ANNUAL REPORT

OF THE SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM (SEAMAP)

OCTOBER 1, 2009 - SEPTEMBER 30, 2010

SEAMAP - Gulf of Mexico
Gulf States Marine Fisheries Commission

SEAMAP - South Atlantic
Atlantic States Marine Fisheries Commission

SEAMAP - Caribbean
Puerto Rico Sea Grant College Program

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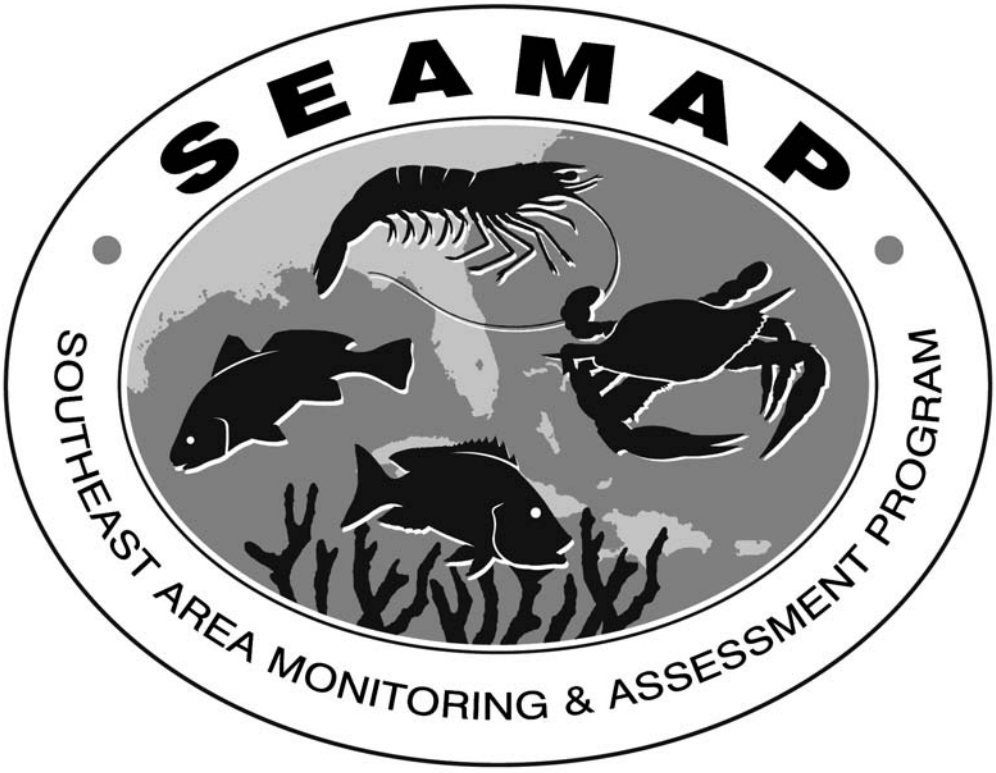

Gulf States Marine Fisheries Commission

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SEAMAP is a State/Federal program administered by the Southeast Regional Office, National Marine Fisheries Service. This project was supported in part by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service, under State/Federal Project Number NA06NMF4350007.

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ANNUAL REPORT
of the
Southeast Area Monitoring and Assessment Program
October 1, 2009 - September 30, 2010

INTRODUCTION

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for the collection, management, and dissemination of fishery-independent data and information in the southeastern United States. The program presently consists of three operational components: SEAMAP-Gulf of Mexico, which began in 1981; SEAMAP-South Atlantic, implemented in 1983; and SEAMAP-Caribbean, formed in 1988.

Each SEAMAP component operates independently, planning and conducting surveys and information dissemination in accordance with administrative policies and guidelines of the National Marine Fisheries Service's Southeast Regional Office (SERO). Agencies and organizations directly involved with SEAMAP are shown in Table 1.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-2010. Funding allocations to participants for FY1985-FY2010 were handled through State/Federal cooperative agreements, administered by SERO and the Southeast Fisheries Science Center (SEFSC), National Marine Fisheries Service (NMFS).

This report provides an overview of the SEAMAP Gulf, South Atlantic, and Caribbean programs. It outlines the program management, resource survey operations, information services activities, and publications for FY2010 and proposed activities for FY2011.

PROGRAM MANAGEMENT

Activities and operations of each SEAMAP component are wholly defined by the respective managing units: the SEAMAP-Gulf Subcommittee of the Gulf States Marine Fisheries Commission's (GSMFC) Technical Coordinating Committee, the SEAMAP-South Atlantic Committee of the Atlantic States Marine Fisheries Commission's South Atlantic State-Federal Fisheries Management Board, and the SEAMAP-Caribbean Committee of the University of Puerto Rico Sea Grant College Program. The Gulf and South Atlantic committees consist of designated representatives from each member state, NMFS, and the Gulf of Mexico and South Atlantic Fishery Management Councils. In addition, the SEAMAP-South Atlantic committee includes a representative from the Atlantic States Marine Fisheries Commission (ASMFC). The Caribbean component consists of members from the Puerto Rico Department of Natural and Environmental Resources, Virgin Islands Department of Planning and Natural Resources, Puerto Rico Sea Grant College Program, NMFS, U.S. Fish and Wildlife Service, and Caribbean Fishery Management Council. Each committee meets yearly to review operations, examine priorities, and plan future activities. Daily operations are carried out by the respective SEAMAP coordinators, assisted by staffs of the two Commissions and Puerto Rico Sea Grant College Program and personnel associated with the SEAMAP Information System, SEAMAP-South Atlantic Data Management System (DMS), SEAMAP Archiving Center, SEAMAP Invertebrate Plankton Archiving Center (SIPAC), and the Southeast Regional Taxonomic Center (SERTC).

SEAMAP-Gulf of Mexico

Major SEAMAP-Gulf Subcommittee meetings were held in October 2009 and March 2010 in conjunction with the Annual Meeting of the GSMFC. All meetings included participation by various work group leaders, the Coordinator, the Program Monitor, and other GSMFC staff. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 2010 to discuss respective program needs and priorities for FY2011.

Coordination of program surveys and distribution of quick-report summaries of a Gulf-wide survey to management agencies and industry were major functions of SEAMAP management in 2010. Other important management activities included

TABLE 1.

SEAMAP ORGANIZATION

Program	Administering Organization	Participating Agencies
SEAMAP-Gulf of Mexico	Gulf States Marine Fisheries Commission	Alabama Department of Conservation and Natural Resources Florida Fish and Wildlife Conservation Commission Louisiana Department of Wildlife and Fisheries Mississippi Department of Marine Resources/USM/Gulf Coast Research Laboratory Texas Parks and Wildlife Department National Marine Fisheries Service/Southeast Fisheries Science Center Gulf of Mexico Fishery Management Council
SEAMAP-South Atlantic	Atlantic States Marine Fisheries Commission	Florida Fish and Wildlife Conservation Commission Georgia Department of Natural Resources North Carolina Department of Environment and Natural Resources South Carolina Department of Natural Resources National Marine Fisheries Service/Southeast Fisheries Science Center South Atlantic Fishery Management Council U.S. Fish and Wildlife Service Atlantic States Marine Fisheries Commission
SEAMAP-Caribbean	Puerto Rico Sea Grant College Program	Puerto Rico Department of Natural and Environmental Resources Puerto Rico Sea Grant College Program Virgin Islands Division of Fish and Wildlife National Marine Fisheries Service/Southeast Fisheries Science Center U.S. Fish and Wildlife Service Caribbean Fishery Management Council

coordinating data provision and specimen loans, preparing publications and documents, and assisting in the preparation of State/Federal cooperative agreements, including amendments to permit extension of activities previously not detailed in the agreements.

SEAMAP-South Atlantic

Two committee meetings and several conference calls were coordinated and documented in FY2010. Additional tasks included fulfilling data requests, preparation of annual program reports and State/Federal Cooperative Agreements, and distribution of publications.

The SEAMAP-South Atlantic Committee held their annual meeting in conjunction with the joint annual meeting held August 9-10, 2010 in St. Croix, U.S. Virgin Islands. The meeting included participation by the work group leaders and coordinator. The Committee developed the SEAMAP-South Atlantic budget and research program priorities for FY2011. The Committee also reviewed progress by the Crustacean, Data Management, Bottom Mapping, Fish Habitat Characterization and Assessment Work Group, and Coastal Survey work groups and provided direction where necessary. Topics discussed included analyzing diet data from MARMAP, standardization of state red drum longline surveys, and progress on development of the SEAMAP-South Atlantic database.

SEAMAP-Caribbean

Four SEAMAP-Caribbean meetings were coordinated and documented in FY2010. The meetings took place in Puerto Rico and the U.S. Virgin Islands (USVI) where members reviewed all programmatic surveys on conch, lobster and reef fish being carried out in the USVI and Puerto Rico. The SEAMAP joint annual meeting held in St. Croix, U.S. Virgin Islands was also coordinated by the Caribbean coordination section. A one-week ROV workshop training was coordinated to take place in the SEABOTIX facilities in San Diego, California. Five SEAMAP-Caribbean members participated in the ROV training course. In May, the Caribbean

Chair and coordinator traveled to Pascagoula, MS to attend a chair's and coordinator's workshop. The meeting was primarily called to start the development of the 2011-2015 SEAMAP Strategic plan.

A SEABOTIX-Remote Operated Vehicle (ROV) received an important upgrade during the contracted SEABOTIX training. A tracking and grabber system, an internal LED light for a second color camera, and a scaling laser, were some of the new tools added to improve the capabilities of the sampling equipment. SEAMAP-Caribbean will expand their surveys during 2010-2011 to verify, describe, and characterize spawning aggregation sites previously identified during an extensive interview-based survey. Potential spawning sites are located around the Puerto Rico Archipelago, including the islands of Mona, Desecheo, Culebra and Vieques. Initial studies are being concentrated on the east coast of Puerto Rico to verify past known spawning aggregation sites and identify potential new aggregation areas. A total of 27 known past spawning aggregation areas and 93 present potential (non-overlapping) spawning aggregation sites were identified using fishers' traditional knowledge. Of the potential spawning aggregation sites, 71 were identified as supporting multiple species spawning throughout the year.

Two SEAMAP-Caribbean posters were produced as outreach materials. The color posters entitled "SEAMAP-Caribbean in Puerto Rico" and "SEAMAP-Caribbean in the Virgin Islands" summarizes the main studies performed by the Caribbean program in each region. The posters have been used in several fisheries workshops for fishermen and also as handouts to the general public. Educational brochures on conch, whelk, lobster and reef fish were also produced and used as outreach materials.

Two graduate students received student assistantships to continue updating the sampling protocols, and to summarize the information of all projects conducted by SEAMAP in the Caribbean. The main goal is to have a clear and uniform sampling protocol and have the information accessible for dissemination, in addition to making them available for outreach. The educational material was made available to fishermen during workshops and to targeted groups during routine coastal and shore visits.

RESOURCE SURVEYS

In FY2010 collection of resource survey information continued for the twenty-ninth consecutive year. Surveys by each program component reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. For instance, the South Atlantic program's bottom mapping will be useful in SEAMAP-Gulf gear calibration efforts, while plankton and environmental surveys in the Gulf program have set the standards for the entire region's much-needed long-term database. Because of the diverse scope and target species involved in the SEAMAP's survey operations, activities are discussed here by geographic region.

SEAMAP-Gulf of Mexico

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from September 22 to November 20, 2009, from off Tampa, Florida to the U.S.-Mexican border. Five hundred forty-one stations were sampled during the survey. Vessels sampled waters out to 60 fm with trawls and plankton nets in addition to environmental sampling. The objectives of the survey were to sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fm; obtain length-frequency measurements for major finfish and shrimp species to determine population size structures; collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters; and collect ichthyoplankton samples to determine relative abundance and distribution of eggs and larvae of commercially and recreationally important fish species.

NMFS and Louisiana vessels collected ichthyoplankton data with bongo and/or neuston nets at sample sites occurring nearest to half-degree intervals of latitude/longitude. The Polish Sorting and Identification Center will sort the samples. Once sorted, the specimens and data will be archived at the SEAMAP Archiving Center.

Winter and Spring Shrimp/Groundfish Surveys

The Winter Shrimp/Groundfish Survey took place from February 1-28, 2010. One hundred nineteen stations were sampled by Louisiana, Alabama, and Texas during the survey that used protocols similar to the other shrimp/groundfish surveys. A new Spring Shrimp/Groundfish Survey also took place from April 16-19, 2010 collecting data at 33 stations.

Spring Plankton Survey

The SEAMAP Spring Plankton Survey took place from April 3 to May 23, 2010. NMFS collected ichthyoplankton samples at 87 SEAMAP stations. This was the twenty-ninth year for the survey. The objectives of the survey were to collect ichthyoplankton samples for estimates of the abundance and distribution of Atlantic bluefin tuna larvae and collect environmental data at all ichthyoplankton stations.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with 333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. A mechanical flowmeter is mounted off-center in the mouth of each bongo net to record the volume of water filtered. Volume filtered ranges from approximately 20 to 600 m^3 but is typically 30 to 40 m^3 at the shallowest stations and 300 to 400 m^3 at the deepest stations. A single or double 2x1 m pipe frame neuston net fitted with 0.947 mm mesh netting is towed at the surface with the frame half-submerged for 10 minutes. Samples are taken upon arrival on station regardless of time of day. At each station either a bongo and/or neuston tow are made depending on the specific survey. Preservation protocol called for the right bongo samples to be preserved in 10% formalin and then transferred to fresh 95% ethanol after 36 hours. The original standard SEAMAP method of initial preservation in 10% formalin for 48 hours was changed to 36 hours in order to improve long term storage for genetic analysis. The left bongo and neuston samples are initially preserved in 95% ethanol and then transferred to fresh 95% ethanol after 24 hours. In addition, hydrographic data (surface chlorophylls, salinity, temperature, and dissolved oxygen from surface, midwater and near bottom, and Forel-ule color) were collected at all stations.

Right bongo and neuston samples collected from SEAMAP stations were transshipped to the Polish Sorting and Identification Center. Left bongo samples were archived at the SEAMAP Invertebrate Plankton Archiving Center (SIPAC).

Inshore Longline Survey

This nearshore survey complements an existing long-term fisheries independent survey currently being conducted by NMFS, by targeting shark species within the shallow waters of the north central Gulf of Mexico. The objectives of the survey are to collect information on coastal shark abundances and distribution with a 1-mile longline and to collect environmental data. During FY2010, Mississippi sampled twelve stations in October 2009. Mississippi also sampled thirty-four stations from March to September 2010. Texas sampled 25 stations from March through September 2010, while Alabama sampled 20 stations during the same period.

Vertical Longline Survey

In 2010, Alabama started a new vertical longline survey to sample reef fish over artificial reefs and other areas. A total of 12 grids are fished per survey. Two structure and two non-structure areas are randomly chosen and equally allocated across three depth strata. Vertical longline reels are randomly baited with either Atlantic mackerel or squid. Soak time is five minutes. Fish may be retained and processed for age and fecundity. All fish are sacrificed for otoliths at stations deeper than 60 m. In water depth less than 60 m, stations may be assigned as tag and release or collection sites. Two hundred thirteen sets were completed in April, May, and June of this year.

Reeffish Survey

The primary purpose of this survey was to assess relative abundance and compute population estimates of reeffish found on natural reeffish habitat in the Gulf of Mexico. Video stereo cameras were used during the survey since they enabled the measurement of length frequencies. Each stereo camera contained paired black-and-white Video stereo still cameras along with a color mpeg camera in a cylindrical pressure housing. Four of these were mounted in a camera array and were positioned orthogonally with the center of the camera mounted 51 cm above the bottom of the array. A chevron fish trap, that measured 1.83 x 1.83 x 0.75 meters with 3.81-cm mesh, was used to capture fish for ageing and other life history studies. Both the fish trap and camera array were baited with squid. The camera array was allowed to soak on the bottom for 30 minutes, and the fish trap soaked for one hour. In August 2010, Florida sampled 32 stations on the west Florida shelf. NMFS conducted reeffish sampling in March through June 2010.

Summer Shrimp/Groundfish Survey

The overall sampling strategy during the 2010 SEAMAP summer survey was to work from the eastern Gulf to the Texas/Mexico border, in order to sample during or prior to migration of brown shrimp from bays to the open Gulf area. The Survey was conducted from May 31 to August 26, 2010. Florida, Alabama, Mississippi, Louisiana, Texas, and NMFS sampled 457 trawl stations during the survey. This was the twenty-ninth year for the survey. In

addition, NMFS and Louisiana vessels collected ichthyoplankton data.

Objectives of the survey were to monitor size and distribution of penaeid shrimp during or prior to migration of brown shrimp from bays to the open Gulf; aid in evaluating the "Texas Closure" management measure of the Gulf Council's Shrimp Fishery Management Plan; and provide information on shrimp and groundfish stocks across the northern Gulf of Mexico from inshore waters to 50 fm.

Fall Plankton Survey

The Fall Plankton cruise took place from August 24 through September 29, 2010. NMFS sampled 159 stations, Mississippi sampled 13 stations, and Louisiana sampled seven stations. The objective of this survey was to collect ichthyoplankton samples with bongo and neuston gear for the purpose of estimating abundance and defining the distribution of eggs, larvae, and small juveniles of Gulf of Mexico fishes, particularly king and Spanish mackerel, lutjanids and sciaenids.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with 333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. A mechanical flowmeter is mounted off-center in the mouth of each bongo net to record the volume of water filtered. Volume filtered ranges from approximately 20 to 600 m^3 but is typically 30 to 40 m^3 at the shallowest stations and 300 to 400 m^3 at the deepest stations. A single or double 2x1 m pipe frame neuston net fitted with 0.947 mm mesh netting is towed at the surface with the frame half-submerged for 10 minutes. Samples are taken upon arrival on station regardless of time of day. At each station either a bongo and/or neuston tow are made depending on the specific survey. Samples are routinely preserved in 5 to 10% formalin and later transferred after 36 hours to 95% ethanol for long-term storage. During some surveys, selected samples are preserved initially in 95% ethanol and later transferred to fresh ethanol. In addition, hydrographic data (surface chlorophylls, salinity, temperature, and dissolved oxygen from surface, midwater and near bottom, and Forel-ule color) were collected at all stations.

Right bongo and neuston samples collected from SEAMAP stations will be transshipped to the Polish Sorting and Identification Center. Left bongo samples will be archived at the SEAMAP Invertebrate Plankton Archiving Center (SIPAC).

SEAMAP-South Atlantic

Coastal Survey

The largest component of SEAMAP-South Atlantic survey research in FY2010 was the continuing Coastal Survey conducted by the South Carolina Department of Natural Resources (SCDNR). The overall goal of this survey is to obtain a long-term database to facilitate management of stocks in the South Atlantic Bight. Initiated as a pilot project in 1986, this is a fishery-independent study designed to monitor the distribution and abundance of coastal species in the South Atlantic Bight and to measure associated environmental parameters in nearshore coastal waters. Sampling was standardized in 1990, and a 10-year trawl report was completed in December 2000 summarizing species composition, regional species assemblages, and trends in distribution and abundance of 27 priority species. In January 2001, the sampling design was changed based on the results of an external program review. Offshore strata were discontinued, and additional stations were added to inshore strata for all three (spring, summer and fall) cruises to reduce variability in the abundance estimates for target species.

The objectives of the survey are to collect data on size, abundance, distribution, and seasonality of target finfish and decapod crustaceans; record species composition, biomass, and abundance to assess latitudinal and seasonal fluctuations; and collect data on size, sex, and gonadal condition of white, pink, and brown shrimp. Otolith, gonad, and stomach samples are taken on selected species for additional life history and diet data.

Three multi-legged seasonal cruises were conducted between Cape Hatteras, North Carolina, and Cape Canaveral, Florida, during FY2010: Fall 2009; Spring 2010; and Summer 2010. Inshore strata (4.6 to 9.2m depths) were sampled during each cruise. All samples were collected during daylight hours to maximize the opportunities for collecting juvenile mackerels, which are found more frequently during the day.

The Fall 2009 cruise completed the twentieth full year of standardized sampling under a stratified random survey design. Sampling was conducted from October 6 to October 29, 2009 and 102 inshore stations allocated to 24 shallow coastal strata in the South Atlantic Bight were sampled. A total of 124 species or genera were identified in fall trawls. *Chloroscombrus chrysurus*, the Atlantic bumper, was the most abundant species, constituting 39% of total abundance, followed by the striped anchovy, *Anchoa hepsetus* (9%); the white shrimp, *Litopenaeus setiferus* (7%); spot, *Leiostomus xanthurus* (6%); and

Atlantic croaker, *Micropogonias undulatus* (5%). Abundance of individuals collected (n=292,991 individuals, mean/tow= 2,616 individuals) in Fall 2009 decreased from the level of fall abundance observed in 2008. Catches off Florida and Raleigh Bay yielded the most individuals. Miscellaneous invertebrate biomass (n=4,607 kg, mean/tow= 41.4 kg) increased in fall 2009. The cannonball jelly, *Stomolophus meleagris*, constituted approximately 12.5% of miscellaneous invertebrate biomass.

The spring cruise for the SEAMAP-Coastal Survey began on April 12 and finished on May 11, 2010. A total of 112 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. A total of 131 species or genera were identified in spring trawls. Spot was the most abundant species, constituting 20% of total abundance, followed by Atlantic croaker (15%); Atlantic bumper (10%); Northern searobin, *Prionotus carolinus* (9%), and southern kingfish, *Menticirrhus americanus* (6%). Abundance of individuals collected (n= 117,295 individuals, mean /tow= 5,639 individuals) in spring 2010 was substantially lower than the record abundance of spring 2009, but was similar to that of 2007 and 2008. Catches off Onslow Bay yielded the most individuals. Miscellaneous invertebrate biomass (n= 4,886 kg, mean/tow= 43.6 kg) increased in spring 2010. The cannonball jelly constituted 76% of miscellaneous invertebrate biomass. The majority of the cannonball jellies (74%) were collected off South Carolina.

The summer cruise for the SEAMAP-Coastal Survey began on July 12 and finished on July 3, 2010. A total of 112 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. A total of 110 species or genera were identified in summer trawls. Atlantic bumper, was the most abundant species, constituting 21% of total abundance, followed by Atlantic croaker (20%); scup, *Stenotomus* sp. (15%); spot (8%); and pinfish, *Lagadon rhomboides* (6%). Abundance of individuals collected (n=211,245 individuals, mean/tow= 1,886 individuals) in summer 2010 was substantially lower than the record abundance of summer 2009, but was similar to that of 2008 and previous years. Catches off Onslow Bay yielded the most individuals, followed closely by Florida, and Long Bay. Miscellaneous invertebrate biomass (n= 2,786 kg, mean/tow= 24.9 kg) increased in summer 2010. The cannonball jelly constituted 20.6% of miscellaneous invertebrate biomass. Miscellaneous invertebrate biomass consisted primarily of jellies of the class Cubozoa and Scyphozoa. Box jellies and sea nettles were noted on 67% and 74% of tows respectively.

Data from the fall FY2010 cruises have been added to the SEAMAP-South Atlantic DMS. For additional cruise information, please see the individual cruise reports available at www.asmfc.org under the Research & Statistics section of the website.

Pamlico Sound Survey

During FY2010, the North Carolina Division of Marine Fisheries (NCDMF) continued the ongoing Pamlico Sound Survey. Cruises sampled 54 stations each in June and September of 2010. This seasonal trawl survey is designed to provide a long-term fishery-independent database on the distribution, relative abundance, and size composition of target species of estuarine fish and decapod crustaceans for the waters of Pamlico Sound. The data are processed by NCDMF and are made available to the SEAMAP-South Atlantic DMS.

Fifty-six species of finfish and invertebrates were captured during the June 7-18, 2010 cruise. The top five species that are considered economically important include spot, Atlantic croaker, blue crab, weakfish, and brown shrimp. Seventy-four species of finfish, invertebrates, and grasses were captured during the September 13-23, 2010 cruise. The top five species caught that are considered economically important were spot, Atlantic croaker, weakfish, white shrimp, and blue crab.

Bottom Mapping Project

The Florida Fish and Wildlife Research Institute (FWRI), South Carolina Department of Natural Resources, University of North Carolina – Wilmington, and Harbor Branch Oceanographic Institute collaborated to synthesize data on habitat distributions for water depths between 200 and 2,000 m within the U.S. Exclusive Economic Zone (EEZ) extending from just south of the Virginia/North Carolina border to the Florida Keys. The resulting deepwater bottom habitat GIS is compatible with the GIS data originally built for the shelf project (Distribution of Bottom Habitats on the Continental Shelf from North Carolina through the Florida Keys).

In FY2009, several processed GIS layers of the deepwater bottom habitat GIS were included in the South Atlantic Habitat and Ecosystem IMS (Internet Map Server). The deepwater coded grid cells, base geology, and coral mounds data layers and metadata are now accessible via the following URL: http://ocean.floridamarine.org/efh_coral/ims/viewer.htm. The IMS is intended to be used by the public, recreational and commercial fishermen, and researchers or resource managers. In addition to the SEAMAP bottom mapping datasets, IMS Users may also view and query GIS data from a variety of

federal, state, academic, and private sources. These complementary datasets include fish distributions (MARMAP), Essential Fish Habitats, deepwater coral (*Oculina* and *Lophelia*), marine protected areas (MPA), special management zones (SMZ), and artificial reefs.

The deepwater GIS will prove to be critical for regional management decisions related to: identification, description, and conservation of unique habitats, including deepwater coral communities and Essential Fish Habitat; designation of Marine Protected Areas; recovery of over-exploited fisheries; locating appropriate cable routes; and exploration for mineral and hydrocarbon resources. As such, a broad user group is anticipated including, but not limited to, state natural resource and commerce agencies, federal agencies, university scientists, and private industry.

Fish Habitat Characterization and Assessment

Reef Fish Sampling - In the summer of 2008, SEAMAP-South Atlantic received funds to support their proposal to complement and expand MARMAP sampling to address high priority needs for over-fished species in the snapper-grouper complex. The primary objective is to enhance the fishery-independent reef fish data collected by MARMAP by increasing sampling in underrepresented regions of the sampled area. In addition, expansion of offshore site sampling through SEAMAP will result in coverage that is more complete and address identified shortfalls of the MARMAP sampling regime.

Sampling was conducted from May 4, 2010 through October 21, 2010 using the R/V Palmetto. The sampling area was between an area 30nm southwest of Cape Look-out, North Carolina and 10nm east of St. Lucie, Florida. Sampling with chevron traps and vertical long lines was conducted during daylight hours, while hook and line, bathymetric, and video collections were made during both day and nighttime hours. Surveys to identify live bottom habitat that can be added to the MARMAP database were done using a variety of sources and methods such as traps, hook and line, bathymetry, and under water video. Following any collections, hydrographic and meteorological data (air and water temperature, salinity, wind speed and direction, wave height, and barometric pressure) were recorded. Abundance, biomass, and length-frequency data of the collected fish were recorded on a computer utilizing electronic measuring boards, and specimens identified for life history work up were kept on ice and processed later. Otolith (for age determination), gonad samples (for determination of sex, maturity, possible transition, and fecundity), stomach contents (for diet studies), and DNA samples (for stock identification and additional analysis) were taken and stored for later processing.

From October 2009 through October 2010, 40.5 sea days were completed for the SEAMAP reef fish survey. This was 7.5 days less than scheduled, largely due to the loss of 3 sampling weeks (15 scheduled sea days) in April 2010 when the R/V Palmetto was not available because of vessel maintenance issues. Some of the lost sea days were made up during the season. The Reef Fish program is scheduled to make up the remaining days early in the 2011 sampling season. During the completed sea days, researchers identified additional natural reef habitat, sampled Marine Protected Areas, collected samples for diet analysis (see section below), and surveyed potential sampling areas for red snapper. Surveys for new live bottom were conducted using bathymetry, reconnaissance trap deployments (with cameras on the traps), short long line deployments, and hook and line fishing efforts. Sampling of reeffish in MPA's was done using standard MARMAP sampling methods. The last sampling cruise was completed on October 21, 2010, and cruise information and samples are currently being processed, analyzed, and entered in the database system. A College of Charleston graduate student completed her thesis research to develop a scheme to characterize habitat based on the chevron trap photos. The results will assist in further refining habitat characterization in a consistent manner. In addition, her thesis reports on an analysis of changes in habitat over time in 3 areas off South Carolina, as well as the occurrence of lionfish in the region. Results show that in at least one live bottom area off Charleston, SC, habitat may have changed between the 1990's and 2009. Also, lionfish were present in about 7% of all trap photographs. Trap photos may be useful to aid in lionfish assessments.

Juvenile Gag Ingress - In this reporting period, collaborations with partners at GADNR and NCDMF continued. Sub recipient contracts were completed to add sampling sites for the 2011 sampling season. During 2010, fifteen sites were sampled near Beaufort, NC; Wilmington, NC; Georgetown, SC; Charleston, SC; Beaufort, SC; Savannah, GA; and Brunswick, GA. The study sites were selected for the high salinity with oyster shell habitat with an associated benthic community consisting of sponge and soft coral (*Leptogorgia spp*.) All of these sites were sampled from 1995-1997 with the exception of the Wilmington and Savannah sites, which were added last year (2009) and Brunswick, which was added this year (2010). Two sites in Beaufort, NC were sampled in 1997. Future monitoring sites include Jacksonville, FL. Ingress monitoring using Witham collectors was established in 1995 and

continued until 1998. Monitoring resumed in 2005 until the present.

During 1995 to 1998, methods and techniques were developed to establish a monitoring program to provide an annual index of juvenile gag abundance to predict future year class strength. That study identified Witham collectors as the most effective method for sampling ingressing reef fish larvae, and the methodology developed during that time was used in the present study. Witham collectors consist of air conditioner filter material (Precisionaire hoghair) folded over a PVC frame. Collectors are floated off the bottom and anchored in tidal creeks about one meter deep at low tide. From 2005 to 2008, sampling was continued at the Charleston sites. During 2006, a different type of filter material (Permaire hoghair) was used on the Witham collector, and zero juvenile gag grouper were collected. To determine the effects of using different filter material during 2006, both filter materials (Precisionaire and Permaire) were fished at the Charleston sites during 2009 and 2010. At each site, four Witham collectors (eight in Charleston) were deployed approximately 30 meters apart and sampled three times a week from mid-March to mid-June (when winter spawned reef fish no longer recruit to this gear type).

Air and water temperature, salinity, wind velocity and direction, and tide stage were measured and recorded in each creek. Salinity and water temperature were measured using a handheld YSI (model 85). Bycatch were identified to the lowest practical identification level and recorded. Gag were brought back to the lab to confirm identification due to the possibility of confusion with black grouper (*Mycteroperca bonaci*). At all stations, salinity ranged from 33 ppt to 26 ppt with a mean of 29 ppt. Surface salinity remained consistent throughout the ingress season. Surface water temperatures expectedly ranged from 16º C to 27º C with a mean of 22º C. Catches in the Witham collectors were dominated by grass shrimp, *Palaemonetes* sp., and xanthid crabs. Several species of juvenile fish were caught including pinfish, toadfish, mummichogs, and gobies. Gag was the 10th most abundant taxa (15th most abundant taxa during 2009).

A total of 2,366 collections (examination and identification of collected organisms of one Witham collector on a given date) were made. One hundred forty-four gag were collected: 1 from the Beaufort, NC sites; 13 from the Wilmington sites; 117 from the Charleston sites; 10 from the Georgetown, SC sites and three from the Beaufort, SC sites. The Witham collector selected gag that had recently entered the estuary (mean size = 20mm TL) during the spring and had not settled out of the water column into the oyster shell habitat.

Since gag become fully recruited to commercial fishing gear at age four or five, we will re-examine data collected in the 1990's and determine if there is a link between juvenile abundance and the number of fishes landed commercially. Then we can establish if the recruitment index has any predictive value. Survival of gag during early life stages, and thus the variability in annual recruitment for gag and other fishes is determined by many biotic and abiotic factors. The more important factors are considered to be food for first feeding larvae, predation, suitable environmental conditions for development (i.e., water temperature), and transport towards favorable nursery areas.

In an attempt to explain the high catch rates in NC during 2009 (38 gag) and the high catch rates at the Charleston sites during 2010 (117 gag), a preliminary examination of sea surface temperatures around and near shore of the Charleston Bump during these sampling seasons revealed warm water currents and eddies being deflected off the Charleston Bump and into the NC/SC border (just south of Wilmington) (Ocean Remote Sensing Group, Johns Hopkins University Applied Physics Laboratory, http://fermi.jhuapl.edu/index.html). These conditions could have influenced success of recruitment of post-larval gag to estuarine habitats in that region. More detailed analysis of the correlation of the sea surface temperature with recruitment may lead to better predictions of year class strength.

Diet Studies - During the reporting period, samples were taken for diet studies targeting gray triggerfish, *Balistes capriscus*; and red porgy, *Pagrus pagrus*. Fish were collected using hook and line fishing aboard the R/V Palmetto with cigar minnows and squid used as bait. Fishes from the baited chevron traps were not included because fish caught with the traps often gorge themselves on bait, compromising processing and analysis of the stomach samples. Ten specimens of each species were targeted in each of 24 zones. Each zone consists of one of three depth zones (0-20m, 21-50m, and >50m) and one of eight 1-degree latitudinal zones (from 27º N through 34º N). This means 240 specimens are needed per species to reach the collection goal. The entire digestive tract was collected from each fish from the mouth to the anus. The digestive tract was wrapped in cheesecloth, labeled, and fixed in 10% formalin for 14 days. Then guts were rinsed with tap water and stored in 70% ethanol. Contents of individual guts were sorted by taxa, counted, and weighed. Prey items were identified to the lowest possible taxon.

This season, 68 fishes (23 gray triggerfish, 45 red porgy) were collected. Including the 2009 samples, this brings the total to 171 (63 gray triggerfish and 108 red porgy). Specimens in the shallowest depth zone (0-20m) were not acquired again this year.

Fifty-nine guts (collected in 2009) have been fully examined to date. The stomach contents of 16 gray triggerfish have been identified. Preliminary results reveal that the majority of gray triggerfish prey consists of mollusks and crustaceans, but they consumed at least 34 different prey taxa including barnacles, polychaetes, amphipods, crabs, snails, echinoderms, and seahorses. Guts of 43 red porgy were sorted and the prey items identified. Red porgy mainly consumed crabs, but results show they consumed at least 49 different prey taxa including molluscs, polychaetes, echinoderms, barnacles, and fishes.

In 2011, depth and latitude gaps will be filled in and one or two new species will be added to the sampling regime. To quantify feeding habits, the relative contribution of food items to the total diet will be determined using percent frequency of occurrence (F), percent composition by number (N) and percent composition by weight (W). Once adequate samples are collected, more analyses will be completed (i.e., examining differences in prey items by depth zone and latitude and between species).

Assessment of Adult Red Drum Populations on the Southeast Atlantic Coast

In 2008, SEAMAP-South Atlantic initiated support for a project to sample the adult red drum population from North Carolina to Florida to develop a better understanding of abundance, distribution, and age composition of the stock. These surveys contribute to the understanding of adult red drum populations along the southeastern Atlantic coast by expanding the currently available data, thereby allowing for more effective and responsible management of the stock. Information derived from these surveys can also be used for coastal shark assessments in the South Atlantic.

The primary objectives of the survey are to conduct fishery independent longline sampling on adult red drum to: develop information on catch per unit effort (CPUE); collect biological information (size, sex etc.) and samples (otoliths, gonads, muscle, fin clips, etc.) from sub-samples of the red drum catch in order to determine size at age, recruitment to the spawning population, mercury contamination, and genetic composition of the stock; tag adult red drum for the collection of migratory and stock identification data; disseminate accomplishments and results to the ASMFC and NMFS for inclusion in stock assessments; and produce an annual summary report. Secondary objectives are to tag and measure small coastal and large coastal sharks caught incidentally to red drum sampling, for inclusion in the COASTSPAN (Cooperative Atlantic States Shark Pupping and Nursery Survey) database and to respond to external requests for samples and/or data.

South Carolina - During the 2009/2010 sampling season, 366 longline sets were made in four strata along the coast of South Carolina. The season was broken down into three, two-month time periods (July/August, September/October, November/December) in 2009; in 2010, three periods were used again, but they were redefined to maximize catches of red drum (August 1-September 15, September 16-October 31, November 1-December 15; for the purposes of this report only the first time period of 2010 is considered). Each time period and stratum were sampled equally. During sampling, 317 red drum were caught. Charleston Harbor yielded the highest numbers of red drum (157) followed by Saint Helena Sound (61), Winyah Bay (53) and Port Royal Sound (47). Two hundred and three red drum were tagged and released, eleven were recaptured, twenty-five were given to the Mariculture project at SCDNR for broodstock, and seventy-one were sacrificed for age/growth and reproductive investigations. Stomach samples and filets were also collected for diet determination (as resources become available) and mercury analysis. Some fish were also surveyed for parasite fauna.

North Carolina - For sampling year 2010, North Carolina conducted sampling in Pamlico Sound from June through October. Sampling occurred either as non-random 'exploratory' sets or as part of a standardized, stratified-random sample design that has occurred in North Carolina since 2007. This design divides a large portion of the Pamlico Sound estuary into 12 similarly sized regions. From July through October, samples were taken from randomly selected grids (1 square nautical mile) within each region during each of three four-week intervals. All samples were conducted with a 1,500-meter mainline, with gangions placed at 15 meter intervals (100 hooks/set) during nighttime hours starting at sunset. On average, four sets were made per night. Two samples were collected from each randomly chosen sample site. Additional, non-random, exploratory sets were made opportunistically.

Random sampling occurred in July (n=12 sets), August (n=30 sets), September (n=24 sets), and October (n=6 sets) and yielded 404 red drum (6, 159, 233 and 0 respectively; Table 2). Additional exploratory sets were made in June (n=12 sets yielding 7 red drum) and July (n=9 sets yielding 10 red drum). Red drum captured ranged in size from

28 to 48 inches fork length (Figure 1). Thirty-five red drum were sacrificed to determine age composition and for other biological investigations. The remaining fish were tagged and released to track migration, stock ID and growth rates. Sampling during this period resulted in twelve recaptures of red drum. Overall species composition for the period of June through October is summarized in Table 2.

Table 2. Number of individuals captured by species from the North Carolina longline survey during June through October 2010 (n=number of sets).

	June	July		August	September	October	All
	non-random	non-random	random	random	random	random	
	n=12	n=9	n=12	n=30	n=24	n=6	n=93
Finfish							
Red Drum	7	3	6	159	233	0	408
Bluefish	4	0	1	2	11	3	21
Pinfish	0	0	0	1	2	1	4
Cobia	1	0	1	1	0	0	3
Sharks							
Bull Shark	0	0	0	1	0	0	1
Atlantic	1	0	2	1	2	0	6
Sandbar Shark	0	0	1	2	6	0	9
Blacktip Shark	0	0	0	1	0	0	1
Skates and Rays							
Southern Stingray	2	5	12	20	9	0	48
Atlantic Stingray	25	1	1	1	0	0	28
Butterfly Ray	3	0	3	4	0	0	10
Cownose Ray	0	4	9	18	3	0	34
Clearnose Skate	2	0	1	0	2	0	5

Georgia - For the current reporting period, sampling occurred off southeast Georgia and northeast Florida during the fall months (October-December) of 2009 and the spring and summer months (April-September) of 2010. A total of 233 longline sets were deployed over the two seasons with 84 sets made during fall 2009 and 149 sets during the spring and summer of 2010. A reduced number of stations were sampled during August and September because of boat issues. Sampling conducted in Georgia's nearshore waters yielded a total of 56 adult red drum; 48 during fall 2009, 8 during summer 2010. Red drum ranged in size from 756mm to 1047 mm center length. All but 5 red drum were tagged prior to release. Two loggerhead and 4 Kemps ridley turtles were caught during the study period. The two loggerheads were released with the hooks. Three of the four Kemps were released after hooks were removed; however, the fourth turtle had the hook in its throat and was difficult to view. This individual was brought back to the Georgia Sea Turtle Center where veterinary staff were able to remove the hook and release the animal. The overall species composition for fall 2009 and summer 2010 is summarized in the following table.

TABLE 3.

Species	Number Caught Fall 2009	Summer 2010	Study Period Total
Shark Species---			
Atlantic sharpnose shark	71	326	397
Blacknose shark	11	111	122
Blacktip shark	1	10	11
Bonnethead	22	64	86
Finetooth shark	0	2	2
Nurse shark	1	0	1
Sandbar shark	5	4	9
Scalloped hammerhead shark	0	1	1
Smooth dogfish	1	0	1
Spinner shark	1	4	5
Tiger shark	0	1	1
Target Species--			
Red Drum	48	8	56
Other Bycatch Species--			
Atlantic croaker	0	1	1
Black seabass	15	2	17
Brittle star	1	1	2
Bullnose ray	16	0	16
Channel whelk	0	1	1
Clearnose skate	35	4	39
Cobia	1	1	2
Eel sp.	1	0	1
Gafftopsail catfish	1	5	6
Gulf kingfish	1	0	1
Hardhead catfish	0	1	1
Kemp's ridley turtle	2	2	4
Knobbed whelk	2	0	2
Lettered olive snail	0	1	1
Lizardfish	1	0	1
Mantis shrimp	3	0	3
Oyster toadfish	1	0	1
Rock seabass	1	0	1
Sea rat	2	0	2
Sea star	9	8	17
Southern eagleray	0	2	2
Southern kingfish	15	10	25
Spotted eagle ray	0	1	1
Stingray *	0	26	26
Weakfish	1	0	1

* - Includes southern, bluntnose, and Atlantic stingrays combined.

SEAMAP-Caribbean

In FY2010, SEAMAP-Caribbean supported a variety of activities in the U.S. Virgin Islands (USVI) and Puerto Rico.

Queen Conch Survey – Virgin Islands

The Division of Fish and Wildlife, DPNR completed all underwater conch surveys for the U.S. Virgin Islands. Approximately twenty trips for the territory were completed from November 2008 to October 2010. A total of 22 original survey sites and 2 new survey sites have been completed on St. Thomas/St. John from 2008 to 2009. On St. Croix a total of 24 original sites and 8 new sites were completed from 2009 to 2010. Around the island of St. Thomas, 133 adult conch and 140 juvenile conch were observed on scooter transects for a total of 253 queen conch. St. John had 60 adult and 59 juvenile conchs for an observed total of 119 queen conch. St. Croix had a greater abundance of conch with 290 adults and 351 juveniles for a total of 641 queen conch observed on transects. Mean densities for adult and juvenile conch on St. Thomas were 36.68 conch/ha and 45.08 conch/ha, respectively.

St. John conch densities were 18.34 adult/ha and 18.03 juvenile/ha. St. Croix observed densities were 26.51 adult/ha and 32.09 juvenile/ha.

Juvenile Lobster Survey – Virgin Islands

A study was completed to monitor the annual recruitment of juvenile lobsters in coastal mangrove environs to artificial habitats. Coastal Zone Management permits were obtained for the deployment of lobster habitats in territorial waters of St. Croix and St. Thomas. Additional approval was required for the deployment of lobster habitats in St. Croix in the Salt River National Historical Park and Ecological Preserve, managed by the National Park Service (NPS) and the Government of the Virgin Islands.

Ten lobster habitats, consisting of two tiers of eight concrete blocks each, were established in the Cas Cay Marine Reserve on the east end of St. Thomas and Salt River Ecological Preserve and Wildlife Sanctuary (Salt River Bay) in St. Croix in October. Lobster habitats were established in seagrass blowout areas (minimum of 2-3 m water depth) in close proximity to fringing mangroves. Lobster habitats were surveyed monthly from November 2008 to November 2009. Data collection consists of monitoring lobster recruitment (number, size and sex), as well as identifying and enumerating the fish and invertebrates associated with the artificial habitats.

A total of 90 juvenile lobsters were recorded in Salt River habitats during the study period. The number of lobsters ranged from 0-15 per survey with a maximum of 10 per habitat. The mean size of juvenile lobsters in the habitats were 28.3 mm (SD = 10.01 mm). Lobster size ranged from 10-60 mm. Two possible peaks in lobster abundance were noted, April-May and August-November. Larger lobsters were found in August and smaller lobster from September-November. Recruitment appears to be spatially related to the artificial habitat location within the study area. More lobsters were found in habitats in the interior of the bay closer to the mangroves than in the outer embayment near the fringing reef. No lobster recruitment was recorded in Cas Cay Marine Reserve habitats.

A total of 1,873 fish representing 18 families and 42 species were recorded at the Salt River habitats. The most abundant fish families were Labridae (wrasse-slippery dick), Acanthuridae (surgeonfish-doctorfish), Pomadasyidae (grunts-French grunt) and Scaridae (parrotfish-bucktooth parrotfish). A total of 734 fish representing 17 families and 38 species were recorded at the Cas Cay habitats. The most abundant fish families were Labridae (wrasse-slippery dick), Pomacentridae (damselfish-beau gregory and bicolor damselfish), Acanthuridae (surgeonfish-doctorfish and blue tang), and Canthigasteridae (sharpnose puffers).

Parrotfish Survey – Virgin Islands

A study was initiated in May 2009 to determine the reproductive cycle of stoplight (*Sparisoma viride*), redtail (*Sparisoma chrysopterum*) and redfin (*Sparisoma rubripinne*) parrotfish. Samples of 25 fish of each of the three species are obtained monthly for biostatistical measurements, sex and gonad condition. The stages of gonad maturation, as recorded by visual observation of the gonads, was recorded as unknown (Stage 1), resting (Stage 2), developing (Stage 3), ripe (Stage 4) or spent (Stage 5) based on visual inspection. A total of eight samples have been obtained on St. Croix resulting in 200 stoplight and redtail parrotfish and 150 redfin parrotfish. A total of 16 samples have been obtained in St. Thomas resulting in 136 stoplight, 27 redfin and 105 redtail parrotfish. The study is ongoing and will continue until September 2010.

Administrative/Staff Issues – Virgin Islands

There have been two new additions to the administrative staff of DFW. Ms. Beulah Dalmida-Smith was appointed as Director of the Division of Fish and Wildlife. Ms. Dalmida-Smith started on August 3 and is located in St. Thomas. Dr. Jonathan Jed Brown was appointed as Assistant Director and Chief of Fisheries. He started on December 4 and is

located in St. Croix. Vacant fisheries positions (two in St. Croix and one in St. Thomas) continue to hamper the ability of the Division to complete projects in a timely manner.

Training – Virgin Islands

Two staff, one from St. Thomas, and one from St. Croix attended a weeklong training program in San Diego at the headquarters of Seabotix, Inc. The purpose of the training was to learn to operate and maintain a small ROV. A Seabotix ROV was purchased for the Caribbean SEAMAP program, and the training will allow staff to deploy the ROV in the USVI to conduct underwater surveys.

Reef Fish Survey – Puerto Rico

All the contracts to hire the proposed personnel were submitted, approved and work continues on the east and west coasts. Most of the procuring of project materials was finished and all materials received. The study objective is to expand the reef fish sampling to the east and south coasts of Puerto Rico.

The Reef Fish Survey was conducted on the West coast in 30 quadrants chosen randomly; each quadrant was sampled twice for a total of 60 trips. Data (stations, depth, weather conditions, etc.) of each trip were recorded. From March 2010 to July 2010, a total of 730 fishes weighing over 240 kg from 27 species and 17 families were collected. Each fish was measured, weighed, and visually sexed. The gonads were photographed, removed, and preserved for histological analysis. The process of fixing and cutting the sampled gonads was delayed due to lack of personnel. A student from the Catholic University helped with processing a number of gonads as part of a special project.

The new database program to be used in the management and analysis of data was received from the SEAMAP data manager. Quality control during the data entering process revealed several glitches with the program. The errors are being corrected as they are found in the database. Data collected from the west coast have already been keypunched but many errors have been found so the data entry will be corrected and validated.

East coast sampling started in October 2009. A total of 49 trips were made by June 30, 2010, yielding a total of over 70 kg of finfish from 16 species and 8 families. Over 90% of the data was entered into the database, and the quality control process revealed serious errors in the data. For reasons unknown, the data entry person changed the measurements and the date format creating confusion in the data that was all ready keypunched. After a meeting with the biologists in charge, it was decided that it would be easier to keypunch the whole data set again. Notwithstanding, the species composition collected at both ends of the island are similar and the species dominating the catch were the same, red hinds and coneys.

Spawning Aggregation Site Monitoring – Puerto Rico

Surveys of the spawning aggregation sites off the west coast of Puerto Rico were delayed due to procurement issues involving the purchase of the cameras to be used in the spawning aggregation monitoring. The late arrival of the cameras has delayed the start of the survey until December 2010.

Yellowtail Snapper Survey – Puerto Rico

This survey was planned to start in August 2009 off the west coast of Puerto Rico. Although the contracts with the fishers were in place, they needed to be amended. That process was finished and the amendment was signed one day before those contracts were to expire on March 31, 2010. All of the funding for this survey was received in 2009. Finally, sampling started in May 2010 on the west coast. A total of 13 trips out of 60 have been made.

After some sampling adjustments, data collection started for this species. This is a new survey and fine-tuning the methodology to collect data for yellowtail snappers is continuing. The techniques are completely different than what was implemented in the reef fish survey, one being it is a night fishing survey. They are using two or three different baits and combinations of bait and hooks to determine the best technique. Sampling includes fishing at traditional commercial yellowtail fishing grounds, and at other places identified by fishers as not good yellowtail fishing sites. The yellowtail snapper sampling should end by April 2011.

Lane Snapper Survey – Puerto Rico

The objective of this survey is to collect data on the lane snapper fisheries needed for a meaningful assessment of the population. A fisher survey will be conducted among fishers that target this species to collect information on traditional fishing grounds. With this information, the stations to be sampled will be selected. They are planning to start sampling by September 2010 on the west coast of Puerto Rico.

SPECIAL STUDIES

In addition to the regularly scheduled surveys, SEAMAP participates in a variety of other projects. The SEAMAP provides guidance, personnel, and

other contributions to these studies for enhancement and protection of the marine resources.

Winter Trawling and Fish Tagging Cruise[1]

The SEAMAP Cooperative Winter Offshore Tagging Cruise was conducted from February 18-25, 2010 aboard the National Science Foundation Research Vessel Cape Hatteras. The Scientific Party included representatives from the Atlantic States Marine Fisheries Commission, Delaware State University, East Carolina University, Maryland Department of Natural Resources-Fisheries Service, North Carolina Division of Marine Fisheries, North Carolina State University, and U.S. Fish and Wildlife Service. Sampling was conducted in North Carolina waters and in waters off southeastern Virginia. This year's cruise ranks 18th overall (of 23 Cruises) in numbers of striped bass tagged and released (572). Striped bass scale samples were taken for aging fish. Spiny dogfish (11,371) were captured, enumerated, measured and gender determined. One Atlantic sturgeon was captured, measured, sampled for tissue, tagged, and released this year. Summer flounder and three species of skates were measured and released. American shad, alewife, blueback herring and hickory shad were enumerated and retained for processing by East Carolina University. All of the information collected during the Cooperative Tagging Cruise will aid in the development and implementation of fisheries regulations by state and federal fishery management agencies, the three East Coast Fishery Management Councils, and the Commission.

INFORMATION SERVICES

Information from the SEAMAP activities is provided to user groups through the program administration and complementary systems: the SEAMAP Information System, SEAMAP-South Atlantic Data Management System, SEAMAP Archiving Center, SIPAC, and SERTC. Products resulting from SEAMAP activities can be grouped into two major categories: data sets (including broadly, digital data and collected specimens) managed by the SEAMAP Information System, SEAMAP-South Atlantic Data Management System, SEAMAP Archiving Center, SIPAC, and SERTC; and program information. Program information is discussed in the PROGRAM MANAGEMENT Section of this report.

SEAMAP Information System

Biological and environmental data from all SEAMAP-Gulf surveys are included in the SEAMAP Information System, managed by GSMFC and NMFS-SEFSC. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. Data from all SEAMAP-Gulf surveys during 1982-2009 have been entered into the system and data from 2010 surveys are in the process of being verified, edited, and entered for storage and retrieval. Verified, non-confidential SEAMAP data are available conditionally to all requesters.

Requested SEAMAP data were used for a multitude of purposes in 2010:

- Evaluating the abundance and size distribution of penaeid shrimp in federal and state waters to assist in determining opening and closing dates for commercial fisheries;
- Assessing the impact of the BP Deepwater Horizon oil spill on the Gulf of Mexico ecosystem;
- Evaluating and plotting the size of the hypoxic (Dead Zone) area off of Louisiana;
- Assessing shrimp and groundfish abundance and distribution and their relationship to such environmental parameters as temperature, salinity, and dissolved oxygen;
- Identifying environmental parameters associated with concentrations of larval finfish;
- Assessing the potential impact of liquefied natural gas facilities on marine fish stocks;
- Compiling the 2010 SEAMAP Environmental and Biological Atlas; and
- Comparing catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets.

Real-time Data

A major function of the SEAMAP Information System is the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted to the NMFS Mississippi Laboratories from the NOAA vessel, while the states' data were entered into the system weekly. Plots of station locations and catch rates of shrimp, squid and dominant finfish species were prepared, edited, and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. SEAMAP real-time data plots were produced during the 2010 Summer Shrimp/Groundfish Survey. Six weekly mailings were produced and distributed to approximately 150 interested individuals. These plots were also available through the SEAMAP web page.

[1] Data from the cruise is preliminary and therefore subject to revision.

SEAMAP-South Atlantic Data Management System

The SEAMAP-South Atlantic Data Management Workgroup has been developing a data scheme and data management guidance plan during this reporting period. The database management responsibilities for SEAMAP-South Atlantic have shifted from NMFS Pascagoula, MS to a relational database housed at SCDNR in Charleston. The database will include data from the SEAMAP-South Atlantic Coastal Survey, bottom mapping, fish habitat characterization and assessment (MARMAP and Red Drum Longline Surveys), Pamlico Sound Survey and Cooperative Winter Tagging Cruise. The draft ACCESS database is in place to incorporate all the SEAMAP-South Atlantic surveys and consists of several tables. Species codes for species and area have been sorted out, and researchers have been converting data into the system. SEAMAP-South Atlantic data from the MARMAP cooperative studies will easily be moved into the system as MARMAP's database was used as a basis for developing the SEAMAP-South Atlantic database. All the data will be converted from Microsoft ACCESS to Oracle by South Carolina Department of Natural Resources, Information Technology Services (SCDNR), who will also be hosting the data. SCDNR will create an interface for accessing the data via the web for SEDAR and other partners, and will ultimately interact with the IMS database and be accessible in Arc Server. The work group has some queries developed that enable users to see length-frequencies, and trends, for the entire time series. Once the data scheme is established and data uploaded to the system, then the group will start developing GIS products and queries for the web interface. The workgroup has also developed some new web designs for re-designing the html website (allows easier linking, bookmarking) and sql query interface for searching the database. The workgroup is exploring servers to host this database.

SEAMAP Archiving Center

Larval fish and fish eggs are sorted to the lowest taxa level possible at the Polish Sorting and Identification Center of the Sea Fisheries Institute in Szczecin and Gdynia. The specimens are then returned to the SEAMAP Archiving Center (SAC) for archiving and loan to researchers. Over the last year, 28,116 lots of specimens were returned from the Polish Sorting and Identification Center and 21,897 new lots have been added to the SEAMAP Access database. The specimens cataloged this year represent 18 orders, 126 families, 235 genera and 245 species.

The SEAMAP Archiving Center is managed in conjunction with Florida Fish and Wildlife Conservation Commission's (FWC) Fish and Wildlife Research Institute (FWRI) in St. Petersburg, Florida. The SAC processes specimen loans, requests for associated plankton data, and requests for data clarification. Sixty-nine requests have been accommodated this year to forty-three different researchers at both the state and federal level.

SEAMAP Invertebrate Plankton Archiving Center

The SEAMAP Invertebrate Plankton Archiving Center (SIPAC) is in its twenty-sixth year of operation. Sara LeCroy at the USM/GCRL Museum currently serves as the SIPAC curator. The overall mission of the SIPAC is to archive and manage the large collection of plankton samples acquired during SEAMAP cruises and to obtain specimens and/or data on selected invertebrate larval stages from those samples.

On August 29, 2005, Hurricane Katrina struck the Mississippi Gulf coast, severely damaging the building at the Gulf Coast Research Laboratory in which the SIPAC samples were housed. The room containing these samples was breached by the storm surge and many samples were washed out into the surrounding area. Although some samples were destroyed, many were not, and as a result of post-Katrina recovery efforts, 4,896 of the 9,010 archived samples (54%) have been reclaimed and re-archived. An additional 4,147 small vials containing partially or completely identified invertebrate plankton material have also been recovered, representing 58% of the original 7,177 samples archived prior to Katrina. These have all been cleaned, inventoried, provided with fresh alcohol, and re-archived.

During the past year, an additional 264 bongo samples have been added to the archive, which, combined with the 4,896 recovered samples and the 960 samples deposited since Katrina, brings the total number of plankton samples currently housed at the SIPAC to 6,120. The number of samples on loan remains at 975. The 197 boxes of plankton samples that were acquired last year remain in temporary storage in the invertebrate prep room and visitor's office space. These samples will be transferred to smaller jars and recorded, and the remaining dehydrated samples will be discarded, as time permits. The useable samples will then be incorporated into the SIPAC collection.

In an effort to keep the space required to house the SIPAC collection of unsorted plankton samples to a minimum, samples that have been in the collection for over 10 years and duplicate samples sorted and received from the Polish Sorting and Identification Center, are aliquoted to ¼ their original volume and placed into 100 ml vials, as necessary. When possible, the remaining 3/4 aliquots are donated to educational institutions for use as teaching materials.

If the remaining sample must be discarded, sample jars are cleaned and returned to NMFS-Pascagoula for reuse. To date, approximately 2,264 samples collected from 1982-1988 have been aliquoted and prepared for long-term storage; of these, at least 900 (40%) were recovered post-Katrina. Because there is very little free space in the area currently being used to store the samples, further aliquoting of older samples to reduce the space required for storage will be necessary.

During the next year, the SIPAC will continue to manage SEAMAP invertebrate plankton collections, accession samples, and provide available samples, data, and specimens from the collection to qualified researchers as requested. As the Katrina recovery process nears completion, the focus of the SIPAC personnel is shifting to participation in a multi-institutional project funded through the Northern Gulf Institute, entitled "Identifying linkages between zooplankton dynamics, fishery resources, and climate change in the northern Gulf of Mexico." Part of this project entails the use of SIPAC samples to develop scanning protocols for the analysis and digital archiving of zooplankton samples (LSU) and the identification of the larvae of commercially important decapod crustacean taxa from selected SEAMAP cruises (GCRL/SIPAC). This information, as well as data obtained from archived partially identified decapod material in the SIPAC collection, will be added to the SEAMAP plankton database maintained by the NMFS Pascagoula Laboratory. In addition, during the course of the project, plankton samples previously sorted for fish larvae and archived at the Sea Fisheries Institute in Gdynia, Poland, will be returned to the U.S. and used to fill gaps in the SIPAC holdings caused by losses sustained because of Hurricane Katrina. The first shipment of samples arrived in Pascagoula and delivered to the SIPAC in October 2010.

Southeast Regional Taxonomic Center (SERTC)

In FY2009, SEAMAP-South Atlantic dedicated funds in support of SERTC as it will serve as a valuable asset to the SEAMAP programs in the South Atlantic Bight and Gulf of Mexico. SERTC is located in the Marine Resources Research Institute (South Carolina Department of Natural Resources) in Charleston, South Carolina. This facility has developed a curated collection of marine and estuarine animals from the South Atlantic Bight and is maintaining a searchable library based on taxonomic peer-reviewed literature. Through the use of collaborations with other labs and museums, SERTC has collected and preserved representative specimens from numerous habitats throughout the Southeast, documenting several range extensions for Atlantic species.

The present and future goals of SERTC are to: maintain and expand a curated collection of the coastal and marine fauna of the South Atlantic Bight; maintain a current collection of taxonomic literature and a searchable reference database pertaining to those organisms; validate provisional identifications of specimens in existing reference collections at the Marine Resources Research Institute and the Grice Marine Laboratory; catalogue fauna housed at the Grice Marine Laboratory and new specimens from ongoing sampling; develop a tissue repository with potential use in the genetic differentiation of species; prepare illustrated keys to selected taxa, including new species from the SAB; maintain an Internet website to present species profiles, morphological illustrations, and interactive identification keys to select taxa; and assist scientists with taxonomic research through specimen loans and consultation.

For SEAMAP-South Atlantic goals, SERTC is presently concentrating work on stomach content analysis and deciding on level of identification necessary as well as variables to measure: prey numbers, lengths, weights, or volumes. Facilities at SERTC may also serve as a potential sample processing facility for collections generated through research by SEAMAP components.

Program Documents

The following documents were published and distributed by the SEAMAP program in FY2010:

Gulf States Marine Fisheries Commission. 2010. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs. 1 p. + appendices.

Rester, J.K., M. Paine, and E. Ojeda Serrano. 2009. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 2008 to September 30, 2009. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. No. 177, GSMFC, Ocean Springs, MS. 20pp.

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PROPOSED SEAMAP ACTIVITIES, FY2011

Last year, total program allocations for all three SEAMAP components, Gulf, South Atlantic and Caribbean, was approximately $5.09 million. At the August meeting, the SEAMAP components based their allocations for 2011 on level funding of $5.09 million. Proposed FY2011 activities for all participants are shown in Table 4.

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Table 4.

PROPOSED SEAMAP ACTIVITIES, FY2011

	Fall	Winter	Spring	Summer
Gulf of Mexico Activities				
Resource Surveys:				
Spring Plankton Survey			X	
Reeffish Survey			X	X
Summer Shrimp/Groundfish Surveys				X
Fall Shrimp/Groundfish Surveys	X			
Fall Plankton Survey	X			
Winter Plankton Survey		X		
Plankton and Environmental Data Surveys			X	X
Inshore Longline Surveys	X		X	X
Florida Trawl Survey	X			X
Louisiana Inshore Survey	X	X	X	X
Information Operations:				
Biological and Environmental Atlas		X		
2011 Marine Directory			X	
FY2011 Joint Annual Report		X		
Real-time Data Summaries		X		X
Data Input and Request Processing	X	X	X	X
Specimen Archiving and Loan	X	X	X	X
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X
South Atlantic Activities				
Resource Surveys:				
Coastal Survey	X		X	X
Pamlico Sound Survey	X			X
Winter Trawling and Fish Tagging Cruise		X		
Bottom Mapping Project	X	X	X	X
Fish Habitat Characterization and Assessment	X	X	X	X
Adult Red Drum Longline Survey	X		X	X
Information Operations:				
Data Input and Request Processing	X	X	X	X
Data Analysis and Utilization	X	X	X	X
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X
Caribbean Activities				
Reeffish Surveys	X	X	X	X
Information Operations:				
Coordination with Caribbean Countries Research Programs	X	X	X	X
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X

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