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ANNUAL REPORT

OF THE SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM (SEAMAP)

OCTOBER 1, 2000 - SEPTEMBER 30, 2001

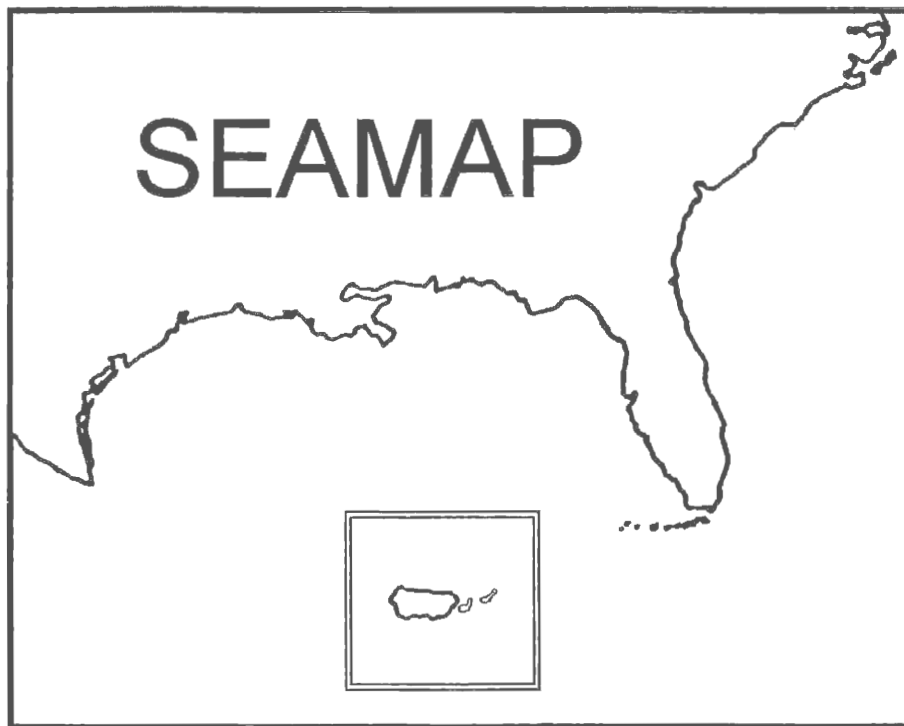
SEAMAP - Gulf of Mexico
Gulf States Marine Fisheries Commission

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, 2000 - September 30, 2001

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 1985-2001. Funding allocations to participants for FY 1985-FY 2001 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 FY 2001 and proposed activities for FY 2002.

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 2000 and March 2001, 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 2001 to discuss respective program needs and priorities for FY 2002.

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 FY 2001. 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 Shallow Water Trawl Work Group had an external review completed in November 2000 which provided guidance on sampling methodology and precision of the data. The Shallow Water Trawl work group held a conference call on November 14, 2000 to develop additional funding priorities for FY 2001. The Shallow Water Trawl/Crustacean Work Groups held a meeting on November 27-28, 2000 in Charleston, SC. The Trawl work group discussed the external trawl review and made recommendations to change sampling for 2001 by dropping the offshore strata and adding stations to the inshore strata to reduce variation in the data, and to begin collecting age, growth, and reproductive data for selected priority species.

The Data Management Work Group held a meeting November 15-16, 2000 in Charleston, SC. Progress was made on revising data formats in the new Oracle system, and

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/CMS/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

data availability on the Internet, and formatting and content of a draft SEAMAP.ORG web site.

The South Atlantic Committee held a conference call on November 20, 2000. The Committee reviewed work group reports and developed a recommendation to the South Atlantic Board for priority expenditures in 2001. The South Atlantic Board (SAB) met on November 29, 2000 to review and take action on the Committee recommendations.

The Bottom Mapping Work Group met May 17-18, 2001 in Charleston, SC to begin developing a list of issues necessary to create deepwater protocols and future work group priorities. Presentations were given by Geno Olmi (CSC), George Sedberry (SCDNR), and Steve Ross (UNC) on deepwater habitats and projects that may provide data for an expanded SEAMAP bottom mapping effort.

The SEAMAP-SA held their annual meeting in conjunction with the joint annual meeting held August 8-9, 2001, in St. Thomas, USVI. Topics discussed included funding allocation, SEAMAP database public view through Business Objects, and fisheries independent data collection/storage

standards. The new 2001-2005 Management Plan was distributed, and the committee developed a recommendation to the SAB for project funding in FY2001.

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. 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 Saint Thomas, USVI in August 2001. The South Atlantic Chairperson served as chairperson at this meeting. During this period some changes were made to the membership composition of the Caribbean committee, Efrain Hatchette and Ruth Gómez were replaced by K. Roger Uwate, Chief of Fisheries, USVI.

RESOURCE SURVEYS

In FY2001, collection of resource survey information continued for the twentieth 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 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 1986-2000 covered Gulf waters from Florida Bay to Brownsville, Texas. The Fall Plankton cruise took place from September 5 - October 16, 2000. Florida, Alabama, NMFS, Mississippi, and Louisiana sampled 148 stations on the west Florida shelf and northern Gulf of Mexico. The objective of this survey is to collect ichthyoplankton samples with bongo and neuston gear for the purpose of estimating abundance and defining the distribution of eggs, larvae, and small juveniles of Gulf of Mexico fishes, particularly king and Spanish mackerel, lutjanids and sciaenids.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with .333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. Wire angle was maintained at 45 degrees. Neuston samples were taken with .947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 48 hours were transferred to 95% ethyl alcohol for final preservation. Left bongo samples were preserved via an ethanol/ethanol transfer to aid in preservation of larval otoliths. In addition, hydrographic data (surface chlorophylls, salinity, temperature and dissolved oxygen from surface, midwater and near bottom, and Forelule 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).

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from October 14 - December 1, 2000, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to

60 fm, covering 373 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 232 stations from Mobile Bay, Alabama to Brownsville, Texas at depths out to 60 fm. The R/V VERRILL sampled 13 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 26 stations in Louisiana territorial waters. Texas vessels sampled 80 stations within their territorial waters.

In addition, ichthyoplankton data were collected by NMFS, Mississippi, and Louisiana vessels at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 55 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. NMFS completed 46 ichthyoplankton stations, Mississippi completed 2 stations, and Louisiana completed 7 stations. The samples, except those taken by Louisiana, will be sorted by the Polish Sorting and Identification Center. Once sorted, the specimens and data will be archived at the SEAMAP Archiving Center.

Spring Plankton Survey

The SEAMAP Spring Plankton Survey took place from April 17, 2001 through May 31, 2001. One hundred eighty-nine stations were sampled from the west Florida shelf to the Louisiana/Texas border. This was the twentieth year for the survey. The objectives of the survey were to collect ichthyoplankton samples for estimates of the abundance and distribution of Atlantic bluefin tuna larvae and collect environmental data at all ichthyoplankton stations.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with .333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. Wire angle was maintained at 45 degrees. Neuston samples were taken with .947-micron mesh nets on 1 x 2-

meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 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 Forelule 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).

Reeffish Survey

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

Reeffish sampling took place on several occasions throughout the fiscal year. Alabama conducted sampling on October 17, October 19-20, October 30, and November 3, 2000. NMFS conducted sampling May 29 - June 6, 2001 onboard the NOAA Ship OREGON II. NMFS also conducted sampling June 12-23 onboard the NOAA Ship MCARTHUR.

Summer Shrimp/Groundfish Survey

During the spring of 2001, 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 2001 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 through July 24, 2001. This was the twentieth year for the survey. Efforts were affected by Tropical Storm Allison, the OREGON II breaking down, and the trawl wench breaking on the OREGON II.

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. All vessels took environmental data, including temperature, salinity, oxygen, and chlorophyll at each station.

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 2001 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. Sampling was standardized in 1990, and a 10-Year Trawl Report was completed in December 2000 summarizing species composition, regional species assemblages, and trends in distribution and abundance of 27 priority species. 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 2001: Fall 2000 (October 2 - October 31), Spring 2001 (April 16 - May 10), and Summer 2001 (July 23 - August 16). Inshore strata (4.6 to 9.2m depths) were sampled during each cruise. Historic offshore strata (9.2 to 19m depths) were sampled only during the fall 2000 cruise when penaeid shrimp spawning is thought to occur. In January 2001, the sampling design was changed based on the results of an external program review. Offshore strata were discontinued, and additional stations were added to inshore strata for all three cruises to reduce variability in the abundance estimates for target species. All samples were collected during daylight hours to maximize the opportunities for collecting juvenile mackerels.

The fall 2000 cruise completed the eleventh full year of standardized sampling under a stratified random survey design. Sampling was conducted during October 2 - October 31 at 76 inshore stations and 16 offshore stations. Sampling emphasized 24 target species for additional biological measurements. The mean number of individuals taken per tow (mean = 1,312/tow) in fall collections were considerably lower than the record estimates observed in fall 1999. 2000 statistics primarily reflect the abundance of the striped anchovy, Atlantic moonfish, and the Atlantic bumper, which constituted 31% of overall abundance from fall collections taken from inner strata in 2000. The spot, and the Atlantic croaker, typically numerically dominant species, ranked 6th and 8th respectively in seasonal abundance. Spanish mackerel were taken in all regions among inner strata, although they were most abundant off of Georgia. King mackerel were also taken in all regions among inner strata, and most abundant in the Onslow Bay region. White shrimp were the most abundant shrimp species collected during the fall cruise. Also, eleven loggerhead turtles (*Caretta caretta*) were caught,

tagged, and released alive near the area of capture in waters off Florida (1), Georgia (2), South Carolina (4), Long Bay (3), and Onslow Bay (1). One of the turtles bore tags from the SCMRD Turtle Project.

The spring 2001 cruise sampled 102 stations from 24 inshore strata between April 16 through May 10. Deeper (offshore) strata (30-60 ft) are no longer being sampled by the survey. The total number of individuals collected (mean/tow = 1,067) in 2001 decreased from the spring 2000 level of abundance, whereas the miscellaneous invertebrate biomass (mean/tow = 137.4 kg) increased. The butterfish, constituted 29% of all individuals collected and was the most abundant species collected in spring SEAMAP trawls. Spot, Atlantic croaker, and weakfish, were the second, third, and fourth most abundant finfish species collected. Otolith and gonad samples were collected from specimens of weakfish (n=304), Atlantic croaker (n=140), and spot (n=272). For the first time in the history of the survey, counts were recorded for the cannonball jellyfish, *Stomolophus meleagris*, which ranked second in abundance. Cannonball jellyfish have washed up on southeastern beaches during spring, prompting a decision to record their relative abundance in SEAMAP trawl tows. The spring 2001 cruise collected Spanish mackerel from all regions except Raleigh Bay. King mackerel were only collected in waters off of South Carolina and Florida. Although the white shrimp was the most abundant commercially important shrimp species collected during the spring cruise, abundance was very low, only slightly greater than the record low observed in 1996. Six sea turtles were caught, tagged, and released alive.

The summer 2001 cruise sampled 102 stations in 24 inshore strata (including 24 new stations sampled for the first time during the summer cruise). Sampling was conducted from July 23 through August 16, 2001. A total of 124 species or genera was identified in summer trawls. Both the abundance of individuals collected (mean/tow=2019) and the miscellaneous invertebrate biomass (mean/tow = 70.2 kg) in 2001 increased from the summer 2000 level of abundance. Overall abundance was the highest since the record year observed in 1991 and miscellaneous invertebrate biomass reached a record level for summer trawls. Levels of abundance and biomass may be a reflection of the greater number of stations towed and the reallocation of stations within each stratum in 2001. Otolith and gonad samples were collected from specimens of weakfish (n=306), Atlantic croaker (n=439), spot (n=233), and southern kingfish (n=32). Spanish mackerel were relatively abundant, with the 2001 summer catch exceeded only in summer 1991. Spanish mackerel were taken in tows from all regions, but were most abundant in Onslow Bay. King mackerel were taken in all regions, except Raleigh Bay, 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 of Onslow Bay. Ten sea turtles were caught, tagged, and released alive.

Data from the fall 2000 and spring 2001 cruises have been added to the SEAMAP Data Management System (DMS).

Data from the summer 2001 cruise are currently being added to the SEAMAP DMS. The results of the entire 2000 cruise season (Spring 2000, Summer 2000, and Fall 2000 cruises) are documented in the final 2000 project report, Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 2000 by South Carolina Marine Resources Division.

Pamlico Sound Survey

During FY 2001, 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 had no operational funds in FY 1999. They met in May 2000 and discussed improvements to the CD for version 1.2, the development of a new summary hardcopy document to accompany the CD, and product distribution to libraries for late 2000. During 2001, the workgroup met to discuss the development of protocols to capture deepwater (200-2000m) data on bottom type for funded action in 2002. 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 1.2 and the summary document 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. The Puerto Rico 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 the 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 was completed and the data entered into the TIP database and forwarded to NMFS. The FY 2000 Reef Fish Survey in St. Croix was delayed due to repairs to the RV-SARIMA and installation of the pot hauler and davit on the boat.

In Puerto Rico, the three year cycle of the reef fish survey ran as scheduled. Monthly sampling trips were conducted until March, when the sampling cycle was completed. At the present time a report with the results is in preparation. In April, Puerto Rico started the queen conch survey, which will be carried out at the stations previously sampled in 1995. For this new survey additional areas will be sampled at the south coast of Puerto Rico. The survey was expanded to these areas due to an increase in funding for the sampling period. The survey is undertaken as a cooperative agreement between the PR Department of Natural and Environmental Resources and the University of Puerto Rico. Sampling started at the west and south coasts 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 14-19, 2001, personnel from the Atlantic States Marine Fisheries Commission, Maryland Department of Natural Resources, North Carolina Division of Marine Fisheries, U.S. Fish and Wildlife Service (FWS), and the National Marine Fisheries Service participated in a striped bass tagging cruise. This was the 14th 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 capture and tagging of migratory Atlantic striped bass exceeded the long-term average value for striped bass caught (14-year average of 1,959) and tagged (14-year average of 1,759). The Scientific Party and crew of the OREGON II, trawling night and day in the Atlantic Ocean off the North Carolina Outer Banks, processed 2,473 fish. In addition to tagging 2,445 of the striped bass, scale samples were taken for aging fish. All healthy fish were measured, tagged with FWS internal anchor tags, and released. Fish which were mortally injured during capture were sacrificed for aging, prey analysis and genetic sampling.

Observations were also taken regarding weakfish abundance and distribution. Fewer large fish were observed this year, and juvenile weakfish remain extremely abundant south of Cape Hatteras.

Four Atlantic sturgeon were captured this year. They were tagged and released after taking tissue samples for genetic analysis. Whales of an unknown species were observed once during the cruise this year. For the fifth consecutive year during this cruise, spiny dogfish were enumerated. As observed in the previous years, the majority of the adult or immature fish encountered were females, but more males were captured again this year. Total numbers of spiny dogfish captured were well below prior years' totals. The spiny dogfish work is conducted in cooperation with the National Marine Fisheries Service--Northeast Fisheries Science Center, North Carolina Division of Marine Fisheries, East Carolina University, and Acadia University in Wolfville, Nova Scotia, Canada.

Data from the initial twelve years of the cruise were entered into a geographic information system (GIS) database at the U.S. Fish and Wildlife Service's Raleigh, NC, Ecological Services field office. Preliminary plots of cruise tows and recapture localities have been made; however, additional cleaning of the database must take place before final analysis can be conducted. Also this year, in association with the Atlantic States Marine Fisheries Commission's Habitat Program and the National Marine Fisheries Service, data from all 14 years of the cruise have been entered into a GIS database at NMFS headquarters in Silver Spring, MD, and are undergoing analysis by intern Jodi Marcus, with assistance from GIS Specialist Keith Bickers, to assess habitat use off North Carolina as well as patterns of travel and habitat use inferred from coastwide tag returns. Preliminary GIS products have been prepared and additional work is underway. A summary report which will analyze and discuss the data from the past 14 cruises is under preparation.

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 1982-2000 have been entered into the system and data from 2001 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 252 SEAMAP data requests have been received. In most instances, requests were filled promptly. To date, 248

requests have been completed. During this reporting period, 13 requests were received.

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 FY2001:

- 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 2000 and 2001 SEAMAP Biological and Environmental Atlases;
- Stock assessment of Atlantic Menhaden, and weakfish by ASMFC;
- VPA stock assessment of Atlantic sharpnose and bonnethead sharks;
- Bottom mapping data used as definition of Essential Fish Habitat for the South Atlantic by the South Atlantic Fishery Management Council;
- Historical and current shark abundance in the South Atlantic Bight for SCDNR, NMFS Highly Migratory Species;
- Life history data (age/growth, reproduction) on weakfish, Atlantic croaker, spot, and southern kingfish;
- Horseshoe crab blood samples for genetic/species identification / stock identification studies;
- Tissue samples from banded drum and southern flounder for DNA analysis for NOAA forensic standards;
- 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, SCDNR sea turtle project, and the US Navy.
- Collection of *Portunus* crab species for stock identification studies;
- Weekly penaeid shrimp abundance information from the Spring South Atlantic Trawl survey to evaluate season opening dates in Georgia and South Carolina;
- Coastal temperature data for Coast Guard evaluation of the need for survival suits on vessels in the South Atlantic;

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. SEAMAP real-time data plots were produced during the 2001 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 240 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.

Data from the 2000 Fall Shrimp/Groundfish Survey were used to produce red snapper real-time plots. These plots described research trawl effort and catch rates for juvenile red snapper during the Survey. This was the third year the plots were produced and distributed to interested individuals.

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 2001, 34,155 samples were returned from the Polish Sorting and Identification Center. Data entry for sorted samples is being completed in the new Oracle format of the SEAMAP DMS. The 20,933 samples cataloged this year represent 18 orders, 126 families, 235 genera and 245 species.

The SEAMAP Archiving Center, which is managed in conjunction with Florida Fish and Wildlife Conservation Commission (FWC) in St. Petersburg, Florida, processes both specimen loans and requests for associated plankton survey environmental data. Fifty-six requests have been accommodated this year to ten different researchers at both the state and federal level.

SEAMAP Invertebrate Plankton Archiving Center

The SIPAC is in its seventeenth year of operation. Sara LeCroy at the USM/CMS/GCRL currently 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.

The graduate student previously employed by SIPAC graduated during the current year and will be replaced by another student or technician. This person will assist the curator with the cataloging of new samples, and the maintenance and curation of the collection. Activities during the year included the maintenance and curation of the existing collection, as well as the cataloging of 251 additional bongo net samples from year 2000 SEAMAP plankton cruises. The number of samples currently cataloged in the SIPAC collections is 7,609, 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 1988-1990 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:

Atlantic States Marine Fisheries Commission. 2000. SEAMAP 10-Year Trawl Report: Results of trawling efforts in the coastal habitat of the South Atlantic Bight, FY 1990-1999. Atlantic States Marine Fisheries Commission, Special Report No. 71. 143 pp.

Gulf States Marine Fisheries Commission. 2001. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 1 p. + appendices.

Rester, J.K., G.G. White, and E. Ojeda Serrano. 2000. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 1999 to September 30, 2000. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. 10 pp.

Rester, J.K. 2001. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 2000 to September 30, 2001). No. 92. Gulf States Marine Fisheries Commission, Ocean Springs, 16 pp. + appendices.

Rester, J.K., D. Hanisko, B. Pellegrin, N. Sanders, Jr. 2001. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1999. No. 82. Gulf States Marine Fisheries Commission, Ocean Springs, 247 pp.

South Carolina Marine Resources Division. 2000. 2000 Fall SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 7 pp.

South Carolina Marine Resources Division. 2001. 2001 Spring SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 9 pp.

South Carolina Marine Resources Division. 2001. 2001 Summer SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 9 pp.

South Carolina Marine Resources Division. 2001. Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 2000. South Carolina Department of Natural Resources, Charleston, SC. 74 pp.

Southeast Area Monitoring and Assessment Program-South Atlantic. 2001. Distribution of Bottom Habitats on the Continental Shelf from North Carolina through the Florida Keys. SEAMAP-SA Bottom Mapping Workgroup, Atlantic States Marine Fisheries Commission, Washington, DC. 166 pp.

Southeast Area Monitoring and Assessment Program-South Atlantic. 2001. South Atlantic Bight Bottom Mapping CD-ROM, Version 1.2. SEAMAP-SA Bottom Mapping Workgroup. Atlantic States Marine Fisheries Commission, Washington, DC.

White, G.G.. 2001. SEAMAP - South Atlantic Annual Report FY-2000, 1 October 1999 - 30 September 2000. Submitted to the South Atlantic Board of the Atlantic States Marine Fisheries Commission, Washington, DC. 105 pp.

White, G.G.. 2001. Southeast Area Monitoring and Assessment Program (SEAMAP) Management Plan: 2001 - 2005. Atlantic States Marine Fisheries Commission. 105 pp.

PROPOSED SEAMAP ACTIVITIES, FY2002

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately \$1.4 million. Proposed FY2002 activities for all participants are shown in Table 2.

Table 2.

PROPOSED SEAMAP ACTIVITIES, FY2002				
	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				
2000 and 2001 Biological and Environmental Atlas		X		
2002 Marine Directory			X	
FY2002 Joint Annual Report		X		
Real-time Data Summaries		X		X
Data Input and Request Processing	X	X	X	X
Specimen Archiving and Loan	X	X	X	X
Program Administration	X	X	X	X
Joint Planning Activities	X	X	X	X
South Atlantic Activities				
Resource Surveys:				
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
2001 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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