

ANNUAL REPORT of the Southeast Area Monitoring and Assessment Program October 1, 2001 - September 30, 2002

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 1985-2002. Funding allocations to participants for FY1985-FY2002 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 FY2002 and proposed activities for FY2003.

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 2001 and March 2002, 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 2002 to discuss respective program needs and priorities for FY2003.

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 FY2002. 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

One committee meeting and three work group meetings were coordinated and documented in FY2002. Additional tasks included fulfilling data requests, preparation of annual program reports and State/Federal Cooperative Agreements, and distribution of publications.

The SEAMAP-South Atlantic Committee held their annual meeting in conjunction with the joint annual meeting held August 6-8, 2002, in San Antonio, Texas. The meeting included participation by the work group leaders and coordinator. Topics discussed included funding allocation, SEAMAP database public view through Business Objects, fisheries-independent data collection/storage standards, NMFS data management activities, and direction on workgroup activities. The committee also developed a recommendation to the South Atlantic Board for project funding in FY2003.

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

The Crustacean Work Group held a symposium in conjunction with the Southeast Estuarine Research Society in Savannah, Georgia from February 28 to March 2, 2002. The symposium focused on "Management, Monitoring, and Habitat Considerations for Crustacean Fisheries in the Southeastern United States." The meeting also provided a means for technical information exchange between scientists working for both academic and management purposes.

The Shallow Water Trawl Work Group had an external review completed in November 2000 that provided guidance on sampling methodology and precision of the data. Based on that review, the Shallow Water Trawl Survey modified the sampling strategy beginning with the spring 2001 cruise 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 Work Group held a meeting on September 9-10, 2002 to discuss survey needs and outline data management issues for the Data Management Work Group.

The Bottom Mapping Work Group met September 19-20, 2002 in Charleston, South Carolina. They began to create protocols to convert existing data on deepwater bottom habitats into a standard format as Phase 1 of a project to extend the bottom mapping GIS product

from the 200-meter to 2,000-meter depth contour. Phase 2 of the project is also underway to create an annotated, searchable bibliography of deepwater bottom type data sources. Phase 1 and 2 will be completed by spring 2003. In the final phase of the project (2003-2005), the protocols developed in Phase 1 will be used to convert data identified in Phase 2 into a digital GIS mapping tool.

The Data Management Work Group will hold a meeting in December 2002 to review the NMFS data formats and functionality in the new Oracle system relative to the needs identified by the Trawl Work Group and South Atlantic Committee.

SEAMAP - Caribbean

The SEAMAP-Caribbean Administrative and Working Group component met three times during the past year to discuss results of previous year's projects, to evaluate the status of conch projects and their reports, overview the status and coordinate efforts on current lobster surveys, and overview the reefish survey in St. Croix. The coordination section contracted a fisheries specialist to evaluate all available DMS (PR and VI) reefish data for an extensive quality control and consistency verification. A final report with all findings was submitted to the SEAMAP-Caribbean Working Group and recommendations were discussed on

October 15, 2002. The Committee discussed and planned the next cycle studies, and 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 San Antonio, Texas in August 2002.

RESOURCE SURVEYS

In FY2002, collection of resource survey information continued for the twenty-first consecutive year. Surveys by each program component reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. For instance, the South Atlantic program's Bottom Mapping will be useful in SEAMAP-Gulf gear calibration efforts, while plankton and environmental surveys in the Gulf program have set the standards for the entire region's much-needed long-term database. Because of the diverse scope and target species involved in the SEAMAP's survey operations, activities are discussed here by geographic region.

SEAMAP - Gulf of Mexico

Fall 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 1986-2001 covered Gulf waters from Florida Bay to Brownsville, Texas. The Fall Plankton Survey took place from August 28, 2001 through December 5, 2001. Florida, Alabama, NMFS, Mississippi, and Louisiana sampled 171 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 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).

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from October 10 - December 13, 2001, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering 334 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.

NMFS, Mississippi, Alabama, and Louisiana vessels collected ichthyoplankton data at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 49 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 Polish Sorting and Identification Center will sort the samples, except those taken by Louisiana. 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 18, 2002 through May 31, 2002. One hundred sixty-seven stations were sampled from the west Florida shelf to the Louisiana/Texas border. This was the twenty-first 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 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).

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. NMFS conducted sampling April 2 through May 31, 2002. Three hundred twenty-four sites were sampled using trap videos and fish traps.

Summer Shrimp/Groundfish Survey

During the spring of 2002, 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 2002 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 3 through July 17, 2002. This was the twenty-first year for the survey.

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 2002 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. 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. 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 2002: Fall 2001 (October 2 - November 9), Spring 2002 (April 10 - May 9), and Summer 2002 (July 15 - August 1). Inshore strata (4.6 to 9.2m depths) were sampled during each cruise. All samples were collected during daylight hours to maximize the opportunities for collecting juvenile mackerels.

The fall 2001 cruise completed the twelfth full year of standardized sampling under a stratified random survey design. However, it also completed the first full year of sampling only the inner strata using optimal station allocation. Sampling was conducted during October 2 - November 9 at 102 inshore stations, including 24 stations that were not sampled during previous fall cruises. Sampling emphasized 27 target species for additional biological measurements. Although the mean catch per tow for individuals collected (n=122,242 individuals, x/tow=1198 individuals) decreased only slightly from the level observed in fall 2000, the miscellaneous invertebrate biomass (n=14,292 kg, x/tow=140.1 kg) in 2001 increased from the level observed in fall 2000. Spot and Atlantic croaker, typically numerically dominant species, ranked 9th and 14th respectively in seasonal abundance. Otoliths were collected from specimens of weakfish (n=189), Atlantic croaker (n=226), spot (n=249), and southern kingfish (n=413). Additionally, gonad samples were collected for verification of onboard maturity assessments. Spanish mackerel were at a record low for collections taken during fall, with abundance greatest in waters off Florida, and absent from collections made in Raleigh Bay. King mackerel were 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, seven loggerhead turtles (*Caretta caretta*) were caught, tagged, and released alive near the area of capture in waters off Florida (n=3), Georgia (n=2), South Carolina (n=1), and in Raleigh Bay (n=1). None of the turtles bore previous tags, and no external signs of disease were found.

The spring 2002 cruise sampled 102 stations from 24 inshore strata between April 10 and May 9. A total of 141 species or genera were identified in spring trawls. Scup was the most abundant species, constituting 25% of total abundance, followed by Atlantic bumper (7%), Atlantic croaker (6%), and spot (6%). Abundance of individuals collected (n=104,331 individuals, x/tow=1023 individuals) and the miscellaneous invertebrate biomass (n=14,294 kg, x/tow= 140.1 kg) in 2002 changed only slightly from the level of abundance observed in Spring 2001, although an increase in the number of sharks taken in trawls was noted. Otoliths were collected from specimens of weakfish (n=155), Atlantic croaker (n=98), and southern kingfish (n=439). Additionally, gonad samples were collected for verification of onboard maturity assessments. The spring 2002 cruise collected Spanish mackerel from all regions except Raleigh Bay and Onslow Bay. Overall abundance was very low in spring trawls, with highest collections in waters off of Georgia. King mackerel were taken only in the southern portion of the South Atlantic Bight. White shrimp was the most abundant commercially important shrimp species collected during the spring cruise, and were taken from strata in all regions, except Raleigh Bay.

The summer 2002 cruise sampled 102 stations in 24 inshore strata. Sampling was conducted from July 15 through August 1, 2002. A total of 117 species or genera were identified in summer trawls. Atlantic croaker was the most abundant species, constituting 23% of total abundance, followed by the cannonball jelly (18%), spot (8%), and scup (8%). The abundance of individuals in 2002 was lower than the levels of abundance and biomass observed in Summer 2001. Record numbers of the loggerhead sea turtle (n=16) and Kemp's ridley turtle (n=3) were taken in summer collections. Eight of the loggerhead turtles were caught off Georgia, six in Florida waters, and one each in Long and Onslow Bays. All of the Kemp's ridley turtles were caught off Georgia. All turtles were tagged and returned to the water unharmed. Blue crab abundance in summer trawls (n=63) was much higher than spring catches (n=7) in 2002, and the percentage of sponge crabs in crab catches made in summer 2002 (27%) increased from 17% in spring. However, crab abundance was much higher in summer 2001 (n=268). Otoliths were collected from specimens of weakfish (n=121), Atlantic croaker (n=220), and southern kingfish (n=363). Additionally, gonad samples were collected for verification of onboard maturity assessments. The abundance of Spanish mackerel (n=832, x/tow=8.2) in 2002 summer decreased from levels observed in 2001. King mackerel 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 except Raleigh Bay, but the highest mean

catch per tow of brown shrimp was taken in waters of Onslow Bay.

Data from the fall 2001 and spring 2002 cruises have been added to the SEAMAP Data Management System (DMS). Data from the summer 2002 cruise are currently being added to the SEAMAP DMS. The results of the entire 2001 cruise season (Spring 2001, Summer 2001, and Fall 2001 cruises) are documented in the final 2001 project report, *Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 2001* by South Carolina Marine Resources Division.

Pamlico Sound Survey

During FY 2002, 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 were investigated to obtain files for processing. The data available from these sources varies in information content and accuracy in pinpointing reef habitat location. Treatment of each data type and gear is standardized, and the most accurate data for each gear

type for each location are being compiled according to procedures developed by the Bottom Mapping Work Group. The database is designed for easy incorporation into Geographic Information System (GIS) or other PC mapping software programs.

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

During 2001, the work group began discussing the development of protocols to capture deepwater (200 - 2000 m) data on bottom type for funded action in 2002. The deepwater bottom type project will extend the depth range of the existing Bottom Mapping CD-ROM, and is progressing under a three-phase plan. Phase 1 and 2 are occurring simultaneously in FY 2002-2003. Phase 1 will develop protocols to recover existing data and convert it into a standard format. Phase 2 will gather key information on existing data sources (availability, format, data contacts, number of records, geographical range, etc) to help the Bottom Mapping Work Group prioritize data sources to obtain for conversion. Phase 3 will begin when funding is available to use the protocols developed in Phase 1 to obtain and standardize the data identified in Phase 2. Future priorities also include increased availability of summary data via the Internet in both a static and interactive mapping formats.

SEAMAP - Caribbean

SEAMAP-Caribbean support for the USVI bottom-mapping project continued in 2002. During this period, SEAMAP-Caribbean provided funds to convert side scan sonar data collected by the Environmental Protection Agency's OSV ANDERSON to a format compatible with USVI Division of Fish and Wildlife software. The OSV ANDERSON completed about 8 square miles of side scan sonar work in the USVI during February 2002. By October 2002, USVI Division of Fish and Wildlife was awaiting a 160 GB hard drive to accommodate converted data.

The 1999-2000 reef fish trap and line survey for St. Croix was completed in 2002. This project was delayed because of major repairs to the Division of Fish and Wildlife's R/V SARINA which were

completed in late 2001. In 2002, ten survey trips were completed. Also in 2002, the final report documenting results was completed and submitted. Data collected for all trips were entered into the SEAMAP database and submitted to NMFS.

Field work for the 2000-2001 conch survey in St. Thomas/St. John was completed in 2001. Five pueruli lobster collection sites were established on the southeast side of St. Thomas. At each collection site, 2 pueruli collectors were deployed. These collectors were set up at 100 foot intervals on the southeast side of St. Thomas. Each juvenile lobster collector is composed of 16 concrete blocks. These lobster collectors are checked every 3 months. During the first check (September 2002), no juvenile lobsters were observed on any of the juvenile lobster collectors.

Also in 2002, SEAMAP-Caribbean contracted with the University of Puerto Rico to review SEAMAP-Caribbean reefish survey data. An anomaly was encountered with USVI data. USVI Division of Fish and Wildlife staff reviewed data and determined that 1999 and 2000 St. Thomas data had been incorrectly entered as pounds, not kilograms (as specified in the SEAMAP data forms). This problem has now been resolved.

During 2002, the SEAMAP-Caribbean Program in Puerto Rico undertook several activities. Sampling for spiny lobster post-larvae and juvenile assessment started off the west coast of Puerto Rico. The purchase of the needed materials and creation of the collector and juvenile habitats was done in a reasonable time. Two sets of 10 "casitas" of sixteen concrete blocks each were deployed at two selected areas off the west coast of Puerto Rico. One set was deployed in shallow water on a sand flat located on the back reef of El Ron at depths ranging from 12 to 20 feet depth. The other set was deployed at a sand flat located near El Tourmaline Reef in depths ranging from 24 to 35 feet. A total of thirty larvae collectors were deployed in six areas.

The information corresponding to sampling periods of 1997, 1998 and part of 1999 (a total of 2,500 records of detailed meristics, representing 496 cards from the reefish survey) were entered in the SEAMAP database. The 1999 data for both vessels used and 2000 data are currently being entered. An annual report of shallow-water reefish monitoring (SEAMAP-Caribbean fisheries-independent monitoring), from January 1, 2001 to December 31, 2001 was submitted by the DNER-PR to the NMFS on January 2002.

SPECIAL STUDIES

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

Winter Trawling and Fish Tagging Cruise

The SEAMAP Cooperative Winter Offshore Tagging Cruise was conducted from January 14-22, 2002 aboard the NOAA Ship OREGON II. The cruise included 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), the National Marine Fisheries Service, and North Carolina State University participated in a striped bass tagging cruise. This was the fifteenth 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.

The cruise resulted in the tagging of 22 Atlantic sturgeon, 1,997 spiny dogfish, and 4,093 striped bass. 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 12,462 fish. In addition to tagging 4,093 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 that were mortally injured during capture were sacrificed for aging, prey analysis, and genetic sampling.

For the first time, large numbers of small (age 0 and possibly age 1) bluefish were captured this year off Ocracoke and to the north. Larger bluefish, which have been taken consistently for the past several years off Diamond Shoals, were not seen in large numbers this year. Observations were taken also regarding weakfish abundance and distribution. Several catches of large fish were observed this year, and juvenile weakfish were extremely abundant south of Cape Hatteras. Twenty-three Atlantic sturgeon, a new cruise record, were captured and twenty-two of them tagged and released this year. Tissue samples for genetic analysis were also taken from those tagged.

For the sixth 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. This year's sex ratio overall was 8:1, females to males. Summer flounder were not tagged this year; however, fish were measured and a number of larger fish were captured. Overall numbers of summer flounder encountered on the cruise this year were above numbers observed in previous years likely due at least in part because the OREGON II's nets were modified to more effectively sample and capture benthic species.

A notable non-fish capture this year was a World War II era aerial bomb that was hauled aboard in tow number 158, accompanied by an Atlantic sturgeon.

The bomb was transported to Little Creek, Virginia, where it was transferred to the U.S. Navy.

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, North Carolina, 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 previous 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, and 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 that will analyze and discuss the data from the past 15 cruises is under preparation by the South Atlantic Fisheries Resources Office.

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 1982-2001 have been entered into the system and data from 2002 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 FY2002:

- 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 2001 and 2002 SEAMAP Environmental and Biological Atlas;
- Comparing catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets;
- 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;
- Weekly penaeid shrimp abundance information from the Spring South Atlantic Trawl survey to evaluate season opening dates in Georgia and South Carolina;
- Specimens of invertebrate species for catalogue of voucher specimens for Southeastern Regional Taxonomic Center at MRRI;
- Life history data on three species of *Menticirrhus* (graduate student research);
- *Diplectrum formosum*, *Haemulon aurolineatum*, and *Balistes capriscus* specimens for age-growth research (MARMAP);
- Weakfish and bluefish specimens for age/growth analysis;
- Loligo specimens for genetic analysis and population study;
- Fin clip samples from Atlantic croaker for genetic stock identification;
- Penaeid shrimp specimens exhibiting signs of black gill disease for verification of the presence of the disease in shrimp stocks; and
- Weekly blue crab/sponge crab abundance information in response to concern about status of blue crab in South Carolina waters.

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 2002 Summer Shrimp/Groundfish Survey. Seven weekly mailings were produced and distributed to approximately 220 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 2001 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 fourth 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 2002, 30,492 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 34,725 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 data. Ninety-nine requests were accommodated this year to nine different researchers at both the state and federal level, and one Florida high school.

SEAMAP Invertebrate Plankton Archiving Center

The SIPAC is in its eighteenth year of operation. Sara LeCroy at the USM/COMS/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 previous year and has been replaced by another student assistant this year. This person assists the curator with the cataloging of new samples, and the maintenance and curation of the collection. Activities during the year were limited to the maintenance and curation of the existing collection, as well as the cataloging of 542 additional bongo net samples (12 from year 1997 plankton cruises; 269 from year 2000 plankton cruises; 261 from year 2001 plankton cruises). In addition, approximately 180 bongo samples were returned to the NMFS laboratory in Pascagoula, Mississippi, for further analysis and the collections were reorganized to allow more space for incoming samples. The number of samples currently cataloged in the SIPAC collections is 8,151, with 326 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 their original volume and placed into 100 ml vials, as necessary. When possible, the remaining 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 removal of approximately 180 samples to the NMFS - Pascagoula during the current year, there is presently sufficient space available for additional samples to be deposited into the SIPAC archives without continuing the aliquoting of 1988-1991 SEAMAP 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 FY2002:

Gulf States Marine Fisheries Commission. 2002. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 1 p. + appendices.

Rester, J.K., G.G. White, and E. Ojeda Serrano. 2001. Annual Report of the Southeast Area Monitoring and Assessment Program (SEAMAP), October 1, 2000 to September 30, 2001. Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, Puerto Rico Sea Grant College Program. 10 pp.

Rester, J.K. 2002. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 2001 to September 30, 2002). No. 104. Gulf States Marine Fisheries Commission, Ocean Springs, 16 pp. + appendices.

Rester, J.K., D. Hanisko, B. Pellegrin, N. Sanders, Jr. 2002. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 2000. No. 101. Gulf States Marine Fisheries Commission, Ocean Springs.

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

South Carolina Marine Resources Division. 2002. 2002 Spring SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 9 pp.

South Carolina Marine Resources Division. 2002. 2002 Summer SEAMAP Cruise Report. South Carolina Department of Natural Resources. Charleston, SC., 10 pp.

South Carolina Marine Resources Division. 2002. Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY 2001. South Carolina Department of Natural Resources, Charleston, SC. 89 pp.

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

PROPOSED SEAMAP ACTIVITIES, FY2003

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately \$1.4 million. Proposed FY2003 activities for all participants are shown in Table 2.

Table 2.

PROPOSED SEAMAP ACTIVITIES, FY2003				
	Fall	Winter	Spring	Summer
Gulf of Mexico Activities				
Resource Surveys:				
Spring Plankton Survey			X	
Reef Fish Survey			X	X
Summer Shrimp/Groundfish Surveys				X
Fall Shrimp/Groundfish Surveys	X			
Fall Plankton Survey	X			
Plankton and Environmental Data Surveys	X	X	X	X
Information Operations:				
2001 and 2002 Biological and Environmental Atlas		X		
2003 Marine Directory			X	
FY2003 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
2002 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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