep 1) and will collaborate with existing project SARDARA (global tuna fishing database).
- 5) A computer engineer will be recruited for APECOSM code parallelization at IRD.
- 6) The parameterization of SEAPODYM using optimization will be achieved for yellowfin tuna in the Pacific Ocean.
- 7) The parameterization of APECOSM will be achieved for one species in the Indian Ocean.
- 8) Using biogeophysical reanalyses provided (NCEP-ORCA2-PISCES; ERA40-ORCA2-PISCES; ERA40-ORCA05-PISCES), SEAPODYM simulations for the three species with parameterization achieved in the Pacific Ocean will be produced at global scale.
- 9) PIs and collaborators will attend the CLIOTOP symposium in La Paz, Mexico in December 2007, the P.I. meeting in Hawaii in November 2007, and/or the tuna conference in Lake Arrowhead in May 2008.

## **Long-Term Deployment of Satellite Tags on Swordfish using the California Harpoon Fleet**

**P.I.: John R. Sibert [Heidi Dewar and Jeffrey J. Polovina]**

Over the next fiscal year we plan to deploy a total of 19 tags. This includes two tags remaining from last year and an additional 5 tags purchased with excess funding. This will bring the total to 35 tags including those provided as a match by the Tagging of Pacific Pelagic program. All tags will be set to release after 6 months to reduce problems with non-reporting. Half of the tags will be deployed at the beginning of the season in July and half at the end in October or November. For comparison of tag retention using the different dart types, 13 will be deployed with one dart type and 6 with the other to balance out the darts deployed in previous deployments. Once the all data has been recovered (in spring of next year) a synthetic analysis will be conducted to determine the essential habitat of swordfish, geographic movement patterns, and whether locations estimates can be improved using hydrographic features. These results will be published in two companion papers.

## **Sustainable Fisheries Initiative (SFI)**

**P.I.: Thomas A. Schroeder [Alvin Katekaru]**

SFI will continue to support outreach/education for protected resources mitigation activities and conservation and management actions, authorized under the Magnuson-Stevens Act, for the U.S. domestic fisheries in the Pacific island areas.

## **Marine Turtle Conservation and Management Initiative**

**P.I.: Thomas A. Schroeder [Charles Karnella]**

### *Solomon Islands Marine Turtle-Fisheries Interaction Outreach Education Project*

NOAA Fisheries will continue to monitor the situation with the government and fisheries in the Solomon Islands and look into opportunities to implement the project when feasible.

### *New Caledonia Marine Turtle-Fisheries Interaction Outreach Education Project*

This project is complete, however, invoices are still being processed for the project (expected to be cleared early in the next fiscal year).

### *Loggerhead Turtle Conservation-Education and Outreach Program*

As the Public Outreach Educator has just been appointed, most of the objectives have yet to be completed; however this project is on schedule and is projected to educate many individuals about loggerhead biology and conservation in New Caledonia during the next fiscal year.

## **Pacific Islands Regional Observer Program**

**P.I.: Thomas A. Schroeder [Kevin Busscher]**

From July 2007 through June 2008, we plan to complete a minimum of 360 observed trips through the final data editing stage. These 360 observed trips include the Deep Set Hawaii Longline Fishery, the Shallow Set Hawaii Longline Fishery, and the American Samoa Longline Fishery. With our present staff fully trained we expect to meet these goals.

## **Coastal Research**

### **Coral Reef Management Initiative**

**P.I.: Thomas A. Schroeder [Alan Everson, John Naughton]**

Plans are to continue to work with the various Federal, State, and local agencies to enhance the management of coral reef ecosystems throughout the Pacific. The GIS database will continue to expand and participation in the Coral Reef Mitigation work will continue. Staff will continue with oversight of the LAS fishery management process and assist with project implementation in Hawaii, Guam, CNMI, and American Samoa. Coral reef outreach/education efforts will also continue in all of the jurisdictions. In CNMI the interviews with the fishermen will continue. A pilot study for a community-based monitoring and enforcement program will be established in Tanapag village. Traditional fishing practices will be promoted in different villages in Saipan. An NGO will be formed by the fishermen to promote traditional fishing practices and coral reef conservation.

### **National Environmental Policy Act (NEPA) Initiative**

**P.I.: Thomas A. Schroeder [Charles Karnella]**

The NEPA analysis to support promulgation of the initial implementing regulations will be completed. Research and preparation for and development of appropriate NEPA analyses required to implement decisions of the WCPF Commission will proceed as required.

### **Sustaining Healthy Coastal Ecosystems**

**P.I.: Thomas A. Schroeder [Russell E. Brainard]**

Continued coral reef assessment and monitoring efforts are scheduled for FY 2008 on board the NOAA Ships *Oscar Elton Sette* and *Hi`ialakai*. There will be CRED research cruises to the MHI, NWHI, American Samoa, and the Pacific Remote Island Areas (PRIAs). Benthic habitat mapping and characterization efforts will be conducted off the R/V *AHI* and the NOAA Ship *Hi`ialakai*, and are scheduled for all locations. Replacement and deployment of various oceanographic and meteorological monitoring platforms are also scheduled for all locations next fiscal year.

Marine debris plans for FY 2008 include continuation of removal efforts in the NWHI on the NOAA Ship *Oscar Elton Sette* as well as continued collaboration with potential U.S. Coast Guard deployments in the NWHI. There are also plans for continuation of the ongoing MHI marine debris cleanup that is based on helicopter surveys conducted in 2006-2007.

## **Hawaii Regional Coastwatch**

**P.I.: Thomas A. Schroeder [Samuel G. Pooley and Jeffrey J. Polovina]**

During FY 2008, we propose to expand collaboration efforts with regional research agencies and/or consortiums (e.g., PacIOOS) for furthering the mission statement of OWCP. In addition, we plan to develop new and improved satellite remote sensing datasets to the THREDDS/LAS infrastructure. Plans include near real-time ocean color, and/or high-resolution ocean surface winds.