5.0 PROJECTS FUNDED

List of Florida Sea Grant Projects That Were Active During 2006 and Funded by Sea Grant/NOAA and Extramural Sources, in Three Major Categories According to Sponsorship

I. CORE SEA GRANT PROGRAM PROJECTS
(This list includes projects that were completing or in process in 2006)

I.A. Research (For complementary projects see section II.A)

I.A.1. Fisheries and Aquaculture

R/LR-B-56, Combining DNA Forensic and Population Genetic Approaches for Application to Shark Conservation, Management, and Trade Monitoring - - There is an urgent need for better tracking of shark fisheries and trade on a species and population specific basis to better serve and manage sharks on a worldwide basis. This continues earlier work to develop identification markers for shark species that is already being used by NOAA law enforcement.

R/LR-B-57, Assessment of Regional Spiny Lobster Stock Abundance Trends and Linkages that Explain Florida Stock Abundance Declines -- In spite of a 50% reduction in traps, the Florida spiny lobster fishery shows a 58% decrease in landings during the 1999 to 2002 fishing seasons. Significant catch decreases are observed also in the Bahamas, Cuba, and Nicaragua. No knowledge regarding the origin of these common decreasing trends is available, but regional overexploitation and environmental change are suspected. This proposal investigates the roots of such decreasing trends.

R/LR-B-58, Passive Acoustic Measurement of Black Drum Spawning Output -- Many fisheries scientists throughout the southeast U.S. have been using passive acoustics to identify spawning habitat of sound-producing fishes. The purpose of this project is to determine whether sound analysis can yield quantitative data on the number of eggs spawned. This study will serve as a test case that can be used as a model for future studies of other important species, such as red drum and spotted seatrout, where issues such as egg transport and egg identification may be more difficult.

R/LR-B-59, Recruitment Dynamics and Population Connectivity of Gray Snapper, *Lutjanus griseus*, Among West Florida Estuarine Systems -- The Sustainable Fisheries Act (1996) mandated the protection of essential fish habitat, yet provided little guidance as to what constitutes *essential* habitat. This proposal aims to develop an approach to evaluate the essential nature of fish nursery habitat by linking nursery-specific juvenile production with eventual recruitment to adult habitat. Gray snapper, *Lutjanus griseus* will be used as a model estuarine-dependent reef fish to develop such an approach.

R/LR-B-60, Developing a Multiple Genetic Marker Approach to Assess Global Scale Population Structure and Mating Systems in High Fin-market Demand Shark Species -- The goal of the project is to make possible shark conservation, management, and trade monitoring on a species and population-specific basis by providing a comprehensive, multi-genetic marker assessment of global population structure in fin-trade sharks, determining the population of origin of market derived shark fins, and elucidating shark mating systems.

R/LR-A-39, Enhancing Stress Resistance of Cultured Hard Clams in Florida by Triploidy -- Florida has approximately 350 active clam growers producing a crop worth of $18.2 million in 2001. Recently, the need for a hardier clam strain has become evident as clam culturists in Florida report below average survivals or total losses during the prolonged hot summers. Triploid clams may be a solution to this problem as they are virtually sterile, spawning does not occur, and energy may be available during this stressful period for basic metabolism.

R/LR-A-40, Improved Hatchery Technology of Cobia Using Proactive Microbial Management and a Simplified Live Food Regime -- The objective is to develop innovative, reliable and environmentally sustainable hatchery technology for larval rearing and production of cobia fingerlings. This will be achieved by developing proactive health management methods aiming to reduce the input of microbes from major sources of contamination during the culture cycle for this valued fish species.

R/LR-A-41-PD, **Development of Feeding Mechanics, Performance and Prey Selectivity in Marine-fish Larvae: A Novel Approach to Understanding Food Requirements of Marine Ornamental Fish** -- High mortality during larviculture remains a major obstacle to successful rearing of a large number of marine ornamental fish species. In particular, catastrophic mortality is associated with first-feeding or the "critical period" during which larvae switch from endogenous to exogenous feeding. This research is aimed at determining the causes of mass mortality during the early stages of exogenous feeding in hatchery-reared marine ornamental fish larvae.

R/LR-A-42, Demonstrating Hatchery and Growout Technology for Production of Cobia from Egg to Market -- The objective is to improve hatchery and offshore growout technology to expand the marine fish aquaculture in the US. This work will perfect and transfer innovative, reliable and environmentally sustainable technologies and protocols for disease prophylaxis and management of cobia (*Rachycentron canadum*) eggs, larvae, postlarvae, fingerlings, juveniles and adults, by developing methods for controlling disease outbreaks at the hatchery, nursery, shipping and growout stages, as well as reducing the costs and risks of fingerling transport.

R/LR-A-43, Developing Improved Hatchery Technology for Marine Ornamental Fish Using Stage-specific Feeding Management Regimes -- The main goal of this study is to develop effective and sustainable hatchery technology for the difficult to raise marine ornamental fish species *Centropyge flavissimus* (lemonpeel anglefish) and *Liopropoma carmabi* (candy basslet). These species demand a high price in the aquarium trade and have been successfully spawned in captivity. A novel approach will be developed that integrates the development of feeding kinematics, feeding mechanisms and feeding performance in the development of stage-specific feeding regimes that will enhance survivorship during the larval rearing of these species.

R/LR-A-44, Sunray Venus Clam: A New Species to Diversify the Florida Aquaculture hard Clam Industry Over the past two decades, Florida has seen a dramatic increase in aquacultured shellfish production. The clam industry grew from $0.4 million (13 farmers) in 1987 to $18 million (336 farmers) in 2001. However, the industry is built on a single species whose value fell to just under $13 million in 2003 as hard clam dock-side prices plummeted from 13¢ to 9¢ per clam during the 2001-2004 economic downturn. This was not reflected in other bivalve species, such as oysters. Diversifying the shellfish culture industry by developing farming technology and markets for other bivalve species will increase economic stability and growth of the industry.

I.A.2. Seafood Technology and Seafood Safety

R/LR-Q-27, Regulation of Capsular Polysaccharide and Virulence in *Vibrio vulnificus* -- The goal of this work is to define genetic elements that regulate the on/off switching involved in the phase variation from virulent to avirulent forms of *V. vulnificus*. Preliminary data have identified phase variable genes within the capsular polysaccharide operon, and these mechanisms and others will be investigated for application to intervention strategies to reduce risk of oyster consumption and also for virulence-specific gene probes and/or molecular typing.

R/LR-Q-30, Evaluation of QPCR Methods for Detection of *Vibrio vulnificus* -- FDA recently mandated (Post Harvest Treatment) PHP of oysters, which requires validation and verification protocols that enumerate *V. vulnificus* before and after treatment. However, standard assays are time-consuming, labor intensive, expensive

and unreliable. Direct comparison of QPCR assays to standard methods is needed to establish the most effective approach for the seafood industry to address the validation and verification of PHP for reduction of *V. vulnificus* in oysters. The goal of QPCR development is to provide more efficient and cost effective methodology for industry assessment of validation and verification procedures.

R/LR-Q-31, Objective Quantification of the Extent of Aquatic Food Product Enhancement with Carbon Monoxide -- The possibility, extent and quantification of "color enhancement" data using CO is non-existing. This type of data is needed to give regulatory agencies a scientific basis for decision-making, and to guide the industry to develop effective CO treatment methodologies without the potential pitfalls and disadvantages of this technology. Computer machine vision, electronic nose, microbial analysis, and sensory panel tests will be conducted to generate a complete data set regarding possible "color enhancement" of various fish with lateral dark red sections.

R/LR-E-19PD, Oyster Demand Adjustments to Alternative Consumer Education and Post Harvest Treatments in Response to *Vibrio vulnificus* -- The goal is to provide timely science-based direction that supports and augments current research directed at developing and implementing educational and outreach programs to better inform consumers of the potential risks associated with *V. vulnificus*. The work will provide economic losses due to existing perceived oyster consumption risks, the effects of various market promotion campaigns and attitudes of consumers of oysters.

I.A.3. Biotechnology

R/LR-MB-20, Design and Development of New Antifouling Paint Additives Based on Marine Pyridyls -- This project builds on the investment and findings in R/LR-MB-16. Researchers will synthesize pyridyl compounds derived from marine worms and field test their ability as paint additives to reduce biofouling.

R/LR-MB-21, Characterization and Synthesis of Hydroxconophans: A New Class of Neuropharmacological Agents from Cone Snails -- This project builds on the investment and findings in R/LR-MB-18. Researchers will expand the set of conopeptides from cone snails and evaluate therapeutic potential.

R/LR-MB-22, Chemical Variation in Marine Cyanobacterial for Drug Discovery -- The overall goal of this project is to discover new natural products from Florida benthic marine cyanobacteria that will be useful as drugs in the treatment of human disease. Marine cyanobacteria produce a great diversity of compounds, mostly non-ribosomal peptides and lipopeptides, with over 200 natural products reported. Marine cyanobacteria provide an exceptional resource for new natural products because of their tremendous biodiversity and chemical diversity. This project will be the first systematic approach to studying benthic cyanobacteria from Florida coastal waters for biotechnological applications.

R/LR-MB-23, Profiling the Marine Sponge *Discodermia* Transcriptome Enriched for Secondary Metabolite-coding Messages -- The ultimate goal of this project is to provide a novel approach towards eventual recombinant production of potent bioactive compounds known to be produced by the marine sponge genus *Discodermia*. Based upon a "transcriptome" approach, mRNA (cDNAs) involved in active secondary metabolite (SM) pathways or their regulation will be identified.

R/LR-MB-24, Cloning of the Terpene Synthase Involved in Eleutherobin Biosynthesis -- The motivation for this project is that the lack of an available supply has hampered the development of many marine natural products. Eleutherobin and derivatives are potent microtubule stabilizing agents whose full potential as therapeutic agents has not been evaluated due to limited availability. Completion of this project would lay the ground work for the development of a chemoenzymatic production method.

R/C-S-46, Field Measurements of Hurricane Wave Processes -- The overall goal of this project is to quantify and improve descriptions of hurricane wave transformation near the coast and its effects. The population of the US coast, and Florida in particular, is increasing rapidly. With this comes an increased probability of hurricane damage from waves and storm surge. However, the quantity of wave data near the coast to improve predictions and thus planning and construction is not adequate. Also lacking are collocated wind and wave measurements which could help to improve turbulence predictions and thus gust loading on houses.

R/C-S-47, Integrated Prediction of Hurricane Induced Inundation and Shoreline Change -- Hurricanes are the most devastating and damaging natural hazards impacting the U.S., accounting for 65% of insured losses from natural hazards in the past 50 years. The 2004 hurricanes caused $42 billion damage and 59 deaths in the U.S. Florida was the hardest hit by four major hurricanes. This research will significantly advance our predictive ability of coastal hazards (flooding, erosion, and rip current) to mitigate damages to coastal communities. Outcome of the research will directly benefit NOAA's effort to improve its storm surge models.

I.A.4. Ecosystem Health

R/C-E-50, Quantification of Habitat Use by Reef Fishes in the Florida Coral Reef Ecosystem -- The Florida Keys coral reef ecosystem, comprised of a network of interconnected inshore coastal bays, barrier islands, and offshore coral reef environments, supports highly productive and diverse fish and invertebrate communities and a multibillion dollar fishing and tourism industry. The goal of this project is to develop robust methods for identification and quantification of reef fish habitat use that improves the statistical precision of ecosystem-wide fishery-independent reef fish visual census sampling surveys; enhances stock assessment capabilities; and provides a framework for evaluation of marine reserves.

R/C-E-51, Using Natural Chemical Tracers to Evaluate Point-Source and Non-Point Sources of Fresh Water Inputs to Biscayne Bay -- Identification of point-source and non-point sources of fresh water to coastal estuaries is essential in understanding the water quality of these areas. Planned future changes in fresh water deliveries to Biscayne Bay from point-source discharges via canals to non-point source discharge from wetlands and groundwater flow requires a monitoring method that effectively detects these changes, i.e., one that can detect changes in canal discharge versus groundwater seepage. The results of this project will provide a scientific-based tool for assessing the results of the fresh water redistribution plan.

R/C-E-52, A Portable Enterococcus Sensor for Monitoring Coastal Water Quality -- The coastal ocean is an important economic and recreational resource that is constantly influenced by human activities. In 2003, there were more than 18,000 days of beach closings throughout the US due to high concentrations of fecal bacteria. This was an increase of more than 51% over the previous year. Health related management of recreational coastal sites is currently undertaken by monitoring fecal coliform and enterococci by membrane filtration. The proposed method will be completely field based and linked to a preexisting (in house designed and produced) handheld detector that will use remote networking to send actual data plots back to a mainframe computer. This will allow public health managers to make regulatory decisions based on near real-time data as it becomes available.

R/C-E-53-PD, Assessing the Importance of Substrate Composition and Novel Marine By-products in Enhancing Mitigation of Essential Fish Habitats -- A keystone contributor to biological diversity along the Florida coast is the polychaete Phragmatopoma lapidosa. The worms construct nearshore reefs that provide shelter for many species. However, they can be impacted by sediment transported offshore from both natural beaches and beach restoration projects. Laboratory research suggests that a chemical in the worm's tubes may be applied to deployed structures to enhance worm recruitment. A determination of the circumstances that the chemical may enhance recruitment, combined with data on local recruitment rates, would allow coastal managers to modify artificial reefs to include those preferred features, and thereby maximize larval settlement and formation of "natural" habitats.

I.A.5. Coastal Hazards

R/C-S-44, Development of a Predictive Index for Rip Currents -- Building on R/C-S-42, a predictive rip current index can be employed to reduce the number of rip current related rescues and deaths. It would more accurately identify the conditions under which the strongest and most dangerous rip currents will occur, and provide real-time information with which to assist lifeguards with staffing decisions and to alert the public to the hazard. The goal of this project is to develop the index.

R/C-S-45, Risk Versus Mitigation Measures: Quantifying Residential Vulnerability to Hurricane Winds and Evaluating the Cost Effectiveness of Retrofits -- The implementation of affordable solutions to mitigate damage from hurricane winds can only follow from a quantification of the wind forces causing this destruction, models that relate wind forces to the capacity of man-made structures to resist them, and engineering-based evaluations of the cost effectiveness of various mitigation techniques. There is a strong need for a public risk model that will allow for a scientific and accurate evaluation of the cost effectiveness of mitigation measures on the scale of city, county, or state.

I.A.6. Waterfront Communities

R/C-P-26, Mitigating the Exposure and Vulnerability of Coastal Communities to Hurricane Flood Damage Through Growth Management -- Vulnerability of human settlements to damage from natural disasters is a significant constraint to local and global sustainability. Local growth management strategies have been advocated as a principal strategy for reducing such vulnerability, but empirical analysis of direct measures of the effectiveness of such strategies is very limited. Principal beneficiaries will include the Florida Department of Community Affairs, local governments of coastal jurisdictions in Florida, and state and local governments in other coastal areas of the United States.

R/C-P-29, Planning for Sustainable Coastal Communities and Waterways -- Florida faces a critical challenge: how to balance the use and protection of its coastal resources. Currently, Florida's 35 coastal counties (of 67) account for 79% of the state's population and over 80% of its economic activity. Nearly one million boats are registered in Florida (about one per 17 residents). The Coastal Planning position will broaden the scope of the existing Florida Sea Grant Boating and Waterway Management Program (BWMP), which includes a multidisciplinary team of geographers, biologists, legal specialists, and marine extension agents that carry out activities statewide.

R/C-P-30, Promoting Policy Planning for Coastal Communities, Coastal Access and Coastal Hazards Mitigation - - Local waterfront governments often lack the time, funds or expertise to pursue coastal policy innovation and secure this within their comprehensive planning structure. They will benefit from a comprehensive legal analysis of their coastal policymaking authority, especially in the confusing nearshore jurisdictional environment, and from a systematic assessment of the planning tools at their disposal that is packaged in a useable format. This project will be an applied legal and policy research and model code development-project, coupled with legal and planning extension to disseminate results. Working with selected communities, it will marshal information and develop locally applicable policy plans adapted to individual community needs.

R/MI-13-PD, Intelligent Manatee Idle Speed Zones -- Controversy currently exists between users of waterways and proponents that wish to protect manatee habitat. Manatee idle speed zones greatly impact coastline property values, constrain the construction of docks and boat ramps, and affect the total economic output of the Florida marine industry ($14.1 billion dollars/180,000 related jobs). This research has the potential to significantly reduce the economic impact that round-the-clock idle speed zones have on boating associated businesses and recreational boating activities in Florida's waterways, while maintaining the integrity of the manatee habitat.

I.B. Extension and Communications

SGEP-13, Florida Sea Grant Extension Program - - This work will continue to provide effective and responsible extension education programming that promotes the wise use of coastal and marine resources in Florida, with impacts that extend to the Southeast and the nation. Currently, Extension has 18 agents and 4 full-time specialists that serve the 80% of Florida's population that live in the 36 coastal counties of the state. In cooperation with industry Florida Sea Grant has made a significant impact on improving seafood quality and seafood safety, for example through state, regional and national leadership in development of the Hazard Analysis and Critical Control Point seafood inspection program. This effort has been recognized by the "Hammer Award" of the Vice President of the U.S. for achievement by partnerships. Other efforts include guidance to local government in developing artificial reefs, development of shellfish mariculture, assisting fishers and their families deal with the impacts of the net ban in Florida, and use of rural tourism as an economic development tool.

COMM-5, Florida Sea Grant Communications Program – The production of high-quality publications and other research, extension and education support materials continues through the communications program to effectively communicate results of Florida Sea Grant activities to both general and specialized audiences. Productions have included Florida Sea Grant Reports, Florida Sea Grant Technical Papers, books and book chapters, extension publications, brochures, maps and posters. Productions have also included educational videos, news releases and features for Florida Sea Grant's web site. A five-year publication list covering 2000-2004 summarizes communication program output at www.FLSeaGrant.org online. The Communications Program oversees the Florida Sea Grant web site, which contains nearly all of the Florida Sea Grant productions, as they are routinely posted there as part of the production process and policy.

I.C. Program Management and Development

M/PM-13, Florida Sea Grant Management - - To meet the programmatic goal of Florida Sea Grant, i.e., the use and conservation of the marine resources of Florida and the nation in a way that leads to a sustainable economy and environment, this project works to coordinate and administer the State University System of Florida Sea Grant College Program. Management activities have been judged against quantitative and qualitative performance goals as mandated by the University of Florida and the National Sea Grant College Program Office. The latest Federal program review evaluated FSG as "Excellent" for all criteria, tops in the nation.

M/PD-11, Coastal Science and Technology Innovation with Limited Funds: The Florida Sea Grant Program Development Portfolio - - This project continues to give Florida's universities and academic laboratories, through Sea Grant, the unique capability to respond even in the middle of a fiscal year to timely marine issues and demonstrations essential to coastal user groups. Projects are low budget with limited objectives. All proposals are peer reviewed to insure technical merit and relevance. Projects are conducted if they demonstrate a likelihood of rapid success and meet at least one of six criteria: (1) offer solution to clearly defined timely problem; (2) address problem in opportunistic research area; (3) pilot study to see if longer project justified; (4) provide information to attract support elsewhere; (5) Extension demonstration project; (6) timely exchange of scientific information. Projects that were completing from earlier years and new projects started in 2005 are:

- 04-10 Atlantic Tsunami Run-up Modeling
- 05-3 Using Dynamic Technology to Enhance Delivery of Florida Sea Grant Web Content
- 05-4 Tracking the Movements of Bull Sharks in the Gulf of Mexico Using Pop-up Satellite Archival Transmitters (PSAT tags)
- 06-1 Florida Sea Grant Elise B. Newell Seminar Series
- 06-2 Timely Marine Issues

II. ADDITIONAL PROJECTS FROM SEA GRANT SPECIAL INITIATIVES AND NATIONAL OPPORTUNITIES

(Either in process or started in 2006)

II. A. Research

II.A.1. Seafood Technology

R/LR-Q-26, Improved Methods for Molecular Detection of *Vibrio vulnificus* -- *Vibrio vulnificus* remains the leading cause of seafood-associated deaths. Current detection assays are consuming (2-7 days), labor intensive, expensive and not always reliable. FDA has increasingly turned to molecular detection, but problems have been reported with available assays. The objective of this project is to evaluate and improve molecular detection and typing methods for *V. vulnificus* in order to standardize evaluation of oyster and seawater samples.

R/LR-Q-28, Gulf Oyster Industry Program: Product Characterization to Advance the Use of Post Harvest Treatments (PHT) for Raw Oysters -- The oyster industry is faced with federal mandates requiring the implementation of new post harvest treatments (PHT) to yield safer oyster products destined for raw consumption. Failure to implement effective PHT's for raw oysters that reduce recorded illnesses due to problematic *Vibrio vulnificus* could result in closures or restricted oyster production along the Gulf of Mexico. This project will develop and implement the utilization of sensory product characterizations (PC) as a tool to better direct commercial practices and marketing efforts for raw oysters, particularly new PHT products mandated for food safety.

R/LR-Q-29, Consumer Market Research of VAP and PHP Oyster Products to Increase Gulf Oyster Consumption and Reduce *V. vulnificus* Related Illnesses - - In 2003, the Gulf of Mexico region produced 72 percent of the national oyster harvest (29.2 million pounds of meat), totaling $74.16 million. One factor negatively affecting the Gulf oyster industry is the pathogen *Vibrio vulnificus*. This naturally occurring, halophilic bacterium is transmitted to humans through exposure of wounds to warm seawater or the consumption of raw or undercooked oyster meat. Consumption of this pathogen by healthy individuals may result in ephemeral illness, but for individuals considered "at-risk" (i.e., those with compromised immune systems, diabetes or liver disease), *V. vulnificus* infections can result in a >50% mortality rate. The overall goal of this project is to fragment the oyster consuming market into specific segments to better understand consumer and non-consumer characteristics, needs, and demographics so that high-risk consumers can be identified and educated about the risk of consuming raw oysters.

II.A.2. Ecosystem Health

R/C-E-47, A Multidisciplinary Investigation for Determining MPA Baselines at Bimini Bahamas and Essential Fish Habitat for the Lemon Shark at Three Nursery Sites -- Habitat loss and degradation pose serious threats to the long-term sustainability of coastal marine fish and shellfish resources. NOAA's Strategic Environmental Assessments Division has recently embarked on a program to map and analyze fish and invertebrate habitats and distribution using a geographic information system in conjunction with habitat suitability index models. At present, these models generally lack mathematical and statistical rigor. This project will develop a practical, biologically-sound, and statistically robust methodology for quantitative assessment of what constitutes 'essential habitat' for economically and ecologically important coastal species.

II.A.3.

R/MI-12 Development of an Advanced Underwater Video Telemetry and Data Collection Instrument for Remote Observation of Aquatic Organisms and Underwater -- There is widespread interest in the scientific application of

underwater video units from researchers at academic institutions, government agencies, non-profit research foundations and the fishing industry. This project will test the application of CRITTERCAM on nurse, bull and hammerhead sharks.

R/C-P-27-CC, Waterways and Waterfronts: The Legal Framework for Public Access -- Local waterfront governments often lack the time, funds or expertise to pursue waterfront policy innovation and secure this within their comprehensive planning structure. This will benefit from a comprehensive legal analysis of coastal policymaking authority, especially in the confusing nearshore jurisdictional environment, and from a systematic assessment of the planning tools at their disposal that are packaged in a useable format. This project will provide this assessment and incorporate non-regulatory alternatives such as tax and other land use incentives.

R/C-P-28-CC, Smart Growth for Coastal Communities -- In coastal communities across the nation, there is a growing concern that current development patterns, dominated by what some call "sprawl," are contributing to water quality and environmental degradation. Though supportive of growth, communities are increasingly seeking solutions to balance growth with community and environmental values. Community decision-making often lacks the resources and training necessary to address these issues resulting in a new demand and a new opportunity for smart growth extension programming.

II. B. Extension

E/T-9, NOAA South Florida Marine Ecosystem Outreach Project - - Restoration and long-term sustained water quality of the South Florida Ecosystem is a priority among federal, state and local agencies, with billions of dollars being expended on a variety of projects over the next 25 years. The ultimate success of these projects will depend on the awareness, knowledge and decisions of citizens, business owners, and community leaders that are based on sound science. This project will serve as the link between science-based information developed by NOAA agencies and Sea Grant-supported research and the citizenry of South Florida.

E-T-11, Online Outreach Designed to Demystify Marine Biotechnology: *marnebiotech.org* -- There is a general lack of understanding of marine biotechnology by non-scientists. The goal of the project is to draw upon Sea Grant's vast national network of research, education and outreach resources to build an effective marine biotechnology website. It will be an effective tool for increasing awareness of this field among government officials, policymakers, students, educators, scientists, journalists, the general public, and industry professionals.

E/FE-GM, Gulf of Mexico Regional Fish Extension Project -- The FY02 National Sea Grant federal appropriation required the enhancement of Sea Grant's fisheries extension program. The topic of focus for Florida Sea Grant is participation in the sustainability of the Gulf of Mexico shrimp industry.

E/FE-SA, South Atlantic Regional Fish Extension Project -- The FY02 National Sea Grant federal appropriation required the enhancement of Sea Grant's fisheries extension program. Florida Sea Grant Extension is a member of the South Atlantic Regional Fish Extension Project team addressing marine protected areas essential fish habitat and fisheries management.

E/FE-FSG, Fisheries Extension Enhancement -- The FY02 National Sea Grant federal appropriation required the enhancement of Sea Grant's fisheries extension program.

SGEP-13-FE-A & C [2 modules], Florida Sea Grant Fish Extension Project -- The FY03 National Sea Grant federal appropriation continued the required enhancement of Sea Grant's fisheries extension program. Florida Sea Grant will hire two new fisheries oriented county faculty (Bay, Collier) and increase its recreational fishery extension program activity by one-half FTE.

E/T-16, National Sea Grant Extension Academy -- Florida Sea Grant Program will coordinate, develop and establish a national academy for training professional people new to Sea Grant Extension. There is a need for training in "Extension Professional Competencies" for new extension faculty. This is being conducted with the support of both the National Sea Grant College Program and the Assembly of Sea Grant Extension Program Leaders.

II.C. Fellowships

E/INDST-4, A Critical Evaluation of Two Approaches to Biomonitoring: Functional Biomarkers Assays and Stress Protein Biomarkers in *Mercenaria mercenaria* (Hard Clam) -- Biomarkers are biological changes that are observed in an animal following exposure to sublethal environmental or anthropogenic stressors. This project proposes to test the following assumption: stress protein biomarkers expression profiles correlate with traditional functional biomarker assays of bivalve health. This will be done by exposing *Mercenaria mercenaria* to two important environmental stressors, high temperature and low-oxygen conditions (hypoxia), both of which are known to induce stress protein responses and affect the health of aquatic organisms.

E/ST-30, 31, 32, 33 Knauss Fellowship -- Three students in 2004-2005 and one in 2005-2006 spent one year in Washington, D.C. working in Federal programs related to coastal and ocean science and management.

III. MAJOR EXTRAMURAL (NON-SEA GRANT-FUNDED) PROJECTS

A number of other projects indicate the reliance of other organizations upon Florida Sea Grant, and are in addition to the partnerships reflected in the projects listed above. Certain projects supplement salary requirements for Extension. These are projects that are funded from the agency to Florida Sea Grant, but are not funded through NOAA. A brief listing of those projects active during 2005 is presented below.

III.A. Extension

E/T-12, Southeast Atlantic Coastal Ocean Observing System -- Florida Sea Grant Extension will continue outreach as a component of the Southeast Atlantic Coastal Ocean Observing System (SEA-COOS). The four Sea Grant programs (North Carolina to Georgia) are cooperating in this regional project. The goal is to establish a dialog with non-scientific users, identify their information needs and the preferred formats and methods of information delivery. Florida will train its extension faculty, focus on regional groups (e.g., ports, hazards) and local sectors (e.g., fishers and emerging response offices), host sector workshops and convene instate meetings with user groups.

COSEE-GOM, (Florida Portion), Regional Center for Ocean Sciences Education Excellence (COSEE) – Gulf of Mexico -- This program is designed to strengthen ocean sciences education through interpretation of research results. The audience is the general public, pre-college teachers and students, informal educators and university and community college faculty and students.

E/T-17, The Gulf in Peril: Strategies for Restoring and Preserving Coastal Ecosystems of the Gulf of Mexico -- The Conservancy of Southwest Florida and the Florida Sea Grant College Program are convening a conference in response to the recommendations of the Pew Ocean Commission and the U.S. Commission on Ocean Policy, and the observations of the Gulf in Peril series. The conference will bring together public and private sector stakeholders for the purpose of addressing the key issues and outline actions.

SGEP-13-EPA, EPA Smart Growth Extension Partnership -- The goal is to provide smart growth information to local decision-makers including what it is, why it is important for managing coastal resources, what tools are available, who are the major players, and the resources available.