

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

OCTOBER 1, 1988 - SEPTEMBER 30, 1989

SEAMAP - Gulf of Mexico
Gulf States Marine Fisheries Commission

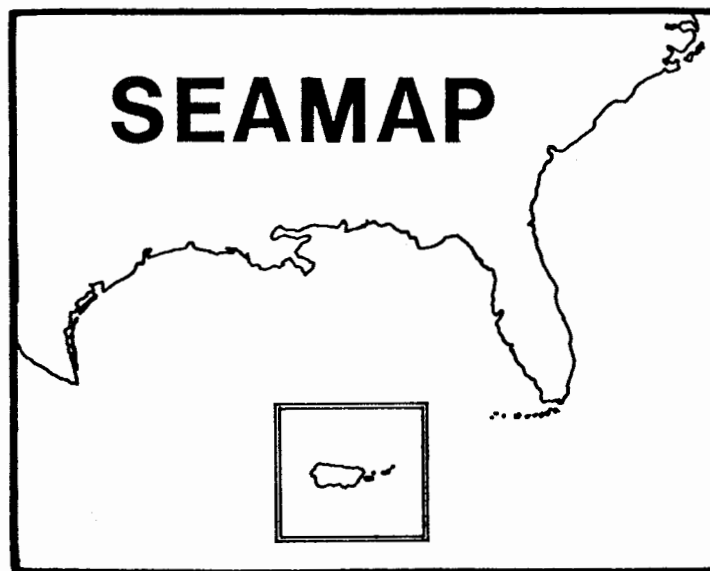
SEAMAP - South Atlantic
Atlantic States Marine Fisheries Commission

SEAMAP - Caribbean
Caribbean Fishery Management Council

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ANNUAL REPORT of the Southeast Area Monitoring and Assessment Program October 1, 1988 - September 30, 1989

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 mid-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 on Table 1.

Federal programmatic funding for SEAMAP activities and administration was appropriated in Federal Fiscal Years 1985-1989. Funding allocations to participants for FY1986-FY1989 were handled through State-Federal cooperative agreements, administered by SERO and the Southeast Fisheries Center (SEFC), National Marine Fisheries Service (NMFS).

Joint annual reports of the Gulf and South Atlantic SEAMAP programs were published in October 1985, October 1986, and December 1987, covering activities of FY1985, FY1986, and FY1987 (Gulf States Marine Fisheries Commission-GSMFC, Atlantic States Marine Fisheries Commission-ASMFC). Beginning in 1988, the joint annual report included the newly-formed Caribbean component. Publication of this report in August 1989 covered activities of FY1988 (GSMFC, ASMFC, Caribbean Fishery Management Council-CFMC). In March 1989 the programs approved publication of a cooperative FY1989 annual program report, here presented as a summary of SEAMAP operations, administrative activities, and publications for FY1989 and proposed activities for FY1990.

PROGRAM MANAGEMENT

Activities and operations of each SEAMAP component are wholly defined by their respective managing units: the SEAMAP-Gulf Subcommittee of the

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 Caribbean Fishery Management Council. The Gulf and South Atlantic committees consist of designated representatives from each member State and the NMFS (Mississippi Laboratories), and the Gulf of Mexico and South Atlantic Fishery Management Councils. The Caribbean component consists of members from Puerto Rico Department of Natural Resources (CODREMAR), Virgin Islands Division of Fish and Wildlife, Puerto Rico Sea Grant Program, NMFS-SEFC, U.S. Fish and Wildlife Service, and the National Parks 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 Caribbean Council, and personnel associated with the SEAMAP Information System, SEAMAP Archiving Center, and SEAMAP Invertebrate Plankton Archiving Center.

SEAMAP - CARIBBEAN

Action taken at the Joint SEAMAP-Gulf and South Atlantic meeting held in Mayaguez, Puerto Rico, August 1987, resulted in the approval of a SEAMAP-Caribbean component. An invitation was extended to the Caribbean Fishery Management Council 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 to 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.

In conjunction with the Gulf and South Atlantic components, SEAMAP-Caribbean participated in planning and development of the overall Five-Year Joint Management Plan, which will serve to guide SEAMAP into the mid-1990's.

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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 (MDWFP)/Gulf Coast Research Laboratory Texas Parks and Wildlife Department (TPWD) National Marine Fisheries Service - Southeast Fisheries Center (NMFS-SEFC) 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 National Marine Fisheries Service - Southeast Fisheries Center (NMFS-SEFC) South Atlantic Fishery Management Council (SAFMC)
SEAMAP-Caribbean	Caribbean Fishery Management Council	Puerto Rico Department of Natural Resources (CODREMAR) Virgin Islands Division of Fish and Wildlife Puerto Rico Sea Grant Program National Marine Fisheries Service - Southeast Fisheries Center (NMFS-SEFC) U.S. Fish and Wildlife Service National Parks Service

SEAMAP - GULF OF MEXICO

Major SEAMAP-Gulf Subcommittee meetings were held in October 1988 and March 1989, in conjunction with the Annual Fall and Spring Meetings of the GSMFC. Resource survey planning meetings of the Subcommittee were held in January and July 1989; all meetings included participation by the several work group leaders, Coordinator, Data Manager, curators, and the GSMFC Executive Director.

The annual joint meeting of the three programs was held in January 1989, in New Orleans, Louisiana with representatives from all participating agencies attending. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in July 1989 to discuss respective program needs and priorities for FY1990.

SEAMAP-Gulf work groups met this past year to provide recommendations to the Subcommittee for survey and data management needs. The Red Drum Work Group participated in the State-Federal Red Drum Conference in March 1989 and met in April 1989; the Plankton Work Group met in February 1989; and the

Shrimp/Bottomfish Work Group met at a May 1989 meeting in Biloxi, Mississippi. The Adult Finfish Work Group met in February and September 1989; and the Data Management Work Group met in August 1989. Where additional discussion was needed, the Subcommittee and work groups also deliberated plans and needs via telephone conference calls.

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 FY1989. 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 main FY1989 SEAMAP-South Atlantic Committee meetings were held in January, April, and July. Additional meetings to review projects

and plan future activities were held jointly with SEAMAP-Gulf and SEAMAP-Caribbean representatives in January and July.

SEAMAP-South Atlantic work groups met several times during the year. The Crustacean Work Group met in December and March to examine research needs and promote cooperative studies. A major accomplishment was the initial publication of a crustacean newsletter. The Bottom Mapping Work Group met in May to review suggested data components for a data management system bottom mapping module, determine a draft computer format, and prepare recommendations for a phased implementation schedule. The Shallow Trawl Work Group met in December, in conjunction with an ASMFC trawl technology workshop in Rhode Island, to review the fall survey results, and conferred via telephone in June to evaluate the long-term sampling design and recommend a standard reporting format. The Data Management Work Group was invited to meet jointly with the SEAMAP-Gulf Data Coordinating Work Group in November, but attendance was minimal because of scheduling conflicts. A training session to familiarize work group members with the new SEAMAP Data Management System was scheduled for late fall 1989.

The purpose of the joint meeting was to develop a slate of programmatic policies that would essentially define SEAMAP management for the next five years. Members of all three Committees (Gulf, South Atlantic, Caribbean) met in caucus with members of the Planning Work Group to develop sets of policy statements in five areas: operations, administration, budget, evaluation, and information management. These groups then met in general session, and using a computerized system, deliberated on more than 170 policies and procedures to arrive at consensus on approximately 130 of these. The policy statements were subsequently formatted by the plan developer and along with other information from previous SEAMAP documents, form the basis of the Five-Year Plan.

The Committee met in Charleston on April 6-7 to develop five-year programmatic goals and objectives, and review FY1989 survey plans. Work group reports were reviewed and preliminary plans made for the spring-summer-fall trawling surveys. The major part of the meeting was given to developing consensus on goals and objectives which had been tentatively approved by the Gulf and Caribbean committees from a proposed slate generated by the Planning Work Group.

The Committee met on July 26 in Savannah to evaluate priority species for the summer-fall trawling surveys, determine preferred sampling design, and assess the bottom mapping implementation options posed by that work group. Discussion followed on proposed activities and funding needs for FY1990, in preparation for the Joint Budget Meeting the following day.

The annual budget planning meeting was held jointly with the Gulf and Caribbean programs on July 27. Near-level funding (i.e., FY1989) was agreed upon for the South Atlantic and Gulf programs, with an additional allocation to the Caribbean program for FY1990 administrative needs.

The Committee again met on July 28 to determine final plans for FY1990 and develop the Annual

Operations Plan. Priorities for FY1990 are: (1) the Nearshore Regional Trawl Survey; (2) program administration; and (3) implementation of the SEAMAP Data Management System.

RESOURCE SURVEYS

In FY1989, collection of resource survey information continued for the eighth 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 both 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

*Shrimp/Groundfish Surveys

The 1988 Fall Shrimp/Groundfish Survey was conducted during October 3 - December 6, 1988, from off Pensacola, Florida to the United States-Mexican border. Vessels from NMFS, Mississippi, Louisiana and Texas sampled inshore and offshore waters to 60 fm, covering a total of 328 trawl stations, in addition to plankton and environmental sampling.

Sampling design was modified from previous fall surveys to conform to the summer shrimp/groundfish cruise. Objectives of the survey were:

- (1) to sample the northern Gulf of Mexico to determine abundance and distribution of demersal organisms from inshore waters to 60 fm;
- (2) to obtain length frequency measurements for major finfish and shrimp species to determine population size structures;
- (3) to collect environmental data to investigate potential relationships between abundance and distribution of organisms and environmental parameters;
- (4) to collect ichthyoplankton samples to determine relative abundance and distribution of eggs and larvae of commercial and recreationally important fish species.

During the survey the NOAA Ship OREGON II sampled offshore waters and territorial Louisiana and Texas waters. The R/V TOMMY MUNRO sampled Mississippi territorial and offshore waters. The R/V PELICAN sampled Louisiana territorial and offshore waters. Texas vessels sampled within territorial waters. Planned trawling activities by an Alabama vessel were cancelled due to weather conditions.

Of the total 328 trawl samples taken, NMFS completed 206 stations; Mississippi 22, Louisiana 20, and Texas 80. All vessels took environmental data, including temperature, salinity, and dissolved oxygen.

Ichthyoplankton data were collected by all except Texas vessels at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 52 stations were sampled with bongo and/or neuston nets, as encountered along cruise tracks: NMFS completed 39 ichthyoplankton stations; Louisiana 10, and Mississippi 3. All samples, except those taken by Louisiana, will be sorted at the Polish Sorting Center (PSC) in Szczecin, Poland, with specimens and data archived at the SEAMAP Archiving Centers.

*Summer Shrimp/Groundfish Trawl Survey

Design of the 1989 Summer Shrimp/Groundfish Trawl Survey was recommended by the Shrimp/Bottomfish Work Group to the SEAMAP Subcommittee following a work group conference call in March 1988. A planning meeting of the work group was held in May 1989 to examine 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 1989 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 2 to July 16, 1989. Sampling conducted east of the Mississippi River, from July 10 to July 14 re-surveyed eastern areas after emigration of brown shrimp from inshore waters.

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 16-ft trawls in waters less than 5 fm and 40-ft trawls in deeper waters. 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 311 trawl samples was taken from coastal and offshore waters out to 50 fm from Perdido Bay, Alabama to Brownsville, Texas. All vessels took environmental data, including temperature, salinity, dissolved oxygen, and chlorophyll at each station.

West of the Mississippi River Delta, hypoxic bottom waters (less than 2.0 parts per million of oxygen) were noted in several areas between 89°41.4' and 93°11.6'W. Long. in 7-14 fm.

*Spring Plankton Survey

For the seventh season since 1982, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ship ALBATROSS IV and Florida's R/V HERNAN CORTEZ II sampled offshore waters from 24°-30° N. lat. and 84°-94° W. long. from April 24 to May 21, 1989. At irregular intervals during the survey, the NOAA vessel departed from the scheduled cruise track to run a series of stations across ocean fronts and other physical features. Time and location of these special stations were determined from satellite imagery processed by NMFS Mississippi Laboratories, NSTL facility. Samples taken at special frontal boundary stations consisted of bongo and neuston tows, chlorophyll, and environmental data.

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 10 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 150 stations was sampled. The ALBATROSS IV occupied 125 stations and the R/V HERNAN CORTEZ II sampled 25 stations along the west Florida shelf. Time restraints and inclement weather prevented the ALBATROSS IV from occupying 20 additional station sites.

Hydrographic data at all stations included surface chlorophylls; salinity, temperature, and dissolved oxygen from surface, mid-water, and near bottom; and forel-ule color.

Right bongo and neuston samples from SEAMAP stations will be transshipped by the NMFS Miami Laboratory to the PSC. Left bongo samples are currently archived at the Gulf Coast Research Laboratory in Ocean Springs, Mississippi. Samples from the special frontal boundary stations will be sorted at the Miami Laboratory. Salinity data from the Florida vessel were sent to the NMFS Pascagoula Laboratory for interpretation.

*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, 1987, 1988, and in the current year covered Gulf waters from Florida Bay to Brownsville, Texas. Vessels from Florida, Alabama, Mississippi, Louisiana, and from NMFS surveyed from September 11 through October 12, 1989 for a total of 154 stations.

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The NOAA Ship OREGON II sampled 77 stations from 83°00' to 97°00' W. long. and 26°00' to 30°30' N. lat., at depths from 5 to 100 fm. Weather curtailed sampling at 19 scheduled stations. Florida's R/V HERNAN CORTEZ II sampled 36 stations from off Tampa Bay southward to the Florida Straits. Stations were located along a 30-minute latitude/longitude grid from inshore waters to the shelf edge. An Alabama vessel sampled 10 stations at the mouth and outside Mobile Bay. The R/V TOMMY MUNRO sampled 5 stations south of Mississippi Sound along a 30-minute grid, and the R/V PELICAN sampled 12 locations off Louisiana, taking 26 samples with a 60 cm bongo net and 2 x 1 m neuston net.

Stations were sampled with standard SEAMAP bongo nets with 333 micron mesh and/or 1 x 2 m neuston nets fitted with 947 micron mesh. Hydrographic sampling included chlorophylls; salinity, temperature and dissolved oxygen from surface, midwater, and bottom; and water transparency and color. Right bongo samples will be transhipped by the NMFS Miami Laboratory to the PSC; 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 will be 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, 50 plankton tows were piggybacked on the NMFS and state vessels, sampling randomly-generated trawl stations within the standard 30-min 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. Louisiana sampled with a 0.5 m ring net and a 20.0 cm bongo 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 and 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-Miami 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 at the Gulf Coast Research Laboratory in the event of damage or loss of the specimens sent to Poland.

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 1989, detailed earlier.

SEAMAP - SOUTH ATLANTIC

*Bottom Mapping Survey

Lack of funding prevented implementation of the data entry and analysis for the first element in this study, covering the area off Georgia and North Florida. This project remains a high priority for the program, but must be postponed until funds are available.

*Nearshore Regional Trawl Survey

The major survey conducted by SEAMAP-South Atlantic in 1988-89 was the continuing Nearshore Regional Trawl Survey, a fishery-independent study of the coastal habitat between Cape Hatteras, North Carolina and Cumberland Island, Georgia, during fall of 1988 and spring and summer 1989. For fall 1988, four fixed sampling stations were established and were subdivided into three trawling sites, so that latitudinal and locational differences in catch could be examined. Each trawling site was sampled once during daylight hours and once again at night so diurnal differences in catch could be observed. This cruise completed the design phase of the regional trawl survey.

Primary sampling and analytical emphasis was placed on eighteen commercially and recreationally important species, which were measured individually and the combined weight of each species recorded. Other specimens were sorted into species groups, and the combined weight and a species list were reported.

The spring cruise of the SEAMAP Shallow Water Trawl survey began on April 12 and was completed on June 16, 1989, encompassing the South Atlantic Bight from Cape Hatteras, North Carolina to Cape Canaveral, Florida. A total of 106 stations was sampled with twin 75' mongoose-type trawls. Fifty-three stations were proportionally allocated among 24 inshore strata (15' and 30' contours being the inner and outer boundaries) and the remaining 53 were allocated to 24 offshore strata (boundaries being the 30' and 60' contours). All samples were taken at night (one hour after sunset to one hour before sunrise) and were sorted to species, counted, and weighed. Selected target species were measured to the nearest centimeter.

The summer cruise of the SEAMAP Shallow Water Trawl Survey began on July 18, 1989 and was completed August 4, 1989. Sampling required 6 days on a northern leg and 4 days on a southern leg to complete the 53 stations of the 24 inshore

strata (depth ranging from 4.6 m to 9.2 m). Offshore strata were not sampled during the summer cruise. All efforts were carried out during daylight hours (one hour after sunrise to one hour before sunset) per the request of the SEAMAP-South Atlantic Committee in order to improve data on critical finfish species. Data from the spring and summer cruises are currently being entered into the computer.

It is most likely that the change in abundance between the spring and summer cruises was the result of both the change in season and the switch to daylight sampling. Geographic shifts in abundance would tend to indicate that seasonal changes played the major role. The large increases in abundance for the mackerels and brown shrimp most likely reflect changes in season rather than a result of daylight sampling, since an increase in abundance of Spanish mackerel and brown shrimp occurred during the summer months of the 1988 cruise as well.

***North Carolina Seasonal Estuarine Survey**

The NCDMF conducted seasonal trawl surveys in the Pamlico-Albemarle sounds system on a quarterly basis (September and December 1988; March and June 1989). The purpose of this ongoing survey is to obtain fishery-independent data on the distribution, relative abundance, and size composition of important species of finfish, crabs, and penaeid shrimp. Target species were river herring and shads, striped bass, bluefish, weakfish, seatrouts, spot, croaker, red drum, mackerels, flounders, shrimps, and blue crab. Sampling was conducted in a stratified random design, using depth strata (less than 12 ft, greater than 12 ft) and one-minute grids. Sampling gear was the SEAMAP 30-ft falcon trawl, towed for 20 min during daylight hours. A brief summary of each cruise was made available to the SEAMAP program, and an annual report was prepared. The sampling plans for each cruise are determined by the NCDMF and provided to the SEAMAP Program Officer. Data will be made available to the SEAMAP Information System when the data management system is able to process the data.

***North Carolina Calico Scallop Survey**

The NCDMF conducted two-day cruises in spring and fall 1988 to assess calico scallop stocks in the Atlantic Ocean east and west of Cape Lookout. Abundance and shell height of calico scallops were determined. Sampling gear consisted of a 12-ft headrope trawl with 1-in bar mesh in the body and 3/4-in bar mesh in the tailbag. The net was equipped with two rows of 1/4-in chain and 20-in x 36-in wood doors. Tow time was 5 min during daylight hours. Sixteen samples were taken within areas known to have previously yielded commercial quantities of calico scallops. Standard environmental data were also recorded. Data will be made available to the SEAMAP Information System. Two cohorts of scallops were found. Based on cruise data, the NCDMF opened the fishery, and good landings were made.

SPECIAL STUDIES

For the sixth year, the SEAMAP Program actively participated in the nationwide sampling for contaminants in coastal fishes and sediments, as part of the NOAA National Status and Trends Benthic Surveillance Project. Both SEAMAP Gulf of Mexico and South Atlantic supplied personnel from state fishery management agencies to provide guidance in locating concentrations of the target species, Atlantic croaker and spot.

Sampling methodologies in the 1989 Benthic Surveillance Project were identical to those of the four previous surveys. Gulf sites included: Tampa Bay (FL), St. Andrews Bay (FL), Pensacola Bay (FL), Pascagoula River (MS), Mississippi River Delta (MS), Galveston Bay (TX), San Antonio Bay (TX), Barataria Bay (LA), and Choctawhatchee Bay (FL).

South Atlantic sites sampled in the summer and fall 1989 included: Pamlico Sound (NC), Charleston Harbor (SC), Sapelo Sound (GA), St. John's River (FL), and Biscayne Bay (FL).

Sampling was conducted from August 28 to October 10, 1989 with the NOAA Ship FERREL serving as the primary platform. Analyses of trace metals, aromatic and chlorinated hydrocarbons, and other contaminants in fish tissues and sediments are coordinated by the NMFS Beaufort (NC) Laboratory. While in previous surveys the Oxford Laboratory and Charleston Laboratory performed histopathological studies on collected spot and croaker from the Gulf, samples from the 1989 survey will be analyzed at the NMFS Northwest Fisheries Center in Seattle.

Many of the sites are large, complex estuarine systems with a variety of microenvironments which may vary from relatively pristine to heavily impacted. This within-site variability led to an intensive examination in Galveston Bay during the 1988 and 1989 surveys. Galveston Bay was selected for: (1) an abundance of target fish (Atlantic croaker and spot); (2) a complex bay system with a number of sites with man-made impacts; (3) a site where relatively strong metal and organic signals were obtained from 1984 samples; and (4) a major maritime population center with industrial, shipping, and fishing activities. A total of five subsites were selected in the Galveston Bay system with fish and sediment samples collected at each.

A comprehensive document, A Summary of Data on Tissue Contamination from the First Three Years (1986-1988) of the Mussel Watch Project (NOAA Tech. Memo. NOS OMA 49) has been prepared and is available from the NOAA Rockville (MD) National Ocean Service Office.

FIVE-YEAR PLAN

As a result of the external Joint SEAMAP Program Review conducted during May-October 1987 under contract from the SEFC, a joint Five-Year Plan was authorized. Through the NMFS/North

Carolina 1989 SEAMAP cooperative agreement, North Carolina was funded to prepare this document. A Planning Work Group was formed, consisting of the NMFS Program Manager; Gulf, South Atlantic, and Caribbean Coordinators; and the North Carolina plan developer. The group met in December 1988 and in March 1989 to develop a plan format and matrices for policy and objectives planning. Materials thus generated were used at the January and July meetings to prepare joint programs sections of the plan.

DATA MANAGEMENT

Biological and environmental data from all SEAMAP-Gulf surveys are included in the SEAMAP Information System, managed in conjunction with NMFS-SEFC. 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 1982-1987 have been entered into the system, and data from 1988 and 1989 surveys are in the process of being verified, edited, and entered for storage and retrieval. Data from SEAMAP-South Atlantic surveys have not yet been entered into the system, but will be transferred from North Carolina and South Carolina data management systems when the modules for survey data in the SEAMAP system are available.

Verified, non-confidential SEAMAP data are available conditionally to all requestors, although the highest priority is assigned to SEAMAP participants. A total of 86 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, 84 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.

The distributive processing SEAMAP Data Management System development for data entry, edit, upload, data base, data query, and download has been completed. Operational versions are now located at six SEAMAP field sites. Approximately 57% of the total system estimated cost of \$529,251 has been committed to contracts (\$299,697). Approximately 94% of the committed contract money or \$282,534 has been utilized as of September 30, 1989. Delivery of the remaining personal computers was rescheduled for the last week in October 1989.

A centralized data management system being used by NMFS for the SEAMAP Program operates on a Burroughs 7811 computer located in Seattle, Washington, and depends on skilled programmers and computer operators for data entry, retrieval and display. SEAMAP participants submit their data to the SEAMAP Data Manager for system entry, who then assures the entry of data to the Burroughs. To verify the data, printed listings of newly entered data are produced and returned to the SEAMAP participant. Entry errors are corrected on the listing and the data are resubmitted. This mail-oriented loop iterates until all data are verified.

To retrieve data, SEAMAP participants must submit a Data Request and Use Agreement Form to the Data Manager. The Data Manager approves the request, and ensures the data are retrieved from the system by skilled programmers.

Outside users (e.g., Minerals Management Service, U.S. Army Corps of Engineers, etc.) may request listings of particular data sets. The information provided is used for efforts such as environmental impact statements, life history studies, oceanographic process research, and long-term ecological trends strategy evaluation. Outside users, like the SEAMAP participants, submit the request to the SEAMAP Subcommittee through the SEAMAP-Gulf Coordinator for approval to proceed. Once the request is approved, information is provided by the Data Manager and staff members through a priority based, mail-oriented system.

The proposed system is decentralized, i.e., distributed. Thus, the SEAMAP users will be able to locally, and directly, enter and retrieve data. Software for the proposed system has been distributed to participants for trial runs of data input.

This new system will overcome the deficiencies of the current system (i.e., the time necessary to enter and retrieve data) and will provide powerful and flexible local data analysis and display capabilities. Under the proposed system, each SEAMAP site will enter, verify and edit their data, eliminating the mail-oriented loop necessary to enter/edit/verify data under the current system. Secondly, each site will have the capability of locally accessing SEAMAP data, utilizing a user-friendly system. Local data retrieval will allow the data to be accessed in a timely manner with a minimum amount of effort and programming skills.

Under the new system, outside users may continue to request special data sets for research or study. 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 FY1989:

- Evaluating the abundance and size distribution of penaeid shrimp in Federal and

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State waters to assist in determining opening and closing dates for commercial fisheries.

- 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 1983, 1984, 1985, and 1986 SEAMAP Biological and Environmental atlases.
- Comparing catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets.
- Compiling the 1984 and 1985 SEAMAP Ichthyoplankton Atlas.
- Identifying optimized gear for squid and butterflyfish.

Data from the SEAMAP-South Atlantic Shallow Trawl Survey is presently managed under a separate system of the South Carolina Marine Resources Research Institute, pending completion of the new SEAMAP DMS. The South Carolina system is a contracted project that monitors fish and shrimp populations with standard gear to support a long-term data base, including analysis of fishery information and production of reports on fisheries trends.

REAL-TIME DATA

A major function of the SEAMAP Information System in 1989 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 Pascagoula Laboratory 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 Pascagoula Laboratory, 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

SEAMAP collects plankton and associated environmental data on most surveys. The specimens are sent to Poland for sorting under a U.S. agreement with that country, which has a well-deserved reputation for excellence in this field.

Larval fish and fish egg samples sorted to the family level by the PSC are returned to the SEAMAP Archiving Center (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 have been identified to represent 18 orders, 125 families, 295 genera, and 244 species.

The SAC is managed in conjunction with FDNR 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, presently a cumbersome manual procedure. Plans call for 700 SEAMAP samples (+ 25% quality control) to be sorted for ichthyoplankton during the PSC contract period of September 1988 through August 1989. Priorities for sorting these samples from the backlog at PSC have been determined. Beginning in the fall of 1987 plankton samples taken by Louisiana vessels were sorted by LDWF and sorting has continued for 1988-1989 samples. All specimens and data will be provided to the SEAMAP Archiving Center.

Loan of SEAMAP specimens, and development of the system and its protocols, are supervised by SAC's curator, following policies outlined in the SEAMAP Operations Plan. More than 3,100 specimen lots of fish larvae have been loaned, most of them species of commercial and recreational importance: mackerels, snappers, tunas, butterflyfish, bluefish, red drum, jacks, herrings, grunts, and others. With the complete accessioning of 1986 samples, the catalogue is expected to contain approximately 42,000 lots, a collection of significant size. A poster entitled "SEAMAP Ichthyoplankton Collections from the U.S. Gulf of Mexico" was presented at the meeting of the American Society of Ichthyologists and Herpetologists held in June 1989 to increase awareness of the SEAMAP collection and facilities.

SEAMAP INVERTEBRATE PLANKTON ARCHIVING CENTER

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

Through September 30, 1989 a total of 3,801 unsorted SEAMAP bongo and neuston samples have been catalogued and archived at the SIPAC. Additional 1988 neuston samples catalogued at SIPAC await shipment to the PSC. A total of 620 samples has been sorted at Gulf Coast Research Laboratory and the PSC for selected invertebrate taxa following established protocol. Sorted specimens from 346 of the 400 samples that the PSC has agreed to sort in 1986, have now been received and catalogued at SIPAC. SIPAC was notified in July 1989 that the remaining 54 samples would be completed as soon as possible.

As of September 31, 1989 a total of 1,890 lots of selected invertebrate taxa have been sorted and catalogued at SIPAC. Of that total, 1,037 lots were provided by the PSC, and 853 lots were provided by Gulf Coast Research Laboratory personnel. Portunid megalope have been identified from most of the samples. There are currently

1,282 lots of identified Portunid megalope catalogued at SIPAC. Data from these samples have been provided to Harriet Perry (GSMFC Crab Subcommittee) and Mr. Gus Zieske of Louisiana Wildlife and Fisheries.

INFORMATION DISSEMINATION

The following reports were published and distributed in FY1989:

- 1989 SEAMAP Marine Directory. Inventories of marine agency contacts (State, Federal, and university) concerned with fishery research in the Gulf, and summaries of information provided by these organizations: target species, types of fishery-independent sampling gear and platforms, annual sampling effort, and other material.
- 1989 SEAMAP Subcommittee Report to the GSMFC Technical Coordinating Committee; a detailed summary of program accomplishments, emphasizing survey design, materials collected, data dissemination, budget information, and future survey activities.
- Sciaenops, Newsletter of the State-Federal Cooperative Program for Red Drum Research in The Gulf of Mexico. Vol. 3, No. 1. 1989-90 program updates published and distributed to program participants and others interested in red drum research.

- 1988 Annual Report of the SEAMAP Program - October 1, 1987 to September 30, 1988; a summary of 1988 activities and proposed 1989 events for the SEAMAP-Gulf, South Atlantic, and Caribbean programs.
- 1989 Annual Report to the South Atlantic Board of the SEAMAP Program: October 1, 1988 to September 30, 1989; a summary of FY1989 activities and proposed 1990 events for the SEAMAP-South Atlantic Program.
- Pamlico-Albemarle Sounds Survey Cruise Reports (September 1988; November 1988). C.D. Stephan, D.W. Moye, S.K. Strasser. North Carolina Division of Marine Fisheries.
- Calico Scallop Survey: November 1988 Cruise Report. C.D. Stephan, North Carolina Division of Marine Fisheries. (May 1989).

PROPOSED SEAMAP ACTIVITIES, FY1990

Program allocations for the SEAMAP programs, Gulf, South Atlantic and Caribbean, total \$1 million. However, anticipated reductions for the deficit spending reduction and NMFS surcharges will reduce the available funds. Proposed FY1990 activities for all participants are shown in Table 2.

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TABLE 2.
PROPOSED SEAMAP ACTIVITIES, FY1990

	Fall	Winter	Spring	Summer
<u>Gulf Activities</u>				
Resource Surveys				
Spring Plankton Survey			X	
Shrimp/Groundfish Trawling Surveys	X			X
Louisiana Seasonal Surveys	X	X	X	X
Plankton Survey	X			
Plankton and Environmental Data Surveys	X	X	X	X
Information Operations				
1987 Biological and Environmental Atlas				X
1990 Marine Directory			X	
1990 Annual Report	X			
Data Management System Implementation	X	X	X	X
Data Input and Request Processing	X	X	X	X
Specimen Archiving and Loan	X	X	X	X
Real-time Data Summaries				X
1989-1994 Five-Year Management Plan	X			
Program Administration				
Joint Program Planning	X	X	X	X
<u>South Atlantic Activities</u>				
Resource Surveys				
Nearshore Regional Trawl Survey	X		X	X
Seasonal Pamlico-Albemarle Trawl Survey	X	X	X	X
North Carolina Calico Scallop Survey	X		X	
Winter Trawl/Fish Tagging Survey		X		
Benthic Characterization - Northeast Florida				X
Information Operations				
Data Management System Implementation	X	X	X	X
Pilot Data Processing				X
Specimen Archiving and Loan	X	X	X	X
1989 Annual Report	X			
1987 Passive Gear Workshop Proceedings				X
1989-1994 Five-Year Management Plan	X			
Program Administration				
Joint Program Planning	X	X	X	X
<u>Caribbean Activities</u>				
Resource Surveys				
Fall Longlining/Plankton Survey	X			
Summer Reef Fish/Plankton Survey				X
Information Operations				
Specimen Archiving and Loan	X	X	X	X
Program Administration				
Survey Planning	X	X	X	X
Joint Program Planning				X

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SEAMAP-Gulf of Mexico Representatives

Walter M. Tatum, Chairman
Alabama Department of Conservation and
Natural Resources

Richard Waller, Vice Chairman
Gulf Coast Research Laboratory/Mississippi
Department of Wildlife, Fisheries and Parks

Barney Barrett
Louisiana Department of Wildlife and Fisheries

J. Alan Huff
Florida Department of Natural Resources

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Scott Nichols
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Southeast Fisheries Center

Wayne Swingle
Gulf of Mexico Fishery Management Council

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David Cupka, Vice Chairman
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Roger Pugliese
South Atlantic Fishery Management Council

SEAMAP-Caribbean Representatives

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