ANNUAL REPORT

OF THE SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM (SEAMAP)

OCTOBER 1, 2008 - SEPTEMBER 30, 2009

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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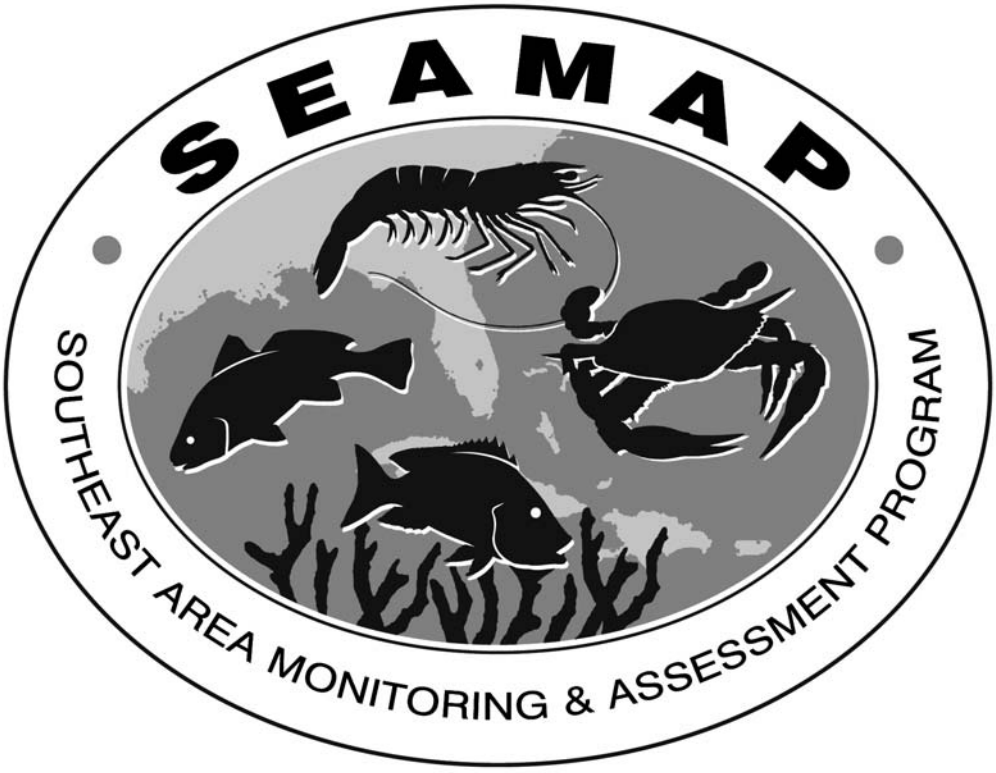

Gulf States Marine Fisheries Commission

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ANNUAL REPORT
of the
Southeast Area Monitoring and Assessment Program
October 1, 2008 - September 30, 2009

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 1985-2009. Funding allocations to participants for FY1985-FY2009 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 FY2009 and proposed activities for FY2010.

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 2008 and March 2009 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 2009 to discuss respective program needs and priorities for FY2010. In addition to the Subcommittee meetings, several work groups met during the reporting period. The Trawl Work Group met in March 2009 to discuss changes to the survey designs of the Shrimp/Groundfish Surveys.

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 2009. 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 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

One committee meeting and several conference calls were coordinated and documented in FY2009. 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 3-4, 2009 in Charleston, South Carolina. The meeting included participation by the work group leaders and coordinator. The Committee developed the SEAMAP-South Atlantic budget and research program priorities for FY2010. 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 development of the SEAMAP-South Atlantic database.

SEAMAP-Caribbean

A total of four SEAMAP-Caribbean committee meetings and two conference calls were coordinated during the fiscal year. The committee meetings took place in Puerto Rico and the U.S. Virgin Islands to review all programmatic surveys on conch, lobster and reeffish.

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," summarize the main studies performed by the program in both regions. 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 reeffish were also produced and used as outreach materials.

A SEABOTIX-Remote Operated Vehicle (ROV), which will be used by both the Virgin Islands and Puerto Rico SEAMAP-Caribbean components, was acquired with the last supplemental funds. SEAMAP-Caribbean will expand their surveys during 2009-2011 to verify, describe and characterize spawning aggregation sites previously identified and spatially localized during an extensive interview-based survey. Initial studies will concentrate 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 testimonies. Of the "potential" spawning aggregation sites, 71 were identified as supporting multiple species spawning throughout the year.

A conch research study titled "Comparative analysis and GIS mapping of continued SEAMAP-Caribbean queen conch (*Strombus gigas*) stock abundance surveys in Puerto Rico," was coordinated and funded by SEAMAP-Caribbean. A stock abundance survey of the Puerto Rico queen conch population was undertaken in 2006 and data were successfully plotted and analyzed within a GIS. The findings of this recent survey and geospatial analyses have been compared to previous stock abundance surveys of the Puerto Rico population. Through comparative analysis and GIS mapping of SEAMAP-Caribbean stock abundance survey data, this study attempts to assess the status and shelf-wide distribution of queen conch in Puerto Rico, highlighting changes within the population over a ten year period.

RESOURCE SURVEYS

In FY2009, collection of resource survey information continued for the twenty-eighth 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 23 to November 20, 2008, from off Tampa, Florida to the U.S.-Mexican border. Four hundred seventy-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

A new Winter Shrimp/Groundfish Survey took place from January 21 to February 24. One hundred fifteen stations were sampled by Louisiana (January 26-29, 2009), Alabama (January 21, 2009), and Texas (February 3-24, 2009) during the survey that used protocols similar to the other shrimp/groundfish surveys. A new Spring Shrimp/Groundfish Survey also took place from March 15 to March 17 collecting data at 31 stations.

Winter Plankton Survey

The SEAMAP Winter Plankton Survey took place from February 4 to March 16, 2009. NMFS collected ichthyoplankton samples at 137 SEAMAP stations. The objectives of the survey were to assess the occurrence, abundance and geographical distribution of the early life stages of winter spawning fishes from mid continental shelf to deep Gulf waters; measure the vertical distribution of fish larvae by sampling at discrete depths in the water column using a 1-meter Multiple Opening and Closing Net Environmental Sensing System (MOCNESS); and sample the size fraction of fishes that are underrepresented in bongo and neuston samples using a juvenile (Methot) fish trawl.

Spring Plankton Survey

The SEAMAP Spring Plankton Survey took place from March 29 to June 1, 2009. NMFS collected ichthyoplankton samples at 79 SEAMAP stations. This was the twenty-eighth 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 also to collect environmental data. During FY2009, Mississippi sampled eight stations in October 2008. Mississippi also sampled sixty-four stations from March to September 2009.

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.

The totals for the SEAMAP reeffish survey in 2009 for both the *Oregon II* and *R/V Gandy* were: 55 blocks (Primary Sample Units), 453 camera stations and 74 fish traps.

Summer Shrimp/Groundfish Survey

The overall sampling strategy during the 2009 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 June 1 to July 18, 2009. Florida (142 stations), Alabama (10 stations), Mississippi (36 stations), Louisiana (29 stations), Texas (80 stations), and NMFS (344 stations) sampled 641 trawl stations during the survey. This was the twenty-eighth year for the survey. In addition, NMFS, Mississippi, 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 25 through September 30, 2009. NMFS sampled 128 stations, Mississippi sampled 5 stations, and Louisiana sampled 7 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 FY2009 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 and attempt to locate spawning grounds.

Three multi-legged seasonal cruises were conducted between Cape Hatteras, North Carolina, and Cape Canaveral, Florida, during FY2009: Fall 2008; Spring 2009; and Summer 2009. 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 2008 cruise completed the nineteenth full year of standardized sampling under a stratified random survey design. Sampling was conducted from September 29 to October 31, 2008 and 102 inshore stations allocated to 24 shallow coastal strata in the South Atlantic Bight were sampled. A total of 132 species or genera were identified in fall trawls. *Chloroscombrus chrysurus*, the Atlantic bumper, was the most abundant species, constituting 17% of total abundance, followed by the Atlantic moonfish, *Selene setapinnis* (13%), white shrimp, *Litopenaeus setiferus* (10%), and the striped anchovy, *Anchoa hepetus* (10%). Abundance of individuals collected (n = 332,409 individuals, mean/tow = 3,265.8 individuals) in fall 2008 was the second highest fall catch recorded. This high abundance was primarily due to very large catches of Atlantic bumper in waters off Florida. The lowest regional abundance was observed in Onslow Bay. Miscellaneous invertebrate biomass (n = 3,321 kg, mean/tow = 32.6 kg) decreased in fall 2008. The cannonball jelly, *Stomolophus meleagris*, constituted approximately 57% of miscellaneous invertebrate biomass.

The spring cruise for the SEAMAP-Coastal Survey began on April 15 and was completed on May 9, 2009. A total of 112 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. This is an increase from the previous 102 stations sampled. A total of 125 species or genera were identified in spring trawls. Atlantic bumper, *Chloroscombrus chrysurus* was the most abundant species, constituting 56% of total abundance, followed by the Atlantic croaker, *Micropogonias undulatus* (10%); the striped anchovy, *Anchoa hepsetus* (7%); the spot, *Leiostomus xanthurus* (6%); the Atlantic menhaden, *Brevoortia tyrannus* (3%); and the Atlantic moonfish (3%). Abundance of individuals collected (n = 631,569 individuals, mean /tow = 5,639 individuals) in spring 2009 increased significantly from the level of spring abundance observed in 2008 or any previous year. Miscellaneous invertebrate biomass (n = 962 kg, mean/tow = 8.6 kg) decreased in 2009. The cannonball jelly, *Stomolophus meleagris*, constituted 32% of miscellaneous invertebrate biomass. Interest has been expressed in the occurrence of algae this spring. Algae occurred in 10% of tows and 3.9 kg of tubular and filamentous red algae were taken. Most (97%) of the algae was encountered off South Carolina.

The summer cruise for the SEAMAP-Coastal Survey began on July 13 and was completed on August 5, 2009. A total of 112 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. A total of 120 species or genera were identified in summer trawls. Atlantic bumper, *Chloroscombrus chrysurus* was the most abundant species, constituting 49% of total abundance, followed by Atlantic croaker, *Micropogonias undulatus* (10%); scup, *Stenotomus sp.* (5%); spot, *Leiostomus xanthurus* (5%); pinfish, *Lagadon rhomboides* (4%); and brown shrimp, *Farfantepenaeus aztecus* (3%). Abundance of individuals collected (n = 320,514 individuals, mean/tow = 2,862 individuals) in summer 2009 was higher than any previous year. Catches off Florida and Georgia, where Atlantic bumper were most common, yielded the most individuals. Miscellaneous invertebrate biomass (n = 1,864 kg, mean/tow = 16.6 kg) decreased in 2009. The cannonball jelly, *Stomolophus meleagris*, constituted only 1.3% of miscellaneous invertebrate biomass.

Data from the fall FY2009 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 FY2009, the North Carolina Division of Marine Fisheries (NCDMF) continued the ongoing Pamlico Sound Survey. Cruises sampled 54 stations each in June and September/October of 2009. 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.

Seventy-five species of finfish and invertebrates were captured during the June 8-19, 2009 cruise. The top five species that are considered economically important include spot, Atlantic croaker, blue crab, weakfish and brown shrimp. Ninety-six species of finfish, invertebrates and grasses were captured during the September 28-October 8 cruise. The top five species that are considered economically important were spot, Atlantic croaker, weakfish, southern kingfish, and brown shrimp. The cruise window was extended into October due to a generator malfunction.

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 general 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

Reeffish sampling - In the summer of 2008, SEAMAP-South Atlantic received funds to be able 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 reeffish 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 more complete coverage and address identified shortfalls of the MARMAP sampling regime.

In this reporting period, sampling was conducted from April 22, 2009 through October 9, 2009 using the *R/V Palmetto*. The area sampled was between an area 30nm south west of Cape Look-out, North Carolina (34º 10'N and 76º 09'W) and 10nm east of St. Lucie, Florida (27º 16'N and 34º 10'N and 80º 01'W). 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 night-time hours. Surveys to identify live bottom habitat that can be added to the MARMAP data base 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.

During October of 2008 and from April through September of 2009, 18.5 sea days were completed for the SEAMAP program. This was less than scheduled because of weather cancelations early and late in the sampling season. During these sea days, researchers identified additional natural reef habitat, sampled established and alternative 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 established MPA's was done using standard MARMAP sampling methods using traps and vertical (or short) longline gear. Sampling of fish communities in the MPA's and alternative MPA sites took place in the North Florida MPA (established and alternative 2 area), Edisto MPA, South Carolina MPA-A (established and alternative 2 area), and the alternative 2 area of the Georgia Tilefish MPA. The last sampling cruise was completed on October 9, 2009, and that cruise season

information is currently being processed, analyzed, and entered in the database system. A graduate student has begun analyzing the images taken by trap cameras to identify/verify live bottom habitat type, and possible changes in habitat type. The next step will be to examine the fish (species and densities) captured on the photos for potential analysis of fish communities.

Juvenile gag ingress - In this reporting period (2009 sampling season), collaborations with partners at GA-DNR and NC-DMF were established and subrecipient contracts were completed to add sampling sites for this study. In 2009, 11 sites were sampled in the vicinity of Wilmington, NC (Hewlett Creek and Motts Creek), Georgetown, SC (2 sites at the Baruch Barony); Charleston, SC (Conch Creek, Inlet Creek, Price Creek); Beaufort, SC (2 sites in Station Creek); and Savannah, GA (Bear Island Creek and Redbird Creek). The study sites were selected based on high salinity and oyster shell habitat with an associated benthic community consisting of sponge and soft coral (*Leptogorgia* spp.) All of the sites were sampled from 1995-1997 with the exception of the Wilmington and Savannah sites, which were added this year. Ingress monitoring using Witham collectors was established in 1995 and continued until 1998. Monitoring resumed in 2005 until the present.

During the early development years of the survey, Witham collectors were identified as the most effective method for sampling ingressing gag and other fish postlarvae. This methodology has been used in the present study to establish a monitoring program to provide an annual index of juvenile gag abundance to predict future year class strength. At each site, four Witham collectors were deployed approximately 30 meters apart and sampled two to three times a week from mid-March to mid-June (when winter spawned reeffish, such as gag, no longer recruit to this gear type). Air and surface water temperature, salinity, wind velocity and direction, and tide stage were measured and recorded in each creek. Bycatch was 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*) and other species.

A total of 1,577 collections (examination and identification of collected organisms of one Witham collector on a given date) were made. 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 15th most abundant taxa with 42 gag captured in 2009. Noteworthy was the collection of the Asian isopod, *Synidotea laevidorsalis*, at the Savannah sites. This isopod is native to the Western Pacific and was introduced to San Francisco Bay, South Carolina, and New Jersey. The Witham collectors at the Wilmington sites yielded 38 gag. In Wilmington, the first gag was collected on April 22nd and the last gag on June 1st. Motts Creek (NC) yielded 27, and Hewlett Creek (NC) 11 gag. Near Charleston (SC) 4 gag were collected, the first one was caught on April 27th and the last on May 22nd. Three gag were caught in Inlet Creek and one in Conch Creek. Catch per unit effort (CPUE) was determined by dividing the total number of collections (N) in a certain week or locations, by the total number of gag collected in that week or at that location. CPUE steadily increased after the first gag was captured during the week of April 20th, with a peak (0.10 fish/collector) in the week of May 18th, followed by a decline until the week of June 1st.

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, a preliminary examination of sea surface temperatures around and near shore of the Charleston Bump during the sampling season 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*; red porgy, *Pagrus pagrus*; and white grunt, *Haemulon plumier*. Fish were collected using hook and line fishing aboard the *RV 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. In total, 119 fishes (41 gray triggerfish, 65 red porgy, and 13 white grunt) were collected. Specimens in the shallowest

depth zone (0-20m) were not acquired this year and white grunt specimens in the deepest depth zone (>50m) were not collected. The entire digestive tract was collected from each fish from the mouth to the anus. The digestive tract was wrapped in cheese cloth, 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. Twenty-four guts collected in the reporting period have been fully examined to date. Guts of seven gray triggerfish have been processed, examined, and prey items identified. Preliminary results revealed that the majority of gray triggerfish prey consists of crustaceans, but they consumed at least 15 different prey taxa including barnacles, amphipods, crabs, snails, and seahorses. Guts of 17 red porgy were sorted and the prey items identified. Results show red porgy consumed at least 30 different prey taxa including bivalves, echinoderms, crustaceans, barnacles, and fishes. The white grunt gut contents have yet to be processed.

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 2008/2009 sampling season, 333 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, and November/December). Each time period and stratum was sampled equally. During sampling, 155 red drum were caught. Winyah Bay yielded the highest numbers of red drum (65) followed by Port Royal Sound (41), Charleston Harbor (32) and Saint Helena Sound (17). Eighty-four red drum were tagged and released, eight were recaptured, nine were given to the Mariculture project at SCDNR for broodstock, and 54 were sacrificed for age/growth and reproductive investigations. Stomach samples and filets were also collected for diet determination and mercury analysis. Some fish were also surveyed for parasite fauna.

In 2009 sampling began in July instead of March, as was done in 2008. Due to decreases in funding from the various funding sources that support this project, sampling has been concentrated from late summer through late fall in order to maximize encounters with red drum during sampling. Sampling will continue in two-month time periods in each of the four stratum.

North Carolina - For sampling year 2009, North Carolina DMF longline sampling occurred in Pamlico Sound from June through October. Sampling occurred as either 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 the total sample area into four regions with each region further divided into three similarly sized sub-regions. From July through October, samples are taken from randomly selected grids (1 square nautical mile) within each sub-region during each of three four-week intervals. All samples are 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 are made per night. Two samples are collected from each randomly chosen sample site. All stratified-random sampling occurs within the Pamlico Sound. Additional, non-random, exploratory sets are made opportunistically.

Random sampling occurred in July (n=12 sets), August (n=28 sets), September (n=28 sets), and October (n=2 sets) and yielded 414 red drum (8, 282, 124 and 0 respectively; Table 2). Additional

exploratory sets were made in June (n=3 sets), July (n=3 sets), and October (n=3 sets) yielding 10 additional red drum (1, 9 and 0 respectively). Reddrum captured ranged in size from 30 to 48inches fork length. Overall species composition for the period of June through October is summarized in the following table (n=number of sets).

TABLE 2.

	June non-random n=3	July non-random n=3	random n=12	August random n=28	September random n=28	October non-random n=3	random n=2	All n=79
Finfish								
Red Drum	1	9	8	282	124	0	0	424
Bluefish	0	0	8	2	4	1	0	15
Spot	0	0	0	1	0	0	0	1
Pigfish	0	0	0	0	1	0	0	1
Sharks								
Smooth Dogfish	0	0	1	0	1	0	0	2
Atlantic Sharpnose	0	0	0	0	5	0	0	5
Sandbar Shark	0	0	0	0	2			
Rays								
Southern Stingray	1	3	10	14	12	0	1	41
Atlantic Stingray	0	0	2	4	1	0	1	8
Butterfly Ray	0	1	44	8	2	0	0	55
Cownose Ray	0	1	2	1	1	0	0	5

Georgia - For the current reporting period, sampling occurred off southeast Georgia and northeast Florida during the fall months (October – December) of 2008 and the summer months (July – September) of 2009. A total of 158 longline sets were deployed over the two seasons with 82 sets made during fall 2008 and 76 sets during summer 2009. Generally, sampling begins during the second half of April; however, during 2009 sampling was delayed until July because the research vessel was down for maintenance purposes. Sampling conducted in Georgia's nearshore waters yielded a total of 24 adult red drum; 23 during fall 2008, 1 during summer 2009. Fish captured ranged in size from 765mm to 1005 mm center length. All fish were tagged and released. A single Kemp's Ridley sea turtle was captured during fall 2009. The hook was removed from the turtle and the animal was released in excellent condition. Species composition for fall 2008 and summer 2009 is summarized in Table 3.

TABLE 3.

Species	Fall 2008	Summer 2009	Study Period Total
Shark Species --			
Atlantic sharpnose shark	39	273	312
Blacknose shark	7	62	69
Blacktip shark	0	2	2
Bonnethead	6	58	64
Bull shark	3	0	3

TABLE 3. (continued)

Species	Fall 2008	Summer 2009	Study Period Total
Finetooth shark	0	1	1
Lemon shark	1	0	1
Sandbar shark	5	2	7
Spinner shark	1	1	2
Tiger shark	0	3	3
Black seabass	7	1	8
Brittle Star	1	0	1
Bullnose ray	1	0	1
Clearnose skate	31	0	31
Conger eel	0	1	1
Gafftopsail catfish	0	3	3
Gray triggerfish	1	0	1
Kemp's Ridley Turtle	0	1	1
Remora	1	1	2
Sea rat	3	0	3
Sea Star	7	2	9
Southern kingfish	10	6	16
Spotted Eagle Ray	1	0	1
Stingray*	2	10	12
Weakfish	0	1	1

* - Includes southern, bluntnose, and Atlantic stingrays combined

SEAMAP-Caribbean

In FY2009, SEAMAP-Caribbean supported a variety of activities in the U.S. Virgin Islands (USVI) and Puerto Rico.

Queen Conch Survey – Virgin Islands

An important fishery exists in the U.S. Virgin Islands (USVI) for queen conch (*Strombus gigas*), a large marine gastropod mollusk. Conch regulations were revised and went into effect on July 1, 2008 to eliminate overfishing of conch resources, particularly in St. Croix, and to avoid a collapse of the resource. The proactive harvest regulations for the territory were recommended by the Fisheries Advisory Committees. Provisions in the regulations include conch size and meat weight limits, harvest quotas, landing restrictions (50,000 lb annual harvest quota/district), sale restrictions, closed season and reporting requirements. The SEAMAP conch surveys, scheduled to end by December 31, 2007, were extended to allow priority for the completion of the 2004-2005 trap study.

A study was conducted to assess the abundance of conch within the Territorial Sea and Exclusive Economic Zone (EEZ), contiguous to the USVI. A delay in the startup of the conch surveys in St. Thomas/St. John occurred due to the late availability of federal funds, administrative challenges in establishing grant fiscal accounts within the new fiscal system, and the inability to obtain contract divers. As a result, conch surveys, which were to be conducted during the closed season (July – October), were conducted during the open harvest season. The Division of Fish and Wildlife (DFW) conducted a survey of conch fishers in St. Thomas/St. John to identify known commercial harvest locations. Maps were mailed to conch fishers to obtain information on current harvest locations. Two current harvest locations were added to the original 22 survey sites surveyed in 1981 and 2001.

Underwater scooter conch surveys were conducted from November 14, 2008 to April 24, 2009. Diver teams counted and measured conch and identified habitat type along two 4-m wide, timed compass transects. Ten old sites and two new sites were

surveyed in St. Thomas. The total survey area of 31,059 square meters (3.1 hectares) yielded 253 conch, 113 adults and 140 juveniles. Conch density ranged from 0 – 3,706 per hectare for adults and 0 – 1,409 per hectare for juveniles. In St. John, 12 old sites were surveyed covering 30,476 square meters (3.0 hectares). A total of 116 conch, 44 adults and 59 juveniles were recorded. Conch densities ranged from 0 – 182 per hectare for adults and 0 – 311 per hectare for juveniles. Data analysis and report preparation are in progress.

Conch surveys were not initiated in St. Croix at the same time as St. Thomas/St. John due to staff shortages and the lack of Division-certified divers. St. Croix conch surveys were initiated in September 2009. Four trips were conducted and 10 sites were surveyed. The conch season remains closed until November 1. The remaining 12 original sites and eight new sites are scheduled to be completed during the closure period.

Lobster Survey – Virgin Islands 2007

Artificial Habitats

A study was undertaken in the USVI to monitor the annual recruitment of juvenile lobsters in coastal mangrove environments to artificial habitats. A Coastal Zone Management permit was approved in April 2008 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. Approval from the NPS was received in June 2008. 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 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 September 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 68 juvenile lobsters have been recorded in Salt River habitats during the study period. No lobster recruitment has been recorded in Cas Cay Marine Reserve habitats. Recruitment appears to be spatially related to the artificial habitat location within the study area. Densities as high as 10 juvenile lobsters in one habitat have been recorded in Salt River. Thirty-two fish species from 14 families have been recorded associated with the habitats. Juvenile acanthurids (surgeonfish), labrids (wrasses) and lutjanids (snappers) comprise the most dominant fish species. The study is ongoing and will continue until November 2009.

Parrotfish Survey – Virgin Islands

Parrotfish have become the staple reeffish protein source for Virgin Islanders, especially on St. Croix. 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 stage of gonad maturation is recorded as unknown (Stage 1), resting (Stage 2), developing (Stage 3), ripe (Stage 4) or spent (Stage 5) based on visual inspection. The study is ongoing and will continue for one year until May 2010.

Reeffish – Handline Survey– Virgin Islands

Fish trap sampling methodology was deleted from the FY2008-2011 amended grant documents for the Caribbean due to poor catch rates. The line fishing component was expanded. Due to the delay in allocation of federal funds and subsequent development of accounting codes, the startup of the project was delayed. Sampling is scheduled to begin in October 2009.

Administrative/Staff Issues

Two new additions to the administrative staff of DFW have been announced. Ms. Beulah Dalmida-Smith, a native Virgin Islander and former Commissioner of DPNR, has been appointed as Director of the Division of Fish and Wildlife. Ms. Dalmida-Smith assumed her responsibilities on August 3 and is located in St. Thomas. The Director's position had been vacant since April 2008. Mr. Jonathan Jed Brown has been appointed as Assistant Director and Chief of Fisheries. His employment will start in November and he will be located in St. Croix. The Chief of Fisheries position has been vacant since August 2006. Vacant fisheries positions (two in St. Croix and one in St. Thomas) continue to challenge the ability of the Division to complete projects in a timely manner. Filling fisheries personnel vacancies was established as a top priority.

Lobster Survey – Puerto Rico

Artificial Habitats

The sixty casitas grouped in six stations for the lobster artificial habitats were monitored monthly from January 2008 to December 2008, between the new and full moon. Many octopuses were found inside the casitas. Because they are a major lobster predator, octopuses are relocated from the structures. A total of 76 octopuses were relocated. The lobsters were not removed from the structures. The total overall number of lobsters in the casitas increased gradually during the monitoring time frame, with a maximum of 123 lobsters in December. The total number of juveniles found in a station ranged from 0 to 80 and the size of juveniles found at the artificial shelters ranged from 0.5 inches to three inches.

Six stations, each with ten artificial habitats for a total of 60 artificial habitats or casitas, were deployed on the west coast of Puerto Rico. The stations were monitored monthly since their deployment. In July, a total of 53 lobsters were counted among all the casitas. Most of the lobsters were collected at the Fanduco station (24) during that month. The maximum amount of lobsters in one casita was nine.The maximum lobster size found in a casita has been 2.5 inches carapace length. Octopus immediately inhabited artificial shelters upon deployment and their numbers increased over time. When found, they were relocated from the casitas.

Larvae Collectors

A total of 28 collectors were deployed in March 2008. Two collectors were put at seven different stations and each station contains two separate lines. One collector is 5 feet from the bottom and the other is at 30-40 feet depth in the water column. The collectors were sampled monthly from April 18, 2008 to March 10, 2009 to observe for lobster presence. During the sampling, the collectors are taken out of the water and replaced with a dry collector from the previous month. The lobsters found were counted according to the classification (development stage). All larvae were put in an aquarium and released later. The development stages used to classify the lobsters are: transparent, pigmented, post-puerulii and juvenile.

The total number of puerulii found on any particular station ranged from 0 to 103. September and January were the months in which greater amounts of puerulii were observed in the shallow collectors. The most often found stage in the collectors were juveniles (703), followed by the pigmented stage (286), and then the transparent stage (125). The major abundance of puerulii and juveniles were observed during the first quarter and five days after the first quarter (almost full moon). A completion report on the Lobster survey was submitted in 2009. Most puerulii were observed settling on stations located in deeper water (over 60' depth) in the collector closest to the bottom. The greatest amount of puerulii found in one station was 56. Gaps in monthly data collection were experienced due to the loss of collectors or inclement weather.

Reeffish Survey- Puerto Rico

Two fishermen and a biologist were contracted to conduct the Reeffish Survey on the west coast. Thirty quadrants were chosen randomly and each quadrant was sampled two times for a total of 60 trips. The data from each trip was recorded. A total of 730 fishes were collected from March 2009 to July 2009 and each fish was measured and weighed. The gonads were photographed and removed for histological analysis.

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 January 28-February 7, 2009 aboard the National Science Foundation *R/V Cape Hatteras*. Personnel from U.S. Fish and Wildlife Service, North Carolina Division of Marine Fisheries, Atlantic States Marine Fisheries Commission, East Carolina University, North Carolina Department of Environment and Natural Resources - Division of Marine Fisheries, North Carolina State University, Delaware State University and Maryland Department of Natural Resources participated in the cruise. This was the twenty-second year of the cooperative project, initiated in 1988 at the request of SEAMAP-South Atlantic. Adult striped bass, *Morone saxatilis*, over-wintering in the area between False Cape, Virginia and Cape Lookout, North Carolina, were tagged for assessment

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

of the population structure and exploitation rates. Atlantic sturgeon, *Acipenser oxyrinchus*, was tagged and sonic transmitters were placed in thirteen of them, as well as in fifty spiny dogfish, *Squalus acanthias*. Summer flounder and three species of skates were measured and released.

During the course of the trip, 146 striped bass were tagged, as were 31 Atlantic sturgeon. This year's cruise capture and tagging of migratory Atlantic striped bass was the lowest ever for striped bass tagged (21-year average of 2,124). The 2009 cruise ranks twenty-second (last) overall in numbers of striped bass tagged and released. During its 22-year history, the Cooperative Winter Tagging Cruises have collectively tagged 43,593 striped bass. A majority of the fish tagged this year were in the 28-inch and up (711 mm +) size classes. Summary reports for each annual cruise are available through the South Atlantic Fisheries Resources Office.

INFORMATION SERVICES

Information from the SEAMAP activities is provided to user groups through the program administration and three 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. 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 1982-2008 have been entered into the system and data from 2009 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, although the highest priority is assigned to SEAMAP participants.

Requested SEAMAP data were used for a multitude of purposes in 2009:

- 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;
- 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 2009 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 2009 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 200 interested individuals. These plots were also available through the SEAMAP web page.

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 Adult 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 in Microsoft ACCESS, and the data will eventually be web accessible for SEDAR and other partners, and interacting with the IMS database and accessible in Arc Serve. 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, 29,700 lots of specimens were returned from the Polish Sorting and Identification Center and thirty-eight thousand five hundred and eleven (38,511) 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. Seventy requests have been accommodated this year to twenty-seven 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-fifth 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 are in the process of being re-archived. An additional 4,000 (estimated) small vials containing partially or completely identified invertebrate plankton material have also been recovered. The recovered samples are currently housed within the GCRL Museum's Research Building Collection Room. At this time, the room that previously housed the samples has been completely cleared of debris and there are no remaining samples to be recovered in that area. The actual number of recovered samples mentioned above has changed slightly from previously estimated numbers because some of the salvaged material (46 samples) ultimately proved to be damaged beyond recovery when it was examined more closely.

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 1/4 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, part of the post-Katrina recovery process will include further aliquoting of older samples to reduce the space required for storage. Aliquoting is expected to begin in the coming year.

In October of 2008, the SIPAC Curator received a request from the Southeast Fisheries Science Center Beaufort Laboratory to house plankton material from the NGOMEX plankton surveys conducted in the northern Gulf of Mexico in the 1980s. Because of the value of the collection and its relevance to the SIPAC holdings, the Curator agreed and the

collection, consisting of 218 boxes of pint and quart jars of material and associated data, was transferred to the Ocean Springs facility in November. The samples were examined and 21 boxes of samples containing only dehydrated, unsalvageable material were recorded and discarded. The remaining 197 boxes, some containing dehydrated samples mixed with good samples, have been temporarily stored on shelves in the invertebrate prep room and visitor's office space. These samples will be aliquoted and recorded and the remaining dehydrated samples will be discarded, as time permits. The useable samples will then be incorporated into the SIPAC collection.

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. A high priority will continue to be placed on the rehabilitation, reorganization and documentation of the post-Katrina collection. In addition, SIPAC personnel will be participating in a multi-institutional project funded through the Northern Gulf Institute and 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 NOAA/NMFS 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 as a result of Hurricane Katrina.

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 FY2009:

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PROPOSED SEAMAP ACTIVITIES, FY2010

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 2010 on level funding of $5.09 million. Proposed FY2010 activities for all participants are shown in Table 4.

Table 4.

PROPOSED SEAMAP ACTIVITIES, FY2010

	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			
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		
2010 Marine Directory			X	
FY2010 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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