

# ANNUAL REPORT

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

OCTOBER 1, 1999 - SEPTEMBER 30, 2000

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

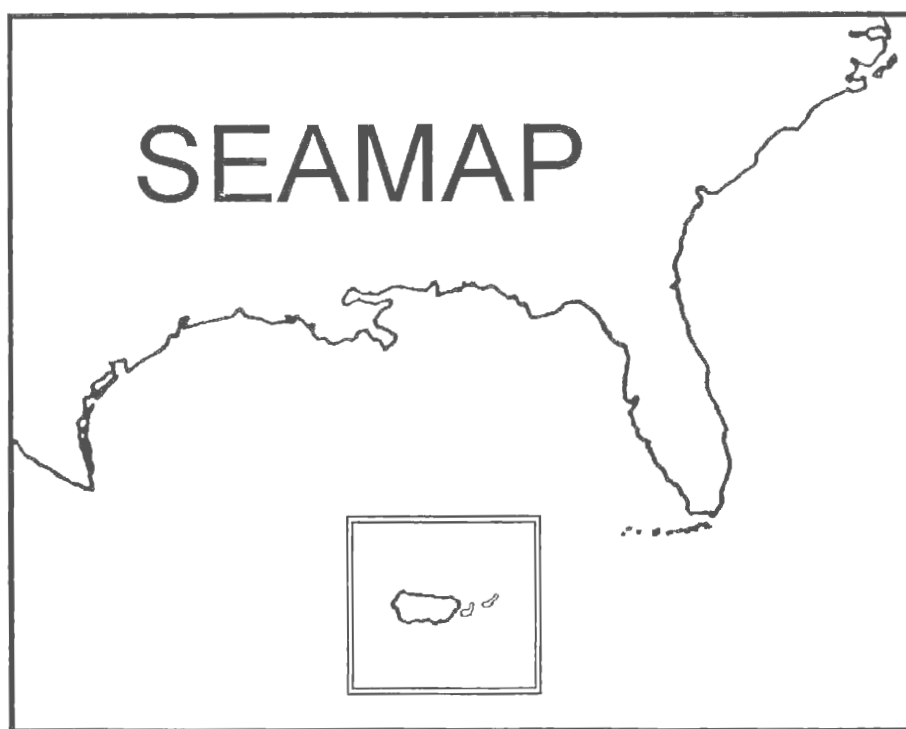
**SEAMAP - South Atlantic**  
Atlantic States Marine Fisheries Commission

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



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Annual Report Preparation By:

Jeffrey K. Rester  
Coordinator, SEAMAP - Gulf of Mexico

Geoffrey G. White  
Coordinator, SEAMAP - South Atlantic

Edgardo Ojeda Serrano  
Coordinator, SEAMAP - Caribbean

Design and Layout:

Cheryl Noble  
Gulf States Marine Fisheries Commission

# ANNUAL REPORT

## of the

### Southeast Area Monitoring and Assessment Program

#### October 1, 1999 - September 30, 2000

## 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 1985-2000. Funding allocations to participants for FY1985-FY2000 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 FY2000 and proposed activities for FY2001.

## 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 the 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 1999 and March 2000, 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 2000 to discuss respective program needs and priorities for FY2001.

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 FY2000. 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 held a conference call in April to determine project priorities and met in conjunction with the SEAMAP joint meeting in Savannah, Georgia during FY2000. Topics for the meeting, held August 3-4, 2000 included: report of SEAMAP-SA activities in FY2000 (including work group meetings and reports, reports of survey activities and special studies, data management report, and utilization of SEAMAP-SA data), funding for FY2001, and South Atlantic funding priorities for inclusion in the 2001-2005 SEAMAP Management Plan. Several changes were made to the membership of the South Atlantic Committee effective August 22, 2000: Henry Ansley (GA) was voted in as Chair of the Committee, Mike Street (NC) was replaced by Katy West, Alan Huff (FL) was replaced by Henry Norris, and David Whitaker (SC) was replaced by Dale Theiling who was elected vice-chair of the Committee. Due to the effective dates of this report, the active members through August 2000 are listed in the back of this document.

**TABLE 1.**  
**SEAMAP ORGANIZATION**

Program	Administering Organization	Participating Agencies
SEAMAP-Gulf of Mexico	Gulf States Marine Fisheries Commission	Alabama Department of Conservation and Natural Resources Florida Fish and Wildlife Conservation Commission Louisiana Department of Wildlife and Fisheries Mississippi Department of Marine Resources/USM/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 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

The Bottom Mapping Workgroup met May 18, 2000 in St. Petersburg, Florida. Topics discussed included a review of the South Atlantic Bight Hardbottom Mapping CD-ROM, (Version 1.1), improvements to be made for Version 1.2 and the development of future initiatives and funding priorities of the Bottom Mapping Workgroup. Workgroup members developed the outline for a new summary document to accompany the CD-ROM. The document should be completed by the end of calendar year 2000.

The Shallow Water Trawl Workgroup completed a ten-year trawl survey summary report. The Shallow Water Trawl Workgroup, the Crustacean Workgroup, and the Data Management Work Group are scheduled to meet in November, 2000.

#### **SEAMAP - Caribbean**

The SEAMAP-Caribbean Administrative and Working Group component met four times during the past year to discuss results of the previous year's projects, plan strategies and schedule use of equipment for the Bottom Mapping Projects, and the development status of the Reef Resources Survey

during 2000. The SEAMAP-Caribbean Committee updated the Management Plan for the 2001-2005 data collection period. The committee also evaluated and critically discussed other necessary studies and funding priorities. Delegates from the SEAMAP-Caribbean Committee participated in the Joint Annual Meeting held in Savannah, Georgia in August 2000. The Caribbean Chairperson served as chairperson at this meeting.

#### **RESOURCE SURVEYS**

In FY2000, collection of resource survey information continued for the nineteenth 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 16<sup>th</sup> to December 3<sup>rd</sup>, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering 409 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 269 stations from Mobile Bay, Alabama to Brownsville, Texas at depths out to 60 fm. The R/V VERRILL sampled 8 stations at the mouth and outside Mobile Bay. The R/V TOMMY MUNRO sampled 28 stations south of Mississippi Sound along a 30-minute grid. The R/V PELICAN sampled 24 stations in Louisiana territorial waters. 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 52 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. NMFS completed 45 ichthyoplankton stations, Mississippi completed 2 stations, and Louisiana completed 5 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.

### Reeffish Survey

The primary purpose of this survey is to assess the relative abundance and compute population estimates of reeffish. Stations are randomly selected 100 m<sup>2</sup> sites that are designated as "reef areas". There are several aspects of the reefish survey: 1) locating and compiling known hardbottom 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 are collected. Also, after the last set, one ichthyoplankton station is completed each day with a surface neuston net and Tucker trawl. Environmental and plankton samples collected use established SEAMAP protocols and plankton samples are transshipped to the Polish Sorting and Identification Center. Final analysis of video tapes is 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.

Reeffish sampling took place on several occasions throughout the fiscal year. Alabama conducted sampling on October 28, 1999, December 14, 1999, and January 11, 2000. Texas conducted sampling on November 8, 1999, March 24-25, 2000, April 14, 2000, April 26, 2000, August 1, 2000, and August 31, 2000. Due to budget constraints, NMFS was not able to participate in the Reeffish Survey this year.

### Spring Plankton Survey

For the nineteenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ship GORDON GUNTER sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 18 to May 30, 2000. A total of 177 stations was sampled. Florida's portion of the spring plankton survey was canceled again this year due to budget constraints. Due to rising overhead costs, the number of days allocated for Florida's portion of the spring cruise has been drastically reduced over previous years. The NMFS felt that it would be better to use some of the money allocated for the spring cruise to add a day to the fall cruise.

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).

## Summer Shrimp/Groundfish Survey

During the spring of 2000, 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 2000 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 5 to July 20, 2000.

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 388 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.

## 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 1986-1999 covered Gulf waters from Florida Bay to Brownsville, Texas. A total of 154 stations was sampled by the R/V SUNCOASTER, R/V TOMMY MUNRO, R/V PELICAN, R/V GORDON GUNTER and the R/V VERRILL. These samples were collected from August 31 to October 14, 1999.

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

## 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, 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 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.

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.

## SEAMAP - South Atlantic

### Shallow Water Trawl Survey

The major SEAMAP - South Atlantic survey in FY2000 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 FY2000: Fall 1999 (October 5 - November 11), Spring 2000 (April 17 - May 10), and Summer 2000 (July 18 - August 1). 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 1999 cruise completed the tenth full year of standardized sampling under a stratified random survey design. Sampling was conducted during October 5 - November 11 at 94 stations and emphasized 24 target species for additional biological measurements. The mean number of individuals taken per tow (mean = 2,008/tow) in fall collections was the highest level ever observed in SEAMAP-SA samples from fall trawls. This level of abundance primarily reflects the abundance of white shrimp and Atlantic croaker. Spanish mackerel were taken in all regions among inner strata, although they were most abundant off of Georgia. King mackerel were most abundant in Georgia. White shrimp were the most abundant shrimp species collected during the fall cruise. Also, seven loggerhead and one Kemp's ridley sea turtles were caught, tagged, and released alive.

The spring 2000 cruise sampled 105 stations from April 17 through May 10. Overall abundance from spring collections in 2000 was increased from the 1999 spring cruise levels, whereas the miscellaneous invertebrate biomass decreased. Catches of Atlantic thread herring accounted for 33% of all individuals collected in inner strata, followed by spot and Atlantic croaker in abundance. The spring 2000 cruise collected Spanish mackerel from all regions in inner strata. King mackerel abundance dropped in the spring 2000, following a trend observed in fall 1999. The abundance of penaeid shrimp were dominated by the white shrimp, which ranked fifth in abundance overall. Five sea turtles were caught, tagged, and released alive.

The summer 2000 cruise sampled 78 stations and targeted 24 species. Sampling was conducted from July 18 through August 1, 2000. The overall number of individuals taken in summer collections in 2000 was the second highest summer abundance observed from 1990-2000. Spot and Atlantic croaker accounted for 35% of all individuals captured. Spanish mackerel were taken in tows from all regions, but

king mackerel were only taken from the three southernmost regions, and were most abundant in waters off Florida. Brown shrimp were the most abundant penaeid shrimp species taken during the summer cruise. Brown Shrimp were taken from strata in all regions, but the highest mean catch per tow of brown shrimp was taken in waters off South Carolina. Ten sea turtles were caught, tagged, and released alive.

Data from the fall 1999 and spring 2000 cruises have been added to the SEAMAP Data Management System (DMS). Data from the summer 2000 cruise are currently being added to the SEAMAP DMS. The results of the entire 1999 cruise season (Spring 1999, Summer 1999, and Fall 1999 cruises) are documented in the final 1999 project report, *Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY1999* by South Carolina Marine Resources Division.

### **Pamlico Sound Survey**

During FY2000, 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.

### **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 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. Continuing into FY1998, staff with the Florida Marine Research Institute (FMRI) reproduced the Bottom Mapping Final Reports on a CD-ROM readable on any desk top PC (SEAMAP-SA South Atlantic Bight Hardbottom mapping CD-ROM, version 1.0). Included on the CD-ROM are data and maps covering the area from Florida to the North Carolina-Virginia border. The CD-ROM also includes GIS files, a map viewing program (ArcExplorer) and a database file of the entire region that can be imported into most database software systems. Version 1.1 of the CD was printed in February 1999, incorporating improvements suggested by the Bottom Mapping Workgroup. The Workgroup had no operational funds in FY1999. They met in May 2000 and discussed improvements to the CD for version 1.2, the development of a new summary hard copy document to accompany the CD, and product distribution to libraries for late 2000. Future priorities include increased availability of summary data via the Internet in both a static and interactive mapping formats. Copies of the Bottom Mapping CD version 1.1 are available through the ASMFC.

#### **SEAMAP - Caribbean**

The Virgin Islands component of the SEAMAP-Caribbean completed the Bottom Mapping Project in October 2000. This project commenced in June 1998. Due to Hurricane Georges in 1998 and change of staff, completion of the project was delayed. Because of the high cost of renting the side scan sonar equipment, \$25,000.00 was secured from the Southeast region (NMFS) to purchase a new Side Scan System (SSS) for

the Virgin Islands. The unit was received in April 1999. It was loaned to the University of Puerto Rico so they could complete their bottom mapping project in La Parguera Bay. This project is in its final phase of ground truthing. The SSS was returned to the Virgin Islands where the training phase ended in June 2000. The Virgin Islands component completed the mapping of one square nautical mile using SEAMAP funds and is continuing this project under USFWS funding. They have currently completed the side scan survey of nearly 4 sq. nm of the SEAMAP area project. They encountered some minor problems related to poor reception of the GPS differential signal from the USCG beacon in Isabela, Puerto Rico. The problem was corrected when a local beacon was placed in St. Thomas.

The Puerto Rico DNER coastal bottom mapping as part as the Essential Fish Habitat project has also been delayed. Although all the SSS equipment has been acquired, the project is still waiting for some crew and a new captain to be hired by the PR-DNER. Once all the crew are hired, Mona Island will be the first area to be mapped, continuing with the southwest coast of Puerto Rico.

The 1999-2000 Virgin Islands Reef Fish Survey in St. Thomas has been completed and the data compiled for post processing. The fiscal year 2000 Reef Fish Survey in St. Croix has been delayed until the repairs of the RV-SARIMA have been completed.

In Puerto Rico, the reef fish survey is running as scheduled. Monthly sampling trips were conducted until August, when sampling was curtailed in order to carry out ship repairs. After this, one of the crew members retired and they continued sampling using other DNER Marine Laboratory personnel. All data has been compiled for post processing. These samples are running jointly with a University of Puerto Rico red hind project.

#### **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 January 28 - February 4, 2000, personnel from the Atlantic States Marine Fisheries Commission, Maryland Department of Natural Resources, Virginia Marine Resources Commission, North Carolina

Division of Marine Fisheries, U.S. Fish and Wildlife Service (FWS), and the U.S. National Ocean Service participated in a striped bass tagging cruise. This was the 13<sup>th</sup> year of the cooperative project, initiated in 1988 at the request of SEAMAP-South Atlantic. Adult striped bass overwintering in the area between False Cape, Virginia and Wimble Shoals, North Carolina, were tagged for assessment of the population structure and estimation of exploitation rates of the migratory Atlantic Coast stock.

This year's cruise established a new record for the capture and tagging of migratory Atlantic striped bass. The scientific party and crew of the Oregon II processed 6,546 striped bass, exceeding the previous record of 4,632 fish in 1994. A total of 6,275 striped bass were tagged and released from 141 trawl sets. In an effort to focus on fish using the southern part of the wintering grounds, and to attempt to tag coastal migratory fish and avoid tagging Chesapeake Bay out-migrants, sampling locations were primarily in North Carolina waters. Efforts were also made to sample the Wimble Shoals area based on observed bycatch of large striped bass during the spiny dogfish gill net fishery. All healthy fish were measured, tagged with FWS internal anchor tags, and released. Captured striped bass were tested for coded wire tags (CWT) which indicate hatchery origin. No fish were recaptured with internal anchor tags or coded wire tags. Any additional striped bass mortalities were processed for scale and otolith aging, food habits determination, and PCB analysis of the muscle tissue. A database for striped bass tag returns is managed by the FWS in Annapolis, MD.

Additional work on the cruise included enumeration & tagging of spiny dogfish, tagging of Atlantic sturgeon, and measurement of summer flounder. Catches of spiny dogfish were down from prior years, and there was a notable lack of neonates. Length and sex data was obtained from 406 spiny dogfish. Eight Atlantic Sturgeon were captured, tagged, and released during this year's cruise. Also, 157 summer flounder were measured this year, but were not tagged since the NC Division of Marine Fisheries has discontinued their tagging program.

## 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 1982-1999 have been entered into the system and data from 2000 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. A total of 239 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, all requests have been completed.

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) a 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 States 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 SEAMAP-Gulf 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.

Requested SEAMAP data were used for a multitude of purposes in FY2000:

- 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;
- Compiling the 1999 and 2000 SEAMAP Biological and Environmental Atlases;
- Comparing catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets;
- Stock assessment of Atlantic menhaden, Atlantic croaker, and cownose ray by ASMFC;
- Bottom mapping data used as definition of Essential Fish Habitat for the South Atlantic by the South Atlantic Fishery Management Council;

- Shrimp viral study, and incidence of black gill disease in penaeid shrimp species;
- Life history data (age/growth, reproduction) on weakfish and red snapper;
- Horseshoe crab blood samples for genetic/species identification / stock identification studies;
- King and Spanish mackerel samples for study of heavy metal contamination by SC-DHEC;
- Marine turtle capture data for use by a sea turtle expert working group studying loggerhead and Kemp's ridley turtle abundance, the NMFS Marine Turtle Tagging database, and SCDNR sea turtle project; and
- Shrimp gut contents analyzed for comparison with that of baited shrimp for forensics study.

### 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 three times weekly via cellular phone 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 and edited at the NMFS Mississippi Laboratories, and processed by GSMFC for weekly distribution to management agencies, fishermen, processors and researchers. For the first time since 1997, SEAMAP real-time data plots were produced during the 2000 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 260 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.

Beginning in 1998, the SEAMAP Subcommittee decided to produce near-real-time data for the Fall Shrimp/Groundfish Survey. The second annual fall real-time data distribution was produced in January of 2000. Plots of station locations and catch rates of red snapper were prepared and edited at the NMFS Mississippi Laboratories, and processed by GSMFC for a summary distribution at the end of the Survey to management agencies, fishermen, processors and researchers. These plots were also available through the SEAMAP home page on the GSMFC web site.

### SEAMAP Archiving Center

Larval fish and fish egg samples sorted to the lowest taxal level possible by the Polish Sorting and Identification Center are returned to the SEAMAP Archiving Center for archiving

and loan to researchers. For 2000, 12,217 samples were returned from the Polish Sorting and Identification Center. Data entry for 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 the Florida Fish and Wildlife Conservation Commission (FWC) in St. Petersburg, Florida, processes both specimen loans and requests for associated plankton survey environmental data. Thirty-five requests have been accommodated in the present year to nine different researchers.

### **SEAMAP Invertebrate Plankton Archiving Center**

The SIPAC is in its sixteenth year of operation. Ken Stuck at the USM/IMS/GCRL serves as 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 at a reduced level of activity. The SIPAC continues to provide unsorted plankton samples and data or specimens of larval invertebrates to qualified researchers upon request.

One graduate student is employed by SIPAC. In addition to cataloging new samples, maintenance and curation of the existing collection, he is utilizing flatfish from the SEAMAP collections for his thesis research project. Activities were limited to maintenance and curation of the existing collection. The number of samples currently cataloged in the SIPAC collections is 7,358, with 146 samples currently on loan.

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. 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. Due to the recent addition of samples to the collection during the year, there is currently no space available for additional samples to be deposited into the SIPAC archives. However, once the ongoing aliquoting of the 1988-1989 SEAMAP samples has been completed, there should be sufficient space available for archiving additional samples.

During the next 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. 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 FY2000:

Gulf States Marine Fisheries Commission. 2000. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 1 p. + appendices.

Moore, T. 2000. Pamlico Sound Survey, July 1999 Cruise report. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC 28557. 33pp.

North Carolina Division of Marine Fisheries. 2000. Survey Population Parameters of Marine Recreational fishes in North Carolina. Annual Progress Report, grant F-42 segment 9 (January 1 - December 31, 1999). North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries. 82 pp.

Rester, J.K., G.G. White, and E. Ojeda Serrano. 1999. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 1998 to September 30, 1999. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. 10 pp.

Rester, J.K. 2000. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 1999 to September 30, 2000). No. 79. Gulf States Marine Fisheries Commission, Ocean Springs, 16 pp. + appendices.

Rester, J.K., D. Hanisko, P.A. Thompson, N. Sanders, Jr. 2000. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1998. No. 75. Gulf States Marine Fisheries Commission, Ocean Springs, 243 pp.

South Carolina Marine Resources Division. 1999. 1999 Fall SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 8 pp.

South Carolina Marine Resources Division. 2000. 2000 Spring SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 8 pp.

South Carolina Marine Resources Division. 2000. 2000 Summer SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 8 pp.

South Carolina Marine Resources Division. 2000. Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY1999. South Carolina Department of Natural Resources, Charleston, SC. 74 pp.

White, G.G. 2000. SEAMAP - South Atlantic Annual Report FY-1998, 1 October 1997 - 30 September 1998. Submitted to the South Atlantic Board of the Atlantic States Marine Fisheries Commission, Washington, DC. 81 pp.

White, G.G. 2000 SEAMAP - South Atlantic Annual Report FY-1999, 1 October 1998 - 30 September 1999. Submitted to the South Atlantic Board of the Atlantic States Marine Fisheries Commission, Washington, DC. 103 pp.

**PROPOSED SEAMAP ACTIVITIES, FY2001**

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately \$1.2 million. Proposed FY2001 activities for all participants are shown in Table 2.

**TABLE 2.**

**PROPOSED SEAMAP ACTIVITIES, FY2001**

	Fall	Winter	Spring	Summer
<b>Gulf of Mexico Activities</b>				
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:				
1999 and 2000 Biological and Environmental Atlas		X		
2001 Marine Directory			X	
FY2001 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
<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				
Information Operations:				
Data Input and Request Processing	X	X	X	X
2000 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>				
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

### SEAMAP-Gulf of Mexico Representatives

Richard Waller, Chairperson  
Mississippi Department of Marine Resources  
USM/IMS/Gulf Coast Research Laboratory

Joanne Lyczkowski-Shultz  
National Marine Fisheries Service  
Pascagoula Laboratory

Jim Hanifen, Vice Chairperson  
Louisiana Department of Wildlife and Fisheries

Richard Leard  
Gulf of Mexico Fishery Management Council

Terry Cody  
Texas Parks and Wildlife Department

Steve Heath  
Alabama Department of Conservation and Natural Resources

Mark Leiby  
Florida Fish and Wildlife Conservation Commission

### SEAMAP-South Atlantic Representatives

David Whitaker, Chairperson  
South Carolina Department of Natural Resources

Lisa Kline  
Atlantic States Marine Fisheries Commission

Roger Pugliese  
South Atlantic Fishery Management Council

John Merriner  
National Marine Fisheries Service  
Beaufort Laboratory

Alan Huff  
Florida Fish and Wildlife Conservation Commission

Michael Street  
North Carolina Department of Environment and Natural Resources

Henry Ansley  
Georgia Department of Natural Resources

### SEAMAP-Caribbean Representatives

Barbara Kojis, Chairperson  
Virgin Island Division of Fish and Wildlife

James Oland  
U.S. Fish and Wildlife Service

Aida Rosario  
Puerto Rico Department of Natural and Environmental Resources

Graciela Garcia-Moliner  
Caribbean Fishery Management Council

Manuel Valdés Pizzini  
Puerto Rico Sea Grant College Program

Miguel Rolón  
Caribbean Fishery Management Council

Richard Appeldoorn  
University of Puerto Rico

Jose Rivera  
National Marine Fisheries Service (Contractor)

William Tobias  
U.S. Virgin Islands Division of Fish and Wildlife

Ruth Gomez  
U.S. Virgin Islands Division of Fish and Wildlife

Efraín Hatchette  
U.S. Virgin Islands Division of Fish and Wildlife

### SEAMAP Personnel

Jeffrey K. Rester  
SEAMAP-Gulf Coordinator  
Gulf States Marine Fisheries Commission

David Borden, Chairman  
Atlantic States Marine Fisheries Commission

Geoffrey G. White  
SEAMAP-South Atlantic Coordinator  
Atlantic States Marine Fisheries Commission

Mark McDuff  
National Marine Fisheries Service  
SEAMAP Data Manager

Edgardo Ojeda Serrano  
SEAMAP-Caribbean Coordinator  
Puerto Rico Sea Grant College Program

Kenneth Stuck, Curator  
SEAMAP Invertebrate Plankton Archiving Center

Larry Simpson, Executive Director  
Gulf States Marine Fisheries Commission

Scott Nichols  
National Marine Fisheries Service  
SEAMAP Program Manager

John Dunnigan, Executive Director  
Atlantic States Marine Fisheries Commission

Cynthia Pierce  
National Marine Fisheries Service  
SEAMAP Program Officer

Fred Miller, Chairman  
Gulf States Marine Fisheries Commission

