ANNUAL REPORT
of the
Southeast Area Monitoring and Assessment Program
October 1, 1996 - September 30, 1997

INTRODUCTION

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for 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 1985-1997. Funding allocations to participants for FY1985-FY1997 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 FY1997 and proposed activities for FY1998.

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 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 and 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 Puerto Rico Department of Natural and Environmental Resources, Virgin Islands Division of Fish and Wildlife, 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 1996 and March 1997, in conjunction with the Annual Fall and Spring Meetings of the GSMFC. All meetings included participation by various work group leaders, Coordinator, Data Manager, Program Manager, and the GSMFC Executive Director. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 1997 to discuss respective program needs and priorities for FY1998.

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 FY1997. 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.

SEAMAP - South Atlantic

The SEAMAP - South Atlantic Committee met once during FY1997, in conjunction with the SEAMAP joint meeting in Charleston, South Carolina. Topics for the meeting, held August 3, 1997 included: report of SEAMAP - South Atlantic activities in FY1997 (including work group reports, reports of survey activities and special studies, data management report, and utilization of SEAMAP - South

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 Department of Environmental Protection Louisiana Department of Wildlife and Fisheries Mississippi Department of Marine Resources/USM/IMS/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 Department of Environmental Protection Georgia Department of Natural Resources North Carolina Department of Environment, Health 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

Atlantic data), South Atlantic needs and funding priorities, funding for FY1998, and Bottom-mapping Work Group membership. Work group presentations were given for the Bottom-mapping and Shallow Water Trawl Work Groups.

The Bottom-mapping Work Group met on March 20-21, 1997 in St. Petersburg, Florida to discuss bottom-mapping activities in Florida. Topics discussed included review of progress by Florida Marine Research Institute, overview of possible approach to handling/displaying data in future (GIS capabilities), new database formats, workgroup recommendations for compilation/synthesis of all data sets in current fiscal period, and discussion of future initiatives. The Final Report from Florida's segment was completed, *Distribution of Hard-Bottom Habitats on the Continental Shelf off the Northern and Central East Coast of Florida.*

SEAMAP - Caribbean

During FY1997, the SEAMAP-Caribbean Committee in conjunction with the Reef Resources Work Group met several times to consider various issues concerning the status of ongoing projects in Puerto Rico and the U.S. Virgin Islands, proposed activities for FY1998, and budget matters. During these meetings, various issues were discussed including modifying the year's activities from the scheduled shallow-water reef fish monitoring to a one-year bottom mapping project as well as developing methodology for conducting the bottom mapping project.

RESOURCE SURVEYS

In FY1997, collection of resource survey information continued for the fifteenth 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 data base. 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 8, 1996 to December 5, 1996, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering a total of 346 trawl stations, in addition to plankton and environmental sampling.

Sampling design was similar to the Summer Shrimp/Groundfish Survey. 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.

During the survey, the NOAA Ship OREGON II sampled 199 stations in offshore waters and territorial Louisiana and Texas waters. The R/V VERRILL sampled 7 stations in Alabama territorial waters. The R/V TOMMY MUNRO sampled 29 stations in Mississippi territorial and offshore waters. The R/V PELICAN sampled 31 stations in Louisiana territorial and offshore waters. And Texas vessels sampled 80 stations within their territorial waters.

In addition, ichthyoplankton data were collected by NMFS and Louisiana vessels at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 50 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. NMFS completed 43 ichthyoplankton stations and Louisiana completed 7 stations. The samples, except those taken by Louisiana, will be sorted by the Polish Sorting and Identification Center . Once sorted, the specimens and data will be archived at the SEAMAP Archiving Center.

Louisiana Seasonal Day/Night Surveys

The Louisiana Department of Wildlife and Fisheries (LDWF) conducts seasonal day and night surveys as part of its continuing effort to provide comparative information on the abundance and distribution of critical life stages of major Gulf species, especially shrimp and associated environmental parameters. The sampling design for these surveys has changed little from similar day/night surveys in past years.

Sampling was conducted aboard the R/V PELICAN during July 1997. A stratified random station selection design was maintained, varying from the transects previously surveyed. During each segment, 24 stations were sampled during day and night at depths from 5 to 20 fm. The June sampling was completed as part of the SEAMAP Summer Shrimp/Groundfish Survey.

All seasonal trawls were completed with the standard SEAMAP net and doors. All organisms captured were identified, counted, measured and weighed. Environmental data and plankton/neuston sampling were conducted at trawl stations as well. Plankton samples were archived and sorted at the LDWF Plankton Laboratory. Specimens and data will be shipped to the SEAMAP Archiving Center in St. Petersburg, Florida. The area sampled covered Louisiana territorial and EEZ waters.

Spring Plankton Survey

For the fifteenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ships CHAPMAN and OREGON II and Florida's R/V SUNCOASTER sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 16 to June 10, 1997. A total of 187 stations was sampled. The CHAPMAN and OREGON II sampled 169 stations and the R/V SUNCOASTER sampled 18 stations along the west Florida shelf.

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 SIPAC. Salinity data from the Florida vessel were sent to the NMFS Mississippi Laboratories for interpretation.

Reef Fish Survey

The sixth Reef Fish Survey began on June 18 and will continue into late fall 1997. Vessels from NMFS, Texas, and Alabama sample inshore and offshore waters, in addition to plankton and environmental sampling. To date, approximately 230 stations have been sampled throughout the Gulf of Mexico. Randomly selected sites from Brownsville, Texas to Key West, Florida are chosen from known hard bottom locations. The objectives of the survey are to:

(1) assess relative abundance and compute population estimates of reef fish using a video/trap technique;

(2) determine habitat using an echo sounder and video camera;

(3) determine if bioacoustics assessment methodology can be applied to reef fish communities;

(4) collect environmental data at each station; and

(5) collect ichthyoplankton samples at selected reef sites.

The primary purpose of this survey is to assess the relative abundance and compute population estimates of reef fish. Stations are randomly-selected 100 m^2 sites which are designated as "reef areas". There are several aspects of the reef fish survey: 1) locating and compiling known hard bottom reef habitat locations; 2) surveying site selection; 3) sampling protocol using a fish trap and video camera and 4) analyzing the video records. Data are collected using the trap/video methodology where a fish trap containing a video camera is deployed onto the selected reef site. Trap soak time is one hour. After trap deployment, hydrographic data including a STD/light meter, transmissometer drop, secchi disk reading and surface chlorophyll samples will be collected. Also, after the last trap/camera set, one ichthyoplankton station will be completed each day with a surface neuston net and Tucker trawl. Environmental and plankton samples collected will use established SEAMAP protocols and plankton samples will be transshipped to the Polish Sorting and Identification Center.

Final analyses of video tapes are accomplished at the Pascagoula Lab, where data are recorded onto standard SEAMAP forms. Tapes are analyzed either in their entirety or by randomly-selected one minute intervals. The determinant factors for sampling are based on whether the reader can identify and count fish entering the camera field of view and record the data.

Summer Shrimp/Groundfish Survey

During the spring of 1997, there was communication between the Shrimp/Groundfish Work Group members to examine the design for the Summer Shrimp/Groundfish Survey and determine the random station locations for each participant.

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.

The overall sampling strategy during the 1997 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 entire survey occurred from June 2 to July 16, 1997. During the survey, the NOAA Ship OREGON II and R/V TOMMY MUNRO sampled offshore and inshore Gulf waters with 40-ft trawls. Alabama's R/V VERRILL sampled offshore Alabama waters 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.

A total of 315 trawl samples was taken from coastal and offshore waters out to 50 fm from Mobile Bay, Alabama, to Brownsville, Texas. All vessels took environmental data, including temperature, salinity, oxygen, and chlorophyll at each station.

In June, catch rates of brown shrimp east of the River were very low, with a maximum catch of 10.1 lb/hr of 66-count shrimp. White shrimp catches east of the River were all less than 1.0 lb/hr. The largest pink shrimp catch rate east of the River was 9.0 lb/hr of 26-count shrimp taken in 13 fm of water off the Mobile Bay. Finfish catch rates east of the River were low, with the largest catch of 870 lb/hr with longspine porgy predominating.

In July's samples west of the river (Louisiana) brown shrimp catches were also low with the largest catch rate of 18.3 lb/hr of 41-count shrimp occurring off Vermilion Bay in 16 fm. Catches of white shrimp were extremely low, with all catches less than 2.0 lb/hr. Finfish catch rates were also low with the largest catch rate of 2,330 lb/hr taken on July 10 with Atlantic croaker predominating.

Moderate catches of brown shrimp were made off Texas from June 2 to July 7. The largest catch rate occurred June 29 in waters off Matagorda Bay in 16 fm (57.1 lb/hr of 71-count shrimp). White shrimp catches off Texas were low with the

largest catch, 26.5 lb/hr of 15-count shrimp, also taken off Matagorda Bay in 6 fm. Catch rates for pink shrimp were also low off Texas, though the largest catch was 69.3 lb/hr of 32-count shrimp off the lower Laguna Madre in 8 fm. Finfish catch rates were low in Texas inshore and offshore waters. The largest catch of finfish was 2,115 lb/hr in 6 fm off Matagorda Bay with Atlantic croaker predominating.

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 in 1986-1996 and in the current year covered Gulf waters from Florida Bay to Brownsville, Texas. Vessels from Florida, Alabama, Mississippi, Louisiana and NMFS began surveying Gulf waters on September 3 and will continue into the first week of October. Stations are located along a 30-minute latitude/longitude grid from inshore waters to the shelf edge.

The NOAA Ship CHAPMAN is sampling stations from Tampa Bay, Florida to Brownsville, Texas at depths from 5 to 100 fm. The R/V VERRILL is sampling stations at the mouth and outside Mobile Bay. The R/V TOMMY MUNRO is sampling stations south of Mississippi Sound along a 30-minute grid. The R/V PELICAN is sampling stations in Louisiana territorial waters. And Florida's R/V SUNCOASTER is sampling stations off Tampa Bay south to the Florida Straits area.

Stations were sampled with standard SEAMAP bongo nets with 333-micron mesh and/or 1 x 2-meter neuston nets fitted with 947-micron mesh. In addition, hydrographic sampling including chlorophylls, salinity, temperature and dissolved oxygen from surface, mid-water, and bottom, and water transparency and water color was conducted at each station. Right bongo samples collected by NMFS and the Gulf States will be transshipped to the PSIC. Left bongo and neuston samples will be stored at the SIPAC at the Gulf Coast Research Laboratory for possible future sorting. Louisiana plankton samples will be sorted by LDWF according to SEAMAP protocols and specimens and data will be provided to the SAC.

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. Plankton and environmental data were also taken by Louisiana at all of its seasonal day/night survey stations. Samples were taken by participants with a 60-cm bongo net and a standard SEAMAP neuston net.

Objectives of these piggybacked surveys were to: (1) collect plankton samples throughout the survey area; and (2) collect associated hydrographic and environmental data at each plankton station. Additionally, environmental data (salinity, temperature, and oxygen from surface, mid-depth and bottom waters, and chlorophyll from surface 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 PSIC, 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.

Chlorophyll samples were filtered at each station using GF/C filters. All filters were put in petri disks and wrapped in foil for onboard storage in the freezer. Chlorophyll analysis will be completed ashore. Preservation of plankton samples was in buffered formalin prior to transfer to ethanol.

In addition to these piggybacked surveys, two major SEAMAP plankton surveys were conducted in FY1997, as detailed earlier.

SEAMAP - South Atlantic

Shallow Water Trawl Survey

The major SEAMAP - South Atlantic survey in FY1997 was the continuing Shallow Water Trawl Survey conducted by the South Carolina Department of Natural Resources (SCDNR). 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. The overall goal is to obtain a long-term database to facilitate management of stocks in the South Atlantic Bight.

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 in order 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 FY1997: Fall 1996 (September 30 - October 30), Spring 1997 (April 14 -May 9), and Summer 1997 (July 15 - August 4). Inshore strata (4.6 to 9.2m depths) were sampled

during each cruise. Offshore strata (9.2 to 19m depths) were sampled only during fall and spring when penaeid shrimp spawning is thought to occur. All samples were collected during daylight hours to maximize the opportunities for collecting juvenile mackerels.

The Fall 1996 cruise completed the eighth full year of standardized sampling under a stratified random survey design. Sampling was conducted during September 30 - October 30 at 94 stations and emphasized 24 target species for additional biological measurements. The overall abundance and mean catch per tow of king mackerel was greater than that of Spanish mackerel in inner strata. The overall abundance and mean catch per tow of king mackerel for fall 1996 was the highest observed in SEAMAP-South Atlantic catches. Spanish mackerel and king mackerel were most abundant in waters off Florida. White shrimp, the most abundant penaeid, made up 83% by number and were most abundant in Onslow Bay, North Carolina.

The Spring 1997 cruise sampled 105 stations from April 14 through May 9. SEAMAP-SA began using electronic fish measuring boards to record biological data. The spring tows yielded slightly less than the average abundance of individuals observed in spring collections for the 1990-1997 period. Invertebrate biomass was at the lowest level observed in SEAMAP-SA samples and consisted mostly of horseshoe crabs (*Limulus polyphemus)* and sponges. Abundance of both Spanish mackerel and king mackerel decreased from 1996 to 1997. Both species were most abundant in waters off Georgia. White shrimp was the most abundant penaeid collected, with 70% collected from strata off South Carolina.

The Summer 1997 cruise sampled 78 stations and targeted 24 species. Sampling was conducted from July 15 through August 4, 1997. The overall abundance of the mean number of individuals taken in summer collections was low compared with previous years, however catches increased from 1996. Similar to the Spring 1997 cruise, invertebrate biomass was the lowest ever observed in SEAMAP-SA summer samples. Spanish mackerel were most abundant in waters off Georgia. King mackerel were most abundant in tows made off Florida, where 96% of the king mackerel were collected. Brown shrimp was the most abundant commercially important penaeid taken during the cruise. The highest mean catch per tow of brown shrimp was taken in waters off South Carolina.

Data from the Fall 1996 and Spring 1997 cruises have been added to the SEAMAP Data Management System (DMS). Data from the Summer 1997 cruise are currently being added to the SEAMAP DMS. The results of the entire 1996 cruise season (Fall 1995, Spring 1996, and Summer 1996 cruises) are documented in the final 1996 project report, *Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY1996* by South Carolina Marine Resources Division.

Pamlico Sound Survey

During FY1997, 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.

Benthic Characterization

The Florida Department of Environmental Protection (FDEP) completed identifying and cataloging benthic invertebrates collected on four SEAMAP survey cruises in the south Atlantic region during 1983-1987. Selected invertebrate groups from northeast Florida were identified to the lowest appropriate taxonomic level.

Species of mollusk, crustaceans, and echinoderms have been cataloged and recorded in a database of benthic shelf fauna from Georgia to Palm Beach, Florida. All data are made available to the SEAMAP DMS. During FY1996, the final data on echinoderms were transmitted to the SEAMAP DMS. Identified organisms are housed in a number of reference collections, including Harbor Branch Foundation, Smithsonian Institution, and FDEP. During FY1997, work continued to prepare a Final Report.

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 reef fish resources and increased fishing pressure. In order to assess reef fish populations and the effects of changes in fishing pressure, the amount of habitat available for priority species of fishes 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 are being 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 FY 96-97, approximately 44,700 records had been compiled from databases obtained off North Carolina, South Carolina and 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. Staff with the Florida Marine Research Institute (FMRI) are currently in the process of editing the overall database to incorporate newly acquired data from some of the states. FMRI staff also are reproducing the overall database and all of the Bottom Mapping Final Reports on a CDROM that will be readable on any desk top operating system. This CDROM will also include maps showing the location of all data points, including data available for the near shore area south and west from Key Biscayne (Cape Florida) to Key West, Florida. FMRI staff are also working to develop a format for disseminating the Bottom Mapping database over the INTERNET through their server.

The Bottom Mapping Work Group also held a workshop during the spring of 1997 to review current activities and discuss future recommended initiatives. A summary of that workshop was provided to the ASMFC.

SEAMAP - Caribbean

During FY1997, there were several fishery-independent surveys conducted in Puerto Rico and the U.S. Virgin Islands. Beginning in early 1997, Puerto Rico and the U.S. Virgin Islands have been conducting a Spiny Lobster Survey. Sampling activities for lobster will be completed by the end of the year in Puerto Rico and will continue until March 1998 in the U.S. Virgin Islands. The purpose of this survey is to access the abundance and distribution of spiny lobster in the Caribbean region. Modified Witham collectors were used to sample post larval and juvenile lobsters. The collectors were placed at seven near-shore areas in a variety of habitats to ensure a representative sample. The stations included Mangrove Lagoon, Christmas Cove, Shark Island, Lavango Cay, Nazareth Bay, Buck Island, and Cas Cay. Latitude, longitude, and habitat type were recorded for each site. A total of 21 collectors was deployed at the various sites. Collectors were sampled at least once every two weeks. Collectors were brought onto the vessel and all puerli and juvenile lobsters were staged and counted. Date, time, weather conditions, salinity and temperature were recorded at each collector. The data collected will be entered into the SEAMAP Information System in the near future. The other survey that has been undertaken is the Reef Fish Survey. This survey is being conducted in Puerto Rico only and sampling began in April 1997 and will continue until March 1998. The survey uses fish traps to collect reef fishes in order to determine the distribution and abundance of important reef fishes in the Caribbean region.

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

During February 1-7, 1997, personnel from Acadia University and the states of North Carolina and Maryland, the Atlantic States Marine Fisheries Commission, the U.S. Fish and Wildlife Service (FWS), and the NMFS, participated in a striped bass tagging cruise. This was the ninth year of the cooperative project, initiated in 1988 at the request of SEAMAP-South Atlantic. Sampling was confined to North Carolina waters to tag coastal migratory fish using the southern part of the wintering grounds rather than outmigrants from Chesapeake Bay. Adult striped bass were tagged for assessment of the population structure and estimation of exploitation rates of the migratory Atlantic Coast stock.

A total of 1,391 striped bass were captured. All healthy fish were measured, tagged with FWS internal anchor tags and released. A total of 1,357 striped bass were tagged. Five Atlantic sturgeon were also tagged and released. For the second time, spiny dogfish were counted. A total of 1,482 spiny dogfish were captured, much less than in 1996, and of these 833, consisting mostly of large females, were tagged using dart tags. Captured tagged striped bass were tested for coded wire tags (CWTs) which indicate hatchery origin; 8 CWT positive fish were identified. A database for striped bass tag returns is managed by FWS in Annapolis, MD.

INFORMATION SERVICES

Information from the SEAMAP activities is provided to user groups through 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 documents.

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 1982-1996 have been entered into the system and data from 1997 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 requestors, although the highest priority is assigned to SEAMAP participants. A total of 210 SEAMAP data requests have been received and processed. In some instances, requests were filled promptly; in many cases, however, a substantial lag occurred because of the extremely large amount of data being collected on an increased number of surveys over those of past years. To date, 209 requests have been completed and work is being performed on those remaining.

The requirements report for an integrated data system, *Data Management System Design Study for Gulf and South Atlantic, 1987*, was completed in March 1987. The document identifies the high-level design specifications and recommended implementation plan for a module-based SEAMAP Data Management System (DMS). The design is based on information contained in the SEAMAP Gulf and South Atlantic DMS Requirements Document developed through a cooperative effort between NMFS and other SEAMAP participants. The document has five sections: (1) background and brief descriptions of current centralized and proposed distributed systems; (2) summary of the Requirements Survey; (3) overview of the system's architecture; (4) description of developmental modules constituting the DMS design; and (5) modular implementation plan which includes costs and schedule.

Work was completed during FY1990 on the new distributed SEAMAP DMS. New modules completed include those for data entry, edit, upload, data query and download. All of the Gulf, South Atlantic, and Caribbean participants are now equipped with the necessary computer hardware and software.

The system is decentralized, i.e., distributed. Thus, the SEAMAP users are able to locally, and directly, enter and retrieve data. Software for the system has been distributed to participants for trial runs of data input.

This system decreases the time necessary to enter and retrieve data and provides powerful and flexible local data analysis and display capabilities. Under the system, each SEAMAP site enters, verifies and edits their data, eliminating the mail-oriented loop necessary to enter/edit/verify data. Secondly, each site has the capability of locally accessing SEAMAP data, utilizing a user-friendly system. Local data retrieval allows the data to be accessed in a timely manner with a minimum amount of effort and programming skills.

Under the system, outside users (e.g., Minerals Management Service, U.S. Army Corps of Engineers, etc.) may request special data sets for research or study. The outside users submit the request to the SEAMAP Subcommittee through the appropriate coordinator for approval to proceed. Once the request is approved, the information is provided by the Data Manager and staff members through a priority-based, mail-oriented system. Also, SEAMAP participants may use the Special Request mechanism for data sets too large for economical downloading by telephone. These requests will be handled by a Central Operations staff in the same priority-based, mail-oriented manner as noted above.

SEAMAP data collected during surveys were used for a multitude of purposes in FY1997:

- Evaluation of the abundance and size distribution of penaeid shrimp in Federal and state waters to assist in determining opening and closing dates for commercial fisheries by NMFS;
- Evaluation of shrimp fishery bycatch and weakfish stock assessment by NMFS;
- Assessment of shrimp and groundfish abundance and distribution and their relationship to such environmental parameters as temperature, salinity, and dissolved oxygen by NMFS;
- Identification of environmental parameters associated with concentrations of larval finfish by NMFS;
- Compilation of the 1994 and 1995 SEAMAP Biological and Environmental Atlases by NMFS and GSMFC;
- Comparison of catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets by NMFS;
- Stock assessment of weakfish, striped bass, bluefish, spot and croaker by the ASMFC;
- Stock assessment of Spanish mackerel by South Atlantic Fishery Management Council and NMFS;
- Species differentiation of *Brevoortia smithi* and *B. tyranus* and age and growth of cobia by NMFS;
- Shrimp viral analysis, life history work on *Centropristis striata* (black sea bass) and *Ballistes capriscus* (gray triggerfish), and DNA research on *Paralichthys dentatus* (summer flounder) and *Cynoscion regalis* (weakfish) by SCDNR;
- Species verification study on *Brevoortia smithi* (yellowfin menhaden) by NMFS;
- Otolith and gonad analyses on seven species *Leiostomus xanthurus* (spot), *Micropogonias undulatus* (Atlantic croaker), *Pomatomus saltatrix* (bluefish), *Cynoscion regalis*, *Menticirrhus americanus* (Southern kingfish), *Paralichthys dentatus*, *Paralichthys lethostigma* (southern flounder) for a MARFIN project;

- Juvenile *Scomberomorus maculatus* (Spanish mackerel) for graduate research at Virginia Institute of Marine Science;

- *Rhizoprionodon terraenova* (Atlantic sharpnose shark) for graduate research at the University of Charleston;

- *Etropus crossotus* (fringed flounder) for life history/fecundity study at the University of South Carolina;

- Differentiation of skate and ray DNA by NMFS;

- Validation of juvenile abundance indices on *Cynoscion regalis, Leiostomus xanthurus, Menticirrhus americanus, M. saxatilis, Micropogonias undulatus, Paralichthys dentatus, P. lethostigma, Archosargus probatocephalus, Brevoortia tyrannus, Peprilus alepidotus, P. triacanthus, Pomatomus saltatrix,* and *Scomberomorus maculatus* by the North Carolina Department of Environment, Health, and Natural Resources;

- Squid (*Loligo* and *Lolliguncula*) for verification of field identification characteristics and genetic analysis for a Louisiana State University researcher;

- Differentiation of shark DNA by NMFS.

Real-time Data

A major function of the SEAMAP Information System in FY1997 was the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted three times weekly via cellular phone to the NMFS Pascagoula Laboratory from the NOAA vessel OREGON II, while the states' data were entered into the system weekly. Plots of station locations and catch rates of shrimp and dominant finfish species were prepared and edited at the NMFS Pascagoula Laboratory, and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. These plots were also available through the SEAMAP-Gulf 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 for archiving and loan to researchers. For FY1997, approximately 12,870 vials have been returned from the Polish Sorting and Identification Center. Data entry for 6,407 of the returned sorted samples has been completed in an improved and simplified SEAMAP DMS. Samples cataloged to date represent 18 orders, 126 families, 235 genera and 245 species.

The SEAMAP Archiving Center, which is managed in conjunction with Florida Department of Environmental Protection (FDEP) in St. Petersburg, Florida, processes both specimen loans and requests for associated plankton survey environmental data. The FDEP has completed renovations on the existing building which houses the SEAMAP Archiving Center, which will allow for expansion of the climate-controlled storage area and upgrading to current fire codes. The SEAMAP Archiving Center personnel, in cooperation with other staff from FDEP, completed the spring ichthyoplankton survey in May 1997 and will be participating in the fall ichthyoplankton cruise. The fall cruise was scheduled to depart in September 1997.

SEAMAP Invertebrate Plankton Archiving Center

The SIPAC is in its thirteenth year of operation. Ken Stuck of GCRL serves as SIPAC curator, and was assisted during FY1997 by a part-time post-graduate student and two graduate students in July and August. 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 FY1997. The SIPAC continues to provide unsorted plankton samples and data or specimens of larval invertebrates to qualified researchers upon request. The post-graduate and graduate students that were supported on SEAMAP funds also participated in SEAMAP cruises aboard the R/V TOMMY MUNRO and OREGON II during FY1997.

During FY1997, a total of 655 SEAMAP plankton samples were received and logged into the SIPAC database. The samples were obtained from the SEAMAP cruises conducted on the OREGON II, CHAPMAN, SUNCOASTER, and PELICAN. The number of samples currently cataloged in the SIPAC collections is 6,268. Samples currently on loan include: 146 samples from various OREGON II, CHAPMAN, HERNAN CORTEZ II and SUNCOASTER cruises to S. Turner; and 7 samples from TOMMY MUNRO cruises to B. Comyns.

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 7 years and duplicate samples sorted and received from the PSIC, are aliquoted to ¼ their original volume and placed into 100ml vials. 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. During FY1997, approximately 100 samples from 1986 SEAMAP cruises were aliquoted. To date, approximately 1,550 samples collected from 1982 - 1986 have been aliquoted and prepared for long-term storage. Due to the recent addition of samples to the collection during FY1997, there is currently no space available for additional samples to be deposited into the SIPAC archives.

During FY1997, an inventory of sorted SEAMAP materials was prepared which summarizes holdings by cruise and taxa. The post-graduate student hired in FY1997 was trained to sort samples for selected invertebrates according to SIPAC protocols. A total of 36 samples collected during OREGON II cruise 190 were sorted, bringing the total number of samples sorted for invertebrates to 1,494, consisting of 6,333 lots. The SIPAC post-graduate student resigned at the end of August and because of lack of funds, will not be replaced until next fiscal year. Therefore, SIPAC invertebrate sorting activities has been suspended.

During the next fiscal year, the SIPAC will continue to manage SEAMAP plankton collections, accession samples, and provide unsorted samples, sorted specimens and data from the collection to qualified researchers as requested. However, due to the resignation of the SIPAC post-graduate student and continual difficulties in retaining trained personnel to process samples, it is anticipated that no additional SEAMAP samples will be sorted for invertebrates in FY1998. Efforts with sorted materials will concentrate on curation and analysis of current holdings and publication of distribution patterns of selected taxa by cruise.

Program Documents

The following documents were published and distributed by the SEAMAP program in FY1997:

Boylan, Jeanne. 1997. 1997 Summer SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC. 7 pp.

Donaldson, D.M. 1996. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 1996 to September 30, 1997). Gulf States Marine Fisheries Commission, Ocean Springs, 29 pp. + appendices.

Donaldson, D.M., R. Peuser and A. Rosario 1996. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 1995 to September 30, 1996. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Department of Natural Resources. 13 pp.

Gulf States Marine Fisheries Commission. 1997. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 1 p. + appendices.

Donaldson, D.M., R. Minkler, P.A. Thompson, N. Sanders, Jr. 1997. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1994. No. 40. Gulf States Marine Fisheries Commission, Ocean Springs, 277 pp.

Donaldson, D.M., R. Minkler, P.A. Thompson, N. Sanders, Jr. 1997. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1995. No. 41. Gulf States Marine Fisheries Commission, Ocean Springs, 280 pp.

Peuser, R.L. 1997. SEAMAP - South Atlantic Annual Report, 1 October 1995 - 30 September 1996. Submitted to the South Atlantic Board of the Atlantic States Marine Fisheries Commission, Washington, DC. 121 pp.

Peuser, R.L. 1997. Southeast Area Monitoring and Assessment Program (SEAMAP) Management Fact Sheets: *Determining Year to Year Trends in Abundance, Essential Fish Habitat, Real-Time Monitoring for Shrimp Management,* and *Collection of Fish Eggs and Larvae.* Atlantic States Marine Fisheries Commission, Washington, DC. 4 pp.

Pulley, M.G. 1997. Pamlico Sound Survey, June 1995 Cruise Report, North Carolina Department of Environment, Health, Natural Resources, Division of Marine Fisheries. 30 pp.

Pulley, M.G. 1997. Pamlico Sound Survey, September 1995 Cruise Report, North Carolina Department of Environment, Health, Natural Resources, Division of Marine Fisheries. 36 pp.

South Carolina Marine Resources Division. 1996. 1996 Fall SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC. 7 pp.

South Carolina Marine Resources Division. 1997. 1997 Spring SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC. 7 pp.

South Carolina Marine Resources Division. 1997. Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY1996. South Carolina Department of Natural Resources, Charleston, SC. 58 pp.

PROPOSED SEAMAP ACTIVITIES, FY1998

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately $1.2 million. Proposed FY1998 activities for all participants are shown in Table 2.

TABLE 2.

PROPOSED SEAMAP ACTIVITIES, FY1998

	Fall	Winter	Spring	Summer
Gulf of Mexico Activities				
Resource Surveys:				
Spring Plankton Survey			X	
Reef Fish Survey			X	X
Summer Shrimp/Groundfish Surveys				X
Louisiana Seasonal Surveys	X	X	X	X
Fall Shrimp/Groundfish Surveys	X			
Fall Plankton Survey	X			
Plankton and Environmental Data Surveys	X	X	X	X
Information Operations:				
1995 Biological and Environmental Atlas		X		
1996 Biological and Environmental Atlas		X		
1998 Marine Directory			X	
FY1997 Joint Annual Report		X		
Real-time Data Summaries				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:				
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
1996 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
Caribbean Activities				
Resource Surveys	X	X	X	X
Information Operations:				
Coordination with Caribbean Countries Research Programs		X	X	
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X

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