

**ANNUAL REPORT**  
**OF THE**  
**SOUTHEAST AREA MONITORING**  
**AND ASSESSMENT PROGRAM**  
**(SEAMAP)**

**OCTOBER 1, 1991 - SEPTEMBER 30, 1992**

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

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

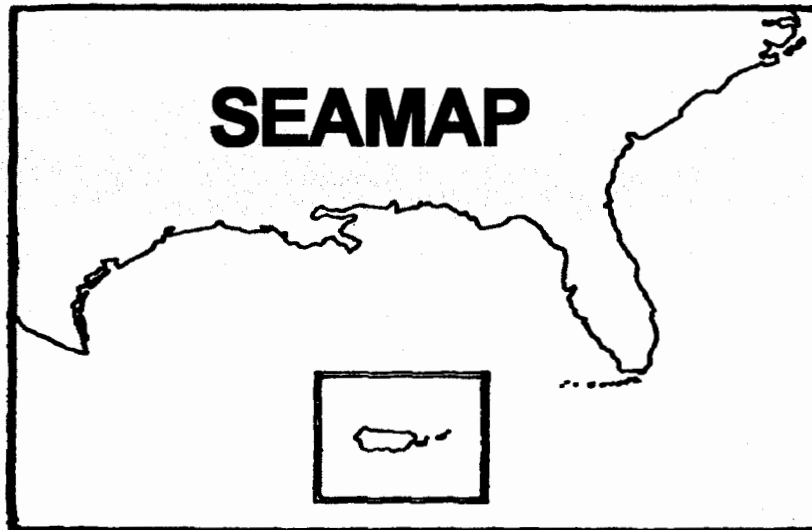
**SEAMAP - Caribbean**  
Puerto Rico Department of Natural Resources

**December 1992**



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**DECEMBER 1992**

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# **ANNUAL REPORT**

## **of the**

# **Southeast Area Monitoring and Assessment Program**

## **October 1, 1991 - September 30, 1992**

### **INTRODUCTION**

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a State/Federal/university program for collection, management and dissemination of fishery-independent data and information in the southeastern United States. The program presently consists of three operational components, SEAMAP-Gulf of Mexico, which began in 1981, SEAMAP-South Atlantic, implemented in 1983 and SEAMAP-Caribbean, formed in 1988.

Each SEAMAP component operates independently, planning and conducting surveys and information dissemination in accordance with administrative policies and guidelines of the National Marine Fisheries Service's Southeast Regional Office (SERO). Agencies and organizations directly involved with the Program are shown in Table 1.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-1992. Funding allocations to participants for FY1986-FY1992 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 resource survey operations, administrative activities and publications for FY1992 and proposed activities for FY1993.

### **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 Board, and the SEAMAP-Caribbean Committee of the Puerto Rico Department of Natural Resources. The Gulf and South Atlantic Committees consist of designated representatives from each member State, NMFS and the Gulf of Mexico and South Atlantic Fishery Management Councils. The Caribbean component consists of members from Puerto Rico Department of Natural Resources, Virgin Islands Division of Fish and Wildlife, Puerto Rico Sea Grant College Program, NMFS, U.S. Fish and Wildlife Service and the National Park Service. Each Committee meets several times 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 Department of Natural Resources and personnel associated with the SEAMAP Information System, SEAMAP Archiving Center (SAC) and SEAMAP Invertebrate Plankton Archiving Center (SIPAC).

### **SEAMAP - CARIBBEAN**

Action taken at the Joint SEAMAP-Gulf and South Atlantic meeting held in Mayaguez, Puerto Rico, August 1987, resulted in the initiation of a SEAMAP-Caribbean component. An invitation was extended to the Caribbean Fishery Management Council (CFMC) to implement the program. The CFMC endorsed the concept and created a task force to determine the appropriateness of SEAMAP activities in the Caribbean fisheries. The task force met on March 30, 1988 and agreed to establish a SEAMAP-Caribbean program under the guidance and supervision of the Caribbean Council. A series of goals and objectives was developed by the participating agencies and presented at the August 1988 Joint SEAMAP meeting held in St. Petersburg, Florida. The first SEAMAP-Caribbean survey of reef resources, including longlining and plankton sampling activities, was planned for November 1988.

The SEAMAP-Caribbean Committee met three times this year to decide on recommendations made by the work group and discuss budget matters.

The SEAMAP-Caribbean Reef Resources Work Group met during the year to establish final procedures for the Reef Resource Study. The purpose of the meeting was to develop a statistically valid fishery independent survey to monitor the reef resources of the waters around Puerto Rico and the U.S. Virgin Islands. The work group submitted a working draft for a reef resources survey project which was approved by the SEAMAP-Caribbean Committee. The document will be used as a guide for reef resources research. Beginning in 1992, the survey will focus on a preliminary study to assess the survey design and to standardize sampling methodologies between U.S. Virgin Islands and Puerto Rico. The research will be conducted in three-year cycles. The Reef Resources Work Group supervised a multivariate analysis of the data set collected by the Fisheries Research Laboratory in a fisheries-independent sampling program. The results were used in defining survey parameters in the statistical survey design analysis of the Reef Resources Survey Project.

The SEAMAP-Caribbean Committee has published the Fishery Independent Data Base Directory. The information for the directory concerning existing

TABLE 1.

SEAMAP ORGANIZATION

Program	Administering Organization	Participating Agencies
SEAMAP-Gulf of Mexico	Gulf States Marine Fisheries Commission (GSMFC)	Alabama Department of Conservation and Natural Resources (ADCNR) Florida Department of Natural Resources (FDNR) Louisiana Department of Wildlife and Fisheries (LDWF) Mississippi Department of Wildlife, Fisheries and Parks/Gulf Coast Research Laboratory (MDWFP/GCRL) Texas Parks and Wildlife Department (TPWD) National Marine Fisheries Service/Southeast Fisheries Science Center (NMFS/SEFSC) Gulf of Mexico Fishery Management Council (GMFMC)
SEAMAP-South Atlantic	Atlantic States Marine Fisheries Commission (ASMFC)	Florida Department of Natural Resources (FDNR) Georgia Department of Natural Resources (GDNR) South Carolina Wildlife and Marine Resources Department (SCWMRD) North Carolina Department of Environment, Health and Natural Resources (NCDEHNR) National Marine Fisheries Service/Southeast Fisheries Science Center (NMFS/SEFSC) South Atlantic Fishery Management Council (SAFMC)
SEAMAP-Caribbean	Puerto Rico Department of Natural Resources (PRDNR)	Puerto Rico Department of Natural Resources Virgin Islands Division of Fish and Wildlife Puerto Rico Sea Grant College Program National Marine Fisheries Service/Southeast Fisheries Science Center (NMFS/SEFSC) U.S. Fish and Wildlife Service (USFWS) National Park Service (NPS)

fishery-independent data bases and on-going local and federal government, university and other research activities of value in assessing and monitoring living marine resources was collected via 106 questionnaires mailed to researchers, institutions and governments. The directory is presently being updated and is available upon request.

**SEAMAP - GULF OF MEXICO**

Major SEAMAP-Gulf Subcommittee meetings were held in October 1991 and April 1992, in conjunction with the Annual Fall and Spring Meetings of the GSMFC. Also, a planning meeting was held in January 1992. The meetings included participation by several of the work group leaders, the Coordinator and the Data Manager. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 1992 to discuss respective program needs and priorities for FY1993.

SEAMAP-Gulf work groups met this past year to provide recommendations to the Subcommittee for

survey and data management needs. The Plankton Work Group met in November 1991 and the Shrimp/Groundfish Work Group met in March 1992. Also, when additional discussion was needed, the Subcommittee and work groups deliberated plans and needs via telephone conference calls.

Coordination of program surveys and distribution of real-time summaries of a Gulf-wide survey to management agencies and industry were major functions of SEAMAP management in FY1992. Other important management activities included coordinating data provision and specimen loans, preparing publications and documents and assisting in the preparation of State-Federal cooperative agreements including amendments to permit extension of activities previously not detailed in the agreements.

**SEAMAP - SOUTH ATLANTIC**

The SEAMAP-South Atlantic Committee met once during FY1992, in conjunction with the SEAMAP Joint Annual Meeting in Savannah, Georgia. Topics for the meeting, held August 12-14, 1992 included work group

reports, reports of survey activities, utilization of SEAMAP-South Atlantic data, funding for 1993, the 1993 Annual Operations Plan, and election of officers.

Work group reports were presented for the Crustacean, Bottom Mapping, Data Management and Shallow Water Trawl Work Groups. The Crustacean Work Group met February 21-22, 1992, and published and distributed the third issue of the SEAMAP Crustacean Newsletter. Other activities included an assessment of needs for crustacean research in the region. The Bottom Mapping Work Group did not meet during FY1992; however, the bottom mapping project was reactivated with the advent of the SEAMAP funding increase for FY1992. The Data Management Work Group participated in the conversion of data collected by the Shallow Water Trawl Survey which is currently stored on the South Carolina Wildlife and Marine Resources Department database, to the program-wide SEAMAP Data Management System. The Shallow Water Trawl Work Group did not meet; however, the survey continued as planned.

The program-wide funding increase for FY1992 greatly facilitated operations for the South Atlantic. Cuts in survey days for the Shallow Water Trawl had been planned, but were not necessary. Maintaining financial support for this survey had previously been determined to be critical to the success for the program. Additionally, the Bottom Mapping Project and conversion of data from North Carolina's Pamlico Sound Survey to the SEAMAP Data Management System format were funded.

## RESOURCE SURVEYS

In FY1992, collection of resource survey information continued for the eleventh consecutive year. Surveys by each program component reflect distinct regional needs and priorities; however, survey operations in one geographic area often provide information useful to researchers in all three regions. For instance, the South Atlantic program's Bottom Mapping will be useful in SEAMAP-Gulf gear calibration efforts, while plankton and environmental surveys in the Gulf program have set the standards for the entire region's much-needed long-term data base. Because of the diverse scope and target species involved in the SEAMAP's survey operations, activities are discussed here by geographic region.

### **SEAMAP - GULF OF MEXICO**

#### **Fall Shrimp/Groundfish Survey**

The Fall Shrimp/Groundfish Survey was conducted from September 30 to November 22, 1991, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters to 60 fm, covering a total of 353 trawl stations, in addition to plankton and environmental sampling.

Sampling design was similar to the summer shrimp/groundfish cruise; objectives of the survey were:

- (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 208 stations in offshore waters and territorial Louisiana and Texas waters. The R/V VERRILL sampled 7 stations in Alabama territorial waters. The R/V TOMMY MUNRO sampled 27 stations in Mississippi territorial and offshore waters. The R/V PELICAN sampled 31 stations in Louisiana territorial and offshore waters. And Texas vessels sampled 80 stations within their territorial waters.

Ichthyoplankton data were collected by NMFS and Louisiana vessels at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 46 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. NMFS completed 40 ichthyoplankton stations and Louisiana completed 6 stations. The samples, except those taken by Louisiana, will be sorted by the Polish Sorting Center. Once sorted, the specimens and data will be archived at the SEAMAP Archiving Centers.

#### **Summer Shrimp/Groundfish Survey**

A planning meeting of the Shrimp/Bottomfish Work Group was held in March 1992 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 FMP; and
- (3) provide information on shrimp and bottomfish stocks across the northern Gulf of Mexico from inshore waters to 50 fm.

The overall sampling strategy during the SEAMAP 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 survey occurred from June 3 to July 13, 1992.

During the survey, the NOAA Ship OREGON II and R/V TOMMY MUNRO sampled offshore and inshore Gulf waters with 40-ft trawls. Alabama's R/V VERRILL sampled offshore Alabama waters with 40-ft trawls.

The R/V PELICAN sampled both Louisiana state waters and offshore waters with 40-ft trawls, and Texas vessels sampled Texas state waters and offshore waters with 20-ft trawls.

A total of 326 trawl samples was taken from coastal and offshore waters out to 50 fm from Mobile Bay, Alabama, to Brownsville, Texas. All vessels took environmental data including temperature, salinity, oxygen, and chlorophyll at each station.

In June, catch rates of brown shrimp east of the River were very low with a maximum catch of 5.0 lb/hr of 25-count shrimp. White shrimp catches east of the River were all less than 2 lb/hr. The largest pink shrimp catch rate east of the River was 15.3 lb/hr of 33-count shrimp taken in 18 fm of water off Mississippi. Finfish catch rates east of the River were moderate with the largest catch of 3,517 lb/hr with Atlantic croaker predominating.

Moderate catches of brown shrimp were made off Texas from June 3 to July 1. The largest catch rate occurred June 24 in waters off Corpus Christi in 10 fm (109.6 lb/hr of 88-count shrimp). White shrimp catches off Texas were low with the largest catch, 59.5 lb/hr of 14-count shrimp, taken off of Brownsville in 9 fm. Catch rates for pink shrimp were low off Texas with the largest catch, 18.0 lb/hr of 47-count shrimp, taken off Laguna Madre in 8 fm. Finfish catch rates were low in Texas inshore and offshore waters. The largest catch of finfish was 1,737 lb/hr in 7 fm off Matagorda Island with Atlantic croaker predominating.

In July's samples west of the river (Louisiana) brown shrimp catches were low with the largest catch rate of 21.7 lb/hr of 32-count shrimp occurring southwest of Vermilion Bay in 16 fm. White shrimp catches were extremely low with a maximum catch rate of 3.1 lb/hr of 19-count shrimp taken in 15 fm southeast of Barataria Bay. Catches of pink shrimp were all less than 1 lb/hr off the Louisiana coast. Finfish catch rates were also low with the largest catch rate of 1,526 lb/hr taken on July 5 with Atlantic croaker predominating.

Several areas of low bottom dissolved oxygen (less than 2 ppt) occurred off Louisiana between Cameron, Louisiana and the Mississippi River in depths of 6 to 22 fms.

## Spring Plankton Survey

For the tenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ship OREGON II and Florida's R/V HERNAN CORTEZ II sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 15 to May 25, 1992.

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°. 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.

A total of 194 stations was sampled. The OREGON II sampled 173 stations and the R/V HERNAN CORTEZ II sampled 21 stations along the west Florida shelf. Hydrographic data at all stations included surface chlorophylls, salinity, temperature and dissolved oxygen from surface, midwater and near bottom and forel-ule color.

Right bongo and neuston samples collected by NMFS and Florida from SEAMAP stations will be transshipped to the Polish Sorting Center (PSC). Left bongo samples will be archived at the Gulf Coast Research Laboratory in Ocean Springs, Mississippi. Salinity data from the Florida vessels were sent to the NMFS Mississippi Laboratories for interpretation.

## Spring Reef Fish Survey

The first Spring Reef Fish Survey was conducted from May 14 to September 11, 1992. Vessels from NMFS, Mississippi and Alabama sampled inshore and offshore waters covering a total of 169 stations, in addition to plankton and environmental sampling. Randomly selected sites from Brownsville, Texas to Key West, Florida were chosen from known hard bottom locations. The objectives of the survey were to:

- (1) assess relative abundance and compute population estimates of reef fish using a video/trap technique;
- (2) determine habitat using an echo sounder and video camera;
- (3) determine if bioacoustics assessment methodology can be applied to reef fish communities;
- (4) collect environmental data at each station; and
- (5) collect ichthyoplankton samples at selected reef sites.

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

Final analyses of video tapes are accomplished at the Pascagoula Laboratory, where data is recorded



onto standard SEAMAP forms. Tapes are analyzed either in their entirety or by randomly-selected one minute intervals. The determinant factors for sampling are based on whether the reader can identify and count fish entering the camera field of view and record the data.

## 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 1986-1991 and in the current year covered Gulf waters from Florida Bay to Brownsville, Texas. Vessels from Florida, Alabama, Mississippi, Louisiana and NMFS surveyed from September 8 to October 2, 1992.

The NOAA Ship OREGON II sampled stations from Tampa Bay, Florida to Brownsville, Texas at depths from 5 to 100 fm. Chlorophyll samples were filtered at each station. Florida's R/V HERNAN CORTEZ sampled stations from off Tampa Bay south to the Florida Straits area. Stations were located along a 30-minute latitude/longitude grid from inshore waters to the shelf edge. An Alabama vessel sampled stations at the mouth and outside Mobile Bay. The R/V TOMMY MUNRO sampled stations south of Mississippi Sound along a 30-minute grid. And the R/V PELICAN sampled stations in Louisiana territorial waters.

Stations were sampled with standard SEAMAP bongo nets with 333-micron mesh and/or 1 x 2-meter neuston nets fitted with 947-micron mesh. Hydrographic sampling included chlorophylls, salinity, temperature and dissolved oxygen from surface, mid-water, and bottom, water transparency and water color. Right bongo samples collected by NMFS and the Gulf States will be transshipped to the Polish Sorting Center. Left bongo and neuston samples will be stored at the SEAMAP Invertebrate Archiving Center at the Gulf Coast Research Laboratory for possible future sorting. Louisiana plankton samples will be sorted by LDWF according to SEAMAP protocols and specimens and data provided to the SEAMAP Archiving Center.

## Plankton and Environmental Data Surveys

As in previous years, plankton samples and environmental data were collected routinely during most SEAMAP trawling surveys. During the Summer Shrimp/Groundfish Survey, plankton tows were piggybacked on the NMFS and state vessels sampling randomly generated trawl stations within the standard 30-minute SEAMAP grids. Plankton and environmental data were also taken by Louisiana at all of its seasonal day/night survey stations. Samples were taken by participants with a 60-cm bongo net and a standard NMFS neuston net.

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 transshipment to Poland 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 Gulf Coast Research Laboratory.

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

In addition to these piggybacked surveys, two major SEAMAP plankton surveys were conducted in FY1992, as detailed earlier.

## SEAMAP - SOUTH ATLANTIC

### Shallow Water Trawl Survey

The major SEAMAP-South Atlantic survey in FY1992 was the continuing Shallow Water Trawl Survey (formerly known as the Nearshore Regional Trawl Survey) conducted by the South Carolina Wildlife and Marine Resources Department (SCMRD). Initiated as a pilot project in 1986, this is a fishery-independent study designed to monitor the distribution and abundance of coastal species in the South Atlantic Bight and to measure associated environmental parameters in nearshore coastal waters. The overall goal is to obtain a long-term database to facilitate management of stocks in the South Atlantic Bight.

Specific objectives of the survey are: 1) to collect data on size, abundance, distribution and seasonality of target finfish and decapod crustaceans; 2) to record species composition, biomass and abundance in order to assess latitudinal and seasonal fluctuations; and 3) to 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 FY1992: Fall 1991 (October 7 - November 16), Spring 1992 (April 22 - May 28), and Summer 1992 (July 13 - August 2). Inshore strata (4.6 to 9.2 m depths) were sampled during each cruise. Offshore strata (9.2 to 19 m depths) were sampled only during fall and spring when penaeid shrimp spawning is thought to occur. All samples were collected during daylight hours to maximize the opportunities for collecting juvenile mackerel.

The Fall 1991 cruise completed the third full year of standardized sampling under a stratified random survey design. During the fall, sampling was conducted at a total of 85 stations and emphasized 24 target species for additional biological measurements. Nine stations scheduled to be sampled

were forfeited because of inclement weather. The Spring 1992 and Summer 1992 cruises sampled 78 stations each.

A brief summary of the preliminary results of each FY1992 cruise is available as a cruise report. Data from the spring and summer 1992 cruises are being processed by the South Carolina Marine Resources Division. The results of the entire 1991 cruise season (Spring and Summer 1991 cruises in addition to the Fall 1991 cruise discussed above) are documented in the final 1991 project report, Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight by Beatty, Boylan, Webster, and Wenner (1992).

## **Pamlico Sound Survey**

During FY1992, the North Carolina Division of Marine Fisheries (NCDMF) continued the ongoing Pamlico Sound Survey (formerly known as the Pamlico-Albemarle Sounds Survey) with cruises that sampled 53 stations each in June and September 1992. 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. Samples were collected with a 9.1 m falcon trawl towed for 20 minutes during daylight hours. Sampling was conducted according to a stratified random design using depth strata (less than 3.7 m, greater than 3.7 m) and one-minute grids. Environmental data were recorded at each station. The data are being processed and are made available to the SEAMAP Data Management System. NCDMF is preparing a program to convert the data to SEAMAP format.

## **Benthic Characterization**

During FY1992, the Florida Department of Natural Resources continued work to characterize the structure and general ecology of South Atlantic benthic communities. Invertebrates were collected on four SEAMAP survey cruises in the region during 1983-1987. Selected invertebrate groups from northeast Florida are being identified to the lowest appropriate taxonomic level, and the data are provided to the SEAMAP database.

During FY1992, data for all asteroids was computerized. Approximately 60% of the Ophiroids to date have been identified, and a paper describing a new species of *Ophioripa* is in preparation. A new species of holothurian is also being described. Florida Department of Natural Resources will continue working with Dr. Richard Turner of Florida Institute of Technology to sort, identify, and curate echinoderm specimens.

## **Bottom Mapping Survey**

In 1985, the SEAMAP-SA Bottom Mapping Work Group developed a plan for establishing a regional database which would include the location and characteristics of hard bottom resources in 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. This study, which is being conducted by South Carolina Marine Resources Division (SCMRD), represents the next step in developing the regional database for the portion of the South Atlantic Bight off South Carolina and Georgia from the beach out to 20 m in depth.

The primary objectives of the study are to: 1) conduct an extensive search of existing databases to identify all known critical hard bottom reef habitats on the continental shelf off South Carolina and Georgia; 2) develop a flexible, easy to use database which will provide researchers and management staff 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; and 3) evaluate PC based software programs that will allow researchers to easily obtain graphic outputs of the database.

Funds for this project resumed in FY1992 after a seven year hiatus. During 1992 SCMRD hired a biologist to investigate biological and side-scan sonar records, and implemented subcontracts with researchers at Georgia Southern University to investigate geological records.

## **SPECIAL STUDIES**

### **Benthic Surveillance Project**

This was the eighth year of SEAMAP's participation in the sampling for contaminants in coastal fishes and sediments under the Benthic Surveillance Project of the NOAA National Status and Trends Program. Both SEAMAP-South Atlantic and SEAMAP-Gulf supplied personnel from State fishery management agencies to provide guidance in locating concentrations of the target species, Atlantic croaker and spot.

Managed regionally through the SEFSC's Beaufort, North Carolina Laboratory, the survey team sampled two South Atlantic sites in Summer 1992. The Savannah River, Georgia was sampled August 15-17 and Biscayne Bay was sampled August 19-20. Gulf sites included: Tampa Bay (August 26-28), Lake Pontchartrain (October 1-7), Barataria Bay (September 28-29), Calcasieu Lake (September 23-24), Galveston Bay (September 15-18), Lavaca Bay (September 10-12), and Arroyo Colorado (September 3-5). The NOAA Ship FERREL was the primary platform. Sampling methodologies in 1992 were identical to those of previous years. Analyses of trace metals, aromatic and chlorinated hydrocarbons, and other contaminants and indicators in the samples were coordinated by the Beaufort Laboratory.

A list of publications produced by the program is available from NOAA, National Status and Trends Program, N/OMA32, 11400 Rockville Pike, Rockville, MD 20852. A report on the findings of the project's first four years is available as NOAA Technical Memorandum NMFS-SEFSC-284, "Metal Contaminant Assessment for the Southeast Atlantic and Gulf of Mexico Coasts: Results of the National Benthic

Surveillance Project of the First Four Years, 1984-1987 by P.J. Hanson and D. W. Evans.

## Winter Trawling and Fish Tagging Cruise

During January 17 - 19 and February 2 - 5, 1992, personnel from the states of North Carolina and Maryland, the U.S. Fish and Wildlife Service (FWS), University of Massachusetts and the NMFS/SEFSC participated in a striped bass tagging cruise. This was the fourth year of the cooperative project that was 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 to assess the population structure and exploitation rates of the migratory Atlantic Coast stock.

A color video sounder was used to locate targets and reduce bycatch. A total of 1,062 striped bass were captured. Of these, 1,017 healthy fish were measured, tagged with FWS internal anchor tags and released. Four hundred twenty-nine striped bass were double tagged with American Littoral Society tags as part of a study to test tag retention. Scales were collected from tagged fish for age and growth determinations. Reduced sea time because of mechanical difficulties limited the amount of time available to tag species other than striped bass. A database for striped bass tag returns is managed by FWS in Leetown, WV.

## DATA MANAGEMENT

Biological and environmental data from all SEAMAP 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 surveys during 1982-1990 have been entered into the system and data from 1991 and 1992 surveys are in the process of being verified, edited and entered for storage and retrieval. Data from the South Atlantic surveys are currently being entered into the SEAMAP Data Management System. The States of South Carolina and North Carolina had utilized their own computer facilities to store and analyze their SEAMAP data. The South Atlantic Data Management Work Group and the SEAMAP Data Manager are implementing the computer programs necessary for converting the Shallow Water Trawl Survey data to the SEAMAP Data Management System format.

Verified, non-confidential SEAMAP data are available conditionally to all requestors but the highest priority is assigned to SEAMAP participants. A total of 123 SEAMAP data requests have been received and processed. In some instances, requests were filled promptly; in many cases, however, a substantial lag occurred because of the extremely large amount of data being collected on an increased number of surveys over those of past years. To date, 119 requests have been completed and work is being performed on those remaining.

The requirements report for an integrated data system, Data Management System Design Study for Gulf

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

Work was completed during FY1990 on the new distributed SEAMAP Data Management System. New modules completed include those for data entry, edit, upload, data query and download. Delivery of the remaining PS/2's has been completed and all of the Gulf States are now equipped with the necessary computer hardware and software.

The new 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 new system overcomes the deficiencies of the old system (i.e., the time necessary to enter and retrieve data) and provides powerful and flexible local data analysis and display capabilities. Under the new system, each SEAMAP site enters, verifies and edits their data, eliminating the mail-oriented loop necessary to enter/edit/verify data under the old system. 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 new system, outside users (e.g., Minerals Management Service, U.S. Army Corps of Engineers, etc.) may continue to request special data sets for research or study. The outside users submit the request to the SEAMAP Subcommittee through the SEAMAP-Gulf or South Atlantic Coordinator for approval to proceed. Once the request is approved, the information is provided by the Data Manager and staff members through a priority-based, mail-oriented system. Also, SEAMAP participants may use the Special Request mechanism for data sets too large for economical downloading by telephone. These requests will be handled by a Central Operations staff in the same priority-based, mail-oriented manner as noted above.

SEAMAP data collected during surveys were used for a multitude of purposes in FY1992:

- Evaluation of the abundance and size distribution of penaeid shrimp in Federal and state waters to assist in determining opening and closing dates for commercial fisheries by NMFS.
- Assessment of shrimp and groundfish abundance and distribution and their relationship to such

environmental parameters as temperature, salinity, and dissolved oxygen by NMFS.

- Identification of environmental parameters associated with concentrations of larval finfish by NMFS.
- Compilation of the 1989 SEAMAP Biological and Environmental Atlas by NMFS and GSMFC.
- Comparison of catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets by NMFS.
- Weakfish and striped bass stock assessment by the ASMFC.
- Analysis of age, growth and fecundity of weakfish, croaker and sea mullet by South Carolina Marine Resources Division (SCMRD).
- Analysis of age and growth of Spanish mackerel by SCMRD.
- Identification of penaeid shrimp viruses by SCMRD.
- Investigation of mature female decapod crabs by Rochester Institute of Technology.
- Description of decapod neotype of Cancer by Smithsonian Institute.

## REAL-TIME DATA

A major function of the SEAMAP Information System in FY1992 was the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted three times weekly via cellular phone to the NMFS Mississippi Laboratories from the NOAA vessel, while the states' data were entered into the system weekly. Plots of station locations and catch rates of shrimp 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. Management agencies also received comprehensive data listings showing penaeid shrimp length frequencies, sampling parameters and environmental conditions.

## SPECIMEN ARCHIVING

Larval fish and fish egg samples sorted to the family level by the PSC are returned to the SAC for archiving and loan to researchers. Data entry for most of the returned sorted samples is completed in an improved and simplified information management system. All data are now managed by a dual microcomputer/mainframe program which eliminates coding errors and facilitates faster data entry. Samples cataloged to date represent 18 orders, 125 families, 234 genera and 244 species.

The SAC is managed in conjunction with Florida Department of Natural Resources in St. Petersburg, and processes both specimen loans and requests for associated plankton survey environmental data. Merging of these files within the SEAMAP Information

System will greatly facilitate managing the environmental data, which is presently a cumbersome manual procedure. Currently, the SAC is without a collection manager or assistant because the curator has shifted job responsibilities within his section at the Department of Natural Resources but he will continue to be involved with the SAC in supervisory, training and administrative capacities. This has created a large backlog of uncataloged samples from 1987 and later years. The Department is in the process of advertising and attempting to hire replacement personnel. When new staff are hired, accessioning of backlogged material will be the main priority until the SAC is caught up on cataloging the collection.

The SAC curator and four staff members from FDNR completed the Florida spring ichthyoplankton cruise in May. Additionally, the curator has sent the final data sets for SEAMAP ichthyoplankton collections from 1984 to 1985 to the National Marine Fisheries Service personnel in Miami in preparation for publication of SEAMAP Ichthyoplankton Atlases for those years.

## SEAMAP INVERTEBRATE PLANKTON ARCHIVING CENTER

With the determination in 1985 by SEAMAP-Gulf that the retained "back-up" bongo collections also contain valuable research materials, the SEAMAP Invertebrate Plankton Archiving Center (SIPAC) was established and is managed in conjunction with Gulf Coast Research Laboratory in Biloxi, Mississippi.

The entire collection of SEAMAP plankton samples cataloged at SIPAC has been moved from its old location at Point Cadet, Biloxi to new facilities on the main campus of Gulf Coast Research Laboratory in Ocean Springs. All SIPAC activities including sample management, curation and sorting will be conducted from this new location.

During the FY1992, 250 unsorted SEAMAP samples were received and cataloged at SIPAC. As of September 4, 1991, a total of 4,867 unsorted fish larvae samples are held at SIPAC. In an effort to limit the space and costs of curating the growing SIPAC collection of unsorted samples, a protocol was adopted to retain only a 1/4 aliquot of samples that are more than 7 years old. To date, 1,022 samples were aliquoted and retained in the collection. A request from Joanne Shultz (NMFS) for a printed list of all SEAMAP plankton samples held at SIPAC and those samples shipped from SIPAC to NMFS or PSC, was received and the information provided.

A total of 1,118 SEAMAP samples has been sorted for selected invertebrate taxa by the SIPAC and the PSC following established protocol. A total of 4,765 lots was obtained from these samples. Portunid megalopae from the sorted samples have been further identified to the lowest possible taxonomic level. Data from these samples have been provided to the GSMFC Crab Subcommittee to develop an atlas of portunid megalopal distribution in the northern Gulf of Mexico.

During the next fiscal year, the SIPAC collection will continue to be maintained and additional samples will be sorted for invertebrates.

Particular emphasis will be placed on providing data on the megalopae of Callinectes sapidus and postlarval Penaeus spp. as requested by several researchers. A substantial data base has been generated on the distribution of blue crab megalopae and postlarval shrimp and is available to researchers upon request.

## INFORMATION DISSEMINATION

The following documents were published and distributed by the SEAMAP program in FY1992:

- Beatty, H.R. and E. L. Wenner. 1991. 1991 Fall SEAMAP Cruise Report. South Carolina Wildlife and Marine Resources Department, Charleston. 5 p.
- Beatty, H. R. and E.L. Wenner. 1992. 1992 Spring SEAMAP Cruise Report. South Carolina Wildlife and Marine Resources Department, Charleston. 6 p.
- Beatty, H.R. and E.L. Wenner 1992. 1992 Summer SEAMAP Cruise Report. South Carolina Wildlife and Marine Resources Department, Charleston. 5 p.
- Beatty, H.R., J.M. Boylan, R.P. Webster, H.R. Beatty and E.L. Wenner. 1992. Results of trawling efforts in the coastal habitat of the South Atlantic Bight. SEAMAP-SA Final Report, FY1991. South Carolina Wildlife and Marine Resources Department, Marine Resources Research Institute, Charleston. 52 p.

- Donaldson, D.M., C.D. Stephan and S. Laureano. 1991. Annual Report of the SEAMAP Program (October 1, 1990 to September 30, 1991). Gulf States Marine Fisheries Commission, Ocean Springs, 10 p.
- Donaldson, D.M. 1992. SEAMAP Annual Report to the Technical Coordinating Committee (October 1, 1991 to September 30, 1992). Gulf States Marine Fisheries Commission, Ocean Springs, 42 p.
- Gulf States Marine Fisheries Commission. 1992. SEAMAP Marine Directory. Gulf States Marine Fisheries Commission, Ocean Springs, 10 p.
- Sanders, N., D.M. Donaldson and P.A. Thompson. 1991. SEAMAP Environmental and Biological Atlas of the Gulf of Mexico, 1989. No. 25. Gulf States Marine Fisheries Commission. Ocean Springs, 318 p.
- Stephan, C.D. 1991. SEAMAP-South Atlantic Annual Report (1 October 1990 - 30 September 1991). Submitted to the South Atlantic Board of the Atlantic States Marine Fisheries Commission. Atlantic States Marine Fisheries Commission, Washington, D.C. 73 p.

## PROPOSED SEAMAP ACTIVITIES, FY1993

Annual program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean total approximately \$1.37 million. Proposed FY1993 activities for all participants are shown in Table 2.

TABLE 2.

PROPOSED SEAMAP ACTIVITIES, FY1993

	Fall	Winter	Spring	Summer
<u>Gulf Activities</u>				
Resource Surveys:				
Spring Plankton Survey			X	
Spring Reef Fish Survey			X	
Shrimp/Groundfish Surveys	X			X
Louisiana Seasonal Surveys	X	X	X	X
Fall Plankton Survey	X			
Plankton and Environmental Data Surveys	X	X	X	X
Information Operations:				
1990 Biological and Environmental Atlas		X		
1993 Marine Directory			X	
FY1992 Joint Annual Report		X		
Data Input and Request Processing	X	X	X	X
Specimen Archiving and Loan	X	X	X	X
Real-time Data Summaries				X
Program Administration	X	X	X	X
<u>South Atlantic Activities</u>				
Resource Surveys:				
Shallow Water Trawl Survey	X		X	X
Pamlico Sound Survey	X			X
Winter Trawling and Fish Tagging Cruise		X		
Benthic Characterization - Northeast Florida	X	X	X	X
Information Operations:				
Specimen Archiving and Loan	X	X	X	X
1992 South Atlantic Annual Report	X			
Bottom Mapping Project	X	X	X	X
Program Administration	X	X	X	X
<u>Caribbean Activities</u>				
Resource Surveys:				
Reef Resources Survey			X	X
Information Operations:				
Fishery Independent Database Directory		X		
Coordination with Caribbean Countries Research Programs	X	X	X	X
Program Administration	X	X	X	X

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