

ANNUAL REPORT

OF THE

SOUTHEAST AREA MONITORING

AND ASSESSMENT PROGRAM

(SEAMAP)

OCTOBER 1, 1998 - SEPTEMBER 30, 1999

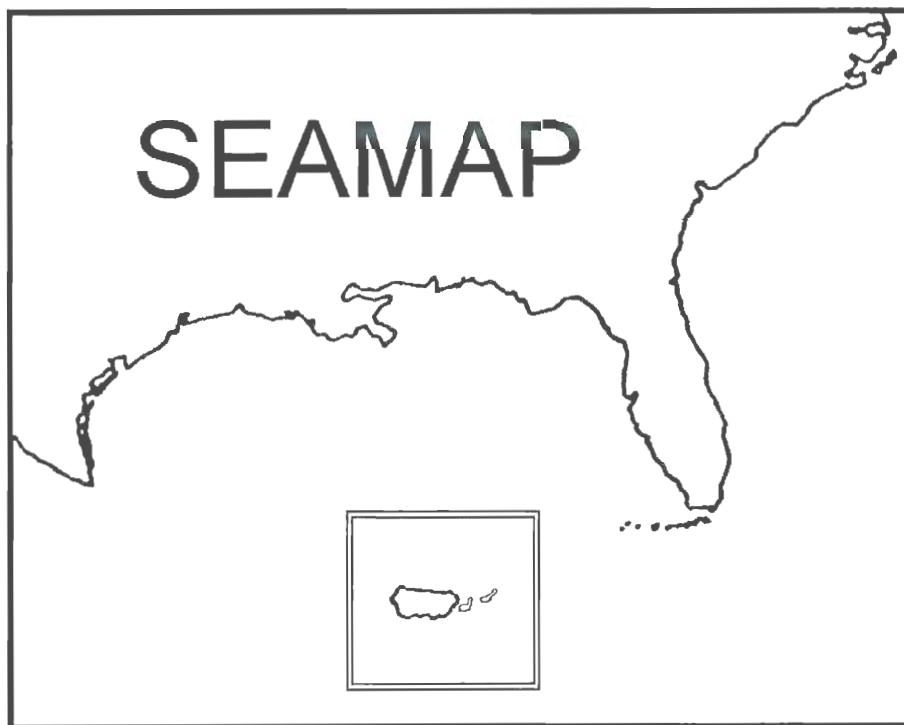
SEAMAP - Gulf of Mexico
Gulf States Marine Fisheries Commission

SEAMAP - South Atlantic
Atlantic States Marine Fisheries Commission

SEAMAP - Caribbean
Puerto Rico Sea Grant College Program

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ANNUAL REPORT of the Southeast Area Monitoring and Assessment Program October 1, 1998 - September 30, 1999

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 I.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-1999. Funding allocations to participants for FY1985-FY1999 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 FY1999 and proposed activities for FY2000.

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 1998 and March 1999, 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 1999 to discuss respective program needs and priorities for FY2000.

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 FY1999. 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 FY 1999, in conjunction with the SEAMAP joint meeting in New Orleans, Louisiana. Topics for the meeting, held August 5, 1999 included: report of SEAMAP-SA activities in FY1999 (including work group meetings and reports, reports of survey activities and special studies, data management report, and utilization of SEAMAP-SA data), web page development, funding for FY2000, and future South Atlantic funding priorities.

The Bottom Mapping Workgroup met May 14, 1999 in St. Petersburg, Florida. Topics discussed included a review of the South Atlantic Bight Hardbottom Mapping CD-ROM,

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

(Version 1.1), improvements to be made for Version 1.2, Internet access to view the hardbottom data, and development of future initiatives and funding priorities of the Bottom Mapping Workgroup. Workgroup members developed a distribution list for the second printing of the CD, and discussed future production of the CD.

A joint meeting was held between the Shallow Water Trawl Workgroup and the Crustacean Workgroup on June 3, 1999 in Charleston, South Carolina. The Trawl Workgroup reported the results of the spring cruise, and discussed future initiatives, including: the improvement of SEAMAP metadata, development of an Internet site, and continued development of a ten-year trawl survey summary report. The Crustacean Workgroup reviewed state reports of recent landings and legislative actions, discussed future initiatives, and coordinated the development of the 1999 Crustacean Newsletter.

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 scheduling for use of equipment for the Bottom Mapping Projects, and the development status of the Reef Resources Survey during 1999. A delegation of the SEAMAP-Caribbean participated in the Joint Annual Meeting, held in New Orleans, Louisiana in August 1999.

RESOURCE SURVEYS

In FY1999, collection of resource survey information continued for the eighteenth 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 11, 1998 to November 20, 1998 from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering 326 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 195 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 22 stations south of Mississippi Sound along a 30-minute grid. The R/V PELICAN sampled 21 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 41 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. NMFS completed 29 ichthyoplankton stations, Mississippi completed 2 stations, and Louisiana completed 10 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.

Spring Plankton Survey

For the eighteenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ship CHAPMAN sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 23 to June 1, 1999. A total of 184 stations was sampled. Florida's portion of the spring plankton survey was canceled this year. This was due to funding 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 for this year, at least, it would be better to use some of the funding 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 1999, 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 1999 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 1 to July 19, 1999.

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 1986-1998 covered Gulf waters from Florida Bay to Brownsville, Texas. Due to bad weather in the fall of 1998, most of the Fall Plankton survey was canceled. A total of 59 stations was sampled by the R/V TOMMY MUNRO, R/V PELICAN, and the R/V VERRILL. These samples were collected from September 22 to October 6, 1998. Stations are located along a 30-minute latitude/longitude grid from inshore waters to the shelf edge.

Stations are 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, 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 Polish Sorting and Identification Center. 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 provided to the SEAMAP Archiving Center.

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 FY 1999 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 FY 1999: Fall 1998 (October 5 - November 10), Spring 1999 (April 13 - May 13), and Summer 1999 (July 12 - July 30). 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 1998 cruise completed the ninth full year of standardized sampling under a stratified random survey design. Sampling was conducted during October 5 - November 10 at 94 stations and emphasized 24 target species for additional biological measurements. The mean number of individuals taken per tow (mean = 1,749/tow) in fall collections was the highest observed from 1990-1998. However, this level of abundance does not correspond to the abundance of the two fishes that typically dominate numerically. Croaker and spot ranked ninth and seventeenth in abundance, respectively. Miscellaneous invertebrate biomass was also at the second highest level ever observed in SEAMAP-SA samples from fall trawls. Spanish mackerel were taken in all regions among inner strata, although they were most abundant in Long Bay and off South Carolina. King mackerel reached the highest abundance ever recorded for a fall cruise, and were most abundant in Long Bay and off South Carolina. White shrimp were the most abundant shrimp species collected during the fall cruise and were fourth in abundance overall. Also, thirteen sea turtles were caught, tagged, and released alive.

The spring 1999 cruise sampled 105 stations from April 13 through May 13. Overall abundance from spring collections in 1999 was below the average abundance from spring cruises (1990-1999), whereas invertebrate biomass was above average for spring cruises. Catches of Atlantic croaker accounted for 21% of all individuals collected in inner strata, while spot ranked fourth in abundance. The spring 1999 Spanish mackerel were taken in tows from all regions in inner strata. King mackerel spring abundance reached the highest level since 1990. The abundance of penaeid shrimp were dominated by the white shrimp, which ranked fifth in abundance overall. Twelve sea turtles were caught, tagged, and released alive.

The summer 1999 cruise sampled 78 stations and targeted 24 species. Sampling was conducted from July 12 through July 30, 1999. Overall number of individuals taken in summer collections in 1999 decreased from 1998 levels. Spot and Atlantic croaker accounted for 32% of all individuals captured. Spanish and king mackerel were absent from collections in Raleigh Bay, North Carolina and were most abundant from waters off Florida. Brown shrimp were the most abundant penaeid taken during the summer cruise. Brown Shrimp were taken from strata in all regions except Raleigh Bay, but the highest mean catch per tow of brown shrimp was taken in Onslow Bay, North Carolina. Five sea turtles were caught, tagged, and released alive.

Data from the fall 1998 and spring 1999 cruises have been added to the SEAMAP Data Management System (DMS). Data from the summer 1999 cruise are currently being added to the SEAMAP DMS. The results of the entire 1998 cruise season (Spring 1998, Summer 1998, and Fall 1998 cruises)

are documented in the final 1998 project report, *Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 1998* by South Carolina Marine Resources Division.

Pamlico Sound Survey

During FY 1999, 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 FY 1998, staff with the Florida Marine Research Institute (FMRI) reproduced the Bottom Mapping Final Reports on a CD-ROM readable on any desktop 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 met in May 1999 and discussed future improvements to the CD, product distribution to libraries, and increased availability of summary data via the Internet in both a static and interactive mapping formats. Copies of the Bottom Mapping CD are available through the ASMFC.

SEAMAP - Caribbean

The Virgin Islands component of the SEAMAP-Caribbean began the 1998 SEAMAP study sites' Bottom Mapping Project in June 1998 with the side scan sonar mapping of Christmas Cove in St. Thomas. Additional mapping was postponed due to hurricane Georges during September 1998 and then due to the high rental cost of the side scan sonar equipment. \$25,000.00 were 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 and it has been on loan to the University of Puerto Rico so they can complete the La Parguera Bay bottom mapping project. The SSS will be returned to the Virgin Islands component in November and they will begin sampling upon its return. NMFS Staff and possibly University of Puerto Rico students will assist during the data collection. The 1999-2000 Virgin Islands Reef Fish Survey is on schedule. Six sampling trips have been completed and the data have been compiled for post processing.

The Puerto Rico component of SEAMAP-Caribbean submitted a completion report in April 1999 that covers the period of April 1994 to November 1998. The first sampling period, April 1994 to March 1995, corresponded to the Shallow-Water Reef Fish Survey. The second sampling period, April 1995 to March 1996, was the conch survey. The spiny lobster post-larvae settlement survey completes the cycle. Difficulties with the procurement process delayed the completion of the lobster survey. The Puerto Rico coast bottom mapping, which is a part of the Essential Fish Habitat project, has been delayed for other reasons. Although almost all of the equipment has been received, the side scan sonar is still on order. Once all of the equipment has been received, Mona Island will be the first bottom area to be mapped, continuing with the southwest coast of Puerto Rico.

SPECIAL STUDIES

In addition to the regularly-scheduled surveys, SEAMAP participates in a variety of other projects. The SEAMAP provides guidance, personnel and other contributions to these studies for enhancement and protection of the marine resources.

Winter Trawling and Fish Tagging Cruise

During January 31 - February 9, 1999, personnel from New York Department of Natural Resources, Maryland Department of Natural Resources, North Carolina Division of Marine Fisheries, and the U.S. Fish and Wildlife Service (FWS) participated in a striped bass tagging cruise. This was the 12th 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.

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 last three years of the spiny dogfish gill net fishery. All healthy fish were measured, tagged with FWS internal anchor tags, and released. A total of 283 striped bass were tagged and released from 146 trawl sets. 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 and tagging of spiny dogfish, tagging of Atlantic sturgeon, and measurement of summer flounder. Length and sex data were obtained from 800 spiny dogfish, 152 smooth dogfish, and 10 spiny dogfish pups. An additional 100 spiny dogfish were tagged with dart tags and released. In the past 12 years, 152 is the most smooth dogfish captured during a cruise, however, the numbers of spiny dogfish captured has declined over the years. Two Atlantic Sturgeon less than 1000 mm TL were captured, tagged, and released. 605 summer flounder were tagged this year, of which approximately 30 were retained for age analysis.

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 1982-1998 have been entered into the system and data from 1999 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 227 SEAMAP data requests has 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 FY1999:

- 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 1998 and 1999 SEAMAP Environmental and Biological I Atlas;
- Stock assessment of weakfish, striped bass, bluefish, spot and croaker by ASMFC;
- Bottom mapping data used to identify Essential Fish Habitat for the South Atlantic by the South Atlantic Fishery Management Council;
- Shrimp viral study, southern kingfish and weakfish samples for age-length key, black sea bass age & growth study, and DNA analysis of horseshoe crab and weakfish by SCDNR;
- Atlantic Sharpnose shark samples for graduate student research at the University of South Carolina;
- Atlantic bumper and blue runner for zoo-archeological reference collection for graduate student research;

- Gafftopsail catfish for graduate student research at University of South Carolina;
- Fish abundance data of *Paralichthys dentatus*, *Stenotomus sp.*, *Centropristis striata*, *Loligo sp.*, *Peprils triacanthus*, and *Squalus acanthias* to be used for essential fish habitat amendments by the Mid Atlantic Fishery Management Council; and
- Marine turtle capture data for use by a sea turtle expert working group studying loggerhead and Kemp's ridley turtle abundance.

Real-time Data

A major function of the SEAMAP Information System in the past 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 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. 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.

Due to the cancellation of near-real-time data distribution during the Summer Shrimp/Groundfish Survey in 1998, the SEAMAP Subcommittee decided to produce near-real-time data for the Fall Shrimp/Groundfish Survey. This was the first time the data were distributed during the fall. 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.

In January of 1999, the Gulf of Mexico Fishery Management Council asked the NMFS to not produce the near-real-time data during the 1999 survey. At their request, no near-real-time data were produced or distributed in the summer of 1999.

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 1999, 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 received 20,691

lots from the Polish Sorting and Identification Center during 1999.

The SEAMAP Archiving Center, which is managed in conjunction with Florida Fish and Wildlife Conservation Commission (FFWCC) 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 fifteenth 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, maintaining and curating the existing collection, he is utilizing flatfish from the SEAMAP collections for his thesis research project. Due to a reduction in available support, the SIPAC technical position was not filled during this reporting period and it is not anticipated that it will be filled in the next fiscal year. Therefore, activities were limited to maintenance and curation of the existing collection. The number of samples currently cataloged in the SIPAC collections is 6,947, with 153 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 7 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 1,600 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 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 1986 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 FY1999:

Gulf States Marine Fisheries Commission. 1999. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 1 p. + appendices.

North Carolina Division of Marine Fisheries. 1999. Survey Population Parameters of Marine Recreational Fishes in North Carolina. Annual Progress Report, grant F-42 segment 8 (January 1 - December 31, 1998). North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries. 39 pp.

Rester, J.K. 1999. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 1998 to September 30, 1999). Gulf States Marine Fisheries Commission, Ocean Springs, 15 pp. + appendices.

Rester, J.K., G.G. White and L. Hinkey. 1998. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 1997 to September 30, 1998. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. 10 pp.

Rester, J.K., D. Hanisko, P.A. Thompson and N. Sanders, Jr. 1999. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1997. No. 63. Gulf States Marine Fisheries Commission, Ocean Springs, 254 pp.

SEAMAP-SA. 1999. South Atlantic Bight Hardbottom Mapping CD-ROM, Version 1.1. Southeast Area Monitoring and Assessment Program - South Atlantic (SEAMAP-SA) Bottom Mapping Workgroup. Available: ASMFC (202) 289-6400, February 1999.

South Carolina Marine Resources Division. 1998. 1998 Fall SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 8 pp.

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

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

South Carolina Marine Resources Division. 1999. Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 1998. South Carolina Department of Natural Resources, Charleston, SC. 69 pp.

PROPOSED SEAMAP ACTIVITIES, FY2000

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately \$1.2 million. Proposed FY1999 activities for all participants are shown in Table 2.

TABLE 2.

PROPOSED SEAMAP ACTIVITIES, FY2000

	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:				
1998 and 1999 Biological and Environmental Atlas		X		
2000 Marine Directory			X	
FY2000 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
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
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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