



# **ANNUAL REPORT**

## **OF THE SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM (SEAMAP)**

**OCTOBER 1, 2006 - SEPTEMBER 30, 2007**

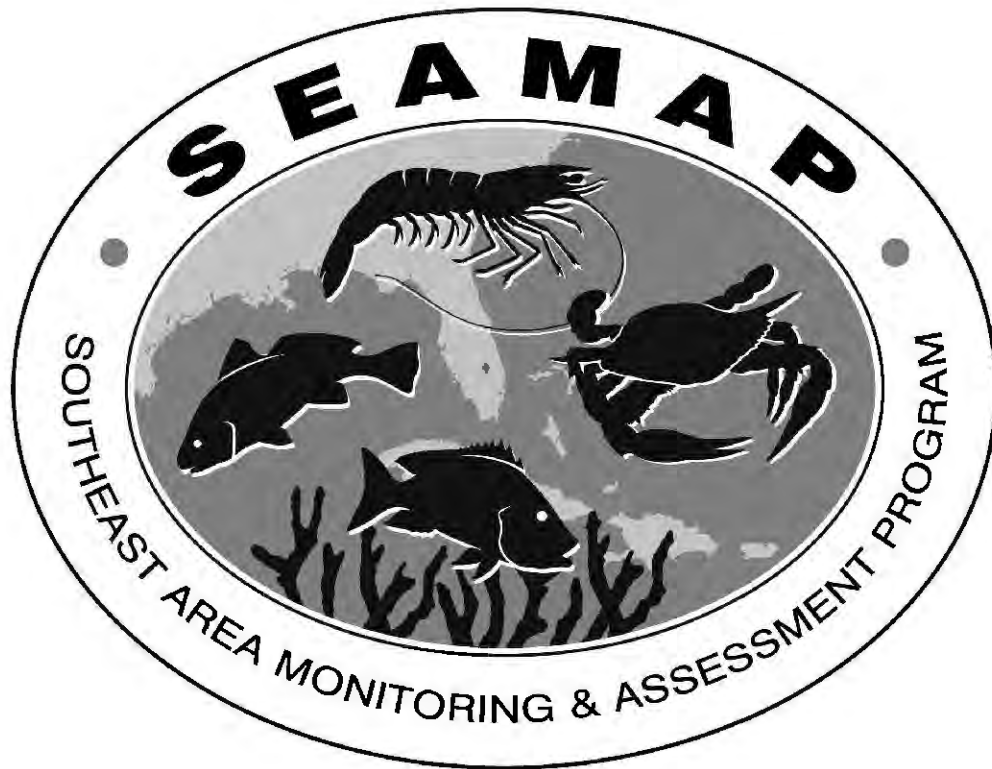
**SEAMAP - Gulf of Mexico**  
Gulf States Marine Fisheries Commission

**SEAMAP - South Atlantic**  
Atlantic States Marine Fisheries Commission

**SEAMAP - Caribbean**  
Puerto Rico Sea Grant College Program

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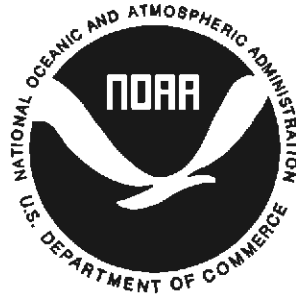


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# **ANNUAL REPORT**

## **of the**

### **Southeast Area Monitoring and Assessment Program**

#### **October 1, 2006 - September 30, 2007**

#### **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 the SEAMAP are shown in Table 1.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-2007. Funding allocations to participants for FY1985-FY2007 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 FY2007 and proposed activities for FY2008.

#### **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 Archiving Center and SEAMAP Invertebrate Plankton Archiving Center (SIPAC).

#### **SEAMAP-Gulf of Mexico**

Major SEAMAP-Gulf Subcommittee meetings were held in October 2006 and March 2007 in conjunction with the Annual Meeting of the GSMFC. All meetings included participation by various work group leaders, the Coordinator, the Data Manager, the Program Monitor and other GSMFC staff. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 2007 to discuss respective program needs and priorities for FY2008.

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 2007. Other important management activities included 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.

**TABLE 1.**

**SEAMAP ORGANIZATION**

<b>Program</b>	<b>Administering Organization</b>	<b>Participating Agencies</b>
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/COST/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

**SEAMAP-South Atlantic**

One committee meeting and one conference call were coordinated and documented in FY2007. Additional tasks included fulfilling data requests, preparation of annual program reports and State/Federal Cooperative Agreements, and distribution of publications, most notably, the SEAMAP 2006-2010 Management Plan.

The SEAMAP-South Atlantic Committee held their annual meeting in conjunction with the joint annual meeting held August 1-3, 2007 in St. Thomas, 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 FY2008. The Committee also reviewed progress by the

Crustacean, Data Management, and Coastal Survey work groups and provided direction where necessary. Topics discussed included fisheries independent data collection/storage standards, NMFS data management activities, and a request to the South Atlantic Board for support for project funding for FY2008 and beyond.

**SEAMAP-Caribbean**

The SEAMAP-Caribbean Administrative and Working Group components held four meetings during FY 2007. They met on February 12<sup>th</sup> in St. Thomas, U.S.V.I.; on May 22<sup>nd</sup> in Río Piedras, P.R.; on August 1<sup>st</sup>, St. Thomas, V.I.; and November 16<sup>th</sup> in Río Piedras, P.R. In addition, the Caribbean Chair, the respective component's program leaders, and the coordinator participated in the SEAMAP

Joint Annual Meeting in St. Thomas on August 2-3. Timely distribution of meeting memos, minutes and agendas to all SEAMAP-Caribbean Committee members were provided to coordinate alternating meetings in Puerto Rico and the U.S. Virgin Islands (St. Thomas).

During the SEAMAP-Caribbean meetings, the committee reviewed and followed up on several topics. They reviewed the 2006 Conch Survey (first year of the multiyear proposal), discussed database management matters, discussed the collaboration with a MRGA/NMFS proposal in relation to the sampling expansion of the SEAMAP surveys, reviewed the 2007 spiny lobster survey (second year of the multiyear proposal), discussed cooperation with a spiny lobster recruitment study to be held in the Caribbean conducted by Old Dominion University, and to validate a hydrodynamic model. In addition, reef fish sampling protocol changes were discussed. A geographic information system (GIS) conch compilation study entitled "Continued GIS mapping and analysis of SEAMAP-C queen conch (*Strombus gigas*) surveys in Puerto Rico" was reviewed by the coordinator. A student assistantship was given to a marine science graduate student to conduct this GIS compilation task.

## RESOURCE SURVEYS

In FY2007, collection of resource survey information continued for the twenty-sixth 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 October 5 to December 15, 2006, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering 344 trawl stations, in addition to plankton and

environmental sampling. The objectives of the survey were to:

- (1) sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fm;
- (2) obtain length-frequency measurements for major finfish and shrimp species to determine population size structures;
- (3) collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters; and
- (4) 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 Plankton Survey

A new SEAMAP Winter Plankton Survey was conducted from March 17 to March 29, 2007. Ichthyoplankton samples were collected at 42 SEAMAP stations. The stations were east of Mobile Bay on the outer shelf. 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); sample the size fraction of fishes that are underrepresented in bongo and neuston samples using a juvenile (Methot) fish trawl; and measure extrusion of the smallest size fraction of fish larvae through the standard SEAMAP bongo net by collecting samples at selected locations with a bongo frame fitted with a 335 micron net on one side and a 202 micron mesh net on the other side.

#### Spring Plankton Survey

The SEAMAP Spring Plankton Survey took place from April 16 to May 29, 2007. One hundred twenty-five stations were sampled from the west Florida shelf to the Louisiana/Texas border. This was the twenty-sixth 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. Wire angle was maintained at 45 degrees. Neuston samples were taken with 947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 36 hours were transferred to 95% ethyl alcohol for final preservation. Left bongo samples were preserved via an ethanol/ethanol transfer to aid in preservation of larval otoliths. 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).

### **Reeffish Survey**

The primary purpose of this survey was to assess relative abundance and compute population estimates of reeffish found on natural reef habitat in the Gulf of Mexico. Two types of gear were used to deploy video cameras: 1) a single-funnel fish trap (2.13 m long by 0.76 m square) with the camera mounted at a height of 25 cm above the bottom of the trap; or 2) a 4 camera array with 4 cameras mounted orthogonal to each other at a height of 25 cm above the bottom. Both gears were baited with squid before deployment. The resultant video recordings (typically of one hour duration) were processed back at the laboratory where fishes were identified and counted independently by two tape readers. Final counts were entered into the SEAMAP reefish database along with additional observations on habitat and fish activity. NMFS conducted reefish sampling from April 20 to May

31, 2007 on the OREGON II. Video cameras were deployed at 185 sites and the fish trap at 27 sites. The soak time for the camera array is 30 minutes and the soak time for the trap is one hour. The reefish cruise was continued on the R/V GANDY and was conducted June 19 through August 12, 2007. Video cameras were deployed at 345 sites and the fish trap at 52 sites for a total of 397 stations. During 2007, the Reefish Survey had a total of 530 camera array stations and 79 trap stations.

### **Summer Shrimp/Groundfish Survey**

The overall sampling strategy during the 2007 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. This was the twenty-sixth year for the survey. The entire survey occurred from June 4 to August 3, 2007 and 307 trawl stations were sampled during the survey. In addition, NMFS, Mississippi, and Louisiana vessels collected ichthyoplankton data.

Objectives of the survey were to:

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

During the survey, the NOAA Ship OREGON II and R/V TOMMY MUNRO sampled offshore and with 40-ft trawls, the R/V PELICAN sampled both Louisiana state waters and offshore waters with 40-ft trawls, and Texas vessels sampled Texas state waters and offshore waters with 20-ft trawls. All vessels took environmental data, including temperature, salinity, and oxygen at each station.

### **Fall Plankton Survey**

The first fall ichthyoplankton survey to assess abundance and distribution of king mackerel eggs and larvae occurred in August 1984. No sampling survey was conducted in 1985; however, expanded surveys since then have covered Gulf waters from Florida Bay to Brownsville, Texas. The Fall Plankton cruise took place from August 28 through

September 29, 2007. NMFS sampled 144 stations on the west Florida shelf and northern Gulf of Mexico. 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. Wire angle was maintained at 45 degrees. Neuston samples were taken with 947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 48 hours were transferred to 95% ethyl alcohol for final preservation. Left bongo samples were preserved via an ethanol/ethanol transfer to aid in preservation of larval otoliths. 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).

### **Plankton and Environmental Data Surveys**

As in previous years, plankton samples and environmental data were collected routinely during most SEAMAP trawling surveys. During the Summer Shrimp/Groundfish Survey, plankton tows were piggybacked on the NMFS and state vessels, sampling randomly generated trawl stations within the standard 30-minute SEAMAP grids.

Objectives of these piggybacked surveys were: 1) to collect plankton samples throughout the survey area; and 2) to collect associated hydrographic and environmental data at each plankton station. Additionally, environmental data (salinity, temperature, and oxygen from surface, mid-depth and bottom waters) were collected during the shrimp/groundfish surveys. Wind direction, wind speed and wave height were taken at all trawl stations.

Samples from the right side of the bongo nets and neuston samples were shipped to the NMFS-Pascagoula Laboratory for shipment to the Polish Sorting and Identification Center, where they will be sorted to the family level (both ichthyoplankton and selected crustacean and molluscan species). The left bongo sample from each station is retained as a back up in the event of damage or loss of the specimens and maintained at the SIPAC. Preservation of plankton samples was in buffered formalin prior to transfer to ethanol.



## SEAMAP-South Atlantic

### Shallow Water Trawl Survey

The largest component of SEAMAP-South Atlantic survey research in FY 2007 was the continuing Shallow Water Trawl 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:

- (1) collect data on size, abundance, distribution, and seasonality of target finfish and decapod crustaceans;
- (2) record species composition, biomass, and abundance to assess latitudinal and seasonal fluctuations; and
- (3) 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 FY 2007: Fall 2006 (October 1- October 28); Spring 2007 (April 17-May 16); and Summer 2007 (July 10-August 11). 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 2006 cruise completed the seventeenth full year of standardized sampling under a stratified random survey design. Sampling was conducted

between October 1-October 28 and 102 inshore stations allocated to 24 shallow coastal strata in the South Atlantic Bight were sampled. A total of 121 species or genera were identified in fall trawls. *Chloroscombrus chrysurus*, the Atlantic bumper, was the most abundant species, constituting 16% of total abundance, followed by the Atlantic croaker, *Micropogonias undulatus* (15%); the brown shrimp, *Farfantepenaeus aztecus* (12%); scup, *Stenotomus* sp. (9%); and the spot, *Leiostomus xanthurus* (6%). Abundance of individuals collected (n=133,209 individuals, mean/tow=1,306 individuals) in fall 2006 decreased from catches taken in the previous two years. Abundance was greatest in the Raleigh and Onslow Bays, whereas the lowest regional abundance was observed in Long Bay. Miscellaneous invertebrate biomass (n=4,409 kg, mean/tow=43.2 kg) also decreased slightly in fall 2006. The cannonball jelly, *Stomolophus meleagris*, constituted approximately 69% of miscellaneous invertebrate biomass.

The spring cruise for the SEAMAP-South Atlantic Shallow Water Trawl Survey began on April 17 and was completed on May 16, 2007. A total of 102 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. A total of 127 species or genera were identified in spring trawls. *Peprilis triacanthus*, the butterfish, was the most abundant species, constituting 17% of total abundance, followed by the Atlantic croaker (14%), the spot (9%), the scup, (9%), the Atlantic thread herring, *Opisthonema oglinum* (8%), and the striped anchovy, *Anchoa hepsetus* (7%). Abundance of individuals collected (n=108,157 individuals, mean/tow=1,060 individuals) in spring 2007 decreased from the level of spring abundance observed in 2006. Miscellaneous invertebrate biomass (n=1,243 kg, mean/tow=13.0 kg) also decreased in 2007. The cannonball jelly constituted more than 62% of miscellaneous invertebrate biomass.

The summer cruise for the SEAMAP-South Atlantic Shallow Water Trawl Survey began on July 10 and was completed on August 11, 2007. A total of 102 stations were sampled in the 24 shallow coastal strata in the South Atlantic Bight. A total of 123 species or genera were identified in summer trawls. A total of 123 species or genera were identified in summer trawls. The Atlantic bumper was the most abundant species, constituting 55% of total abundance, followed by the Atlantic croaker (10%), the scup (4%), and the Atlantic cutlassfish, *Trichiurus lepturus* (3%). Abundance of individuals collected (n=270,605 individuals, mean/tow=2,653

individuals) in Summer 2007 exceeded all previous summer cruises. Abundance was greatest in waters off Florida. The lowest regional abundance was observed in South Carolina.

Data from the spring, summer, and fall FY2007 cruises have been added to the SEAMAP Data Management System (DMS). For additional cruise information, please see the individual cruise reports available at [www.asmfc.org](http://www.asmfc.org) under the Research & Statistics section of the website. Additionally, the results of the entire 2005 cruise season (Spring 2005, Summer 2005, and Fall 2005 cruises) are documented in the final 2005 project report, "Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 2005" by South Carolina Marine Resources Division.

### **Pamlico Sound Survey**

During FY 2007, the North Carolina Division of Marine Fisheries (NCDMF) continued the ongoing Pamlico Sound Survey. Cruises sample approximately 52 stations each in June and September. 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 DMS.

Fifty-five species of finfish and invertebrates were captured during the June cruise. The top five species that are considered economically important include spot, Atlantic croaker, blue crab, *Callinectes sapidus*, weakfish, and white shrimp, which made up 91% of the catch by number. Seventy-one species of finfish and invertebrates were captured during the September cruise. The top five species of spot, Atlantic croaker, weakfish, pink shrimp and southern kingfish made up 84% of the total catch by number. More information on the results of these surveys is available at [www.asmfc.org](http://www.asmfc.org) under the Research & Statistics section of the website.

### **Bottom Mapping Project**

In 1992, the SEAMAP-South Atlantic Bottom Mapping Work Group began an intensive effort to establish a regional database that includes the location and characteristics of hard bottom resources throughout the South Atlantic Bight. The importance of defining these areas has increased in the face of declining reefish resources and increased fishing pressure. To assess reef fish populations and

the effects of changes in fishing pressure, the amount of habitat available for priority species of fish must be quantified.

The primary objectives of the Work Group are to:

- (1) conduct an extensive search of existing databases to identify all known critical hard bottom reef habitats on the continental shelf of the South Atlantic Bight from Florida through North Carolina from the beach out to 200 m in depth; and
- (2) summarize the bottom type information into a flexible, easy to use database which will provide researchers and managers with pertinent information concerning the location and extent of these areas, types of data used in determining bottom type, and source of the data for the development of future habitat mapping systems on available PC hardware.

All accessible databases available from state and federal agencies and other sources that have sampled or surveyed bottom habitats in the region were investigated to obtain files for processing. The data available from these sources varies in information content and accuracy in pinpointing reef habitat location. Treatment of each data type and gear is standardized, and the most accurate data for each gear type for each location are being compiled according to procedures developed by the Bottom Mapping Work Group. The database is designed for easy incorporation into Geographic Information System (GIS) or other PC mapping software programs.

By the end of FY1997, more than 65,700 records were compiled from databases obtained off North Carolina, South Carolina, Georgia, and Florida in three study phases. Reports summarizing the databases available for these areas were provided in three final reports submitted to the SEAMAP-SA Committee. From FY1998 through FY 2001, the Florida Marine Research Institute (FMRI) reproduced and refined the three Bottom Mapping Reports into a single product on a CD-ROM readable on any desktop PC. The CD-ROM includes GIS software, data files, documentation, and maps covering the area from Florida to the North Carolina-Virginia border. Version 1.0 was completed in 1998, Version 1.1 was printed in 1999, and Version 1.2 was printed in 2001. The development of version 1.2 included a much-improved summary document, and several tools to help users view and analyze the data. All versions were distributed to libraries to maximize availability and utilization of the data. Copies of the Bottom

Mapping CD version 1.2 and the summary document are available through the ASMFC.

In 2001, the Southeast Area Monitoring and Assessment Program (SEAMAP) and its Bottom Mapping Workgroup (BMWG) identified deepwater resources as a priority for mapping. The main objective of the Deepwater Bottom Mapping Project was to synthesize data on habitat distributions for water depths between 200 and 2000 m within the U.S. Exclusive Economic Zone (EEZ) extending from just south of the Virginia/North Carolina border to the Florida Keys. This multi-phase project consisted of three phases:

Phase I – The BMWG identified benthic data sampling methods and developed protocols to evaluate each type of deepwater data using standardized methods to define bottom type.

Phase II - The BMWG identified and summarized the relevant biological and geological data sets within the Deepwater Bottom Mapping Project study area for inclusion into a relational database.

Phase III - The data sets identified in Phase II were acquired and the protocols from Phase I applied during the analysis and mapping portion of this effort. The results of Phase III mapping are a deepwater benthic habitat GIS and a variety of products to view and query the compiled data.

The Florida Fish and Wildlife Research Institute (FWRI) created the spatial database for deepwater bottom habitats from 200 to 2000 m depth for the area off the North Carolina, South Carolina, Georgia and east Florida coasts. The methodology to develop the deepwater habitat spatial database followed the SEAMAP deepwater habitat protocol and is compatible with the GIS data originally built for the shelf project.

FWRI submitted a Microsoft Access database template to each of the collaborating partners at South Carolina Department of Natural Resources, University of North Carolina – Wilmington, and Harbor Branch Oceanographic Institute for data entry. Each partner compiled and interpreted data sets across their respective sub-regions. Data sets were prioritized with respect to their information content. Visual records were given top priority for analysis. Priority was given to evaluating the largest and most recent data sources, with lower priority given to older, extensive datasets followed by older, smaller datasets.

Each partner provided interpreted data in the form of Access tables or Excel spreadsheets to FWRI for inclusion in the deepwater habitat spatial database. The Skidaway Institute of Oceanography also provided data for this project. Skidaway staff was responsible for digitizing bottom character maps produced by Dr. Pete Popenoe. The resultant polygonal GIS shapefiles covered a large portion of the deepwater mapping project study area. FWRI included coral mounds digitized by Skidaway as part of this project's point dataset.

The GIS data created for this effort was designed to be compatible with the GIS data built for the continental shelf project. The deepwater bottom-mapping grid dovetails with the original 200m grid by extending the study area to the 2000m isobath within the Exclusive Economic Zone. The individual grid cells will store the bottom-type information of all the individual data records found within each cell.

The mapping results of Phase III are provided in several formats: map atlas .pdf documents, an ArcReader project; an ArcGIS .mxd document; and an Internet Map Service. The variety of map formats insures the results of this effort reach a wide audience.

The map atlas series were created to depict bottom habitat data for the South Atlantic Bight. The atlases are compiled .pdf documents that have integrated links to view all map pages of the series. Map Atlas 1 shows the location and areas of bottom habitats compiled for this effort. Map Atlas 2 shows the distribution of coded grid cells based on these habitat locations. Map Atlas 3 provides an opportunity to view shallow and deep water mapping efforts for the region.

The ArcReader project allows users to view, identify data features, and print customized maps. ArcReader is a free, easy-to-use desktop mapping application. The ArcReader project file provides an interactive viewer for casual GIS users. The ArcGIS .mxd document offers traditional GIS functionality and the opportunity to view the deepwater bottom habitat GIS data with local or online data sources. FWRI GIS personnel also insured the final GIS products are compatible with and importable to the SAFMC South Atlantic Habitat and Ecosystem IMS [http://ocean.floridamarine.org/efh\\_coral/ims](http://ocean.floridamarine.org/efh_coral/ims) which supports the developing South Atlantic Council Fishery Ecosystem Plan.

The deepwater GIS will prove to be critical for regional management decisions related to: identification, description, and conservation of unique habitats, including deep-water 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.

### **SEAMAP-Caribbean**

In FY2007, SEAMAP-Caribbean supported a variety of activities in the U.S. Virgin Islands (USVI) and Puerto Rico. After three unsuccessful bid advertisements in FY2006, a new 31-ft diesel-powered fiberglass vessel was acquired by the Virgin Islands DPNR-DFW. Division personnel inspected the vessel at the factory in Maine and conducted sea trials in March 2007. Following a satisfactory evaluation, the vessel was shipped to the Virgin Islands and arrived in June 2007. After installation of electronics, the vessel, named R/V OLEWIFE, was immediately utilized in SEAMAP sampling. The new vessel was purchased with funding from the U.S. Fish and Wildlife Sport Fish Restoration Program (\$80,000) and SEAMAP-Caribbean (\$41,000).

The Virgin Islands had a number of key administrative and fisheries staff changes during the reporting period. A new administration for the Virgin Islands was inaugurated in January 2007. Dr. David Olsen, a former researcher and Division of Fish and Wildlife Director in the early 1980's, was appointed as the new Director by Governor John deJongh. Filling fisheries personnel vacancies was established as a top priority. The adoption of a new fiscal system, in combination with a new administration, created delays in activating grants.

### **Queen Conch Survey – Virgin Islands**

The SEAMAP conch surveys were scheduled to be completed during the 2007 closed season which was extended through December 31, 2007. Completion of the 2004-2005 trap study took first priority, thus delaying sampling for the conch survey. The conch survey is expected to be completed during the 2008 closed season from June 1 to October 31. Spare batteries for the underwater scooters were requested and received from the SEAMAP-Caribbean Program Coordinator.

### **Trap Survey – Virgin Islands**

Upon receipt of the new research vessel in June, St. Thomas/St. John completed 20 trap survey trips during the reporting period. Several scheduled trips were cancelled due to adverse sea conditions. A total of 548 fish were caught in traps, representing 38 species. The most common species caught in both traps and hand lines were *Epinephelus guttatus* and *E. fulvus*. The remaining trapping trips will be completed in the first quarter of the 2008 reporting period on the island of St. Croix.

### **Supplemental Drift vs. Anchored Line Fishing – Virgin Islands**

Historically, St. Croix and Puerto Rico have conducted drift hook and line fishing during the reef fish trapping project while St. Thomas/St. John conducted anchored fishing. SEAMAP supplemental funds were obtained to determine an index between drift and anchored hook and line fishing so that line fishing results between island groups could be compared. During the study period, 7 out of 10 planned trips were completed. Adverse sea conditions resulted in the cancellation of several scheduled drift fishing trips. The remaining fishing trips will be completed during the first quarter of the 2008 reporting period.

### **Lobster Survey – Virgin Islands**

Due to the long delay in obtaining a new research vessel, it was necessary to request a grant extension for the SEAMAP lobster study to allow for completion of the previous two year's work on reef fish (trap and hook and line) and conch. No work has been completed on lobster during the reporting period.

### **Lobster Survey – Puerto Rico**

Although all material requisitions for the lobster survey were timely submitted, the delay in approval of the FY2007 Federal Budget prevented Puerto Rico from starting the procurement process on time. Field work for the artificial habitats and the pueruli collectors will start as soon as the materials arrive.

### **Queen Conch Survey – Puerto Rico**

A total of 40 interviews with fishermen were conducted on the west, south, and east coast of Puerto Rico. The information was plotted in maps

and compared with the data collected in 1995. In some areas, the fishermen were not willing to perform the interview. Sample stations were selected in a stratified randomized manner. A diver was hired for the surveys and all necessary gear and equipment was purchased. One hundred queen conch visual census surveys were conducted - 42 sites on the west coast, 40 sites on the east coast, 12 sites on the south coast, and 6 sites near Mona Island. A number of logistical problems arose during the sampling period that extended the survey beyond the queen conch closure. Nevertheless, sampling of most stations was done during the state closure season from July 11 - September 30, 2006. All stations were finished by November 17, 2006. Data entry and analysis of the surveys were performed and the data was also put into GIS format.

## **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<sup>1</sup>**

The SEAMAP Cooperative Winter Offshore Tagging Cruise was conducted from January 17-25, 2007 aboard the NOAA R/V OREGON II. Personnel from U.S. Fish and Wildlife Service, North Carolina Division of Marine Fisheries, Atlantic States Marine Fisheries Commission, East Carolina State University, North Carolina State University, Virginia Institute of Marine Science, and Maryland Department of Natural Resources participated in the cruise. This was the twentieth 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 of the population structure and exploitation rates. Other species tagged included Atlantic sturgeon, *Acipenser oxyrinchus*, horseshoe crab, *Limulus polyphemus*, and spiny dogfish, *Squalus acanthias*. Summer flounder, weakfish, and three species of skates were measured and released. A 20-30 foot basking shark was caught and successfully released.

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<sup>1</sup> Data from the cruise is preliminary and therefore subject to revision.

During the course of the trip, 369 striped bass were tagged, as were 5,493 spiny dogfish, 16 horseshoe crabs, and 13 Atlantic sturgeon. The largest striped bass was approximately 48 inches, while the largest Atlantic sturgeon measured approximately 67 inches. Although this year's cruise ranked low for the number of striped bass tagged (perhaps the result of warmer than usual water temperatures), the Winter Tagging Cruise has collectively tagged over 42,000 striped bass during its 20-year history. 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 Archiving Center and SIPAC. 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 Archiving Center and SIPAC; 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 in conjunction with 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 1982-2006 have been entered into the system and data from 2007 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 2007:

- 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 2007 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 2007 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 200 interested individuals. These plots were also available through the SEAMAP home page. Management agencies also received comprehensive data listings showing penaeid shrimp length frequencies, sampling parameters and environmental conditions.

### **SEAMAP Archiving Center**

Larval fish and fish egg samples sorted to the lowest taxa level possible by the Polish Sorting and Identification Center are returned to the SEAMAP Archiving Center (SAC) for archiving and loan to researchers. To date in 2007, 17,424 lots of samples were returned from the Polish Sorting and Identification Center. Data entry for 20,063 of the specimens has been completed in the SEAMAP Access data entry system. 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 survey data, and requests for data clarification. Seventy-six requests have been accommodated this year to eighteen 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-third year of operation. Sara LeCroy at the USM/GCRL Museum currently serves as the SIPAC curator. The overall

mission of the SIPAC, 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, continued during the year, but the focus remained on the recovery of material damaged by Hurricane Katrina. The SIPAC continues to provide unsorted plankton samples and data or specimens of larval invertebrates to qualified researchers upon request.

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 to date approximately 4,675 samples (52%) have been recovered and are in the process of being re-archived. An additional, as yet undetermined, number of vials containing partially or completely identified invertebrate plankton material have also been recovered and are currently being assessed. Prior to re-archiving, each of the recovered samples is carefully checked and the alcohol, internal and external labels replaced, if necessary. Available data from the labels are entered in an Excel spreadsheet as an ongoing record of sample recovery and as soon as the recovered samples are stabilized, data from samples known to be destroyed will also be entered. 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 may change slightly in the future as some of the salvaged material may ultimately prove to be damaged beyond recovery when it is examined more closely.

In July 2007, additional NOAA SEAMAP funds were awarded to aid in the recovery of the SIPAC plankton collection over the next two years. As a result, a half-time technician has been hired specifically to work on rehabilitating and reorganizing the recovered plankton samples and integrating new samples from ongoing cruises into the collection. She is being assisted by a graduate student in the Department of Coastal Sciences for part of that time. Thus, we are once again in a position to begin receiving backlogged material from past SEAMAP plankton cruises, as well as new material from current cruises.

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 ¾ 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 116 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.

Activities during the past year were limited to the recovery, maintenance and curation of the existing collection; no new material was cataloged and there were no new loan requests. The number of samples cataloged in the SIPAC collections prior to Katrina was 9,010, with 4,335 still missing post-Katrina and 326 samples currently on loan. During the next year, the SIPAC will continue to manage SEAMAP plankton collections, accession samples and provide available data from the collection to qualified researchers as requested. A high priority will be placed on the rehabilitation, reorganization and documentation of the post-Katrina collection.

### **Program Documents**

The following documents were published and distributed by the SEAMAP program in FY2007:

Gulf States Marine Fisheries Commission. 2007. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs. 1 p. + appendices.

Jimenez-Marrero, N.M., V. Seda-Matos, M. Cartagena-Haddock, N. Peña and A. Rosario, 2006. West Indian topshell, *Citarium pica*, distribution and abundance around Puerto Rico. Gulf and Caribbean Fisheries Institute, Belize.

Rester, J.K., M. Paine, and E. Ojeda Serrano. 2006. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 2005 to September 30,

2006. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. 10 pp.

Rester, J.K. 2006. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 2005 to September 30, 2006). No. 140. Gulf States Marine Fisheries Commission, Ocean Springs. 16 pp. + appendices.

### **PROPOSED SEAMAP ACTIVITIES, FY2008**

Last year, total program allocations for all three SEAMAP components, Gulf, South Atlantic and Caribbean, was approximately \$1.38 million. In FY2007, the Gulf SEAMAP component received a one-time supplement of \$1.89 million for fishery independent sampling in the Gulf of Mexico. At the August meeting, the SEAMAP components based their allocations for 2008 on level funding of \$1.38 million and \$5 million, which was the funding amount in the President's and Senate's proposed FY2008 budget. Proposed FY2008 activities for all participants are shown in Table 2.



**Table 2.**

**PROPOSED SEAMAP ACTIVITIES, FY2008**

	Fall	Winter	Spring	Summer
<b>Gulf of Mexico Activities</b>				
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 Shark Surveys	X		X	X
Florida Trawl Survey				X
Louisiana Inshore Survey	X	X	X	X
Information Operations:				
Biological and Environmental Atlas		X		
2008 Marine Directory			X	
FY2008 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
<b>South Atlantic Activities</b>				
Resource Surveys:				
Shallow Water Trawl Survey	X		X	X
Pamlico Sound Survey	X			X
Winter Trawling and Fish Tagging Cruise		X		
Bottom Mapping Project	X	X	X	X
Information Operations:				
Data Input and Request Processing	X	X	X	X
2007 South Atlantic Annual Report		X		
Data Analysis and Utilization	X	X	X	X
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X
<b>Caribbean Activities</b>				
Lobster Recruitment Surveys	X	X	X	X
Reeffish Surveys			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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