JIMAR Plans for FY 2016
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Ecosystem Forecasting

ADMB Open Source Project

P.I.: John R. Sibert

Plans for the next fiscal year include continued development of the software to meet standards of modern C++ compilers over all major operating systems. This will include enhancing the documentation and improving software testing, particularly for extant models. This work will lead to the next major release (ADMB 12) in late summer/early fall of 2016. Further collaboration and developments will be pursued including more training courses and a coordinated developers workshop.

Ecosystem Monitoring

A Biogeographic Assessment of Reef Fishes, Fisheries, and Benthic Assemblages in Hawaii

PI: Alan Friedlander

For the next fiscal year the project will undertake the remaining three tasks, including developing final products and meta-data, developing reports and key findings, and assisting NOAA colleagues with outreach about the products. The results from this work will be spatially comprehensive distribution patterns of reef fish populations and benthic assemblages around Hawaii and their correlations with natural and anthropogenic influences while controlling for management (e.g. Marine Protected Areas), habitat (e.g. depth, wave exposure, complexity), and geographical variation. The main product will be in the form of maps, which will be compiled in a report section alongside the findings being prepared by NOAA for other parts of the ecosystem.

Bio-Sampling

P.I.: Mark A. Merrifield [JIMAR Project Lead: Brett Taylor]

The biological research objectives for the next fiscal year will shift in emphasis from studying deepwater bottomfish species to harvested coral reef species in the Pacific Island territories. Biosampling staff will provide training to collaborators in Guam, CNMI and American Samoa on otolith processing techniques to build regional capacity and expertise. Staff will also produce preliminary estimates of length at 50% maturity and growth parameters, as well as derive length-weight relationships for commercially important species (n ≥ 6) across Guam, CNMI and American Samoa. Completion of several draft manuscripts for peer-review is anticipated, all detailing life-history traits of importance to fishery management for parrotfishes and rabbitfishes, as well as a draft manuscript detailing the reproductive biology of the opakapaka from Hawaii. Two research cruises with the Life History Program (LHP) are planned for biosampling of coral-reef fishes and deepwater bottomfishes: the first to Kona/Kingman/Palmyra reefs in July-August 2015, the second to American Samoa in March-April 2016.

Ecosystem Modeling

P.I.: Mark A. Merrifield [JIMAR Project Lead: Melanie Abecassis]

The cetacean habitat work and the Ecopath with Ecosim work will be published. JIMAR staff will continue to examine changes in the oceanography and ecology of the North Pacific Transition Zone. Historical data will be compiled and displayed in an online data visualization tool. The expected outcomes from the work will be a better understanding of recent changes in the North Pacific and a web display of historical data used in past publications.
Finally, JIMAR staff will continue to analyze active acoustics data collected during various research cruises to provide an understanding of the forage biomass in several different areas of the North Pacific.

**Ecosystems Observations Research Program**

**P.I.: Mark A. Merrifield [JIMAR Project Lead: Kyle Koyanagi]**

*Marianas Trench Marine National Monument Pilot Mapping Project.* During the next project year the following tasks will be completed: 1) final versions of the geospatial datasets will be integrated into PIFSC production servers; 2) final versions of the map services and viewers will be deployed; and 3) publication of metadata and user guides for applications, services and datasets associated with this project.

*Scientific Information Services.* Project staff will continue to provide technical support on various aspects of data services needed by PIFSC and JIMAR colleagues. The project specialist will recruit and train new UH student workers and oversee their data entry work. Technical support will be provided for web-based management of metadata for PIFSC and JIMAR scientists. Project staff anticipates receiving training to develop greater skills in web-based data management and delivery.

*SOD-ASTP (Scientific Operations Division-Advanced Sampling Technologies Program).* During the first quarter of the next fiscal year, preparations will continue for an October cruise on the NOAA Ship *Hi’ialakai*. With Modular Underwater Stereoscopic System (MOUSS) being the main bottomfish sampling technology on the cruise, all technical, logistical, and operational preparations must be completed prior to departure. Upon completion of the cruise, SOD-ASTP video analysts will work to generate size-structured bottomfish abundance data to be delivered to the Stock Assessment Group in PIFSC. Database development and media archiving will also be undertaken to accommodate the large amounts of imagery data produced by the MOUSS. Further work includes development of MOUSS technology and exploring its potential in other fisheries applications. The AUV, ROV, USV, and split-beam echo sounder (EK60) technologies will also be developed with the goal of making these technologies available for a variety of projects across PIFSC. Developing a website and promotional material for SOD-ASTP and the sampling technologies housed at PIFSC will also be undertaken to foster collaborations within PIFSC and other interested parties.

*Aquaculture System Management.* For the coming year, JIMAR staff will continue to provide management support for the SWS facility which includes coordinating activities, maintaining and repairing equipment, training staff on system operations, and providing support for incoming animals.

*Focus Habitat Studies Report.* Return trips to the PRIAs (Pacific Remote Island Areas) and American Samoa (including Rose Atoll) are planned for FY 2016 using the *Oscar Elton Sette (OES)* and the *Hi’ialakai* as platforms to fulfill new and ongoing research objectives. Pacific Reef Assessment and Monitoring Program (RAMP) surveys aboard the *Hi’ialakai* will continue and activities aboard the OES will include: 1) collection of deep-slope bottomfish; 2) deployment of juvenile bottomfish settlement traps; 3) documentation of shark depredation and interaction with deep-slope bottomfish; and 4) utilizing midwater Cobb trawls to collect pelagic stage (larvae and juvenile) eteline snappers.

*Fishery Data Management and Spatial Data Analysis.* In the coming year, JIMAR staff will continue to maintain, update, and administer the PIFSC ecological and spatial databases serving the common information needs for marine fishery and ecosystem management personnel. Staff will continue to collaborate with the PIFSC data management team to ensure the South Pacific Tuna Treaty (SPTT) database development meets the needs of hosting the history, current, and future purse seine fishery data, including data entry, and data report needs. Additionally, staff will continue to assist in spatial data analysis and data statistics of pelagic and insular fish species to facilitate timely reporting of information to stakeholders.

*Pacific Islands Deep Sea Coral and Sponge Initiative (PICSI).* Both the NOAA Ships Okeanus Explorer and *Hi’ialakai* will be operating in the Pacific Islands Region and will be collecting data to support PICSI. Biogeographic exploratory work will be a major component of this initiative, because so many areas of the Pacific have not been surveyed, and there is very little information available regarding the distribution and abundance of deep-sea coral and sponge communities in the Pacific Islands. Ecological field work will primarily be focused in the MHI and NWHI, where the infrastructure and technical capacity exist to support this type of field work. During the project period, JIMAR and University of Hawaii field staff in the U.S. Pacific Islands will participate in developing the following deliverables: 1) population and biogeographical assessment; 2) synthesize occurrence and taxonomic data and create data reports on deep sea coral and sponge abundance and distribution; and,
3) synthesize other standard environmental measurement data. Population ecology deliverables include: 1) analysis of voucher specimens and develop taxonomic and life history information; 2) taxonomy and commensalism; 3) preservation of voucher specimens; 4) implementation of protocols for collection, identification, preservation, and cataloging specimens; and 5) annotating and identifying fishes recorded in video data during ROV dives. Mapping Activities to be conducted include: 1) coordinate multibeam mapping activities conducted aboard the NOAA Ships Hi‘ialakai and Okeanos Explorer; 2) collect, catalogue, and process data from multibeam surveys; and 3) develop a surficial geology synthesis of archival and new multibeam and backscatter data for the U.S. Pacific Islands

Fisheries Monitoring and Support
P.I.: Mark A. Merrifield [JIMAR Project Lead: Walter Machado]

The project will continue to monitor Hawaii’s pelagic longline fishery at the same high level to allow quarterly and annual reports to be completed within the allotted time. JIMAR staff will complete daily bigeye and striped marlin catch updates to the fast track system to allow for timely and accurate forecasting and closure to comply with annual Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC) requirements. Additionally, as management, both international and local, continues to evolve to include tracking of more species of concern, the project is exploring options for inclusion of these species. Staff involved with the at-sea electronic tablet reporting initiative will continue to validate and test the reporting application for certification purposes. Should certification efforts prove successful the staff will also incur permanent additional duties in the form of distribution of tablets and training of captains in their use.

The logbook archival scanning project will focus on the American Samoa Longline logbooks once the Hawaii logbooks are completed. JIMAR continues to foster positive and cooperative relationships among PIFSC, the fishing industry, and other interested parties through our daily onsite monitoring activities.

Investigation of Ecological Constraints for Bumphead Parrotfish
P.I.: Mark A. Merrifield [JIMAR Project Lead: Meagan Sundberg]

Due to logistical complexity, there are no plans to travel to Wake Island to conduct more surveys. The project activity is currently suspended, pending a re-evaluation of priorities and potential future directions for investigations in US Monument waters.

Main Hawaiian Islands Deep 7 Bottomfish Fast Track Project
P.I.: Mark A. Merrifield [JIMAR Project Lead: Jessica Miller]

JIMAR staff will continue to enter fisheries data within two days of receiving fishing reports. They will also continue to run daily error checks and give fishery managers weekly summary updates. In June 2015, the Council will recommend multiple year Annual Catch Limits (ACLs) for the 2015-2016 through 2017-2018 fishing years. The ACL for the last four fishing years has been the same (346,000 pounds). This year the 2011 Stock Assessment was updated with 2011 through 2013 bottomfish commercial landings to project percentile of overfishing and to evaluate uncertainties and alternatives for the Scientific and Statistical Committee (SSC), the body that makes scientific management recommendations to the Council. The SSC recommended that the Council opt for a slow-up, fast-down phase-in alternative. This would set an ACL for the 2015-2016 fishing year at 326,000 pounds with a 44% risk of overfishing; for 2016-2017 at 314,000 pounds with a 41% risk of overfishing; and for 2017-2018 at 302,000 pounds with a 38% risk of overfishing.

The fishery will open on September 1, 2015 with a new ACL. The 2014-2016 fishing year will be the fourth year that Civil Resource Violation System citations will be issued by DLNR-DAR, and fines assessed by DLNR-APO for MHI Deep 7 bottomfish trip reports submitted after the 5 day deadline. Trip report requirement compliance rates are expected to continue to improve, allowing JIMAR staff to provide fishery managers a closer to real-time dataset to use in forecasting the ACL attainment date. Beginning in July 2015, JIMAR staff will assist in mailing about 1,300 reminder notices to commercial and non-commercial bottomfish vessel I.D. registrants to renew the MHI Bottomfish Vessel I.D. Registration for the new 2015-2016 fishing year.
Ocean Remote Sensing
P.I.: Mark A. Merrifield [JIMAR Project Lead: Melanie Abecassis]

JIMAR staff will work with the Pacific Islands Regional Climate Service and the Pacific Islands Fisheries Science Center to develop and serve climate indices and products from the project’s satellite remotely-sensed oceanographic data for the Pacific Islands Region. Secondly, JIMAR staff will implement overall data processing architectural redesigns in an effort to enhance the overall data processing efficiency (including a reduction in data processing time and data storage requirements) at OceanWatch - Central Pacific (OWCP). This need arose in view of the continuously growing satellite remote sensing datasets, extended missions, data frequency and overall increases in spatial resolutions. Lastly, JIMAR staff will implement the addition of a new Redundant Array of Independent Disks (RAID) array data storage that’s required for increasing the data capacity at OWCP to support the growing data streams and ensuing increase in data storage capacity.

Pacific Islands Territorial Science Initiative
P.I.: Mark A. Merrifield [JIMAR Project Lead: Toby Matthews]

Over the next reporting period, the Territorial Fisheries Data Specialist will continue analyzing available creel survey data to inform potential improvements to the survey design and expansion algorithms. The Territorial Fisheries Data Specialist will travel to the territorial agencies to discuss results, as well as to provide training, including a fish species identification workshop. The Territorial Fisheries Associate will become proficient at all aspect of the creel surveys and contribute additional surveys to improve the quantity of data available for Guam. The Territorial Fisheries Associate will also work on creating a standard procedure manual for the creel surveys.

Pacific Tuna Fishery Data Management
P.I.: Mark A. Merrifield [JIMAR Project Lead: Jesse Abdul]

JIMAR will hire a new Junior Data Applications Developer to help create the applications necessary to effectively manage the data collected under the South Pacific Tuna Treaty (SPTT). The project will develop a data model to capture the length frequency species composition (LFSC) sampling data. JIMAR will continue to work with SWFSC and PIRO to document their existing business rules and QA/QC validation criteria for implementation within the data management system as a whole. JIMAR will also develop a data management application capable of managing Regional Purse-Seine Logsheet (RPL), Unloading Log (UL), Final Outturn (FOT), and LFSC data. JIMAR staff will develop an automated data import process for the electronically reported RPL data in the eTunaLog format, and the project will develop a centralized tracking application that will track the different workflows necessary for each aspect of a given purse-seine fishing trip. Finally, JIMAR will develop a system to estimate High Seas and US Exclusive Economic Zone (EEZ) fishing days.

SWFSC will enter the remaining LFSC, RPL, UL, and FOT data from 2011-2013; PIFSC FRMD will enter the same data streams collected in 2014-2015. JIMAR and SWFSC will continue working together on the historical SPTT data migration process from SWFSC to PIFSC and coordinate a point in time when the data is migrated to the PIFSC SPTT database and becomes the system of record; this will mark the transition of data management responsibilities from SWFSC to PIFSC.

A reporting workflow will be developed by JIMAR and PIFSC staff working collaboratively to streamline the reporting process for reports required under the SPTT and by RFMOs. A process will also be developed to freeze the data to stabilize and finalize it for reporting purposes. Reusable SQL queries will be developed that will retrieve and format the data necessary for the various summary reports to the necessary stakeholders.

Scientific Advice and Coordination for NOAA Office of Exploration and Research’s 2015-2016 “CAPSTONE” Operations in the Pacific
P.I.: Christopher Kelley

The entire 2015 cruise schedule and the first half of the 2016 cruise schedule for the Okeanos Explorer (EX) will be implemented during the next fiscal year. Therefore, the PI will be heavily engaged in all aspects of his
responsibilities including expedition planning, execution, and post-expedition deliverables. As the ship begins its first multibeam mapping cruise in early July, the PI will travel to Stennis Space Center in Mississippi to meet with Office of Ocean Exploration and Research (OER) data management staff about CAPSTONE data processing, distribution, and archiving. The visit will also commence with the creation of a new sample database since the first ever sampling off the EX will be conducted this year. Upon his return, the PI will serve as one of two on-board Science Team Leads for two of the three Remotely Operated Vehicle (ROV) cruises in August. He will then serve as the UH-Exploration Command Center (ECC) onshore science lead for the third ROV cruise in September. After the final ROV cruise, most of the fall will be spent annotating the cruise video for incorporation into the Deep Sea Coral and Technology Program (DSCTP) national database under the support of a second grant through that program. During the spring of 2016, the PI will travel to Guam to meet the ship and participate on one of the 2016 cruise legs.

Ship-Based GPS Sensing of Precipitable Water

P.I.: Steven Businger

With successful acquisition of the necessary raw data, the project has begun the processing and analysis of the data sets to generate accurate estimates of precipitable water during the cruise including its passage underneath the atmospheric rivers.

Sustaining Healthy Coastal Ecosystems

P.I.: Mark A. Merrifield [JIMAR Project Lead: Supin Wongbusarakum]

Coral Reef Fish Research. During the next fiscal year the Coral Reef Fish team (led by Dr. Adel Heenan and Dr. Jill Zamzow) will continue to work on the following objectives: 1) contribute to the Monuments Northwest Hawaiian Islands monitoring cruise; 2) continue surveys in Kahekili Herbivore Fisheries Management Area; 3) provide technical and analytical support to the Hawaii Division of Aquatic Resources; 4) train monitoring scientists from the American Samoa Department of Marine and Wildlife Resources in the stationary point count fish survey method; 5) prepare a fish monitoring training package; 6) contribute to the main and Northwest Hawaiian Islands Reef Assessment and Monitoring Program cruise; 7) produce the annual reef fish monitoring data report for the American Samoa Reef Assessment and Monitoring Program; 8) produce a summary data brief from the main Hawaiian Islands reef fish survey cruise; 9) conduct reef fish surveys during a reef fish cruise in American Samoa (pending funding); 10) complete a report on improving assessments of Hawaii priority reef fish species and apex predators using remote video-survey imagery; 11) produce a report on a comparison of re-breather versus open circuit SCUBA estimates using the stationary point count method; 12) publish a paper on the environment and human drivers of differences in herbivorous functional groups; and, 13) publish a peer-reviewed paper summarizing an expert panel review of science and technology to promote sustainable fisheries in Southeast Asia and the Coral Triangle.

Benthic Research. During the next fiscal year the Benthic Research team (led by Dr. Bernardo Vargas-Angel) will continue to work on the following objectives: 1) continuation of RAMP activities with two cruises of the MHI and NWHI scheduled for the summer of 2015; 2) completion of analysis of stratified random benthic imagery for the Pacific Remote Islands and American Samoa Reef Assessment and Monitoring Program (ASRAMP) 2015; 3) undertake and expand baseline coral demographic surveys in Faga‘alu, Fagamalo, and Vatia (American Samoa) and West Maui, to support site-specific management efficiency projects for LBSP and MPAs; 4) continue to investigate and evaluate coral demographic patterns across the U.S. Pacific; and 6) continue optimization of stratified random approach to monitoring of coral communities and continue belt-transect proficiency training for CRED staff and partner divers.

Ocean and Climate Change. Led by team leader Dr. Thomas Oliver, the Ocean and Climate Change team plans to work on the following: 1) focus largely on analysis of existing datasets, some of which span a decade of science; 2) complete a manuscript which evaluates the environmental drivers of the Calcification Acidification Units (CAU) record of calcification from the entire U.S. Pacific; 3) complete a paper evaluating the use of satellite proxies to estimate in-situ carbonate system parameters; and 4) complete a paper describing the STR record and the perspective it provides on U.S. Pacific coral communities; and 5) complete a paper on the results for diurnal
carbonate system variability across multiple regions in the Pacific, stemming from new diurnal suite recordings. Lastly, the team will develop ecologically relevant intra-island metrics of physical, biological, and chemical oceanographic information for a collaborative effort with the Fish and Benthic Teams, looking at environmental effects on fish, benthic, and crypto-faunal community composition across the Pacific.

Data Management. During the next fiscal year the Data Management team (led by project leader Troy Kanemura) will continue to work on the following objectives: 1) provide data management services to support CRED’s field missions, including the Main Hawaiian Islands reef fish mission in summer 2015, marine debris survey and removal operations in the Northwestern Hawaiian Islands in summer 2015, fly-in benthic surveys to Fagatume Bay in American Samoa in summer 2015, and Papahānaumokuākea Marine National Monument RAMP in summer 2015. Services to be provided for these missions include: assistance with mission planning; preparing the remote file management system; training the designated data manager; preparing the database applications to facilitate data entry, data validation, data processing, and data QC; ingesting data collected into CRED’s Oracle database or file management systems; and assist with reporting, metadata, and archiving; 2) provide data management support for CRED’s image analysis project to incorporate image analysis results into the Oracle database regardless of the tool used to annotate the photos: Coral Point Count for Excel (CPCe) or CoralNet; 3) provide support for Guam’s Long-Term Coral Reef Monitoring Program. The two applications developed by the team are a web-based data management interface deployed in 2014 and an image analysis ingestion script deployed in 2015; 4) provide support for American Samoa Department of Marine and Wildlife Resources’ (DMWR) Data Management Initiative. This will be achieved through the web-based application developed by the data management team to facilitate entry of data collected under the American Samoa Coral Reef Monitoring Program (ASCRMP) and the American Samoa Integrated Coral Reef Monitoring Program (ICRMP); 5) implement requirements of the White House’s PARR (Public Access to Research Results) initiative, the NOAA and NMFS Data Management Planning Procedural Directives, as well as the PIFSC Data Management Policy; 6) provide support to the National Coral Reef Monitoring Program (CRCP), and collaborate with the CRCP data management team as needed; 7) complete development and implementation of workflows to manage project activities: optical validation, NCRMP data archival, post-mission data migration and manuscript review; 8) implement data management plan for CRED oceanographic data; 9) develop and test a new web-based data entry tool for the project; 10) develop ISO-formatted records for datasets in the NMFS metadata catalog; and 11) enhance web-based waypoint ingestion application for use across the project.

International Programs. During the next fiscal year the International Programs team (led by Dr. Supin Wongbusarakum) will work on the following objectives:

For the USAID-Regional Development Mission Asia, a follow-up workshop will be held to complete an Ecosystem Approach to Fisheries Management (EAFM) plan to address identified transboundary issues of the Sulu-Sulawesi Seascape. A peer-reviewed paper on the results of the 2014/2015 study on Science and Technology to Promote Sustainable Fisheries in Southeast Asia and the Coral Triangle will also be in process.

For research conducted in Indonesia, the team will provide technical expertise in a workshop with Ministry of Fisheries and Marine Affairs of Indonesia (KKP), USAID, and other key country partners in August 2015 toward development of an improved fisheries management governance structure (including input on the development of fishery management councils) to support and implement Indonesia’s national EAFM plans. Additional activities geared toward assistance in EAFM implementation and institutionalization will be based on the outcomes of a meeting (tentatively scheduled for September 2015) with USAID, KKP and a contractor for USAID’s large Sustainable Ecosystems Advanced (SEA) Project.

For research work conducted in the Philippines, the team will: 1) provide technical assistance and guidance to support Philippines Department of Natural Resources, Biodiversity Management Bureau (DENR-BMB) biodiversity awareness raising, education and outreach using ARMS; 2) develop projections of future impacts to Philippines fisheries and marine biodiversity due to ocean variability and change; 3) assist Philippines Bureau of Fisheries and Aquatic Resources (BFAR) in developing management strategies to incorporate considerations of these changes; and 4) provide technical assistance to conduct a needs assessment and develop and implement an EAFM Plan at a priority BFAR demonstration area/site including multiple Philippines Local Government Units (LGUs) and provinces.

For research work conducted in Timor-Leste, the team will: 1) deliver WorldView2 satellite Imagery for bathymetric mapping and benthic habitat characterization; 2) process data for ARMS (biodiversity), CAUs (calcification rates), STRs (temperature), and report on baseline conditions and make suggestions to local agencies how to utilize information; 3) develop a spatial (GIS) data framework for mapping, benthic habitat, and reef fish.
survey data. The team will also assist MAF GIS team on use of maps and GIS tools for coastal resource and fisheries management. In addition, the International team will be collaborating with NMFC to develop a suite of EAFM materials for the Leaders, Executives and Decision-Makers (LEAD).

Ecosystem-Based Management

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Eco,
Human Dimensions of Fishing and Marine Ecosystems in the Western Pacific  

P.I.: Mark A. Merrifield [JIMAR Project Lead: Hing Ling Chan]  

In the coming year, JIMAR researchers will be working on three activities and areas of focus. The sub-projects will be: 1) updating the Fishing Community Profile for the Commonwealth of the Northern Mariana Islands; 2) conducting further analysis of social and fisheries data and indicators for the region; and 3) examining rights-based management alternatives for the Hawaii longline fishery. Updating the Fishing Community Profile for the CNMI will be conducted in coordination with the Western Pacific Regional Fishery Management Council (WPRFMC) and local resource managers to provide updated information about how fishing and people connected with fishing have changed since the original profile was published. Continued analysis of social and fisheries data and development of social indicators will include updating existing data and developing new social indicators related to climate change resilience for communities around Hawaii. Rights-based management has been proposed for Hawaii’s longline fishery and its impacts to fishermen and other stakeholders in the fishery could be considerable. This project will educate those stakeholders about alternatives in rights-based management to assist in identifying aspects of management that would benefit this fishery.

Pacific Islands Region Observer Program Initiative  

P.I.: Mark A. Merrifield [JIMAR Project Lead: John Peschon]  

For the next year, the program will observe approximately 400 trips in the Hawaii and American Samoa longline fisheries. Project staff will complete a minimum of two observer trainings for the Hawaii and American Samoa fisheries, as well as provide technical assistance and training for the emerging Pacific Island observer programs. The program will continue working with the WCPFC, the Forum Fisheries Agency (FFA) and Secretariat of the Pacific Community (SPC). The program will also be working with South Korea, Indonesia, Papua New Guinea, the Federated States of Micronesia and other Pacific Island countries in helping develop and enhancing observer programs.

Pacific Islands Region Outreach and Education Program  

P.I.: Mark A. Merrifield [JIMAR Project Lead: Jeffrey Hare]  

The Outreach and Education Program will continue to serve as a resource for PIRO and PIFSC providing services that help inform stakeholders about NMFS science, service, and stewardship. The program will continue to include an outreach and education coordinator, print layout/web specialist, and multimedia/social media specialist. Outreach events and communications materials will continue to be a focus for the program with staff participating in annual events and seeking new opportunities. Program staff will continue support of outreach displays and materials production, website, social media, and multimedia projects. Specific plans include a complete website redesign, Twitter and Facebook accounts, new outreach displays, brochures, reports, and outreach events that PIR normally attend. Another major project will include the development of a science modules kit with lessons for the classroom based on the modules developed for the 2015 NOAA Fisheries Science Camp. It is anticipated that the NOAA Fisheries Science Camp will be held again in the summer of 2016.

Stock Assessment Research Program  

P.I.: Mark A. Merrifield [JIMAR Project Lead: Marc Nadon]  

JIMAR researchers within the PIFSC Stock Assessment Program will be involved in investigations of insular and pelagic fishes in FY 2016. Work related to the former will include publishing a paper on the stock assessment of Hawaiian coral reef fishes (accepted for publication and will appear online at the start of FY 2016), automated gear calibration analyses, and a new approach to obtain life history parameters in data-poor situations (paper currently under review). A Center for Independent Experts (CIE) review will occur in September 2015 on the length-based assessment approach used for coral reef fishes. Work will begin on the assessment of coral reef fishes in the territories following the results of the CIE review. Further work will be conducted, both in the
field and analytically, on insular bottomfish fishery-independent surveys in Hawaii. Fisheries-independent diver surveys for reef fishes are also planned in American Samoa next winter. The pelagic fish studies will focus on developing stock recruitment relationship functions for pelagic sharks, which will be incorporated in future stock assessments. Further work will be conducted on the simulation testing of fisheries indicators on pelagic shark species from the North Pacific Ocean, under the auspice of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) Shark Working Group. JIMAR staff will be conducting research on improving the gear standardization approach used for billfishes by using interspecific relationships. Additional activities include participation in the 145th Annual Meeting of the American Fisheries Society in August 2015 in Portland, Oregon, as well as various other meetings and workshops.

Western Pacific Fisheries Economic Integration

P.I.: Mark A. Merrifield [JIMAR Project Lead: Kolter Kalberg]

For FY 2016, the primary focus for this project will be to 1) utilize Vessel Monitoring System (VMS) data for the Hawaii-based longline fishery and conduct preliminary analyses of VMS data coverage to explore the feasibility of integrating VMS data into decision support systems such as FishSET; and 2) generate consistent and timely economic information for all fisheries conducted around the Hawaiian Islands through the integration of all State of Hawaii fishery data into a single, readily accessible database.

Protection and Restoration of Resources

Cetacean Research Program

P.I.: Mark A. Merrifield [JIMAR Project Lead: Marie Hill]

Over the next year, activities under the JIMAR CRP projects will include: 1) a shipboard survey for cetaceans within the American Samoa EEZ; 2) small boat surveys for cetaceans off of Guam, Saipan, Tinian, and Aguijan; 3) continued deployment of acoustic recorders on longline gear to assess the potential cues to false killer whales; and 4) continued maintenance and data collection of High-frequency Acoustic Recording Packages (HARPs).

Hawaiian Monk Seal Northwestern Hawaiian Islands Research Seasonal Support

P.I.: Mark A. Merrifield [JIMAR Project Lead: Lizabeth Kashinsky]

In fiscal year 2016, the JIMAR HMSRP staff will continue to collaborate with NMFS scientists to collect monk seal survey and life history data and conduct enhancement activities primarily in the NWHI. JIMAR staff will perform daily field operations and participate in field studies, tag and mark animals for identification, collect specimens for genetic studies, conduct boating operations, and monitor for health and disease opportunistically through necropsies and non-invasive sampling techniques. Non-invasive specimens will also be collected for ongoing foraging studies. Ongoing survival enhancement activities may include collection of dangerous debris off beaches, disentanglement of seals, translocation of weaned pups within FFS, and reunite mother-pup pairs. Special enhancement projects may include continuation of shark monitoring and removal, deworming studies, and translocation of pups between breeding sites. Advanced technologies (remote cameras, rovers, etc.) may also be utilized to monitor the population.

Hawaiian Monk Seal Research Program

P.I.: Mark A. Merrifield [JIMAR Project Lead: Lizabeth Kashinsky]

In fiscal year 2016, the JIMAR HMSRP will continue to collect survey and life history data on monk seals and conduct enhancement activities primarily in the MHI. JIMAR staff will collaborate with NMFS scientists to conduct HMS field studies, analyze data and perform daily maintenance, operations, and training for field camps. JIMAR staff will coordinate and respond to stranded HMSs, conduct boating operations, train and lead field personnel, and continue to update and maintain existing databases. Foraging and dietary studies will be
carried out in the MHI, and health and disease monitoring will occur opportunistically through necropsies and non-invasive sampling techniques in conjunction with foraging studies. Ongoing survival enhancement activities may include collection of dangerous debris off beaches, disentanglement of seals, translocation of weaned pups within FFS, and reuniting mother-pup pairs. Special enhancement projects may include continuation of shark monitoring and removal, and translocation of pups between breeding sites. The program will continue to advance its behavioral research and plans to design studies testing techniques to modify monk seal behavior and develop tools and protocols for application in future management activities.

**Marine Turtle Research Program (MTRP)**

**P.I.: Mark A. Merrifield [JIMAR Project Lead: Devon Francke]**

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 Japan, China, and New Caledonia are slated for FY 2016. Tracking, data management, and mapping expertise will continue to be provided by National Marine Fisheries Service (NMFS) and JIMAR as a joint effort with international colleagues.

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

Necropsy of dead turtles, biological sample collection, and management of biological samples are major responsibilities of JIMAR TRP stranding associates and will continue to be an important part of their routine tasks.

JIMAR TRP staff will conduct longline observer training sessions as requested by PIRO. Training sessions include a 30-minute classroom training session on marine turtle biology and hands-on training in measurements, tagging, and biological sample collection. Two or more training sessions will be conducted in FY 2016.

Field capture of marine turtles on Oahu and periodically on outer islands will continue to be done by JIMAR TRP staff on an as needed basis. Participation in this research includes hand-capturing turtles, performing health assessments, measuring, tagging, collecting biological samples, and releasing the turtles back into the wild.

JIMAR TRP staff will participate in the planning, preparation, and data analysis/reporting of annual nesting beach field work on East Island, FFS. A temporary-hire JIMAR TRP employee will also perform the month-long survey during the summer of 2016.

JIMAR TRP staff will participate in and assist with the planning of future meetings of the China/USA Working Group of the NOAA Living Marine Resources panel initiative. JIMAR will contribute to providing practical experience to the Chinese collaborators through participating in field work and necropsies.

A JIMAR TRP postdoctoral scholar will organize existing databases from aerial and in-water tow board surveys, obtained through ongoing partnerships with PIFSC programs and territorial agencies. JIMAR TRP staff will develop quantitative spatial analyses for estimation of turtle population density and will seek cofactors to understand any spatiotemporal patterns. These results will aim to inform management actions, and statutory processes under the U.S. Endangered Species Act.

**Protected Resources Environmental Compliance Initiative (PRECI)**

**P.I.: Mark A. Merrifield [JIMAR Project Lead: Karen Frutchey]**

The research component of the project has ended, and the only anticipated activity over the next reporting period will be outreach, education and communications in coordination with the JIMAR Communications Team in PIRO. JIMAR project staff work closely with PIRO Communications Team and the PIRO Protected Resources Division (PRD) on outreach aimed to promote awareness and conservation of the Hawaiian monk seal and marine turtles, including leading the development of printed materials that reach thousands of members of the public at educational events throughout Hawaii.

JIMAR staff will continue working closely with PIRO PRD on a public outreach response to Hawaiian monk seals in Oahu harbors, meeting with various harbor masters on developing messaging and signage appropriate to the harbor user target audience.
JIMAR staff will also work to create awareness with the Honolulu hotel visitor community regarding responsible wildlife viewing of sea turtles, and this activity will continue in the new project year.

**Sea Turtle Bycatch and Mitigation Research**

**P.I.: Mark A. Merrifield** [JIMAR Project Lead: Melanie Hutchinson]

The project plans to continue with elements of bycatch reduction testing, but focusing on multiple taxonomic groups including elasmobranches, marine mammals, sea birds, and sea turtle species. In addition, post release mortality studies will be initiated to better understand the consequences of interacting with various fisheries such as longline, gillnet, pound net, and purse seine fisheries. Such studies will utilize various satellite telemetry technologies as well as basic physiological assessments.

**Equatorial Oceanography**

**Characterization and Dynamics of Mesoscale and Submesoscale Oceanic Variability in the Solomon Sea Simulated by a Nested ROMS Model**

**P.I.: Mark A. Merrifield** [William S. Kessler]

During the next fiscal year the project’s primary goals are: 1) to finalize and publish results on small-scale variability and western boundary current dynamics; and 2) to coordinate with UCLA partners on the topic of submesoscale dynamics in low-latitudes. The goal is to analyze a suite of progressively finer resolution model simulations (down to sub-kilometer scales) and isolate unique characteristics of submesoscale variability in a near-equatorial, topographically-dominated context. An important final objective of this project is to assess measurability of the model signals both by altimetry and gliders with their specific accuracies and space-time sampling characteristics.

**Optimizing Routine Ocean Current Measurements by the NOAA Fleet**

**P.I.: Eric Firing**

The overall plan is to add support to 4-5 ships per year until all suitable NOAA ships are included, and to update each ship at intervals of 1-2 years. Based on NOAA IT policy requirements, project researchers will be replacing the computers on the *Ron Brown*, the *Hi`ialakai*, the *Bell Shimada*, and the *Nancy Foster* in the coming year. As of this writing, a new installation on the *Oscar Elton Sette* has already been completed. New installations are planned for the *Gordon Gunter*, the *Pisces*, the *Okeanus Explorer*, and the *Bigelow*. Timing is not yet firm, but it’s anticipated that most of these will be complete by the end of the next fiscal year.

**The University of Hawaii Sea Level Center**

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

The UHSLC data acquisition and archiving software packages have been substantially improved, and the project will continue to refine the website and database tools throughout the year. Project staff will continue to update all of the data processing software to modern languages and user interfaces. UHSLC technicians nominally visit stations at 1.5-2 year intervals for normal maintenance. The project anticipates visiting 16 UHSLC core project stations during FY 2016. UHSLC research in the coming year will consist of a variety of ongoing and new projects. The project will continue to investigate the dynamical origin of the subsurface warming in Indian-South Pacific region using observations and ocean models. Previous results form the foundation for ongoing research into the hemispheric differences in sea level change and heat storage and the relationship between these global patterns and atmospheric forcing. The project will also continue work started during FY 2015 concerning the capability of global climate models (the CMIP5 models in particular) to capture the full amplitude of regional sea level change captured by in situ (tide gauge) and satellite observations. This work will have important
implications for the role of global climate models in planning for near-term (next 10-30 years) sea level rise. Project researchers will continue work on a variety of research tracts concerning 20th century GMSL rise and the optimization of global sea level reconstructions from tide gauge data. This research will include investigations into the effect of gravitational ice melt fingerprints on the rates of sea level change in long tide gauge records, the effect of non-uniform spatial sampling on estimates of the global rate, the error bar about the rate of global change, and the optimization of tide gauge selection and quality control of the data. Finally, a new project will begin focusing on creating seasonal inundation forecasts for Pacific Islands using the relationships between climate variability, sea level, wave generation, and inundation.

University of Hawaii Sea Level Center (GNSS installation at NOAA CO-OPS stations)
P.I.: Mark A. Merrifield, James Foster, Todd Ericksen

For the upcoming fiscal year the project plans to complete the GNSS installations and demonstrate stable station performance and communications.

University of Hawaii Sea Level Center (Ship-Based Tsunami Detection and Characterization)
P.I.: Mark A. Merrifield, James Foster, Todd Ericksen

With the full pilot network installed and operational by the end of Year 1, the goals for Year 2 are to maintain the network’s operational status and initiate testing of system performance. The project will establish a statistical approach for filtering the position time-series and maximizing resolution of tsunami events. Researchers will test against an archive of previous tsunami events and examine the network performance for any event that occurs during the year: confirming null-detections in the event that there was no significant tsunami generated. The project will also complete the software package for receiving, analyzing, presenting and interacting with the ship-based tsunami-detection network data streams.

Climate Research and Impacts

Enhancement of Data and Research Activities for Climate Studies at the International Pacific Research Center (IPRC)
P.I.: Kelvin Richards

The Asia-Pacific Data Research Center (APDRC) will continue its collaboration with Pacific Climate Information System (PaCIS) and develop specific data products and services to help with activities in the insular Pacific. In addition, the APDRC will augment its data holdings and viewers to accommodate Pacific regional data to support local use. More broadly the APDRC will continue to acquire new data sets as identified by IPRC researchers and promote IPRC-generated output via project pages. A concerted effort will be focused on providing the CMIP-5 output via the APDRC servers, thus enabling easier access for interested researchers. Finally, the APDRC will work with the IPRC scientists funded via the JAMSTEC/IPRC Cooperative Studies (JICS).

Mechanisms of Atmospheric Mercury Transport and Transformation in the Remote Pacific Marine Free Troposphere Measured in Hawai‘i
P.I: Mark A. Merrifield [Russell Schnell]

For the next fiscal year a calibration system for Reactive Gaseous Mercury (RGM) species will be deployed and tested, allowing a quantitative assessment of potential measurement biases at the site.
Pacific ENSO Applications Climate Center

P.I.: Mark A. Merrifield

The project will continue to work with Integrated Water Level Service (IWLS) partners to evaluate and improve the ensemble mean sea level anomaly forecasting scheme for the Pacific basin based on both statistical and dynamical model outputs. Project researchers will complement existing water level products by adding ocean wave analyses and forecasts during FY 2016. Another major task will be to enhance the understanding of the seasonal variability and predictability of rainfall in the USAPI region, which will be the focus of a PhD thesis research project. The first stage of this project will be a detailed inter comparison between the station rainfall data archived by the PEAC Center and global gridded satellite derived rainfall datasets such as Global Precipitation Analysis (GPCP) and Tropical Rainfall Measuring Mission (TRMM) with the objective of understanding how local rainfall variability is related to regional and global rainfall variability as well as justifying the use of these satellite derived rainfall estimates in estimations of climatological rainfall features on these islands. Researchers will continue to work to develop a suite of operational products to be distributed through the NWS long wire system Advanced Weather Interactive Processing System (AWIPS).

Profiling CTD Float Array Implementation and Ocean Climate Research

P.I.: Mark A. Merrifield [Gregory C. Johnson]

In FY 2016, 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 content and sea surface salinity variations, and likely assist further with delayed-mode quality control for the PMEL Argo floats.

Tropical Meteorology

Tropical Pacific Testbed (TPT) for GOES-R Application Development

P.I.: Steven Businger

As a result of the Sequester, funds for the TPT/TPPG have been cut and very limited funds remain for the next fiscal year. The PI is motivated to develop and submit a new research proposal to the GOES-R program based on input during the 2014 OCONUS meeting in July 2014. The satellite downlink will continue to be operated with support from the NWS Pacific Region and data stream will continue to UH and the NWSFO. The project will continue to mentor graduate students in use of the polar orbiting satellite imagery and data for their research projects. The project will continue to promote use of high-resolution satellite data and GOES-R products in the classroom.

Tsunamis and Other Long-Period Ocean Waves

Archive of Rapidly-Sampled Hawaiian Sea Level

P.I.: Douglas S. Luther

Considering the continuing importance of the rapidly-sampled sea level records in PacIOOS efforts to diagnose the causes of harbor sea level variations, as well as coastal inundation events, the collection, processing, archiving and dissemination (through ARSHSL) of rapidly-sampled Hawaiian sea level remain a high priority activity. Unfortunately, recovering from the technical difficulties experienced this spring consumed resources beyond what could be afforded by the limited budget for this activity. Consequently, the project was unable to re-establish real-time data collection from PTWC’s gauges. However, a high priority has been placed on fully reestablishing the ARSHSL archiving activities within the complementary PacIOOS program. PacIOOS resources will be used to write the codes necessary to resume real-time data acquisition from PTWC’s gauges for archiving in ARSHSL. The project expects that normal, daily archiving of the Hawaiian sea level data from the PTWC gauges
will resume this year. Archiving of the sea level data from the 6 NOS gauges was unaffected by the PTWC changes. Secondary activities, such as the creation of concatenated hourly datasets, will continue depending on the availability of resources.

The University of Hawaii Sea Level Center—Tsunami Research

P.I.: Mark A. Merrifield

For next fiscal year, UHSLC staff plan to conduct five station visits in the Caribbean and five visits the Pacific, with site selection dependent on station performance. All data from the Pacific and Caribbean tsunami stations are available in real-time via the Global Telecommunications System (GTS). Quality assessment and data processing will be performed by UHSLC staff.