

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

OCTOBER 1, 1987 - SEPTEMBER 30, 1988

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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SEAMAP is a State-Federal program administered by the Southeast Regional Office, National Marine Fisheries Service. This project was supported in part by the National Oceanic and Atmospheric Administration National Marine Fisheries Service, under State/Federal Project Number SM:14:3.

Annual Report Preparation By:

Nikki Bane
Coordinator, SEAMAP-South Atlantic

Tom Van Devender
Coordinator, SEAMAP-Gulf of Mexico

Design and Layout:

Lucia B. Hourihan Eileen M. Benton
Gulf States Marine Fisheries Commission

ANNUAL REPORT of the Southeast Area Monitoring and Assessment Program October 1, 1987 - September 30, 1988

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 Fiscal Years 1985, 1986, 1987, and 1988 (October 1, 1987 through September 30, 1988). State and Commission funding allocations for FY1986, FY1987, and FY1988 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, Atlantic States Marine Fisheries Commission). In March 1988 the programs approved publication of a cooperative FY1988 annual program report, here presented as a summary of SEAMAP operations, administrative activities and publications for FY1988 and proposed activities for FY1989. In addition, this year's report will also present proposed FY89 activities for the newly-formed Caribbean component.

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 Caribbean Fishery Management Council. The Gulf and South Atlantic committees consist of designated representatives from each member State and the National Marine Fisheries Service (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 Island Division of Fish and Wildlife, Puerto Rico Sea Grant Program, National Marine Fisheries Service-Southeast Fisheries Center, 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 by both programs of a SEAMAP-Caribbean component. An invitation was extended to the Caribbean Fishery Management Council to implement the program. The Caribbean Council 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.

SEAMAP - GULF OF MEXICO

Major SEAMAP-Gulf Subcommittee meetings were held in October 1987 and March 1988, in conjunction with the Annual Fall and Spring

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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 Conservation (MDWC)/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 Natural Resources and Community Development (NCDNRCD) 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 Island 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

Meetings of the Gulf States Marine Fisheries Commission (GSMFC). Resource survey planning meetings of the Subcommittee were held in January and August 1988; all meetings included participation by the several work group leaders, Coordinator, Data Manager, curators, and the GSMFC Executive Director.

An annual joint meeting of the two programs was held in January 1988, in Annapolis, Maryland with representatives from all participating agencies attending. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 1988 to discuss respective program needs and priorities for FY1989.

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 1988 and met in July 1988; the Plankton Work Group met via conference call in March and held a meeting in April 1988; and the Shrimp/Bottomfish Work Group met via a

conference call in March and an April 1988 meeting in New Orleans. Where additional discussion was needed, the Subcommittee and work groups also deliberated plans and needs via telephone conference calls.

Coordinating program surveys and distributing quick-report summaries of a Gulf-wide survey to management agencies and industry were major functions of SEAMAP management in FY1988. 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 major FY1988 SEAMAP-South Atlantic Committee meetings were held in March and August

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1988. Additional meetings to review projects and plan future activities were held jointly with SEAMAP-Gulf representatives in January and August; the Caribbean section was also present at the latter.

SEAMAP-South Atlantic work groups met in May and July. The Data Management Work Group met in May to discuss data needs relative to PC module use. The Shallow Trawl Work Group met in July to review results of the 1987 Nearshore Trawl Survey and begin planning for the 1988 survey. Other work group meetings were scheduled for early FY1989 (October).

The January 20-21 joint programs meeting was held in Annapolis, Maryland to evaluate results of the Joint SEAMAP Program Review. Invited participants included South Atlantic Board and Atlantic States Marine Fisheries Commission representatives, NOAA and CASC administrative personnel, NMFS staff from Washington, DC, and a legislative aide from the House Merchant Marine and Fisheries Committee. The Review Panel developed findings and recommendations on 15 objectives designed to evaluate organizational and functional aspects of the program.

The March 24-25 Committee meeting was held in Atlanta, Georgia to address actions required by the Committee to implement endorsed program review findings, FY1989 survey and data management needs, and options available to accommodate possible budget reductions. The Committee endorsed a six-month (July-December) FY1988 Operations Plan that would enable North Carolina, South Carolina and Georgia to proceed on the January-December funding cycle under which the other SEAMAP cooperators operate.

The annual budget planning meeting was held in St. Petersburg, Florida jointly with the Gulf and Caribbean programs on August 24. Priorities for FY1989 are: (1) the Nearshore Regional Trawl Survey; (2) program administration; and (3) development of the Joint Programs Five-Year Management Plan.

In addition to program planning, major management functions of SEAMAP-South Atlantic this year included distribution of the SEAMAP FY1987 Joint Annual Report; and Final Report, Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY87-88. Guidance was also provided to the work groups for preparing project requirements and assisting in the development of State-Federal cooperative agreements.

In conjunction with the Gulf Program, SEAMAP-South Atlantic continued planning for improving the program, following the 1987 Program Review. This activity is detailed in the "Special Studies" section of this report.

RESOURCE SURVEYS

In FY1988, collection of resource survey information continued for the seventh 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 1987 Fall Shrimp/Groundfish Survey was conducted from October 23 - December 3, 1987, from off Pensacola, Florida to the U.S.-Mexican border. Vessels from NMFS, Alabama, Mississippi, Louisiana, and Texas sampled inshore and offshore waters to 60 fm, covering a total of 294 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) 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.
- (4) 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, and an Alabama vessel sampled territorial Alabama waters. Texas vessels sampled within territorial waters.

In addition to the survey activities, five comparative tows were conducted between the OREGON II and TOMMY MUNRO pulling 40-ft trawls and an Alabama vessel pulling a 16-ft trawl. Data will be used to develop calibration factors for the various gear and allow reporting of catch by standard 40-ft trawl hauls.

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Of the total 294 trawl samples taken, NMFS completed 171 stations; Alabama 8, Mississippi 14, Louisiana 21, and Texas 80 trawl stations. All vessels took environmental data, including temperature, salinity, and oxygen.

In the offshore samples catch rates were higher at night than during the day, and most of the biomass occurred in the 40-49 fm depth stratum. Geographically, catch rates were highest east of the River delta and decreased with westward movement.

Sampling design in previous fall surveys allowed for day/night classifications to be determined by time of day stations were encountered along the cruise track. This method may have confounded effects of area and depth with diel effects. The 1987 Fall Survey had day and night treated as independent strata during station selection, eliminating the confusion of areal and diel effects.

Ichthyoplankton data were collected by all, except Texas vessels, at sample sites occurring nearest to half-degree intervals of latitude/longitude.

The Louisiana Department of Wildlife and Fisheries continued seasonal day/night surveys as part of an effort to provide comparative information on critical life stages of major Gulf species, especially shrimp, and associated environmental parameters in Louisiana and adjacent EEZ waters. Seasonal sampling in October and December 1987, and March and July 1988 took a total of 48 trawls (12 day and 12 night in each survey) to depths of 15 fm (90 ft). Plankton and neuston samples were collected at all stations.

•Summer Shrimp/Groundfish Trawl Survey

Design of the 1988 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 April 1988 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 1988 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 14, 1988. SEAMAP sampling conducted east of the Mississippi River, from July 8 to July 12

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. An Alabama vessel sampled offshore Alabama waters with 16-ft trawls. The R/V PELICAN sampled both Louisiana state waters and offshore waters with 40-ft nets, and Texas vessels sampled Texas state waters and offshore waters with 20-ft nets.

A total of 324 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, oxygen, and chlorophyll at trawl stations.

•Spring Plankton Survey

For the sixth season since 1982, 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 24°-30°N. lat. and 84°-94° W. long. from April 19 to May 26, 1988. 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 ten minutes. All plankton samples were initially preserved in 10% buffered formalin and after 48 hours were transferred to 95% ethyl alcohol for final preservation.

A total of 160 stations was sampled. The OREGON II occupied 143 stations and the R/V HERNAN CORTEZ II sampled 17 stations along the west Florida shelf. High seas prevented six planned samples from being taken by the Florida vessel.

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 samples from SEAMAP stations will be transhipped by the NMFS Miami laboratory to the Polish Sorting Center (PSC) in Szczecin, Poland. Left bongo and neuston samples are currently archived at the Gulf Coast Research Laboratory in Ocean Springs, Mississippi with neuston samples to be transhipped to the PSC at

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a later date. Samples from the special frontal boundary stations will be sorted at the Miami Laboratory. Salinity data from the Florida vessels 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, 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 August 26 through October 12, 1988 for a total of 156 stations.

The NOAA Ship OREGON II sampled 80 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 and seas associated with hurricanes Florence and Gilbert in the Gulf curtailed sampling at 16 scheduled stations. Chlorophyll samples were filtered at each station. 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 6 stations south of Mississippi Sound along a 30-minute grid, and the R/V PELICAN sampled 12 stations off Louisiana, taking 24 samples with a .5 m ring net.

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 will be transhipped by the NMFS Miami Laboratory 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, 46 plankton tows were piggybacked on the NMFS and state vessels, sampling randomly-generated 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 .5 m ring net beginning with the July Seasonal Survey.

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; salinity, temperature, and oxygen were taken at the surface, mid-depth and bottom. Wind direction and speed and wave height were taken at all trawl stations.

Samples from the right side of the bongo tows were shipped to the NMFS-Miami Laboratory for transhipment to Poland, where they will be sorted to the family level (both ichthyoplankton and selected crustacean and molluscan species). The other sample from each station is retained as a back-up in the event of damage or loss of the specimens sent to Poland, 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 1988, 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 1987-88 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 summer and fall 1987. 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 difference in catch could be observed.

Primary sampling and analytical emphasis were 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, as well as a species list, were recorded.

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Analysis of variance showed a significant difference in mean biomass among stations, with the Cape Fear station contributing significantly greater biomass than the other stations. Mean biomass per tow for combined stations declined until late fall, when there was an increase due to emigrations of sciaenids offshore. Mean biomass per tow among trawling sites was not significantly different, although inlet sites tended to produce slightly higher catches. Night catches produced significantly greater biomass than day catches among cruises and stations, with the exception of the Cape Fear station, where day catches exceeded those at night. Total effort during this study collected 11,642.1 kg of faunal biomass or 97.02 kg per tow.

A fairly uniform species diversity was found among stations, cruises and day/night catches, although slight variations did occur. A total of 155 species was collected during this survey, with no species being present in all collections.

Combined collections at all stations netted 88,923 individuals of the eighteen target species (numerically, commercially, and recreationally important species) or 741 individuals per tow. The three most abundant sciaenids were croaker, Micropogonias undulatus; spot, Leiostomus xanthurus; and the southern kingfish, Menticirrhus americanus, which together accounted for 79.8% of the total number and 82% by weight of the target species. The most abundant decapod species was the white shrimp, Penaeus setiferus, which constituted 51.2% of the total catch of target decapod species.

Normal cluster analysis classified collections pooled by site location (beach, off beach, inlet) into five groups. Group formation related more the similarity in species composition among stations and cruises than to time of day. Inverse cluster and nodal analysis indicated that site groups were characterized by consistently occurring species assemblage rather than by those that were faithful to a particular site. Cluster results indicate that station location was an important factor determining species assemblages during the current survey.

Particular emphasis was placed on the two scombrids, Spanish mackerel, Scomberomorus maculatus, and king mackerel, Scomberomorus cavalla, due to their importance as both recreational and commercial finfishes. A total of 996 S. maculatus was collected, with 42% of the individuals coming from the Cape Fear station. Fork length (FL) ranged from 4-48 cm, with most of these mackerel being young-of-the-year. The Cape Lookout station produced the greatest number of S. cavalla, where 53% of the individuals were collected. Size of specimens ranged from 5-31 cm FL, which placed them in the 0 or young-of-the-year age class.

The index station that was sampled once during each cruise leg produced lower mean biomass per tow than any of the regular stations. Due to the paucity of data collected at this station, the value of the index station as a monitor for short-term temporal changes is questionable.

Collected data were sent on coded data sheets to SCWMRD for key entry, verification and analysis. These data will be entered into the SEAMAP Information System when the completed shrimp/groundfish file is available for PC entry and retrieval. Additional information on this survey is given in Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY87-88 (SCWMRD 1988).

*North Carolina Seasonal Estuarine Survey

The NCDMF conducted seasonal trawl surveys in the Pamlico-Albemarle sounds system on a quarterly basis (September and December 1987; March and June 1988). 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, seatrout, 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 prior to subsequent segments 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 later be made available to the SEAMAP Information System.

*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. Twelve to sixteen samples were taken within areas known to have previously yielded commercial quantities of calico scallops. Standard environmental data were also recorded. Data will later be made available to the SEAMAP Information System. These data are currently being analyzed and a final report prepared for distribution.

SPECIAL STUDIES

For the fifth 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.

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Sampling methodologies in the 1988 Benthic Surveillance Project were identical to those of the three previous surveys; Gulf sites included Charlotte Harbor, Apalachicola Bay, Mobile Bay, Heron Bay, Galveston Bay, San Antonio Bay, Lower Laguna Madre, Lavaca Bay (new), and Corpus Christi Bay.

Only one site was sampled in FY1988: Pamlico Sound, North Carolina. In accordance with the program's design of alternately sampling half the established sites each year, 1989 sites will include Charleston Harbor (South Carolina), Sapelo Sound (Georgia), and St. John's River (Florida).

Sampling was conducted from August to October 1988 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 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 1988 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 survey. 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.

An interpretive report for project years 1984-1985 was prepared by the NMFS Beaufort Laboratory, available for distribution in December 1988.

PROGRAM REVIEW

An external Joint SEAMAP Program Review was conducted from May to October 1987 under contract from the SEFC. Findings of the review panel were distributed to members of the Gulf and South Atlantic components in October; a summary of the findings was also distributed. Committee and Subcommittee members addressed these findings, endorsing jointly a final slate of recommendations and actions.

These actions were subsequently presented to the Gulf States Marine Fisheries Commission's Technical Coordinating Committee and the Atlantic States Marine Fisheries Commission's South Atlantic Board for discussion. These boards reviewed major findings and agreed by consensus to endorse recommendations to consolidate Gulf and South Atlantic five-year management plans and

develop separate annual operations plans. It was also agreed that resource management "emergency" data needs, such as have recently occurred for red drum and king mackerel fisheries, should be incorporated into the long-term data collection process.

The FY1989 Operations Plans were subsequently developed and approved for each SEAMAP component (Gulf, South Atlantic, Caribbean). Portions of the Five-Year Joint Management Plan will be developed by the North Carolina Marine Resources Division as part of its FY1989 SEAMAP cooperative agreement.

DATA MANAGEMENT

Biological and environmental data from all SEAMAP 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 surveys in 1982 through 1987 have been entered into the system and data from 1988 surveys are in the process of being verified, edited, and entered for storage and retrieval.

Verified, non-confidential SEAMAP data are available conditionally to all requestors, although the highest priority is assigned to SEAMAP participants. During 1987, more than 12 requests were 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.

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 is progressing on schedule. Approximately 42% of the total system estimated cost of \$508.5K has been committed to contracts. About 5% of the system hardware is still on order. Progress has been made in converting the field data sheets to metric units as directed by the SEAMAP Subcommittee. Revised

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data acquisition forms are scheduled for field use for 1989 SEAMAP surveys.

A centralized data management system is presently being used by NMFS for the SEAMAP Program. This system 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 listing of particular data sets. The information provided is used for efforts such as environmental impact statements, life histories 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.

This proposed 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 proposed 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:

- Evaluating the abundance and size distribution of penaeid shrimp in Federal and State waters to assist in determining opening and closing dates for commercial fisheries.
- Assessing shrimp and groundfish abundance and distribution and their relationship to such environmental parameters as temperature, salinity, and 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 Atlantic Marine Resources Research Institute, pending completion of the new SEAMAP Data Management System. 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 1988 was the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted daily via satellite to the NMFS/NSTL facility 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

Larval fish and fish egg samples sorted to the family level by the Polish Sorting Center (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

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microcomputer/mainframe program which eliminates coding errors and facilitates faster data entry. Comprehensive data listings are now available for survey specimens from 1982-1985, consisting of approximately 31,774 specimen lots, as well as many fish eggs and unsorted fish larvae. Samples cataloged to date represent 19 orders, 124 families, and 293 generic or species level taxa.

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 will be sorted by LDWF. 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-Gulf 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 40,000 lots, a collection of significant size. Plans are underway to expand professional awareness of the SEAMAP collection and facilities.

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, managed in conjunction with Gulf Coast Research Laboratory in Biloxi, Mississippi.

Through August 1988 a total of 3,075 unsorted SEAMAP bongo and neuston samples have been catalogued and archived at the SIPAC. Additional shipments of approximately 600 samples have been received from current surveys and are presently being catalogued. To date, 191 samples from 1984 cruises have been sorted for invertebrates at the PSC, using established protocols, and returned to SIPAC. A total of 600 vials of specimens and data sheets are currently being catalogued. An additional 191 plankton samples have been sorted by SIPAC personnel at GCRL.

Neuston samples from OREGON II Cruises 169 and 862 have been loaned to the NMFS Panama City Laboratory in support of mackerel investigations.

INFORMATION DISSEMINATION

The following publications were published and distributed in FY1988:

- 1988 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.
- 1988 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. 2, No. 1-2. 1988-89 program updates to be published and distributed to program participants and others interested in red drum research.
- 1985 SEAMAP Environmental and Biological Atlas, June 1988; a compilation of information obtained from the 1985 SEAMAP surveys, including catch rates of shrimp and finfish, a squid/butterfish survey across the Gulf, an ichthyoplankton cruise, and environmental data.
- 1987 Annual Report of the SEAMAP Program - October 1, 1986 to September 30, 1987; a summary of 1987 activities and proposed 1988 events for both SEAMAP programs.

Information from SEAMAP-South Atlantic program activities was provided in the following publications in FY1988.

- Results of Trawling Efforts in the Coastal Habitat of the South Atlantic Bight, FY87-88. H.R. Beatty, J.W. Hall, E.L. Wenner; a report of the yearly survey of coastal waters off North Carolina, South Carolina and Georgia.
- 1988 Annual Report to the SAB of the SEAMAP Program - October 1, FY1987 to September 30, 1988; a summary of FY1988 activities and proposed 1988 events for the SEAMAP-South Atlantic Program.
- Pamlico-Albemarle Sounds Survey Cruise Reports (December 1987; March 1988; June 1988). D.W. Moye, C.D. Stephan, S.K. Strasser; quarterly reports of the North Carolina Seasonal Estuarine Survey results.
- Joint Annual Report of the SEAMAP Program, October 1, 1986-September 30, 1987 (published December 1987). ASMFC, GSMFC; a summary of activities for both the SEAMAP-Gulf and SEAMAP-South Atlantic programs in FY1987.

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PROPOSED SEAMAP ACTIVITIES, FY1989

Total 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 FY1989 activities for SEAMAP participants are shown in Table 2. It should be noted that the SEAMAP fiscal year begins on January 1, unlike the GSMFC/TCC fiscal years; thus, fall activities for FY1989 will be conducted from October-December, 1989.

**TABLE 2.
PROPOSED SEAMAP ACTIVITIES, FY1989**

<u>Gulf Activity</u>	<u>Fall</u>	<u>Winter</u>	<u>Spring</u>	<u>Summer</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:				
1986 Biological and Environmental Atlas				X
1989 Marine Directory			X	
1989 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	X	X	X	X
<hr/>				
<u>South Atlantic Activity</u>	<u>Fall</u>	<u>Winter</u>	<u>Spring</u>	<u>Summer</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	X	X	X	X
<hr/>				
<u>Caribbean Activity</u>	<u>Fall</u>	<u>Winter</u>	<u>Spring</u>	<u>Summer</u>
Fall Longlining/Plankton Survey	X			
Summer Reef Fish/Plankton Survey				X
Survey Planning		X	X	X
Specimen Archiving and Loan	X	X	X	X
Joint Programs Planning				X
Program Administration	X	X	X	X

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SEAMAP-Gulf of Mexico Representatives

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

Barney Barrett
Louisiana Department of Wildlife and Fisheries

Gary Matlock
Texas Parks and Wildlife Department

Richard Waller, Vice Chairman
Gulf Coast Research Laboratory/Mississippi
Department of Wildlife Conservation

J. Alan Huff
Florida Department of Natural Resources

Scott Nichols
National Marine Fisheries Service
Southeast Fisheries Center

Wayne Swingle
Gulf of Mexico Fishery Management Council

SEAMAP-South Atlantic Representatives

J. Alan Huff, Chairman
Florida Department of Natural Resources

Henry Ansley
Georgia Department of Natural Resources

Scott Nichols
National Marine Fisheries Service
Southeast Fisheries Center

Michael Street, Vice Chairman
North Carolina Department of Natural
Resources and Community Development

David Cupka
South Carolina Wildlife and Marine
Resources Department

Roger Pugliese
South Atlantic Fishery Management
Council

SEAMAP-Caribbean Representatives

Denton Moore, Chairman
Virgin Island Division of Fish and Wildlife

Andrew Kemmerer
National Marine Fisheries Service
Southeast Fisheries Center

Carolyn Rogers
U.S. National Park Service

Manual Hernandez Avila
Puerto Rico Sea Grant Program

Joseph Kimmel
CODREMAR/Puerto Rico Department of
Natural Resources

Hilda Diaz Soltero
U.S. Fish and Wildlife Service

Tom Van Devender
Coordinator-Gulf of Mexico

Nikki Bane
Coordinator-South Atlantic

Miguel Rolon
Coordinator-Caribbean

Larry B. Simpson
Executive Director
Gulf States Marine Fisheries Commission

Irwin Alperin
Executive Director
Atlantic States Marine Fisheries Commission

Taylor Harper
Chairman
Gulf States Marine Fisheries Commission

Robert A. Jones
Chairman
Atlantic States Marine Fisheries Commission

Andrew J. Kemmerer
National Marine Fisheries Service
Program Manager

Kenneth Savastano
National Marine Fisheries Service
Data Manager

John V. Gartner, Jr.
Curator, SEAMAP Archiving Center

Kenneth Stuck
Curator, SEAMAP Invertebrate Plankton Archiving Center

