FLRACEP FACT SHEET

September 1, 2015

Examining Fisheries Impact of Invasive Lionfish with an Ecopath with Ecosim Model

Center of Excellence: University of Florida

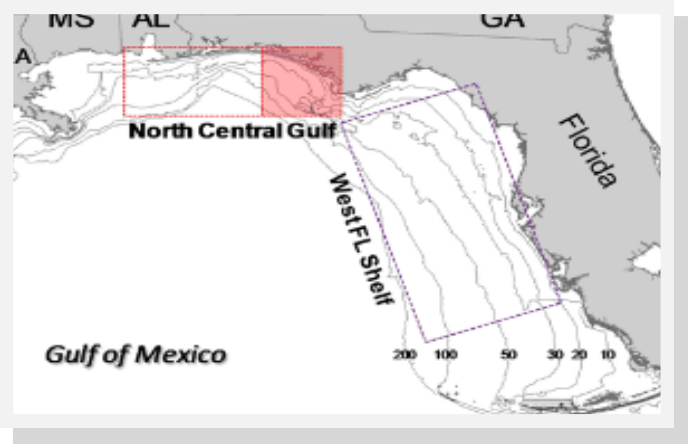
Principal Investigator: Dr. Mike Allen, msal@ufl.edu
Co-PI: Will Patterson, University of South Alabama, wpatterson@disl.org

Credit: L. Horn, UNCW

General Descriptor: Assessing management options to reduce lionfish impacts on reef ecosystems.

Keywords: lionfish, reef fisheries, ecological models, fisheries management

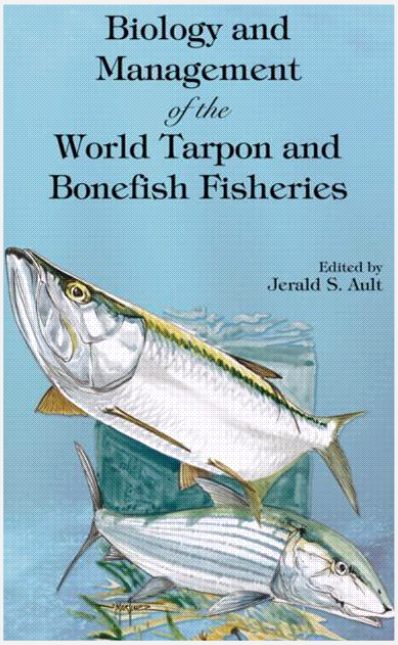
Summary: In the past decade, invasive lionfish (Pterois volitans/miles complex) originally from the Indo-Pacific, have rapidly colonized the northern Gulf of Mexico, and their numbers are increasing exponentially. Recent studies in other Atlantic regions indicate that the invasion has potentially devastating impacts on native reef fish populations and reef ecology, and threatens valued reef fisheries such as snappers and groupers. This project will develop new observations and ecological models to evaluate lionfish impacts on native reef fish, and predict how stronger management actions and varying levels of lionfish removals may mitigate their impacts.



FLRACEP FACT SHEET

September 1, 2015

Biological and Economic Indicators for Assessing Recreational Fisheries



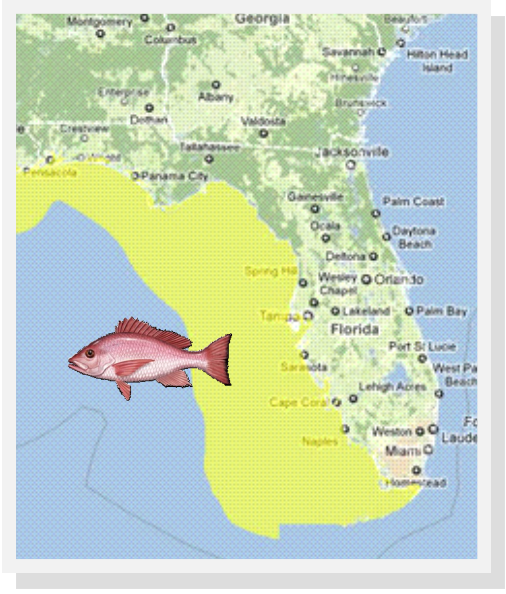
Center of Excellence: University of Miami

Principal Investigator: Dr. Jerald Ault, jault@rsmas.miami.edu
Co-PI: Steven Smith, UM RSMAS, steve.smith@rsmas.miami.edu
Co-PI: Bob Leeworthy, National Marine Sanctuary Program, bob.leeworthy@noaa.gov

General Descriptor: Developing indicators of biological condition and economic value for Florida recreational fisheries.

Keywords: recreational fisheries, socioeconomics, ecological models, biological indicators, ecosystem services

Summary: Marine recreational fishing in Florida is a multibillion dollar enterprise, an order of magnitude larger in economic value than commercial fishing, generating more in annual revenues than the entire Florida citrus industry. Hundreds of species are reported by fishers to state and federal databases; however, less than 10% of these species have up-to-date stock assessments. Many exploited species are primarily targeted by the recreational fleet and their total economic value (dollars and jobs) is unknown. Thus, managers cannot accurately know if these stocks are fished sustainably and in an economically efficient manner. The goal of this study is to identify reliable biological and economic indicators of sustainability and efficiency for Florida recreational fisheries that improve the basis for stock assessments. Objectives are: to develop a suite of biological indicators of stock status and sustainability using existing recreational catch, effort, and abundance data from state-federal databases; and, use these indicators to design and implement an economic survey to improve estimates of the value of ecosystem goods and services of Florida Gulf coast recreational fisheries.



FLRACEP FACT SHEET

September 1, 2015

Improving the Use of Products Derived From Monitoring Data in Ecosystem Models of the Gulf of Mexico

Center of Excellence: University of Miami

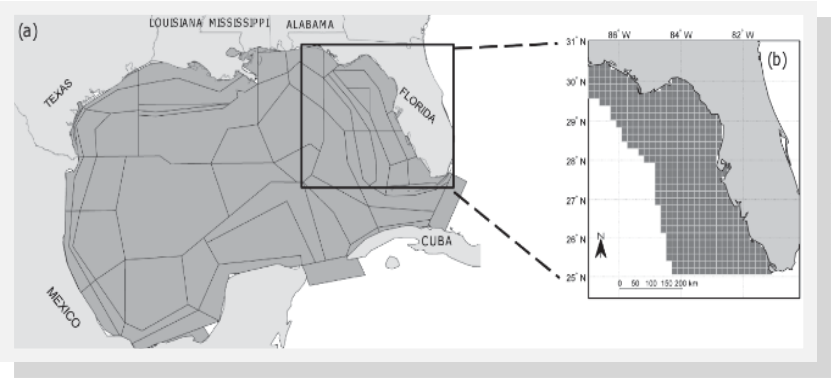
Principal Investigator: Dr. Elizabeth Babcock, ebabcock@rsmas.miami.edu
Co-PI: Arnaud Gruss, University of Miami, a.gruss@miami.edu
Co-PI: Tracey Sutton, Nova Southeastern University, tsutton1@nova.edu
Co-PI: Cameron Ainsworth, University of South Florida, ainsworth@usf.edu

Credit: National Geographic Society

General Descriptor: Improving the use of survey and remote-sensing data in ecosystem simulation models used to inform management and restoration efforts.

Keywords: ecological models, fisheries management

Summary: Ecosystem models are management tools that inform fisheries stock assessments, how to sustain living resources, and may be used to guide restoration decisions made after the Deepwater Horizon oil spill. Models now used in the northern Gulf of Mexico (GOM) require more and better inputs from fisheries catch data, fisheries-independent survey data and remote-sensing data from satellites. This project will develop a framework for improving the use of products derived from monitoring data in GOM ecosystem models. Tasks include: 1) review current use of monitoring data in ecosystem models; 2) conduct workshop with modelers, survey scientists, and fishing industry representatives in order to recommend ways to improve use of monitoring data and related products in GOM ecosystem models; and 3) suggest survey improvements needed to fill critical data gaps.



FLRACEP FACT SHEET

September 1, 2015

Fishery-Independent Surveys of Reef Fish Community, Size, and Age Structure off Northwest Florida

Credit: News-press.com

Center of Excellence: Florida International University

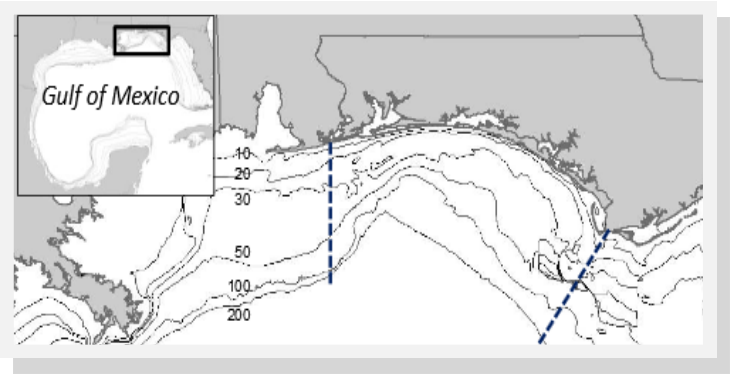
Principal Investigator: Dr. Kevin M. Boswell, kevin.boswell@fiu.edu

Co-PI: Dr. William Patterson, Dauphin Island Sea Lab, wpatterson@disl.org

General Descriptor: Providing new research data on deep reef fish communities using advanced acoustic and undersea technologies.

Keywords: Habitat mapping, undersea technology, reef fisheries, stock assessment

Summary: Marine and coastal fisheries trail only tourism as Florida's most important sources of revenue. A significant component of this fishing effort is focused on reef habitats, which are critical habitat for many exploited species. The health of reef ecosystems has been degraded by numerous crises, such as sedimentation, hypoxia, red tide events, invasive lionfish, and the 2010 Deepwater Horizon Oil Spill (DWH). Baseline information at the necessary scales for evaluation of these impacts is lacking. Additionally, advances in stock assessment models have led to an increased demand for reliable, inexpensive, non-extractive and non-destructive data collection techniques. The goal of this study is to apply advanced technologies to improve the quality and scope of fishery-independent data used to parameterize reef fish stock assessment models. Advanced sonar and remotely operated vehicle technologies are reliable, cost-effective survey methods for assessing reef fish communities across large areas (km^2) of reef habitat in a non-extractive and non-destructive manner. Cross-shelf surveys will assess fish community size structure, spatial distribution and biomass, and resource utilization around both artificial and natural reefs.



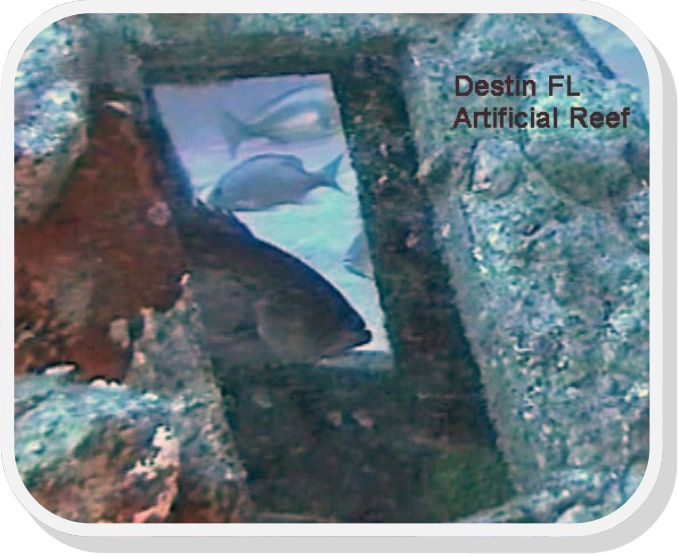
FLRACEP FACT SHEET

September 1, 2015

Evaluating Fish Production and Ecosystem Impacts of Artificial Reefs

Center of Excellence: University of West Florida

Principal Investigator: Dr. Jane M. Caffrey, jcaffrey@uwf.edu
Co-PI: William F. Patterson, Dauphin Island Sea Lab, wpatterson@disl.org
Co-PI: Robert K. Turpin, Escambia Cnty Mar. Res. Div., rkturpin@co.escambia.fl.us

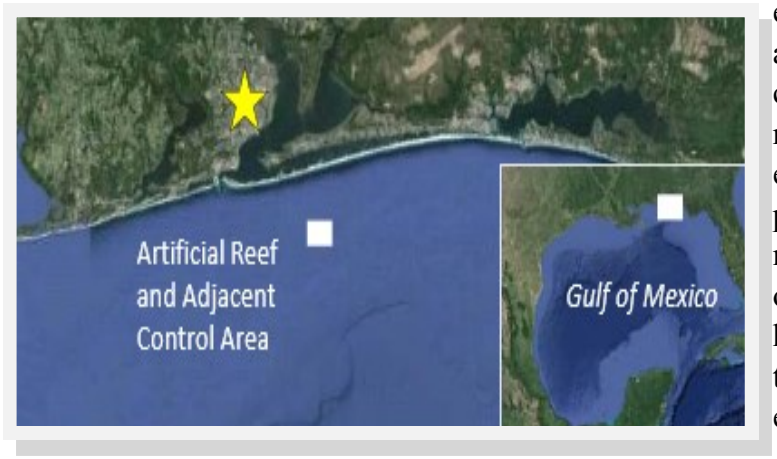


Credit: reefmaker.net

General Descriptor: Evaluating the role of artificial reefs as hotspots of biological productivity.

Keywords: snapper/grouper, reef fisheries, artificial reefs, recreational fisheries

Summary: Marine fisheries are important to Florida's economy, second only to tourism as an economic driver in the state. Several marquee species (gag grouper, gray triggerfish, greater amberjack, and red snapper) are overfished. Deepwater Horizon oil spill early restoration programs are funding artificial reef deployments off the Florida Panhandle to generate new fishing opportunities and compensate for lost use due to fishery closures during the spill. This research will examine the effect of artificial reef habitat on ecosystem productivity. Specifically, it will address the question whether artificial reefs create biogeochemical hotspots and increase rates of primary productivity, which then enhances secondary productivity including fish production. Results will contribute to reef fish management in the region, affect the perception of artificial reefs as a management tool, and help evaluate the utility of using artificial reefs to mitigate lost production of reef fishes due to events such as the Deepwater Horizon Oil Spill.



FLRACEP FACT SHEET

September 1, 2015

Monitoring Oil Spill Effects and Recovery in Large Deep-sea Fishes

Credit: DEEP-C Consortia, GRI

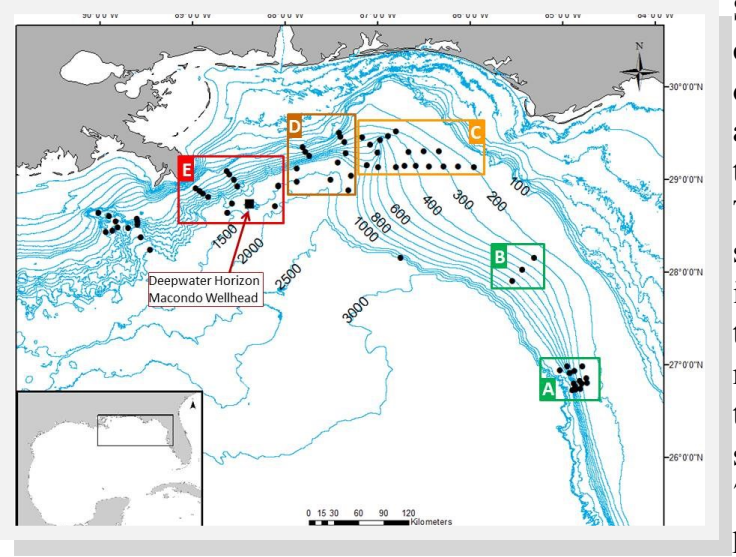
Center of Excellence: Florida State University

Principal Investigator: Dr. Dean Grubbs, dgrubbs@bio.fsu.edu
Co-PI: Dr. Jim Gelsleichter, University of North Florida, jim.gelsleichter@unf.edu
Co-PI: Dr. Charles F. Cotton, Florida State University Coastal & Marine Lab, cotton@fsu.edu

General Descriptor: Examining long-term effects of the DWH oil spill on large deep-sea fishes.

Keywords: deep sea fish, spill monitoring, oil toxicity

Summary: Prior to the Deepwater Horizon (DWH) oil spill, knowledge was limited concerning communities of large bottom-dwelling fishes living below 200 meters in the northern Gulf of Mexico. Since the spill occurred at 1,500 meters, these communities were directly affected. Early post-spill research examined the community structure and the toxicological responses to oil exposure of deep-sea bony fishes, sharks and hagfishes living at depths of 200-2,000 meters from offshore of Louisiana to southwest Florida. Some species show signs of oil exposure, often correlated with distance from the well site, whereas others do not. In some species these effects weren't apparent until three years after the spill, reflecting a time lag for effects to transfer up the food chain. Toxicological responses may be dissipating in some species but remain persistent in others, illustrating the need for long-term monitoring of the effects of the spill. This project will continue monitoring trends in relative abundance and toxicological responses of large deep-sea fishes at stations sampled since April 2011, providing a 7-year time series of the effects of the spill on these poorly-studied species.



FLRACEP FACT SHEET

September 1, 2015

Demonstration of Fisheries Assessment Applications for Underwater Gliders

Credit: USF College of Mar. Sci.

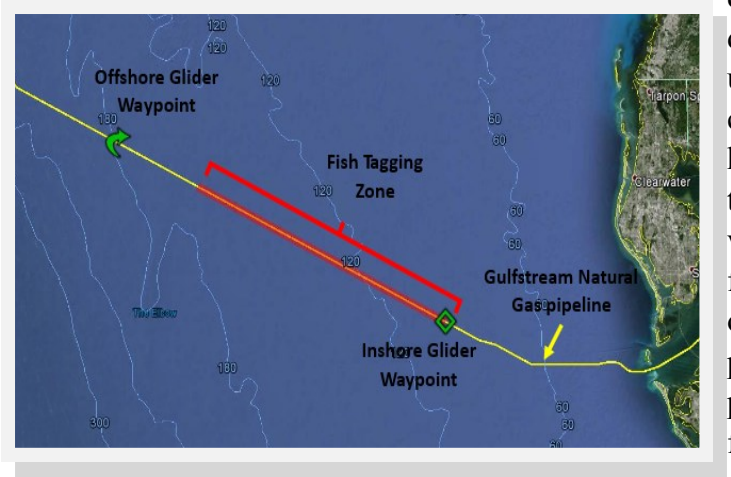
Center of Excellence: University of South Florida

Principal Investigator: Mr. Chad Lembke, College of Marine Science, clembke@usf.edu
Co-PI: Susan Barbieri, FWRI, Susan.Barbieri@myfwc.com
Co-PI: David Mann, Loggerhead Instruments, dmann@loggerhead.com
Co-PI: Steve Murawski, USF College of Marine Science, smurawski@usf.edu
Co-PI: Chris Taylor, NOAA SE Fish. Sci. Ctr.

General Descriptor: Testing new robotic technologies for monitoring grouper distribution and habitat.

Keywords: grouper, undersea technology, habitat mapping

Summary: This project will use cutting edge ocean observing underwater gliders equipped to record water quality variables and fish locations and behaviors. The demonstration will focus on Red Grouper over a seasonal sampling plan within a study area comprising the Gulfstream Natural Gas Pipeline on the West Florida Shelf. Red grouper comprise a large and economically important fishery in the Gulf of Mexico. A key data need for their management is to accurately assess their distribution and how it interacts with fishing pressure to affect the ratio of males to females and productivity. Underwater gliders have demonstrated for over a decade their ability to deliver cost effective data useful for better understanding of the water column structure and circulation impact on numerous processes, such as harmful algal blooms, hypoxia, and contaminant transport. In addition to these water column variables and processes that are all relevant to fisheries monitoring, new technological payloads on the robots including acoustic tag receivers, passive acoustic recorders, and echosounders will provide more data applicable to the assessment of fish ecology and habitat.



FLRACEP FACT SHEET

September 1, 2015

Ontogenetic Shifts in Sea Turtle Habitat Use and Foraging Ecology

Center of Excellence: University of Central Florida

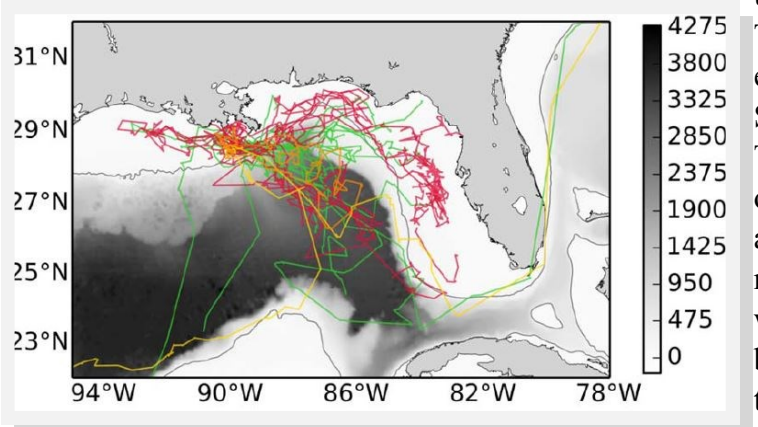
Principal Investigator: Dr. Katherine Mansfield, kate.mansfield@ucf.edu
Co-PI: Erin Seney, University of Central Florida, erin.seney@ucf.edu

Credit: J. Abernathy, UCF

General Descriptor: This project will track distribution and behavior of young sea turtles during "lost years" after they leave nesting beaches.

Keywords: sea turtles, satellite data, acoustic tagging, Sargassum

Summary: Marine turtles are late-maturing, migratory species that inhabit diverse habitats during different stages of their lives. All sea turtle species spend their first years at sea, yet very little is known about where these turtles go and how they interact with their environment between the time they leave their nesting beaches as hatchlings through their early years as oceanic juveniles-- "the lost years." The Deep Water Horizon oil spill occurred in an important habitat for young sea turtles transitioning from oceanic to coastal habitats. To meet species recovery goals, the status and condition of sea turtle stocks must be understood across all life stages and all habitats. This project continues a partially-funded research effort initially supported by the NOAA's Oil Spill Supplemental Spend Plan and Fisheries Sea Turtle Assessment program, in which small, oceanic stage Kemp's ridley, green, loggerhead, and hawksbill turtles were satellite tracked in the northern and eastern Gulf of Mexico. This work will build on these first direct and in situ behavioral data on understudied young sea turtles, which commonly occur in a lesser-studied habitat, offshore Sargassum seaweed mats.



FLRACEP FACT SHEET

September 1, 2015

Egg and Larval Barcoding for Gulf DEPM Stock Assessments

Credit: CIMAGE II Consortium

Center of Excellence: University of South Florida

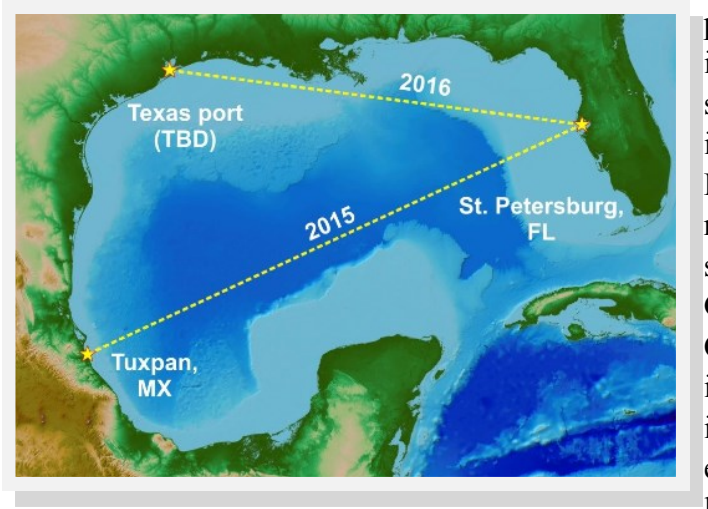
Principal Investigator: Dr. Ernst Peebles, College of Marine Science, epeebles@mail.usf.edu

Co-PI: Dr. Mya Breitbart, USF College of Marine Science, mya@usf.edu

General Descriptor: Rapid identification of fish eggs and larvae using novel DNA barcoding.

Keywords: snapper/grouper, stock assessment, genetics

Summary: Red snapper stock management in the Gulf of Mexico has been contentious and exemplifies need for rapid, complete and accurate stock assessments to inform quotas for all fishing sectors. In other areas of the world, management of similar species has been informed by the daily egg production method (DEPM), a robust, rapid, fishery-independent stock assessment tool not yet widely employed in the US. The method relies on identification of planktonic fish eggs, which can be particularly difficult to identify with confidence and accuracy. Genetic identification of fish eggs has proven to be the most reliable method available and is being used increasingly to provide definitive species-specific information. The project investigators recently developed a highly reliable DNA barcoding approach for identifying large numbers of individual fish eggs. Fish eggs will be sampled along two transects that cross the entire Gulf of Mexico, in partnership with the CIMAGE II Consortium. Application of DNA barcoding to individual fish eggs will inform future DEPM efforts in the Gulf of Mexico regarding the feasibility and expected outcomes of applying DNA barcoding at large geographic scales.



FLRACEP FACT SHEET

September 1, 2015

Hardbottom Mapping and Community Characterization of the West-Central Florida Gulf Coast

Credit: keywestaquarium.com

Center of Excellence: Nova Southeastern University

Principal Investigator: Dr. Brian Walker, walker@nova.edu
Co-PI: Sean F. Keenan, FWRI, Sean.Keenan@myfwc.com
Co-PI: Rene D. Baumstark, FWRI, rene.baumstark@myfwc.com

General Descriptor: This project will map shelf habitats to inform fisheries management and climate impacts research.

Keywords: Seagrass, reef fisheries, habitat mapping, recreational fisheries models, fisheries management

Summary: The continental shelf off Florida's west coast is a mosaic of fish habitats including seagrass beds and carbonate reef outcroppings (hard bottom) classified by the National Marine Fisheries Service (NMFS) as Essential Fish Habitat. Habitat maps and community baseline data, however, are nonexistent for a majority of the region. This collaborative effort between Nova Southeastern University, Florida Fish and Wildlife Conservation Commission, NMFS and other scientists will characterize and map continental shelf seagrass and hard bottom habitats in nearshore areas fished by many recreational fishermen. Objectives include: 1) map hard bottom and seagrass beds using various data types including sonar and satellite imagery; 2) Conduct underwater remote and SCUBA diver surveys to validate the map and associate community information to habitat classifications; 3) Compare and integrate sonar and satellite maps; and 4) Develop recommendations as to how satellite data can best be utilized to improve survey scope and efficiency. Outputs will provide the first hard bottom habitat map and baseline community characterization for 1,600 square kilometers of the West Florida continental shelf adjacent to Tampa Bay.