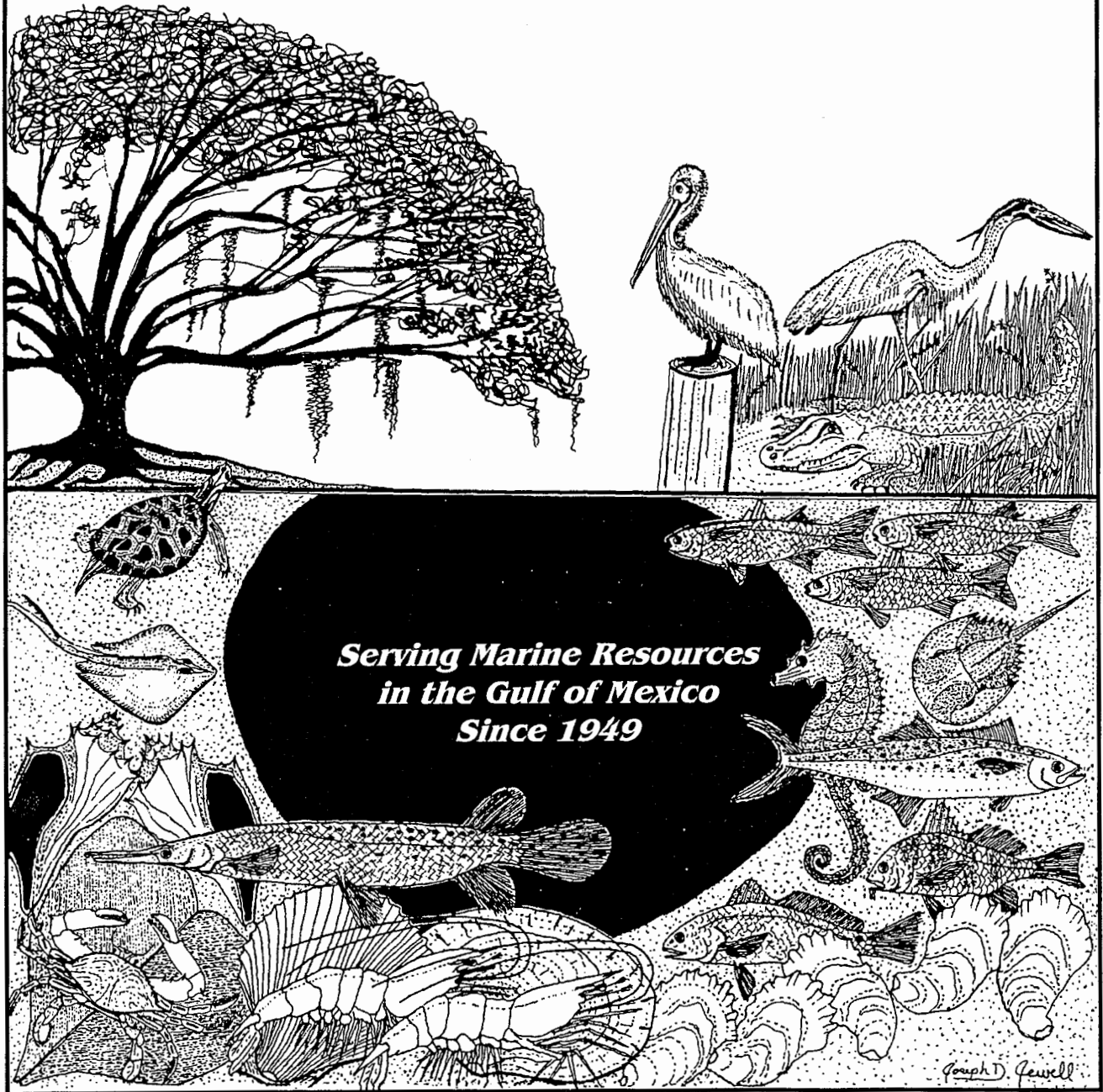


Forty-Ninth Annual Report
of the
GULF STATES MARINE FISHERIES COMMISSION

FOR THE YEAR 1998



The GULF STATES MARINE FISHERIES COMMISSION is an organization of the five states whose coastal waters are the Gulf of Mexico. This Compact, authorized under Public Law 81-66, was signed by the representatives of the Governors of the five Gulf States on July 16, 1949, at Mobile, Alabama. The Commission's principal objectives are the conservation, development, and full utilization of the fishery resources of the Gulf of Mexico to provide food, employment, income, and recreation to the people of these United States.

GULF STATES MARINE FISHERIES COMMISSION

FORTY-NINTH ANNUAL REPORT
(1998)

to the

Congress of the United States

and to the

Governors and Legislators

of

Alabama, Florida, Louisiana, Mississippi, and Texas

Presented in compliance with the terms of the Compact and State Enabling Acts
Creating such Commission and Public Law 66 - 81st Congress assenting thereto

edited by

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Acknowledgments

In submitting this Forty-ninth Annual Report, the Commissioners wish to express their most sincere appreciation for the splendid cooperation of the Members of Congress and the Governors and Legislators of the Compact states. The Commission fully appreciates that such measure of success as has been attained in the past forty-nine years could not have been possible without such valued assistance. This acknowledgment is also extended to the directors and staffs of federal, state, and interstate agencies, and to representatives of all organizations and individuals who have contributed to the realization of the objectives of the Gulf States Marine Fisheries Commission.

Respectfully submitted,

J.E. "Buster" Brown, *Chairman*
George Sekul, *First Vice Chairman*
Ed Conklin, *Second Vice Chairman*
Larry B. Simpson, *Executive Director*

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Commission Roster

Commission Officers

Chairman: J.E. "Buster" Brown

First Vice Chairman: George Sekul

Second Vice Chairman: Ed Conklin

Commissioners

(order of listing - administrator, legislator, governor's appointee)

ALABAMA

James Martin
Alabama Department of
Conservation & Natural Resources
Montgomery, AL

Walter Penry
Alabama House of Representatives
Daphne, AL

Chris Nelson
Bon Secour Fisheries, Inc.
Bon Secour, AL

FLORIDA

Virginia Wetherell
Florida Department of Environmental
Protection
Tallahassee, FL

Legislative Representative not Appointed

Patrick K. McFarland
Port Saint Joe, FL

LOUISIANA

James H. Jenkins, Jr.
Louisiana Department of Wildlife &
Fisheries
Baton Rouge, LA

Warren Triche
Louisiana House of Representatives
Thibodaux, LA

Frederic L. Miller
Shreveport, LA

MISSISSIPPI

E. Glade Woods
Mississippi Department of Marine
Resources
Biloxi, MS

Ed Ryan
Mississippi House of Representatives
Biloxi, MS

George Sekul
Gulf Central Seafoods, Inc.
Biloxi, MS

TEXAS

Andrew Sansom
Texas Parks & Wildlife Department
Austin, TX

J.E. "Buster" Brown
Texas Senate
Austin, TX

L. Don Perkins
Houston, TX

Staff

Larry B. Simpson, *Executive Director*

Ronald R. Lukens, *Assistant Director*
Virginia K. Herring, *Executive Assistant*
Nancy K. Marcellus, *Administrative Assistant*
Cynthia B. Yocom, *Staff Assistant*
Cheryl R. Noble, *Staff Assistant*
Madeleine A. Travis, *Staff Assistant*
Deanna L. Valentine, *Data Entry Clerk*

David M. Donaldson, *Program Manager*
Steven J. VanderKooy, *Program Coordinator*
Jeffrey K. Rester, *Program Coordinator*
Gregory S. Bray, *Survey Coordinator*
Thomas R. Sminkey, *Data Programmer/Analyst*
Joseph P. Ferrer III, *Network Administrator*
Jason S. Keenum, *Accountant*

Committee Officers

Executive Committee	J.E. "Buster" Brown George Sekul Ed Conklin John Roussel
Law Enforcement Committee	Jerald Waller, Chairman
Commercial/Recreational Fisheries Advisory Panel	Philip Horn, Commercial Chairman Tom Smith, Commercial Vice Chairman Pat Murray, Recreational Chairman Randy Gros, Recreational Vice Chairman
State-Federal Fisheries Management Committee	Larry B. Simpson, Chairman
Blue Crab Technical Task Force	Vince Guillory, Chairman
Flounder Technical Task Force	Mike Johnson, Chairman
Menhaden Advisory Committee	Joe Smith, Chairman
Spotted Seatrout Technical Task Force	Harry Blanchet, Chairman
Stock Assessment Team	Joe Shepard, Chairman
Technical Coordinating Committee	William S. "Corky" Perret, Chairman John Roussel, Vice Chairman
TCC Anadromous Fish Subcommittee	Doug Frugé, Chairman Charles Mesing, Vice Chairman
TCC Artificial Reef Subcommittee	Jon Dodrill, Chairman Mike Buchanan, Vice Chairman
TCC Crab Subcommittee	Vince Guillory, Chairman
TCC Data Management Subcommittee	Henry S. "Skip" Lazauski, Chairman Joe Shepard, Vice Chairman
TCC Habitat Subcommittee	Dale Shively, Chairman
TCC SEAMAP Subcommittee	Richard Waller, Chairman Jim Hanifen, Vice Chairman

GULF STATES MARINE FISHERIES COMMISSION **EXECUTIVE DIRECTOR'S REPORT** *Larry B. Simpson, Executive Director*

THE YEAR IN REVIEW

The Commission implemented a coordinated data collection program in 1998. The states and Commission have worked diligently over the last several years to design a program which will satisfy state and federal needs for recreational fisheries data. For many years, the public including the United States Congress has not been satisfied with fisheries data quantity and quality. Managers from state and regional levels called for better data. Decisions that are made based on fisheries data have social and economic consequences; the very best information should be used.

The Commission and states had heard and experienced enough concern over the fundamental input into its decisions and felt that efforts should be directed toward a cure to the problem rather than a treatment of symptoms. Work began to create a new system utilizing the states and the administration of the Commission. All partners including the existing federal players were tasked to come up with an acceptable program.

For many years, Congress has supported a system for both commercial and recreational data collection along the west coast through the administration of the Pacific States Marine Fisheries Commission. The gulf program was patterned and intimately integrated with the other two coasts to ensure that data will be compatible. Both recreational and commercial industry, scientists, university, and managers at all levels support a coordinated data collection program.

It has become abundantly clear over the years that a data program without the essential ingredient of proper administration on both a regional and national basis will fail. A data program that is not dynamic and does not allow for all partners to contribute will die — usually a slow and painful death. Our natural marine resources are worth our very best efforts. Innovation is the difference in progress and mediocrity, and at last, a data collection program supported by all partners (state, federal, council, fishermen, and Congress) is in place. Surely this is a recipe for success.

MEETINGS/ACTIVITIES OF THE EXECUTIVE DIRECTOR

Gulf States Marine Fisheries Commission Meetings

- Pacific States Marine Fisheries Commission/Coordination of Data Programs Meeting, Portland, Oregon - January 1998
- Staff Accountant Interviews, Ocean Springs, Mississippi - January 1998
- Gulf States Marine Fisheries Commission 48th Spring Meeting, Destin, Florida - March 1998
- Conference Call with State Directors on Data Program, Ocean Springs, Mississippi - March 1998
- State Directors' Meeting, New Orleans, Louisiana - May 1998
- State Directors' Meeting, Rockefeller Refuge, Louisiana - June 1998
- System Administrator, Programmer/Analyst, and Survey Coordinator Interviews, Ocean Springs, Mississippi - June 1998
- Recreational Survey Field Workshop, Biloxi, Mississippi - August 1998
- Gulf States Marine Fisheries Commission 48th Annual Meeting, San Antonio, Texas - October 1998
- State Directors' Meeting, Lake Jackson, Texas - November 1998

Gulf of Mexico Fishery Management Council Meetings

Point Clear, Alabama - January 1998
Duck Key, Florida - March 1998
San Destin, Florida - May 1998

Lafayette, Louisiana - July 1998
Mobile, Alabama - September 1998
Galveston, Texas - November 1998

Congressional Activities

Meetings with the Honorable Trent Lott, Pascagoula, Mississippi - August 1998
Dedication of the NOAA R/V GORDON GUNTER, Pascagoula, Mississippi - August 1998
Field Hearings sponsored by the Honorable Billy Tauzin on OCS legislation, New Orleans, Louisiana - May 1998

Other Meetings and Activities

Marine Fisheries Advisory Committee (MAFAC), San Antonio, Texas - January 1998
Gulf of Mexico Program Nonindigenous Workshop, Metairie, Louisiana - February 1998
Gulf Coast Research Laboratory Stock Enhancement Workshop, Biloxi, Mississippi - February 1998
Mississippi Department of Marine Resources Limited Entry Meeting, Biloxi, Mississippi - April 1998
Marine Fisheries Initiative (MARFIN) Meeting, Tampa, Florida - May 1998
Fishery Management in the Gulf of Mexico Interview with Patricia Joos, National Fish and Wildlife Foundation, Ocean Springs, Mississippi - May 1998
Sharing Our Gulf Speaker, College Station, Texas - June 1998
Meeting with Sam Hamilton, Regional Director, U.S. FWS, Atlanta, Georgia - June 1998
Gulf and South Atlantic Fisheries Development Foundation Red Snapper/Shrimp Work Group, Atlanta, Georgia - June 1998
MARFIN Principle Investigator Conference, Tampa, Florida - December 1998

SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM (SEAMAP) *Jeffrey K. Rester, Program Coordinator*

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a state/federal/university program for collection, management, and dissemination of fishery-independent data and information in the southeastern United States. The program presently consists of three operational components: SEAMAP-Gulf of Mexico, which began in 1981; SEAMAP-South Atlantic, implemented in 1983; and SEAMAP-Caribbean, formed in 1988. Each SEAMAP component operates independently, planning and conducting surveys and information dissemination in accordance with administrative policies and guidelines of the National Marine Fisheries Service (NMFS), Southeast Regional Office (SERO).

In 1998, SEAMAP operations continued for the seventeenth consecutive year. SEAMAP resource surveys included the Fall Shrimp/Groundfish Survey, Spring Plankton Survey, Summer Shrimp/Groundfish Survey, Fall Plankton Survey, and plankton and environmental data surveys. Other 1998 activities included SEAMAP information services and program management.

RESOURCE SURVEYS

In 1998, collection of resource survey information continued for the seventeenth consecutive year. The surveys conducted during the year address distinct regional needs and priorities and provided information concerning the marine resources in the Gulf of Mexico.

Spring Plankton Survey

For the seventeenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The National Oceanic and

Atmospheric Administration's (NOAA) Ship CHAPMAN and Florida's R/V SUNCOASTER sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 19 to June 26, 1998. A total of 175 stations was sampled. The CHAPMAN sampled 157 stations and the R/V SUNCOASTER sampled 18 stations along the west Florida shelf.

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. A wire angle was maintained at 45 degrees. Neuston samples were taken with 947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 48 hours were transferred to 95% ethyl alcohol for final preservation. Left bongo samples were preserved via an ethanol/ethanol transfer to aid in preservation of larval otoliths. In addition, hydrographic data (surface chlorophylls, salinity, temperature, and dissolved oxygen from surface, midwater, and near bottom, and Forel-ule color) were collected at all stations.

Right bongo and neuston samples collected from SEAMAP stations will be transshipped to the Polish Sorting and Identification Center. Left bongo samples will be archived at the SEAMAP Invertebrate Plankton Archiving Center (SIPAC). Salinity data from the Florida vessel were sent to the NMFS Mississippi Laboratories for interpretation.

Summer Shrimp/Groundfish Survey

During the spring of 1998, there was communication between the Shrimp/Groundfish

Work Group members to examine the design for the Summer Shrimp/Groundfish Survey and determine the random station locations for each participant.

Objectives of the survey were to:

- 1) monitor size and distribution of penaeid shrimp during or prior to migration of brown shrimp from bays to the open gulf;
- 2) aid in evaluating the "Texas Closure" management measure of the Gulf Council's Shrimp Fishery Management Plan; and
- 3) provide information on shrimp and groundfish stocks across the northern Gulf of Mexico from inshore waters to 50 fm.

The overall sampling strategy during the 1998 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, 1998.

During the survey, the NOAA Ship OREGON II and R/V TOMMY MUNRO sampled offshore and inshore gulf waters with 40-ft trawls. Alabama's R/V VERRILL sampled offshore Alabama waters with 40-ft trawls, the R/V PELICAN sampled both Louisiana state waters and offshore waters with 40-ft trawls, and Texas vessels sampled Texas state waters and offshore waters with 20-ft trawls.

A total of 266 trawl samples was taken from coastal and offshore waters out to 50 fm from Mobile Bay, Alabama, to Brownsville, Texas. All vessels took environmental data, including temperature, salinity, oxygen, and chlorophyll at each station.

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 1986-1997 covered gulf

waters from Florida Bay to Brownsville, Texas. Due to bad weather in the fall of 1998, the Fall Plankton Survey was canceled.

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from October 26 to November 20, from off Mobile, Alabama to the U.S.-Mexican border. Vessels sampled waters out to 60 fm, covering 328 trawl stations, in addition to plankton and environmental sampling. Sampling design was similar to the Summer Shrimp/Groundfish Survey. The objectives of the survey were to:

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

During the survey, the NOAA Ship OREGON II sampled 195 stations from Mobile Bay, Alabama to Brownsville, Texas at depths out to 60 fm. The R/V VERRILL sampled eight stations at the mouth and outside Mobile Bay. The R/V TOMMY MUNRO sampled 24 stations south of Mississippi Sound along a 30-minute grid. The R/V PELICAN sampled 21 stations in Louisiana territorial waters. Texas vessels sampled 80 stations within their territorial waters.

In addition, ichthyoplankton data were collected by NMFS and Louisiana vessels at sample sites occurring nearest to half-degree intervals of latitude/longitude. A total of 39 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. The NMFS completed 29 ichthyoplankton stations and

Louisiana completed ten stations. The samples, except those taken by Louisiana, will be sorted by the Polish Sorting and Identification Center. Once sorted, the specimens and data will be archived at the SEAMAP Archiving Center.

Plankton and Environmental Data Surveys

As in previous years, plankton samples and environmental data were collected routinely during most SEAMAP trawling surveys. During the Summer Shrimp/Groundfish Survey, plankton tows were piggybacked on the NMFS and state vessels, sampling randomly generated trawl stations within the standard 30-minute SEAMAP grids.

Objectives of these piggybacked surveys were to: 1) collect plankton samples throughout the survey area; and 2) collect associated hydrographic and environmental data at each plankton station. Additionally, environmental data (salinity, temperature, and oxygen from surface, mid-depth, and bottom waters, and chlorophyll from surface and bottom waters) were collected during the shrimp/groundfish surveys. Wind direction, wind speed, and wave height were taken at all trawl stations.

Samples from the right side of the bongo nets and neuston samples were shipped to the NMFS-Pascagoula Laboratory for shipment to the Polish Sorting and Identification Center, where they will be sorted to the family level (both ichthyoplankton and selected crustacean and molluscan species). The left bongo sample from each station is retained as a back up in the event of damage or loss of the specimens and maintained at the SIPAC.

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

INFORMATION SERVICES

Information from the SEAMAP activities is provided to user groups through the program administration and three complementary systems: the SEAMAP Information System, SEAMAP Archiving Center, and SIPAC. Products resulting from SEAMAP activities can be grouped into two major categories: data sets (including broadly, digital data, and collected specimens) managed by the SEAMAP Information System, SEAMAP Archiving Center, and SIPAC; and program information. Program information is discussed in the **PROGRAM MANAGEMENT** section of this report.

SEAMAP Information System

Biological and environmental data from all SEAMAP-Gulf surveys are included in the SEAMAP Information System, managed in conjunction with the NMFS Southeast Fisheries Science Center (SEFSC). Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. Data from all SEAMAP-Gulf surveys during 1982-1997 have been entered into the system, and data from 1998 surveys are in the process of being verified, edited, and entered for storage and retrieval. Verified, non-confidential SEAMAP data are available conditionally to all requesters, although the highest priority is assigned to SEAMAP participants. A total of 216 SEAMAP data requests has 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, all requests have been completed.

Requested SEAMAP data were used for a multitude of purposes in 1998:

- Evaluating the abundance and size distribution of peneaid 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 dissolved oxygen;

- Identifying environmental parameters associated with concentrations of larval finfish;
- Compiling the 1996 and 1997 SEAMAP Biological and Environmental Atlases; and
- Comparing catches of shrimp and groundfish captured by 40-ft versus 20-ft trawl nets.

Data Management

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

Work was completed on the new distributed SEAMAP DMS. New modules completed include those for data entry, edit, upload, data query, and download. All of the Gulf States are now equipped with the necessary computer hardware and software.

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

This system decreases the time necessary to enter and retrieve data and provides powerful and

flexible local data analysis and display capabilities. Under the system, each SEAMAP site enters, verifies, and edits their data which eliminates the mail-oriented loop necessary to enter/edit/verify data. Secondly, each site has the capability of locally accessing SEAMAP data, utilizing a user-friendly system. Local data retrieval allows the data to be accessed in a timely manner with a minimum amount of effort and programming skills.

Under the system, outside users (e.g., Minerals Management Service, U.S. Army Corps of Engineers, etc.) may request special data sets for research or study. The outside users submit the request to the SEAMAP Subcommittee through the SEAMAP-Gulf Coordinator for approval to proceed. Once the request is approved, the information is provided by the Data Manager and staff members through a priority-based, mail-oriented system. Also, SEAMAP participants may use the "special request" mechanism for data sets too large for economical downloading by telephone. These requests will be handled by a central operations staff in the same priority-based, mail-oriented manner as noted above.

Real-time Data

A major function of the SEAMAP Information System in the past was the processing of catch data from the Summer Shrimp/Groundfish Survey as near-real-time data. Data were transmitted three times weekly via cellular phone to the NMFS Mississippi Laboratories from the NOAA vessel, while the states' data were entered into the system weekly. Plots of station locations and catch rates of shrimp, squid, and dominant finfish species were prepared and edited at the NMFS Mississippi Laboratories and processed by GSMFC for weekly distribution to management agencies, fishermen, processors, and researchers. These plots were also available through the SEAMAP home page. Management agencies also received comprehensive data listings showing penaeid shrimp length frequencies, sampling parameters, and environmental conditions.

In the summer of 1998, discussions with representatives from the shrimp industry led the NMFS to request that near-real-time data not be produced during the 1998 survey. At their request, only one near-real-time mailing was produced in the summer of 1998.

SEAMAP Archiving Center

Larval fish and fish egg samples sorted to the lowest taxa level possible by the Polish Sorting and Identification Center are returned to the SEAMAP Archiving Center for archiving and loan to researchers. For 1998, samples were returned from the Polish Sorting and Identification Center. Data entry for the returned sorted samples has been completed in an improved and simplified SEAMAP DMS. Samples cataloged to date represent 18 orders, 126 families, 235 genera, and 245 species. The SEAMAP Archiving Center received 13,770 lots from the Polish Sorting and Identification Center during 1998.

The SEAMAP Archiving Center, which is managed in conjunction with Florida Department of Environmental Protection (FDEP) in St. Petersburg, Florida, processes both specimen loans and requests for associated plankton survey environmental data. Fourteen requests have been accommodated in the present year to seven different researchers.

SEAMAP Invertebrate Plankton Archiving Center

The SIPAC is in its fourteenth year of operation. Ken Stuck at the University of Southern Mississippi Institute of Marine Science, Gulf Coast Research Laboratory (USM/IMS/GCRL) serves as SIPAC curator. The overall mission of the SIPAC, to archive and manage the large collection of plankton samples acquired during SEAMAP cruises and to obtain specimens and/or data on selected invertebrate larval stages from those samples, continued during the year but at a reduced level of activity. The SIPAC continues to provide unsorted plankton samples and data or specimens of larval invertebrates to qualified researchers upon

request.

Due to a lack of funding during this reporting period, there were no students or technicians employed by SIPAC. Therefore, activities were limited to maintenance and curation of the existing collection. The number of samples currently catalogued in the SIPAC collections is 6,268, with 146 samples currently on loan.

In an effort to keep the space required to house the SIPAC collection of unsorted plankton samples to a minimum, samples that have been in the collection for over seven years and duplicate samples sorted and received from the Polish Sorting and Identification Center, are aliquoted to $\frac{1}{4}$ their original volume and placed into 100 ml vials. When possible, the remaining $\frac{3}{4}$ aliquots are donated to educational institutions for use as teaching materials. If the remaining sample must be discarded, sample jars are cleaned and returned to NMFS for reuse. To date, approximately 1,450 samples collected from 1982-1985 have been aliquoted and prepared for long-term storage. Due to the recent addition of samples to the collection during the year, no space is currently available for additional samples to be deposited into the SIPAC archives. During the next year, the SIPAC will continue to manage SEAMAP plankton collections and generate specimens and data on selected invertebrate species.

During the next year, the SIPAC will continue to manage SEAMAP plankton collections, accession samples, and provide unsorted samples, sorted specimens, and data from the collection to qualified researchers as requested. Efforts with sorted materials will concentrate on curation and analysis of current holdings and publication of distribution patterns of selected taxa by cruise.

PROGRAM MANAGEMENT

The SEAMAP program is administered by the GSMFC Technical Coordinating Committee's SEAMAP Subcommittee via the SEAMAP program coordinator, who is under the technical direction of the subcommittee chairman and administrative supervision of the GSMFC.

Personnel associated with SEAMAP program management include the program coordinator, data manager, SEAMAP Archiving Center curator, SIPAC curator, and the NMFS-Pascagoula Laboratory director who serves as program monitor.

Planning

Major SEAMAP-Gulf subcommittee meetings were held in March and October 1998 in conjunction with the GSMFC spring and annual meetings. All meetings included participation by various work group leaders, program coordinator, data manager, program monitor and the GSMFC executive director. Representatives from the gulf program also met with the South Atlantic and Caribbean representatives in August 1998 to discuss respective program needs and priorities for 1999.

The Environmental Data Work Group met in February 1998 (via conference call) to discuss issues related to the examination of the quality of environmental data sets and historical use of the data. The Environmental Data Work Group also developed recommendations for future data acquisition that would meet the needs of data users and resource managers. The Environmental Data Work Group also met in April to review the environmental section of the "SEAMAP Operations Manual," to discuss potential problems with the historical environmental data with solutions to rectify the problems, and to discuss the compilation of metadata.

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

1998. 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.

Information Dissemination

The following documents were published and distributed in 1998:

- *1998 SEAMAP Marine Directory*. Inventories of marine agency contacts (state, federal, and university) concerned with fishery research in the Gulf of Mexico and summaries of information provided by these organizations: target species, types of fishery-independent sampling gear and platforms, annual sampling effort, and other materials.
- *SEAMAP Subcommittee Report to the GSMFC Technical Coordinating Committee - October 1, 1997 to September 30, 1998*. A detailed summary of program accomplishments, emphasizing survey design, material collected, data dissemination, budget information, and future survey activities.
- *Annual Report of the SEAMAP Program - October 1, 1997 to September 30, 1998*. A summary of 1997 activities and proposed 1998 events for the SEAMAP-Gulf, South Atlantic, and Caribbean programs.
- *Environmental and Biological Atlas of the Gulf of Mexico, 1996*. A compilation of information obtained from the 1996 SEAMAP survey including catch rates of shrimp and finfish, abundance and distribution of plankton in the Gulf of Mexico, and environmental data from all surveys.



COOPERATIVE INTERSTATE FISHERY MANAGEMENT IN THE TERRITORIAL SEA OF THE GULF OF MEXICO

Ronald R. Lukens, Assistant Director

During January 1, 1998 through December 31, 1998, the GSMFC coordinated recreational fisheries programs throughout the Gulf of Mexico through funding provided by the administrative portion of the Federal Aid in Sport Fish Restoration Program, administered by the U.S. Fish and Wildlife Service (FWS). As a part of the program activities, the program coordinator sponsored and/or attended and participated in meetings and planning and development activities pertinent to carrying out responsibilities of this program.

ARTIFICIAL REEF ACTIVITIES

The TCC Artificial Reef Subcommittee has continued to work on entering data to establish the "Gulf of Mexico Artificial Reef Data Base." As an adjunct to this activity is the proposal to revise and publish the document entitled *A Profile of Artificial Reef Development in the Gulf of Mexico*. While this activity was proposed to be completed during 1997, publication of the document depends on completing the development of the artificial reef data base. Due to its dependence on the artificial reef data base, the GSMFC requested a variance from delivering this publication until 1998. Recent work with the database has indicated that there are missing files and duplicate files (primarily Florida records). Because of this development, the GSMFC has requested to postpone, indefinitely, reprinting the document. Instead, there are three alternate activities, one of which will be selected to replace the artificial reef document. The first is the recent draft of the revision of the *National Artificial Reef Plan*. The draft is in review by the NMFS; however, it is the policy of the three interstate marine fisheries commissions and will be published as the commissions' policy and recommendations for artificial reef planning, development, and management. The second activity is the development and printing of a habitat poster, and

the third activity is the compilation of artificial reef research projects submitted by the state programs into a publication. Work will continue to refine and update the artificial reef data base. At the point when records contained in the database are deemed to be complete, the data base publication will be reprinted.

Also begun last year, the subcommittee has been working toward a review and revision of the *National Artificial Reef Plan*. Mandated by the National Fishing Enhancement Act of 1984, Congress required the NMFS to develop the plan, which was completed in 1985. Because of the significant leadership role displayed by the states regarding artificial reef development and management, the states have felt very strongly that they should also take a leadership role in revising this eleven-year-old plan. The NMFS has provided limited funding to accomplish some of the associated tasks. This activity is being carried out in conjunction with the Atlantic States Marine Fisheries Commission (ASMFC). As of this report, the draft revision of the plan has been completed. This, however, is not the end of the process. Recently, the GSMFC and the ASMFC adopted the draft revision and voted to transmit the document to the NMFS for their consideration. The document was transmitted to the NMFS in late 1998. The NMFS is expected to conduct an internal review and publish availability of the draft plan in the Federal Register to allow for public review. Following those actions, it is anticipated that recommended changes to the draft plan will be provided to the three interstate commissions and their respective states for consideration. Assuming agreement is reached regarding final changes, the draft plan will then be adopted as national policy for artificial reef development and management.

The GSMFC began an activity to enter artificial reef literature, both journal articles and

gray literature, into a literature data base called ProCite. More than three hundred articles have been entered into the data base, and the data base is available on the GSMFC home page at <http://www.gsmfc.org> on the Internet. Individuals can access a query page and request a search for documents by author, title, and key words. In the event an article is needed by someone accessing the data base, they can provide the citation, and staff can locate the document, copy it, and send it to the individual.

FISHERY DATA ACTIVITIES

As a part of the Recreational Fisheries Information Network (RecFIN), which was established in large part through the use of Federal Aid in Sportfish Restoration Administrative Funds, the Data Management Subcommittee oversaw the development of a strategy for the Gulf States, through the GSMFC, to conduct the NMFS Marine Recreational Fishery Statistics Survey (MRFSS) in the Gulf of Mexico. With the conclusion of the 1999 federal appropriations process that goal has been attained, and developments during 1998 have prepared the GSMFC office and the Gulf States to begin collecting recreational fisheries data in January 1999. During 1999, the program coordinator will continue to work through the RecFIN to complete the transition from the current organizational configuration to conducting the survey through the states and coordinated by the GSMFC. Timely and reliable fisheries data will continue to be a high priority for the states and federal agencies charged with the management of marine, estuarine, and anadromous fishery resources in the Gulf of Mexico. In that regard, the GSMFC, through its programs, and primarily through the Data Management Subcommittee, will continue to provide coordination of these activities.

The following is a listing of activities associated with the fisheries data work:

- January 1998 - RecFIN coordination meeting with the Pacific RecFIN
- February 1998 - The annual spring meeting of the RecFIN/Commercial Fisheries

- Information Network (ComFIN) committees
- March 1998 - GSMFC Data Management Subcommittee meeting in support of RecFIN/ComFIN work
- May 1998 - FIN workgroup meetings
- June 1998 - FIN coordination with the Atlantic Coast Cooperative Statistics Program
- June 1998 - RecFIN transition meeting to resolve issues related to coordinating the state collection of recreational fisheries data
- July 1998 - FIN workgroup meetings and port agent meeting
- July 1998 - Second transition meeting to resolve issues related to coordinating the state collection of recreational fisheries data
- August 1998 - FIN workgroup meetings
- August/September 1998 - RecFIN coordination meeting with Pacific RecFIN
- September 1998 - Third transition meeting to resolve issues related to coordinating the state collection of recreational fisheries data
- October 1998 - Meeting of the Data Management Subcommittee
- November 1998 - The annual fall meeting of the RecFIN/ComFIN committees

ANADROMOUS FISH ACTIVITIES

In the third of a three-year study, evaluation continues on the allelic heterozygosity for striped bass samples collected in Gulf of Mexico drainage. The project is on schedule, and a completion report will be available during first quarter 1999.

The FWS Regional Office in Atlanta provided funding to assist in sponsoring a workshop to examine management and restoration activities for striped bass in the Gulf of Mexico region over the past several years. The subcommittee discussed timing and content of the workshop for recommendations to the regional office. Subsequently, the workshop was scheduled for November 1998. It was held in Pensacola Beach, Florida, and was well attended with more than 40 speakers and participants. A proceedings of that workshop will be available in 1999. Recommendations from the workshop will be incorporated into the review of the *Striped Bass*

Fishery Management Plan which is scheduled for 1999.

Through the efforts of the FWS, Recreational Fishery Stewardship Program funds were made available to conduct field work related to striped bass restoration in the Apalachicola-Chattahoochee-Flint, Pascagoula-Leaf-Chickasawhay, and Pearl River systems, all gulf drainage. The TCC Anadromous Fish Subcommittee is providing coordination of those activities through the GSMFC. Projects began in July 1997 and are slated to run for three years. The delaying of the workshop, mentioned above, was necessary because the states wanted to complete at least one year of the stewardship projects before holding a workshop. The timing of the workshop did indeed allow for presentations from the stewardship project managers. The GSMFC staff continues to provide administrative and coordination support to the stewardship projects.

While the GSMFC continues to manage the striped bass data base, no new samples or data were provided during 1998 to be included in the data base. In the meantime, the GSMFC has significantly upgraded its computer and Internet communications capabilities and will make the data base available on the Internet.

FISHERIES HABITAT

In 1996, the U.S. Congress passed significant amendments to the Magnuson-Stevens Fishery Conservation and Management Act, including provisions to identify, describe, enhance, and protect essential fish habitat (EFH). While the Act establishes federal fishery management policies, fisheries habitat is largely located within state jurisdictional waters, a situation which represents the potential for conflict if there is not close coordination between federal agencies and the states. Also, the GSMFC plans to incorporate the activities related to EFH into GSMFC programmatic activities. In that regard, during 1998, the program coordinator has been involved in developing guidelines to implement EFH provisions. The program coordinator has been

instrumental in establishing a joint habitat program between the GSMFC and GMFMC to address EFH and other habitat issues.

As a 1998 activity, the Habitat Subcommittee discussed whether Commission fishery management plans (FMPs) should include EFH or just embrace the ideals of EFH but not use the term "essential fish habitat." The subcommittee felt that the Commission FMPs should resemble those of the GMFMC, but the Commission should not duplicate the effort that went into describing and identifying EFH for the Council's FMPs. Therefore, the subcommittee embraced the ideals of EFH, which include identifying and describing habitat essential to the managed species and generically listing potential threats to the habitat of the managed species but did not feel that a duplication of work already preformed by the Council would be prudent.

The subcommittee agreed that using the term essential fish habitat could cause confusion if the definition did not include everything listed in the Magnuson-Stevens Act. The Magnuson-Stevens Act states that Councils and the NMFS must identify and describe EFH, list potential threats to EFH, list conservation recommendations to conserve EFH, list future research needs, and also establish a consultation process with federal agencies to regulate activities that negatively impact EFH. The subcommittee felt that the use of the term essential habitat would be more appropriate. It would embrace identifying and describing habitat and listing potential threats to habitats that are essential to the species managed by the species. The same definition as used in the Magnuson-Stevens Act could be used by the Commission, but a paragraph should be included that described the differences between essential fish habitat and essential habitat.

MISCELLANEOUS

- January 1998 - The program coordinator attended and participated in the GMFMC Habitat Protection Committee meeting to discuss issues related to the joint habitat program.

- January 1998 - The program coordinator attended a national recreational fish tagging workshop to discuss angler based tagging programs and their activities. The program coordinator was asked to represent the gulf region regarding the issue.
- February 1998 - The program coordinator provided a presentation on national artificial reef issues to the Mississippi/Louisiana joint American Fisheries Society meeting.
- March 1998 - The program coordinator attended and participated the Florida Artificial Reef Summit.
- March 1998 - The program coordinator attended the mid year meeting of the International Association of Fish and Wildlife Agencies.
- April 1998 - The program coordinator attended and participated in the GMFMC EFH Technical Review Panel meeting.
- April 1998 - The program coordinator attended and participated in the Non-indigenous Species Steering Committee meeting of the Gulf of Mexico Program.
- May 1998 - The program coordinator participated as a speaker at a national artificial reef briefing for NOAA at headquarters in Washington, D.C.
- May 1998 - The program coordinator attended and participated in Louisiana EFH meeting.
- June 1998 - The program coordinator attended and participated in a Florida artificial reef permit meeting.
- June 1998 - The program coordinator met with Federal Aid staff of the U.S. FWS Region 4.
- July 1998 - The program coordinator attended and participated in a Non-indigenous Species workshop sponsored by the Gulf of Mexico Program.
- August 1998 - The program coordinator participated in an artificial reef symposium associated with the 1997 American Fisheries Society Meeting.
- September 1998 - The program coordinator attended and participated in the annual meetings of the International Association of Fish and Wildlife Agencies.
- October 1997. The program coordinator participated in a meeting sponsored by the Florida Department of Community Affairs to discuss artificial reef permitting.



INTERJURISDICTIONAL FISHERIES MANAGEMENT PROGRAM

Steven J. VanderKooy, Program Coordinator

PROGRAM ADMINISTRATION

Mr. Steven J. VanderKooy and Mrs. Cynthia B. Yocom served as Program Coordinator and Staff Assistant during 1998. The Interjurisdictional Fisheries Management Program staff arranged 12 technical task force meetings in 1998, organized and participated in a symposium at the National American Fisheries Society in Hartford, Connecticut, and arranged and provided support for several smaller meetings and work groups.

Two documents were published in 1998; *Licenses and Fees for Alabama, Florida, Louisiana, Mississippi, and Texas in Their Marine Waters for the Year 1997* and *Law Summary 1998—A Summary of Marine Fishing Laws and Regulations for the Gulf States*. Data accumulation continued including research papers and other materials critical to the development of the FMPs. The repository for papers referenced in FMPs was expanded as additional information was included in the plans. Revisions, updates, and other pertinent information were distributed to technical task forces (TTFs), state personnel, and agency directors as requested. Completed FMPs and other IJF publications or information were distributed to a variety of agencies and general public (e.g., teachers, students, industry) as requested.

Mr. Jeffery K. Rester and Mrs. Cheryl R. Noble served as Habitat Coordinator and Habitat Program Staff during 1998. The primary focus of the Habitat Program was the completion of the generic EFH Amendment for the GMFMC under the joint Habitat Program between the Council and the Commission. In addition, contributions were made to the habitat sections of the three FMPs currently under development in the form of editorial comment and review.

FMPs UNDER DEVELOPMENT

Blue Crab

The Blue Crab TTF met formally four times in 1998 and once as an informal work group. Actions included the discussion of current problems/possible solutions, compilation of recent data for descriptive and stock assessment purposes, addition of four members to the TTF roster (sociologist, two state representatives, and stock assessment expert), and start of the final editing of several key sections of the FMP. The blue crab stock assessment was further expanded utilizing additional techniques and models not previously available to the TTF. The Blue Crab FMP revision is scheduled for completion in 1999.

Spotted Seatrout

The Spotted Seatrout TTF met three times in 1998; one meeting in March was in conjunction with the Stock Assessment Team to review the spotted seatrout stock assessment. The Spotted Seatrout FMP continued to undergo major revision but still lacked a few elements. In 1998 a sociology section was completed, the stock assessment was nearly finished as a state by state treatment, and the economics section was completed through 1997 landings data. Due to problems among state deadlines, TTF meetings, and revision deadlines, FMP completion is expected in 1999.

Flounders

The GSMFC continued to facilitate the development of a FMP for flounder. The TTF for flounders met on four occasions during 1998 to review progress on assignments. Most of the FMP sections were reviewed and edited at least

twice during 1998. Utilizing a state-of-the-art computer projection unit, the revision process was speedy and efficient. Due to a lack of a completed stock assessment, the TTF delayed completion of the FMP until early 1999.

OTHER ACTIVITIES

Stock Assessment Team

The GSMFC Stock Assessment Team (SAT) met once in 1998 focusing specifically on spotted seatrout and flounder. The SAT resolved conflicts in the data and standardized the information provided by each state. Tuning indices were calculated and the first draft of the spotted seatrout stock assessment was delivered. At that time, the stock assessment included Florida's west coast separated by region, Mississippi, Louisiana, and Texas.

The SAT waited for the completed flounder stock assessment from Texas before they began to pool the data available from the other states into a regional assessment. It was agreed that since the existing data were poor for a gulf-wide assessment of flounder, the Texas state stock assessment would form a basis for the western gulf.

Habitat Subcommittee

Support was provided to the GSMFC's TCC Habitat Subcommittee which convened in New Orleans, Louisiana in March 1998 to review the GMFMC EFH Amendment. The subcommittee also met in October in conjunction with the GSMFC 49th Annual Meeting in San Antonio, Texas. The habitat sections from each of the three FMPs in development were reviewed at that time.

COMMERCIAL FISHERIES INFORMATION NETWORK (ComFIN) & RECREATIONAL FISHERIES INFORMATION NETWORK (RecFIN) *David M. Donaldson, Program Manager*

The ComFIN and RecFIN(SE) are programs to establish a state-federal cooperative program to collect, manage, and disseminate statistical data and information on the marine commercial and recreational fisheries of the Southeast Region.¹

The need for a comprehensive and cooperative data collection program has never been greater because of the magnitude of the recreational fisheries and the differing roles and responsibilities of the agencies involved. Many southeastern stocks targeted by anglers are now depleted, due primarily to excessive harvest, habitat loss, and degradation. The information needs of today's management regimes require data which are statistically sound, long-term in scope, timely, and comprehensive. A cooperative partnership between state and federal agencies is the most appropriate mechanism to accomplish these goals.

Efforts by state and federal agencies to develop a cooperative program for the collection and management of commercial and recreational fishery data in the region began in the mid to late 1980s. In 1992, the NMFS formally proposed a planning activity to establish the RecFIN(SE). Planning was conducted by a multi-agency Plan Development Team through October 1992 at which time the program partners approved a memorandum of understanding (MOU) which established clear intent to implement the RecFIN(SE). Upon signing the MOU, a RecFIN(SE) Committee was established.

In 1994, the NMFS initiated a formal process to develop a cooperative state-federal program to

collect and manage commercial fishery statistics in the region. Due to previous work and NMFS action, the Southeast Cooperative Statistics Committee (SCSC) developed a MOU and a draft framework plan for the ComFIN. During the development of the ComFIN MOU, the SCSC, in conjunction with the RecFIN(SE) Committee, decided to combine the MOU to incorporate the RecFIN(SE). The joint MOU creates the Fisheries Information Network (FIN) which is composed of both the ComFIN and RecFIN(SE). The MOU confirmed the intent of the signatory agencies to participate in the implementation of the ComFIN and RecFIN(SE).

The scope of the ComFIN and RecFIN(SE) includes the region's commercial and recreational fisheries for marine, estuarine, and anadromous species, including shellfish. Constituencies served by the program are state and federal agencies responsible for management of fisheries in the region. Direct benefits will also accrue to federal fishery management councils, the interstate marine fisheries commissions, the National Park Service, the FWS, and the NOAA National Marine Sanctuaries Program. Benefits which accrue to management of fisheries will benefit not only commercial and recreational fishermen and the associated fishing industries but also the resources, the states, and the nation.

The mission of the ComFIN is to cooperatively collect, manage, and disseminate marine commercial and anadromous fishery data and information for the conservation and management of fishery resources in the region and to support the development of an inter-regional program. The four goals of the ComFIN include to plan, manage, and evaluate commercial fishery data collection activities; to implement a marine commercial fishery data collection program; to establish and maintain a commercial fishery data

¹The Southeast Region (the region) includes Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, Puerto Rico, South Carolina, Texas, and the U.S. Virgin Islands.

management system; and to support the establishment of a national program.

The mission of the RecFIN(SE) is to cooperatively collect, manage, and disseminate marine recreational fisheries statistical data and information for the conservation and management of fishery resources in the region; and to support the development and operation of a national program. The four goals of the RecFIN(SE) are to plan, manage, and evaluate recreational fishery data collection activities; to implement a marine recreational fishery data collection program; to establish and maintain a recreational fishery data management system; and to support the establishment of a national program.

PROGRAM ORGANIZATION

The organizational structure consists of the FIN Committee, the ComFIN and RecFIN(SE) committees, three geographic subcommittees (Caribbean, Gulf of Mexico, and South Atlantic), standing and ad hoc subcommittees, technical work groups, and administrative support.

The ComFIN and RecFIN(SE) committees consist of the signatories to the MOU or their designees and are responsible for planning, managing, and evaluating the program. Agencies represented by signatories to the MOU are the National Marine Fisheries Service, U.S. Fish and Wildlife Service, National Park Service, Alabama Department of Conservation and Natural Resources, Florida Department of Environmental Protection, Georgia Department of Natural Resources, Louisiana Department of Wildlife and Fisheries, Mississippi Department of Marine Resources, North Carolina Department of Environment, Health, and Natural Resources, Puerto Rico Department of Environmental and Natural Resources, South Carolina Department of Natural Resources, Texas Parks and Wildlife Department, U.S. Virgin Islands Department of Planning and Natural Resources, Caribbean Fishery Management Council, Gulf of Mexico Fishery Management Council, South Atlantic Fishery Management Council, Atlantic States Marine Fisheries Commission, and GSMFC.

The ComFIN and RecFIN(SE) committees are divided into three standing subcommittees representing the major geographical areas of the region: Caribbean, Gulf of Mexico, and South Atlantic. These subcommittees are responsible for making recommendations to the committees on the needs of these areas. Standing and ad hoc subcommittees are established as needed by the ComFIN and RecFIN(SE) committees to address administrative issues and technical work groups are established as needed by the committees to carry out tasks on specific technical issues. Coordination and administrative support of the ComFIN and RecFIN(SE) are accomplished through the GSMFC.

It should be noted that during the annual fall meeting, the ComFIN and RecFIN(SE) committees elected to forward a recommendation to the Atlantic Coastal Cooperative Statistics Program (ACCSP) Coordinating Council and the GSMFC that, effective upon agreement, the South Atlantic states should discontinue meeting in conjunction with the FIN. The recommendation was approved with the understanding that the South Atlantic states will continue to be signatory to the FIN MOU. Although there will be no representation of the South Atlantic states on FIN, the South Atlantic will continue to participate at the work group level, and there will be continued participation by staff members from both programs to ensure compatibility and comparability.

PROGRAM ACTIVITIES

The ComFIN and RecFIN(SE) are comprehensive programs comprising coordinated data collection activities, an integrated data management and retrieval system, and procedures for information dissemination. Activities during 1998 were associated with addressing issues and problems regarding data collection and management and developing strategies for dealing with these topics. In addition to ComFIN and RecFIN(SE) activities, ongoing marine commercial and recreational fisheries surveys were conducted by the various state and federal agencies involved in these programs. The

ComFIN and RecFIN(SE) committees reviewed and evaluated progress toward the integration of these surveys into the respective programs.

ComFIN and RecFIN(SE) Committees

Major ComFIN and RecFIN(SE) meetings were held in March and November 1998. The major issues discussed during these meetings included:

- identification and continuation of tasks to be addressed in 1998 and instruction to committees, the administrative subcommittee and the data collection, future needs, biological/environmental, social/economic, and ad hoc work groups to either begin or continue work on these tasks;
- development and completion of the 1998 ComFIN and RecFIN(SE) Operations Plans which presented the year's activities in data collection, data management, and information dissemination as well as development of a five-year time table;
- development of the 1999 ComFIN and RecFIN(SE) Operations Plans;
- review of activities and accomplishments of 1998;
- continued evaluation of adequacy of current marine commercial and recreational fisheries programs for ComFIN and RecFIN(SE) and development of recommendations regarding these programs;
- review findings of and receive recommendations from technical work groups for activities to be carried out during 1999;
- preparation and submission of a proposal for financial assistance to support activities of the ComFIN and RecFIN(SE); and
- continued internal evaluation of the program.

Subcommittee and Work Groups

The ComFIN and RecFIN(SE) subcommittees and work groups met this year to provide recommendations to the committees to formulate administrative policies, address specific technical issues for accomplishing many of the ComFIN

and RecFIN(SE) goals and objectives, and examine other issues as decided by the committees. Their activities included:

- The FIN/ACCSP Compatibility Work Group met in May 1998 to review the FIN program design document in respects to compatibility/comparability with the ACCSP. The group examined the similarities and differences in the catch and effort, discards, confidentiality, data management, and other components of the programs.
- The RecFIN(SE) Social/Economic Work Group met in July 1998 to identify the minimum data elements for the social and economic aspects of fisheries, review and expand the quality assurance and quality control (QA/QC) and RecFIN(SE) QA/QC document to include standards for collection and management of social and economic data, and discussion regarding the market and social/economic modules for ComFIN.
- A commercial port samplers meeting was held in July 1998 to discuss the review of commercial data collection methods, focusing on the TIP including an overview of the program sampling techniques/protocols and review of the individual data elements.
- The Data Collection Work Group met in August 1998 to further refine the catch/effort module for the ComFIN, begin discussing the discards and protected species interactions modules for ComFIN and RecFIN(SE), and address several issues regarding data collection activities in the region.
- The Data Collection Procedures Work Group met in August 1998 to develop a document which outlines the procedures for the collection of data under the ComFIN.
- The ComFIN Recommendations Work Group met in August 1998 to develop a recommendations document which will guide the ComFIN. The group utilized a report developed from the ComFIN brainstorming session which outlines the issues and problems regarding commercial data collection in the region. From these issues, the group developed recommendations and associated tasks that will guide ComFIN into

the future.

- The RecFIN(SE) Biological/Environmental Work Group met in November 1998, in conjunction with the Caribbean, to begin discussing the development of marine recreational fishery surveys methodologies for collection of data in Puerto Rico and the U.S. Virgin Islands, review of compilation of meta data related to changes in fishing regulations, develop criteria for defining private access sites, compile potential sources of information, and develop plan of compiling this information, and determine magnitude of night fishing activities by state and develop recommendations by state, by mode.

COORDINATION AND ADMINISTRATIVE SUPPORT

Working closely with the committee in all aspects of program coordination, administration, and operation was a major function of ComFIN and RecFIN(SE) coordination and administrative support. Other important coordination and administrative activities included but were not limited to providing coordination and logistical support, including communications and organization of meetings for the committees, subcommittees, and work groups; serving as liaison between the committees, other program participants, and other interested organizations; preparing annual operations plans under the direction of the committees; preparing and/or supervising and coordinating preparation of selected documents, including written records of all meetings; and distributing approved ComFIN and RecFIN(SE) information and data in accordance with accepted policies and procedures.

Information Dissemination

Committee members and staff provided program information in 1998 via a variety of different methods such as distribution of program documents, presentation to various groups interested in the ComFIN and RecFIN(SE), and the Internet:

- ComFIN Committee. 1998. *1998 Operations Plan for ComFIN Fisheries Information Network (ComFIN)*. No. 54 Gulf States Marine Fisheries Commission, Ocean Springs. 10 pp + appendix.
- FIN Committee. 1998. *Annual Report of the Fisheries Information Network for the Southeastern United States (FIN) January 1, 1997 - December 31, 1997*. No. 53 Gulf States Marine Fisheries Commission, Ocean Springs. 15 pp + appendices.
- RecFIN(SE) Committee. 1998. *1998 Operations Plan for RecFIN(SE) Fisheries Information Network for the Southeast United States [(RecFIN(SE))]*. No. 48 Gulf States Marine Fisheries Commission, Ocean Springs. 18 pp + appendix.
- ComFIN and RecFIN(SE) articles in the ASMFC and GSMFC newsletters.
- Variety of informal discussions occurred throughout the year during ASMFC, GSMFC, NMFS, and other participating agencies meetings and workshops.
- National Park Service personnel periodically provided information concerning the ComFIN and RecFIN(SE) (meeting notices, available documents, etc.) to the Environmental Protection Agency's Gulf of Mexico Program computer bulletin board system.
- The NMFS has begun the development of an user-friendly data management system for the MRFSS.
- The GSMFC has developed a home page for the world wide web which provides programmatic information regarding ComFIN and RecFIN(SE).



JOINT GSMFC/GMFMC HABITAT PROGRAM

Jeffrey K. Rester, Program Coordinator

The GSMFC TCC Habitat Subcommittee met in March to review the GMFMC EFH Amendment. The subcommittee effort included critical comments and updated information which greatly improved the amendment.

The GMFMC Technical Review Panel (TRP) met for the second time in April to also review the amendment. The TRP was pleased with the progress of the document but felt a few minor changes were necessary.

Corrections and updates were made to the amendment, and it was sent to the GMFMC Habitat Protection Committee and the full Council for review in May. The Council decided that with minor editorial changes, the document was ready to be sent out for public comment and public hearings.

During June, the Council's three Habitat Protection Advisory Panels (APs) met to review the document for the second time and provided some substantive comments. During June, public hearings were held in eight locations throughout the gulf. These were well attended by the public, and some very good comments were made.

The Council's Scientific and Statistical Committee (SSC) reviewed the document in early July. Comments from the public hearings, public

letters, APs, and SSC were reviewed by the Council in July. The Council deferred final action on the amendment until revisions were complete. Comments received during public hearings and other reviews were incorporated, and in September, the Council approved the amendment for submission to the Secretary of Commerce. The EFH amendment was submitted before its October 1998 deadline.

The GSMFC TCC Habitat Subcommittee met in October at the annual GSMFC fall meeting. Issues discussed included the Commission FMPs and essential fish habitat; updating the *1990 Summary of Aquaculture Programs by State* report; and formulating a Commission policy on aquaculture. The subcommittee also wanted to develop and produce a poster to stress the importance of habitat conservation in the Gulf of Mexico.

The GMFMC Louisiana/Mississippi Habitat Protection AP met in November to discuss several projects that affect marine fish habitat in Louisiana and Mississippi. The AP recommended that the Council coordinate with different conservation agencies to acquire and protect environmentally irreplaceable habitat types in the gulf. The AP also recommended that the Council examine a proposed casino project in Biloxi, Mississippi.



ALABAMA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, MARINE RESOURCES DIVISION

The Marine Resources Division is responsible for management of Alabama's marine fisheries resources through research and enforcement programs. Three division facilities supported an average of 45 employees of the Administrative, Enforcement, and Fisheries sections during fiscal year 1998.

SIGNIFICANT ACCOMPLISHMENTS

Enforcement officers worked with the Alabama Coastal Conservation Association to develop a program, known as the *Coastwatch Program*, to train citizens to recognize and report violations of fishing laws and regulations. The mission of the program is to support enforcement efforts of the Marine Resources Division to ensure the future availability of our coastal marine resources.

The Enforcement Section received an award from the U.S. Food and Drug Administration for its participation in the Shellfish Patrol Evaluation Task Force. They were instrumental in the development of uniform criteria for the Food and Drug Administration to evaluate shellfish producing states enforcement patrol efforts in protecting consumers from illegally harvested shellfish.

The Biological Section began a cooperative program with the Alabama Department of Environmental Management (ADEM) to integrate the division's assessment and monitoring program with the Department of Environmental Management's water quality monitoring program to enhance both agencies programs with little or no increased costs.

Alabama's largest inshore artificial fishing reef to date was constructed on remnants of the Whitehouse oyster reef. The reef is approximately 75 acres in area and over one mile

in circumference. This should prove to be an excellent spot for Alabama's bay fishermen along the western shore of Mobile Bay. Plans are to enhance the reef with oyster culch which should also increase the oyster resource in that area.

Biological personnel began a pilot project which promises to shift responsibility of the Alabama portion of the National Marine Recreational Fisheries Statistics Survey from the National Marine Fisheries Service to the Marine Resources Division. This should improve the accuracy of the survey at the state level and provide more accurate data for management of such important species as red snapper.

A cooperative endeavor was begun with Auburn University, SEA GRANT and the new Alma Bryant High School in Mobile County to create a mariculture training center at the high school. This promises to be a very successful program which will expand students' ability to participate in future fisheries.

A division home page was created and posted to the Internet/World Wide Web. It is associated with and accessed through the departmental home page at <http://www.dcnr.state.al.us>. This site has become very popular and is an excellent tool in providing information and assistance to the public.

An informational calendar was created and published by the division which contained a very informative tide calendar along with other useful information. The demand for this calendar was extremely high, and the feedback very positive.

SIGNIFICANT PROBLEMS AND SOLUTIONS

Hurricane Georges caused a 90% loss of oyster resources not already destroyed by

Hurricane Danny last year. This was due to a combination of physical stress created by the severe surf conditions on the reef and from oysters and shell resources being washed from the reef into surrounding mud. The oyster resources will be aided in their recovery by planting culch material on the reef and along the edges of the reef next spring to catch the fresh spat.

Controversy continues over the state of the red snapper stocks in the Gulf of Mexico. Federal waters were closed to recreational red snapper fishing from November 27 to December 31, 1997 eliminating a portion of the fishing year. This caused considerable social and economic hardship to that fishery. The Division continues to work with the Gulf of Mexico Fishery Management Council, the National Marine Fisheries Service, and other Gulf of Mexico states to find an equitable solution to this problem.

Negotiations continued this year to close a portion of Mobile Bay to shrimping and address a number of other gear related problems. A set of proposals was presented to various concerned user groups for their input. These comments and considerations are being summarized for use in developing regulations to correct problems.

Abuse of the privileges granted under the live bait law continue to cause tremendous user conflict between recreational fishermen, commercial shrimp fishermen, and live bait fishermen. Meetings between the different groups failed to produce consensus toward development of regulation and legislative changes to reduce the present abuse. Efforts will continue to find solutions to the problems.

ADMINISTRATION SECTION

The Administrative Section provides supervision, clerical, purchasing, and general administrative support for the two operational sections; supervises state seismic activities; and coordinates with other state, federal, and regional agencies on fisheries and environmental matters.

Staff for the Administrative Section consisted

of the division director, seven clerical, and one marine mechanic employee for the majority of the year. Offices are maintained at Dauphin Island, Gulf Shores, Bayou La Batre, and Montgomery.

Accomplishments

Working in a liaison capacity between commercial fishermen, sport fishermen, U.S. Army Corps of Engineers, Minerals Management Service, and the U.S. Coast Guard, a significant expansion was created to Alabama's artificial reef development area in the Gulf of Mexico. The area for artificial reef deployment is approximately 1,200 square miles.

Coordination with federal and other state agencies resulted in nearly 2.5 million dollars in federal disaster funding for restoration of Alabama's marine resources affected by natural disasters including hurricanes and red tide.

A computerized commercial license system was improved and installed at each of the three division offices. The system will reduce double entry and increase accuracy.

Future Plans

Legislation will be introduced to accomplish the following:

- Create a lifetime saltwater fishing license, with a price proportional to the freshwater lifetime license. Contained in the proposed legislation will be a section providing an option for senior citizens to purchase a Lifetime Saltwater Fishing License similar to that now available for freshwater senior citizen fishermen.
- Increase the penalty for illegal deployment of artificial reef material in Alabama's territorial seas.
- Create authority for the Commissioner to establish, by regulation, new live bait areas.
- Create a cast net and gig license.
- Incorporate a saltwater spearfishing license into the current law and allow the sale at state license agents.

ENFORCEMENT SECTION

The Enforcement Section patrols Alabama's coastal waters, enforcing state and federal laws and regulations relating to the conservation and protection of marine resources. Officers also enforce laws and regulations relating to boating safety and freshwater fishing and hunting, conduct search and rescue missions, and participate in drug interdiction operations. Officers are cross-trained and deputized as National Marine Fisheries Service and U. S. Customs agents and cooperate extensively with these agencies and other federal agencies in the coordination of joint enforcement operations, investigative and fisheries enforcement expertise, training, public safety, and other natural resource issues.

Facilities for the Enforcement Section consist of headquarters at Dauphin Island and district offices in Bayou La Batre and Gulf Shores. There are 15 enforcement officers in the section, nine stationed in Mobile County, five stationed in Baldwin County, and the Chief Enforcement Officer stationed at Dauphin Island headquarters.

Accomplishments

Enforcement officers conducted 16,162 hours of boat and shore patrol; 10,783 boat checks; 1,697 seafood shop inspections; 12,378 recreational fisherman checks; and issued 964 citations for illegal activities. Forty-one percent of the citations (398) were for violations of recreational fishing laws and regulations. The 253 violations of commercial fishing laws and regulations comprised 26% of the citations issued. Officers also issued 201 citations for violations of boating safety, 49 game and fish, and 63 citations for other state and federal laws and regulations. A total of 9,460 hours was spent on administrative duties, court attendance, training, and equipment maintenance. Officers worked 2,242 hours with the National Marine Fisheries Service interjurisdictional fisheries enforcement program.

Enforcement officers worked with the Alabama Coastal Conservation Association to develop a program, known as the *Coastwatch*

Program, to train citizens how to recognize and report violations of fishing laws and regulations. The mission of the program is to support enforcement efforts of the Marine Resources Division to ensure the future availability of our coastal marine resources. To date, thirty citizens have been trained during five training sessions held in Mobile and Baldwin counties. The response to the program has been very positive.

An award was received from the U.S. Food and Drug Administration (FDA) for outstanding contributions as a member of the Shellfish Patrol Evaluation Task Force Team. The team was comprised of the FDA, National Marine Fisheries Service, and U.S. Coast Guard representatives, and one representative each from Alabama, Alaska, Mississippi, and New Jersey fisheries enforcement agencies. The team developed uniform criteria for the FDA to evaluate shellfish producing states enforcement patrol efforts in protecting consumers from illegally harvested shellfish.

Officers attended training courses on boat handling, criminal investigation, supervision, and other state and federal agency law enforcement programs.

Future Plans

Develop mechanisms to improve the Coastwatch Program and better communicate important information. Continue to review enforcement policies and procedures for consistency and uniformity. Continue to improve coastal enforcement coordination and cooperation with other divisions and federal agencies.

FISHERIES SECTION

The activities of the Fisheries Section are directed toward management of commercial and recreational fisheries in Alabama's marine and estuarine waters, and involve cooperative efforts with the National Marine Fisheries Service in nearshore federal waters in the Gulf of Mexico and with other Gulf of Mexico state agencies to develop cooperative fisheries management

programs. These activities are mostly funded through federal aid programs of the U. S. Departments of Commerce (National Marine Fisheries Service) and Interior (U. S. Fish and Wildlife Service). Biological programs not covered by federal aid such as fish kills, oyster management, shrimp management, and pollution investigations are supported by commercial and recreational license fees. The Section personnel also assist in oversight of natural gas activities within Alabama's coastal waters, territorial sea, and adjacent federal waters in the Gulf of Mexico, and comment on all applications for U.S. Army Corps of Engineer permits in the coastal area.

Fisheries facilities consist of the Claude Petet Mariculture Center in Gulf Shores and the Marine Resources Laboratory on Dauphin Island.

Accomplishments

Funds provided by the U.S. Economic Development Administration and the U.S. Environmental Protection Agency enabled the Marine Resources Division to conduct an oyster shell gathering/planting program that served as biological enhancement to the oyster resource, as well as, a positive interaction between resource users and management. The division planted 6,100 cubic yards of oyster shell on areas of Cedar Point Reef in the fall of 1998. The shell had been collected from Alabama oyster processors as part of Alabama's ongoing oyster reef enhancement project.

A cooperative program was begun with the ADEM to integrate the division's assessment and monitoring program with ADEM's water quality monitoring program to allow both organizations to increase the intensity of sampling and improve data collection at little or no increase in cost.

Red snapper, Alabama's most valuable reef fish, were spawned at the Claude Petet Mariculture Center during a joint project with Auburn University for the third year. This year the project concentrated on continuing the efforts of previous years while increasing cooperative assistance to other research facilities in Florida,

Mississippi, and Hawaii. Further plans include increasing the infrastructure of the hatchery to provide increased overwintering facilities to achieve taggable size fingerlings and facilities for the induction of spawning with light and temperature manipulation. This will create additional opportunities both in mariculture and management of this species.

The second year of a cooperative project with Auburn University at the Claude Petet Mariculture Center continued to investigate the techniques for raising shrimp in ponds at increased densities using auxiliary aeration techniques. This resulted in a harvest of an average of approximately 1,133 pounds of large shrimp per pond for a total of 17,000 pounds.

During the year, 774 fisheries assessment samples were taken; 138 habitat assessments were performed; and 3,244 fishermen were interviewed during creel surveys.

Wallop/Breaux funds are administered through the U. S. Fish and Wildlife Service. Funds used from this source by the Marine Resources Division were directed toward a creel survey of Alabama's saltwater recreational anglers; construction of artificial fishing reefs in the Gulf of Mexico offshore from Alabama and inshore in Mobile Bay; maintaining equipment and facilities in Gulf Shores and Dauphin Island; managing the public artificial fishing reef permits issuing system in the Gulf of Mexico off Alabama; assisting individuals in designing artificial reefs; maintaining and enhancing boat ramps for boating access; conducting a cooperative red snapper project and study of the attraction of juvenile red snapper to small patch reefs with Auburn University; projects to test various artificial reef modules and investigate red snapper nursery estuary origin with the University of South Alabama; projects to study blue crab megalopal immigration and juvenile survival; and study variations in oyster spat success with the Dauphin Island Sea Lab. A total of 125 retired voting booths were deployed in the near offshore waters from Baldwin County. Alabama's largest inshore fishing reef to date was constructed on a

portion of the dormant Whitehouse oyster reef. This reef is approximately 75 acres in area and over one mile in circumference.

Funds administered by the National Marine Fisheries Service, Department of Commerce and were utilized by the Marine Resources Division in its cooperative statistics program to collect data on commercial shrimp, oyster, crab and finfish landings. Additionally, information on processed seafood such as picked crab meat is compiled. Landings information was collected on fish, shrimp, crabs, and oysters. Biological information was collected on blue crabs, striped mullet, red snapper, and Spanish mackerel. Commercial license information was kept in a computer data base. The cooperative statistics project continued providing monthly dealer mail-in forms for those dealers not visited by port agents. All landings are processed on a monthly basis for inclusion in Alabama's database and forwarded to the National Marine Fisheries Service.

Southeast Area Monitoring and Assessment Program (SEAMAP) funding provided by the National Marine Fisheries Service, Department of Commerce and were utilized in Alabama for the development of a long term fishery-independent data base on recreationally and commercially important marine and estuarine fishery stocks. This project provided funds to manage the Alabama shrimp fishery and evaluate spawning success and juvenile survival for important recreational and commercial species. It also provided funds for a project to independently assess red snapper population by video camera and fish trap sampling. This study was conducted in Alabama's offshore artificial reef permit areas in the Gulf of Mexico.

The Marine Recreational Fisheries Statistics Survey (MRFSS) included a pilot project for this year to characterize the economics and catch of the charter fishing industry. Creel clerks interviewed charter boat fishermen at Alabama's coastal marinas to collect data and also made telephone surveys to determine effort within the fishery. This was successful and increased the

accuracy of the survey. Next year, the division will take over the rest of the survey modes in Alabama's coastal area.

Biological and enforcement personnel worked together to collect data at oyster checkpoints, enabling the development of sound management measures for sustaining the oyster resources. Data collected assisted in assessing the damages from Hurricane Georges, as well as increasing the accuracy of assessment of the health of Alabama's oyster resource. Section personnel also conducted dives on the public reefs to assist in assessing damages caused by Hurricane Georges. The Biological Section monitored shell pick-up and planting activities in which 6,100 cubic yards of shop shell were planted on Cedar Point Reef.

Meetings were held with oil company representatives periodically to discuss options for accomplishment of pipeline projects. Biological personnel checked areas of proposed drilling platform locations and associated pipeline corridors for potential impact to oyster resources for two oil companies.

A cooperative project was accomplished with Auburn University involving the culture of shrimp. Shrimp culture concentrated on the high density production of shrimp with auxiliary aeration.

The division also began a cooperative endeavor with Auburn University and the new Alma May Bryant High School in Mobile County to create a mariculture training center at the high school. This promises to be a very successful program which will expand students' ability to participate in future fisheries.

Personnel created and posted an Internet/World Wide Web home page for the division which is associated with and accessed through the Departmental home page at <http://www.dcnr.state.al.us>. The feedback to this site has been extremely positive and it has proven to be a tremendous asset in getting information and assistance to the public.

Personnel developed and printed an informational calendar which included a very informative tide calendar along with other useful information. The demand for this calendar was extremely high and the feedback positive. Plans are underway to provide a 1999 edition.

Future Plans

The Fisheries Biological Section will continue to collect appropriate data and work with recreational and commercial fishermen and other resource user groups to provide Division administrators with recommendations for strategies and regulations for management.

Development of fishery independent assessment and monitoring of adult finfish by using multi-panel variable mesh gill nets.

Development of mariculture procedures for commercially important marine organisms will continue.

Cooperative projects will continue to be

initiated with Auburn University, the Dauphin Island Sealab, and the University of South Alabama to investigate artificial reef materials suitability, red snapper production enhancement, oyster research, and crab larval settlement and survival.

An enhanced monthly system for obtaining commercial fish dealer landings and out of state landings from Alabama waters will be continued.

Inshore assessment and monitoring work will be coordinated with the current efforts by the Alabama Department of Environmental Management in order to provide a more comprehensive depiction of Alabama's marine waters and resources.

Assumption of the complete Marine Recreational Fisheries Statistics Survey in Alabama to include creel of charter boats, private boats, ramps, and shoreline and continue the telephone survey to better define effort within the fishery.



**FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF MARINE RESOURCES**

FLORIDA MARINE FISHERIES INSTITUTE

FINFISH

Gamefish, Reef fish, and Directed Life History Studies

During 1998, stock assessments on tarpon and snook were provided to the Florida Marine Fisheries Commission (FMFC).

Work describing the life history of bonefish was completed. "Feeding habits of bonefish, *Albula vulpes*, from the waters of the Florida Keys" was published [*Fisheries Bulletin* 96:754-766 (1998)]. Morphometric measurements were made of bonefish to determine differences between *Albula vulpes* and an undescribed species from the Florida Keys. The University of Florida was contracted to determine genetic differences between the two species. Collections were made to look at stomach contents of metamorphic and juvenile bonefish.

Most tarpon data has been published. Work on radiometric aging of tarpon has been completed. Scanning electron microscopy studies to estimate the duration of the tarpon larval phase were completed. A pilot study was conducted to determine the feasibility of radio tagging and tracking tarpon and will implement a more thorough study in 1999.

A three-year Marine Fisheries Initiative (MARFIN) project to describe the age structure of offshore populations of mature red drum was completed. Over 900 adult red drum were captured and aged; fecundity estimates were also made.

"Testicular maturation and regression in the common snook" [*Journal of Fish Biology*. 53:521-542] and "Spawning rhythms of common snook in

Florida [*Journal of Fish Biology*. 53:502-520] were published. Additional manuscripts on snook reproduction and age and growth are in preparation.

Collection of spotted seatrout continued from Florida's East Coast to describe spawning frequency and estimate batch fecundity. Seatrout collections will continue through 1999 in Tampa Bay.

Work on reef fish abundance and biology in southeast Florida was expanded during 1998. Life history work on yellowtail snapper, *Ocyurus chrysurus*; gray snapper, *Lutjanus griseus*; mutton snapper, *Lutjanus analis*; and lane snapper, *Lutjanus synagris*, was initiated, and efforts are under way to expand the study into the Florida Keys.

Permit collections in the Florida Keys were completed and a manuscript is being prepared. Manuscripts on age, growth, and reproduction on gray triggerfish and Florida pompano are undergoing internal review and should be ready for journal submission by the end of June. A two-year MARFIN study describing the life history of hogfish began in November. Final revisions of a manuscript on shad and river herring are almost complete.

Baitfish

Data collection and sample processing of round scads (*Decapterus punctatus*) collected along the West Coast of Florida is complete, and data have been analyzed for a publication on reproductive biology of this species. The research project on the Florida's halfbeak fishery is near completion. The fishery and biological on halfbeak species collected over the past two years are being analyzed. Manuscripts describing life

history aspects of scaled sardine from the east and west coasts of Florida were completed and have been accepted for publication in *Fishery Bulletin*. A manuscript entitled "Association of baitfish species in relation to fish assemblages along the west central coast of Florida" was completed and is in editorial review process. The fifth acoustic/trawl survey was conducted during March-April 1999 along the West Coast of Florida. This survey is conducted annually to provide information on spatial distribution and abundance of important baitfish species such as Spanish sardine, Atlantic thread herring, round scad, and scaled sardine. The results of this survey will be presented to the FMFC for their management review of the baitfish fishery.

Mullet

A multi-state MARFIN study concerning striped mullet population assessment along the southeastern coast of the U.S. continued as planned. Monthly sampling was conducted in two regions (Indian River Lagoon and St. Johns River) along the East Coast of Florida. Monthly sampling included collection of fish for age/growth and reproductive studies. Approximately 200 fish per month were tagged and released for migration and movement studies. The results of these studies would enable us to better understand the population dynamics and stock structures of mullet throughout the Gulf of Mexico and southeast U.S. Monthly juvenile and adult monitoring sampling for mullet continued throughout this period in Tampa Bay, Charlotte Harbor, and Apalachicola Bay. An update on mullet population assessment was prepared for the FMFC. This report included analyses of size/age distributions of adult populations, juvenile abundance indices, and catch and effort statistics for the post net ban period. A manuscript describing spatial and temporal variation in the species composition of bycatch collected during a striped mullet survey was published in the *Gulf of Mexico Science*.

BIVALVE FISHERIES RESEARCH

Bivalve fisheries research at the Florida

Marine Research Institute (FMRI) encompasses bay scallops (*Argopecten irradians*), calico scallops (*Argopecten gibbus*), and hard clams (*Mercenaria* spp.), with consideration of other genera (e.g., *Chione*, *Macrocallista*) as needed. Assessment and monitoring of oysters (*Crassostrea*) are conducted by a separate branch of the FDEP.

Bay scallop research continues to be directed toward assessing biological and environmental factors influencing the depletion or loss of scallop populations in peninsular Florida. Adult abundance monitoring continues in Pine Island Sound, Anclote Estuary, Hernando, Homosassa, Cedar Keys, and Steinhatchee in peninsular Florida and St. Joseph Bay and St. Andrew Bay/Sound in panhandle Florida. Recruitment monitoring suggests that recruitment limitation is preventing the recovery of depleted populations. Federal disaster relief funds have been acquired to conduct a restoration program in the area between Tampa Bay and Homosassa, with the intent of enhancing larval availability and rates of recruitment. Restoration efforts began July 1, 1997. The manuscript "Recruitment of bay scallops (*Argopecten irradians*) in Florida Gulf of Mexico waters: scales of coherence" was published in *Marine Ecology Progress* (Arnold et al., Vol. 170: 143; 1998), and manuscripts concerning historical distribution of bay scallops in Florida and recruitment failure in the Homosassa scallop population are in press.

Geographic information system (GIS) techniques continue to be applied to the management and development of the hard clam fishery in Florida (including GIS-based resource mapping) and to assess the relative value of submerged lands to open-water versus aquaculture clamming operations. The manuscripts "Hard clam aquaculture in Florida, USA: GIS applications to lease site selection" and "A history of quahogging" are in press and the manuscript "GIS and modeling: coupling habitats to Florida fisheries" has been published in *Journal of Shellfish Research* (Rubec et al., Vol. 17: 1451). A study of various enhancement strategies, including spawner transplants, seeding to enhance

spawner populations, and direct larval injection has been implemented.

Beginning in late 1998, the calico scallop fishery was very active harvesting an abundant year class from the Apalachicola area. The FMFC completed and implemented a management plan for calico scallops within state waters, and the federal government continues to develop a management plan for offshore waters. At present, there is no directed research being conducted by FMRI on calico scallops.

CRUSTACEAN FISHERIES RESEARCH

In the crustacean fisheries research program, staff conduct fisheries-oriented biological and ecological studies on crustacean species of economic importance to Florida. During 1998, two manuscripts describing the history and trends in the Florida and Gulf of Mexico blue crab fisheries were published in the *Journal of Shellfish Research*. Staff also prepared the essential habitat section of the GSMFC FMP revision for blue crab in the Gulf of Mexico. Staff continued to present information concerning the configuration of blue crab traps to the FMFC. Staff continue field studies of the population biology of stone crabs in Tampa Bay and have begun analyses for manuscript preparation from the study of the physiological effects of temperature and salinity stress on juvenile stone crabs. Staff participated in workshops being conducted statewide for the purpose of defining shrimping zones in the nearshore waters of Florida. Staff are working with the FMRI Coastal & Marine Resource Assessment (CAMRA) group to prepare maps integrating nearshore habitat and allowed shrimping zones for management of the shrimp fishery. The results of all work are provided to appropriate fishery management agencies and presented routinely at scientific meetings and other public forums.

FISHERIES GENETICS RESEARCH

The fisheries genetics research program has two principal directions: 1) genetic stock identification of economically important marine

organisms, and 2) monitoring the effects of FMRI Stock Enhancement Research Facility (SERF) hatchery operations on the gene pools of wild populations supplemented with hatchery reared organisms and monitoring the success of SERF stock restoration efforts. A work plan for the Fisheries Genetics Program was developed based on needs specified by the FMFC. Two manuscripts describing snook genetic structure are in press: "Genetic identification of Centropomine fishes" and "Molecular systematics and ecological diversification of the transisthmian fish genus *Centropomus* (Perciformes: Centropomidae)." Laboratory analysis of genetic structure in sheepshead was completed, and a manuscript is in preparation that identifies geographic ranges of sheepshead stocks and addresses the issue of putative subspeciation within the species. Laboratory analyses of genetic structure in blue crabs, scallops, shrimp, spotted seatrout/weakfish are nearing completion. Genetic studies of vermillion snapper, yellowtail snapper, grey snapper, and dolphin fishes were initiated.

Genetic monitoring of the SERF red drum stock enhancement program continued. Three manuscripts relating to levels of genetic variation in red drum hatchery broods, parent/offspring identification, and developing genetically efficient breeding protocols are in preparation. A manuscript describing genetic structure and natural levels of genetic variability was accepted for publication: "Genetic population structure of red drum (*Sciaenops ocellatus*) based on mtDNA control region sequence." The genetic tag developed for hatchery red drum is being used to determine the percentage of hatchery-reared red drum in samples obtained from areas where stock enhancement or restoration is ongoing. A paper/presentation was invited by the United States/Japan Natural Resources (UJNR) Panel on Aquaculture; the resulting manuscript, entitled "Genetic considerations during the experimental and production phases of snook stock enhancement" is in review. Analytical models and computer simulation programs were developed to forecast the long-term genetic effects of stock enhancement on wild populations; a manuscript describing and applying these models

is in preparation. A genetic monitoring program for bay scallop stock enhancement was developed and implemented. Data from all studies are provided to appropriate fishery management agencies and are routinely presented at scientific meetings and other public forums. Multiple symposia relating to aquaculture/genetics are being organized and conducted by the program director of Fisheries Genetics for national and international organizations.

FISHERIES STATISTICS

Fisheries Independent Monitoring Program

Fisheries independent monitoring (FIM) of fishes continues in the Tampa Bay, Charlotte Harbor, Indian River Lagoon, Cedar Key, and Apalachicola areas. This is the first year of sampling for this program in Apalachicola. Sampling effort in Florida Bay has been reduced and that effort transferred towards developing a FIM program in the reef tract portion of the Florida Keys. This program is using a visual survey to assess species composition, size, and abundance. It will be operational starting mid 1999. The FIM program uses a systematic sampling strategy to collect fish free from the biases associated with collecting data from recreational and commercial fisheries. Data has been used for numerous stock assessments for several inshore species. The program has been restructured to place more emphasis on assessing the population of subadult/adult fishes rather than on young-of-the-year fishes. The subadult/adult FIM program is used to help monitor the current status of Florida's estuarine fish stocks. Additionally, staff in this program have been involved in the mercury concentration in fish program, the recreational survey and angler interview programs, fish health assessment, as well as studying the fishes from the rivers feeding Charlotte Harbor and Tampa Bay.

Commercial Landings Statistics

Information on the commercial harvest of fish, invertebrates, and other marine resources (including marine life and live rock used in the

aquarium trade and some aquaculture products) is reported by more than 1,300 wholesale and retail dealers to the Florida Marine Fisheries Information System. More than 320,000 marine fisheries trip tickets containing information on catch, gear, time and area fished, price, and commercial fishing licenses are reported annually under the mandatory reporting rules. These data are used in stock assessments, quota monitoring, sampling program design, and summaries of landings and trips by species, qualification of fishermen for state and federal license endorsements and permits, and determination of participation in fisheries. Many of these data are incorporated into state and federal fishery management plans and stock assessments. At present, programming work continues on the conversion of the trip ticket data, associated biological profiles used for editing, and the editing application from Adabase/Natural to an Oracle data base and application. Testing of the efficacy of the new design in Oracle was delayed until May 1999. Incorporation of the new standards proposed by the ACCSP will be carried out after the standards are adopted. Florida was selected by the ACCSP to be one of the sites for the development of the prototype of the ACCSP commercial fisheries data base during 1998. Data for this prototype will be supplied in mid-1999.

Biostatistical Sampling

This cooperative state/federal project is designed to obtain fish and invertebrate species length-frequency measurements and fishing trip characteristics (gears used, duration, effort, area fished, etc.) directly through dockside interviews with commercial fishermen. These data are also used to cross-check information reported in the marine fisheries trip ticket program. Samplers are located in St. Petersburg, Port Charlotte, Marathon, Melbourne, Cedar Key, Jacksonville, and Pensacola. During 1998, samplers measured approximately 110,905 organisms (fish and invertebrates) from about 1,381 trip interviews. Along with the data obtained through interviews and dockside sampling, samplers may also collect otoliths and other hard parts (used for age determinations), gonads (used for reproductive

studies), and other biological tissues for analyses. The samplers are occasionally tasked with at-sea sampling duties or additional duties as required. Beginning in October 1997, samplers were tasked with obtaining additional commercial fishing trip interviews to provide information and samples of lengths of striped mullet harvested weekly during the roe season in order to provide additional data for an upcoming stock assessment.

Recreational Surveys, License Monitoring, and Statistics

Until February 1997, the FMRI received a 10% sample of all individual Saltwater Fishing Licenses and Stamps (spiny lobster and snook) and all ("for-hire") vessel Saltwater Fishing Licenses and tarpon tags. These data are used for mail surveys of recreational anglers and have been utilized by FMRI, the FDEP, and other agencies, universities, companies, and individuals for survey work and mailing lists. Beginning in February 1997, the Florida Game and Fish Commission has issued Saltwater Fishing Licenses and has computerized all license information. For recreational landings estimates and other types of analyses, the NMFS MRFSS is utilized. Beginning in September 1997, the Fishery Dependent Monitoring Group has participated in the Enhanced Pilot Charter Boat Survey for the Gulf of Mexico conducted in cooperation with the NMFS MRFSS, the GSMFC, and the states of Louisiana, Mississippi, and Alabama. Work on this pilot survey began during late 1996 with intensive planning efforts with these agencies. The charter boat sampling frame was developed during 1997 prior to the September 1 implementation of the pilot survey, and public outreach meetings were held to inform charter and guide boat captains about the goals of the pilot survey. The pilot charter boat survey continued during 1998. Florida conducts its portion of the survey with seven field samplers (two in Marathon, one in Port Charlotte, one in St. Petersburg, one in Cedar Key, one in Panama City, and one in Pensacola) coordinated by two researchers in St. Petersburg. Dockside sampling during 1998 achieved four to five times the base level of sampling normally conducted by the

MRFSS for the charter boat mode of fishing in Florida. Fishing effort is being obtained through telephone interviews of a randomly selected 10% sample of charter boats (including fishing guides) on the Gulf Coast. The goal of the project is to compare the experimental method (telephone interviews of charter boat captains) of estimating fishing effort to that obtained during the standard MRFSS random-digit dialing telephone interviews of recreational anglers. In addition to the pilot charter boat survey, the MRFSS transition study involving state biologists conducting the recreational fishing survey using MRFSS protocols began in September 1998. By October, the samplers were hired, trained, and deployed at field locations throughout the state resulting in a total of 27 state biologists involved with the marine recreational fishing survey and pilot charter boat survey in Florida. Sampling activities using the MRFSS protocols began in November 1998 and resulted in exceeding the base survey sampling interview goals by 10%-24% on both the East and West Coast of Florida for all modes (shore, private/rental boats, and charter boats) of fishing. The Fishery Dependent Monitoring Group also participates in the NMFS Beaufort Laboratory Head Boat Survey and has two samplers (Naples to Cedar Key area and Miami to Jupiter area) dedicated to this log book and dockside sampling program.

STOCK ASSESSMENT AND POPULATION MODELING OF FLORIDA'S INSHORE SPECIES

In January 1998, the assessment group produced an annual trends report that summarized fisheries-dependent and independent data through 1996 and another annual trends report in November 1998 that summarized the data through 1997 and provided detailed narratives on 47 popular species in Florida. The assessment group developed stock assessments for bluefish, weakfish, striped mullet, common snook, spiny lobster, and red drum. These assessments use a variety of analytical methods including age-structured models such as tuned sequential population analysis, separable virtual population analyses, non-equilibrium surplus production

models, and modified DeLury depletion models. The group used their bootstrapping-Monte Carlo hybrid model developed in 1997 to evaluate the effects of additional management methods on common snook sizes, sex ratios, average weight of landed fish, and spawning potential ratios. Based upon the results of these models, the FMFC adopted a slot limit for common snook of 26-34 inches and retained the existing seasons and bag limits. Striped mullet stocks on the Gulf Coast continue to show improvement after the elimination of gill nets.

Members of the assessment group serve on several state and federal committees charged with reviewing assessments of marine species in the Gulf of Mexico and along the Atlantic coast. Work was conducted in support of development of the GSMFC FMPs for spotted seatrout and flounders; the GMFMC assessment of the condition of red drum, reef fishes, and mackerels; the GMFMC ad hoc committees for crustaceans and for finfish; the ASMFC assessments for bluefish and weakfish; and the GSMFC Stock Assessment Team. Members of the group continue to supply technical advice to other researchers in and out of the FDEP and to participate on graduate student committees.

Besides the activities above, members of the group contributed presentations at professional meetings and at FMFC meetings, wrote peer-reviewed articles, and participated in a second United Nations, Food and Agriculture Organization sponsored workshop on Caribbean spiny lobsters with researchers from 14 countries. R.G. Muller gave a presentation at the annual American Fisheries Society meeting entitled "Catch curves can be misleading: snook, a case study." Papers published in 1998 included one by Murphy, M.D., D.H. Adams, D.M. Tremain, and B.L. Winner entitled "Direct validation of ages determined for adult black drum, *Pogonias cromis*, in east-central Florida, with notes on black drum migration" *Fisheries Bulletin* 98:382-387; another was by D.J. Pierce, J.E. Wallin, and B. Mahmoudi entitled "Spatial and temporal variations in the species composition of bycatch collected during a striped mullet (*Mugil cephalus*)

survey" *Gulf of Mexico Science* 1998(1): 15-27; another by G. McRae, D. Camp, W. Lyons, and T. Dix entitled "Relating benthic infaunal community structure to environmental variables in estuaries using nonmetric multidimensional scaling and similarity analysis" *Environmental Monitoring and Assessment* 51:233-246, and another entitled "Age structure of offshore red drum populations in nearshore waters off west-central Florida" by R.E. Crabtree and M.D. Murphy that was presented at the 11th Annual MARFIN Conference, December 9-10, 1998, Tampa, Florida.

RESOURCE HEALTH AND ASSESSMENT

Environmental Monitoring and Assessment

A new statewide inshore marine monitoring initiative was begun in 1999. Funded by Environmental Protection Agency (EPA) through 2003, Florida's Inshore Marine Monitoring and Assessment Program (IMAP) builds on the EPA's Environmental Monitoring and Assessment Program (EMAP) to allow a statistically-valid assessment of ecological condition in Florida's nearshore waters using a set of physical, chemical, and biological indicators. These indicators include water quality measurements, fisheries, macrobenthos, and submerged aquatic vegetation (SAV) community structure, contaminants in sediment and fish tissue, and presence of heterotrophic dinoflagellates in sediments. The sample design is two-tiered, consisting of a broad-scale statewide grid and smaller-scale sampling units within five water management districts. The IMAP will be coordinated by staff of the FDEP FMRI. The FMRI operates field labs in Melbourne, Marathon, Charlotte Harbor, Tampa Bay, Cedar Key, and East Point (Apalachicola). These field labs will be used as bases of operation for implementing IMAP statewide.

Coral Reef and Hardground Monitoring and Assessment

During the past year, the third annual sampling of 40 reef sites including 160 stations from Key Largo to Key West was conducted by

Coral/hardbottom Monitoring Project scientists. Point count analysis of the 1996 data has been completed, and 1997 data should be completed by June 1999. Researchers are using a combination of video and species count methods to document 1) cover of coral and other selected benthos and 2) coral species distribution and to determine change over time. The five year project funded by EPA is a cooperative effort between the FDEP FMRI, University of Georgia, and University of Charleston, South Carolina and managed by FMRI involving the teamwork of 15 scientists including principal investigators from each institution.

The FMRI continues to provide expertise in surveys and litigation of ship groundings. The SSN MEMPHIS case was settled and a restoration plan is in process. Groundings continue to require survey and overview by staff. Funds from SSN MEMPHIS have provided additional staff and equipment necessary to conduct the work. Although no new applicants have requested surveys for live rock aquaculture on state submerged lands since 1998; staff regularly provide assistance and guidance to prospective leasees. Site visits for the present leases are proposed for summer 1999.

Staffs were instrumental in revising the coral management plan for incorporation into the South Atlantic Fishery Management Council's comprehensive EFH management plan, which has been completed.

Staff continue to provide technical expertise to the Florida Keys National Marine Sanctuary and the state in reviewing collecting permit requests, zoning issues, and the proposed Tortugas 2000 marine reserve.

Aquatic Health

During March-December 1998, numerous reports of ulcerated and lesioned fish (primarily mullet and sheepshead) were received from the St. Lucie River area. Investigative work has identified an aquatic fungus that is often associated with external lesions on mullet and

sheepshead from the St. Lucie River. Although identification of the fungus is difficult and time consuming, there is evidence that a particular type of fungus is present in some St. Lucie fish samples. This same type of fungus has been implicated in lesion events worldwide, including some events on the eastern seaboard formerly thought to be caused solely by *Pfiesteria* or similar toxic algae. This fungus prefers lower salinities, and our current hypothesis is that sustained low salinities in the St. Lucie River system associated with the large-scale release of water in 1998 allowed the fungus to proliferate and contribute to the increased occurrence of lesions on some fish species. It is not certain whether the fungus induces lesions by itself, or acts in concert with other stresses on the fish to produce the sores. Also, ongoing work will determine if any of the dinoflagellates collected during the lesion event in 1998 are toxic or otherwise harmful to fish.

Since the 1998 event, FMRI has been working closely with both the South Florida Water Management District (SFWMD) and the Army Corps of Engineers (ACOE) - Jacksonville District on the water release issue and is confident that our scientific perspective relative to fish health is being considered in the decision-making process. Based on interactions with these agencies and previous work done by SFWMD scientists, the effect of small pulse releases on estuarine salinities in the St. Lucie River system is expected to be minimal. Because of this fact and current knowledge of the lesion event in 1998, an increase in the frequency of lesioned fish is not anticipated under the proposed release scenarios (500 cubic feet per second pulses over a ten-day period). However, advance notification of this release will allow FMRI to perform experimental fish and water quality sampling before and after the release to ensure that any adverse effects are detected and documented.

The Aquatic Health Group is also involved in an effort to raise bay scallops for restoration purposes. Scientists routinely perform health evaluations on hatchery scallops before they are released into the wild, examining individuals for

evidence of disease or parasitism. This project complements the overall bay scallop restoration project. There are two phases, scallop health and effects of microalgae on scallops. The health portion provides health support for the culture, stocking, and restored bay scallops at all phases of the project. The health evaluation will cover different aspects of potential disease and mortality factors that may affect the successful rearing and stocking of the bay scallop. A health profile for wild scallops will be developed from archived histological material available at FMRI. Wild scallops will be screened for bacteria, parasites, and pathologies, and reference material will be prepared. Critical steps will be ascertained at which mortalities are greatest and evaluation of embryos and larvae will be for factors which may indicate onset of such mortalities. The health of cultured and restored adult scallops will be monitored throughout the project. The microalgae portion of the project will determine the growth and survival of bay scallops based on composition of microalgae available and consumed. If exposed to different concentrations of *G. breve* naturally or experimentally, does this exposure lead to reduced viability of different life stages? The objectives of the health component are to provide health support for successful restoration of bay scallops in Florida; develop health recommendations for a stocking policy for bay scallop restoration in state waters; determine if scallops, juveniles, and adults feed on what microalgae are available or whether they selectively feed by microalgal group or size; and determine if the presence of *G. breve* blooms impairs bay scallop growth, physiology, and viability.

Harmful Algal Blooms (HAB)

The HAB group continues its involvement in the multidisciplinary ECOHAB program in the Gulf of Mexico. ECOHAB allows the testing of refined methods to monitor HAB species and their toxins in the environment. There are five objectives, three of which FDEP is involved in, but not solely; 1) determine the sources of inorganic and organic nutrients that allow growth and persistence of large *G. breve* populations in

coastal waters; 2) determine the interactions of cellular, behavioral, life cycle, and community regulation processes with environmental forcing factors during stages of bloom development; and 3) determine the production, occurrence, fate, and effects of brevetoxins in the environment during and after *G. breve* blooms.

The 30-year historical data base on *G. breve* and its effects are being digitized for trend analyses. A four year grant funded by NOAA and the EPA to model *G. breve* blooms and predict landfall of red tides is underway and involves FDEP, the University of South Florida, Mote Marine Laboratory, and eight other laboratories. New projects for *Pfiesteria*-like dinoflagellates and other toxic species have begun and will be integrated into an overall monitoring and research program. We are currently processing 1998 spring-fall samples from the mid-Atlantic and southeast Atlantic states for *Pfiesteria*-like species using a microalgal assay. It is anticipated that there will be a federal-state cooperative program to monitor for these organisms in each of these states for one or two years. The new work entitled "ECOHAB: *Pfiesteria*-like species in Florida" will help identify the species, the problems and risks, and the most likely geographic areas for toxic outbreaks.

Florida was recently awarded funding for red tide research out of NOAA disaster funds. This funding will be used to work cooperatively with other gulf states on projects that have gulf-wide application. Program duration is April 1999 to April 2002 (three years). Priority research areas include: 1) development of a replacement for the mouse bioassay currently used to screen shellfish samples for levels of brevetoxin for opening and closing shellfish beds; 2) development of a surface recognition probe for *Gymnodinium breve*, the cause of most Gulf of Mexico red tides. A molecular probe that identifies *G. breve* specifically can be used with fluorescence techniques to identify very low quantities (or high quantities) of red tide in seawater; 3) development of a remote sensing network to forecast red tide events within the Gulf of Mexico.

Habitat Assessment and Restoration

Habitat assessment projects seek to assess the ecological status of coastal fisheries habitats, are identifying physical and biological factors that stress coastal plant communities, and are evaluating trends in coastal ecosystem health. The FMRI staff are also developing ecologically and economically sound practices, materials, and recommendations for coastal habitat restoration to enhance fisheries, promote shoreline protection, and enhance water quality statewide. Although work activities are conceptually divided between assessment and restoration, staff within this work group conduct research related to both topics. Seagrass disease associated with the pathogenic slime mold known as *Labyrinthula* is also being studied, and the effect of this pathogen on seagrass mortality is being determined. Staff are also evaluating biological monitoring techniques to assess environmental stress and estuarine health.

The FMRI staff participating in habitat assessment research are 1) developing methods to measure those characteristics (ecoindicators) that may be used to document status and trends in the ecological and physiological condition of vegetated fisheries habitats, 2) assessing scale-based variability in seagrass ecoindicators in selected regions, 3) determining the effects of salinity on the growth and survival of turtle grass (*Thalassia testudinum*) and widgeon grass (*Ruppia maritima*), 4) measuring plant and sediment characteristics that can be used to assess Florida Bay's status, 5) evaluating the different conclusions that may result from qualitative versus quantitative assessment data, 6) determining the effects of propeller scarring on seagrass associated fauna, and 7) determining the distribution of the pathogenic slime mold *Labyrinthula* on seagrass in Florida Bay and its role in seagrass mortality. The FMRI staff participating in habitat restoration are conducting research to 1) develop tissue culture techniques to produce seagrass planting units in the laboratory, 2) evaluate alternative methods to ensure survival of planting units at restoration sites, 3) develop an artificial aquatic system for experimental

manipulation of submerged and intertidal plant communities, and 4) assist resource managers in evaluating sites and designing restoration plans.

Florida Bay

The study of phytoplankton blooms in Florida Bay was continued both in the field and in the laboratory. Field studies consisted of collaborative projects jointly between FDEP, NOAA Atlantic Oceanographic and Meteorological Laboratory (AOML), and the Louisiana University Marine Consortium (LUMCON). These studies are looking at the trophic linkages between primary and secondary production at identical stations. Bimonthly measurements of primary production are made to give the range of annual variability for the selected regions which represent the bay. Concomitant studies on secondary production allow us to detect the trophic linkages which occur and to give an indication as to how efficiently these linkages are functioning. These studies, in addition to others, will be used in various models useful for management of the bay.

Most of the remaining work in Florida Bay has either been grant funded, reported elsewhere, or consists of bringing existing projects to conclusion. The largest of these efforts is the completion of the study of molluscan distribution as affected by salinity change. The only new initiative is a contract to the Florida International University to conduct analyses that statistically link physical conditions in the bay to multiple ecological parameters. The ultimate goal of such statistical analysis is to lead the development of ecological performance measures for Florida Bay.

FISHERIES STOCK ENHANCEMENT

The Fisheries Stock Enhancement Program began its fourteenth year July 1998. Stock enhancement of finfish continued to focus on red drum (*Sciaenops ocellatus*) and common snook (*Centropomus undecimalis*) while molluscan enhancement projects targeted bay scallop (*Argopecten irradians*) and queen conch (*Strombus gigas*).

The project to restore red drum in Biscayne Bay completed its eighth year in August and continued through the end of the year. This project is conducted in partnership with Mote Marine Laboratory (MML) and Dade County Environmental Resources Management. Contracts with University of Miami and Florida International University for grow out, tagging, and release of red drum produced at the FDEP Port Manatee SERF were discontinued during 1998. Releases of red drum reared at SERF continued through November 1998. In November, a decision was made to discontinue releases in Biscayne Bay until a more complete assessment of the impact of previous releases was conducted. A total of 1,671,133 hatchery-reared red drum were released in Biscayne Bay including 1,060,548 phase I; 427,339 phase II; and 183,246 phase III. A total of 2,276,374 hatchery-reared red drum have been released statewide since 1988. When releases of red drum into Biscayne Bay were discontinued it was decided to conduct future releases in three new locations. Two of the new locations are in the Indian River Lagoon, one north and one south. Releases in these two locations are scheduled to begin in early 1999. The third location is Tampa Bay. Currently, no West Coast red drum broodstock are held at SERF (red drum from the east and west coasts of Florida are genetically distinct). West Coast brood animals will be obtained and production of fingerlings for Tampa Bay releases will commence in 1999.

A pilot project to develop and evaluate release and sampling strategies for common snook in Sarasota Bay and southern Tampa Bay, begun in 1996, continued through 1998. This project is a partnership between MML, NMFS, and FDEP. During April, approximately 13,000 snook fingerlings reared at Mote Aquaculture were released into several sites in Sarasota Bay. Approximately 25,000 hatchery-reared snook have been released, the majority in Sarasota Bay and the remainder in southern Tampa Bay. Most of the snook released were reared at Mote Aquaculture while approximately 1,100 were reared by FDEP and Harbor Branch Oceanographic Institution. FDEP and MML staff,

with assistance from Washington Department of Fish and Wildlife, tagged all snook released.

The multi-agency project to restore bay scallop populations on the West Coast of Florida began its second year in July 1998. This is a cooperative project between University of South Florida (USF), MML, and FDEP. The fisheries stock enhancement component of this project is to function as a nursery to rear animals propagated at the USF Scallop Aquaculture Facility. During 1998, approximately 25,000 bay scallops were planted in cages at two locations; 13,000 animals went into Tampa Bay and 12,231 went into the Gulf of Mexico offshore of Crystal River.

The queen conch restoration project, located at the Keys Marine Laboratory, continued through 1998. This project, begun in 1990, is designed to assist with rehabilitation of Florida's queen conch stock by releasing hatchery-reared animals in the wild. Additional information on this project can be found in the South Florida Regional Lab portion of this report.

In an effort to provide additional direction and to move stock enhancement in Florida forward, a Marine Stock Enhancement Advisory Board was organized in 1998. This board is comprised of individuals who represent the recreational angling community or related interests. They provide an important user perspective on stock enhancement issues and assist program managers in identifying both short and long term strategies. In addition, program scientists conducted a finfish species selection and prioritization during 1998. A user group survey was mailed to licensed anglers and others to solicit responses about which species needed enhancement and which species had the highest potential for enhancement. This survey was used to produce a list of twenty-one potential candidate species. The list was then prioritized using the following criteria: 1) not responding to traditional management; 2) culture history; 3) role or impact on ecosystem; 4) ability to monitor impact; 5) political support; 6) subpopulation structure; 7) suitable life-history parameters; 8) likelihood of an effect; 9) user group value; 10) not habitat-limited.

Development of full-scale bay scallop hatchery capability at Port Manatee continued during 1998. Efforts also continue to add intensive culture systems at SERF. A phytoplankton culture laboratory was completed and is in production. This facility can provide food for scallops in intensive culture as well as for zooplankton to be used for intensive finfish larviculture.

Hatchery Operations

Red Drum Production: Twenty-seven East Coast red drum brood fish, divided between five environmental control rooms, were photothermally conditioned for egg production during fall 1998. Total egg production during fall 1998 was 138,877,800.

Approximately 32,000 phase I fingerlings were harvested from four of five ponds stocked. Two bird-netted ponds were stocked with 21,367 East Coast fingerlings for phase II production. These two ponds had not been harvested by year's end.

Approximately 10,000 phase II West Coast red drum, reared from eggs provided by Florida Power Corporation's Crystal River Mariculture Facility, were harvested during October. Some of these fish were provided to and used by researchers at MML for a field study on habitat utilization and by researchers at USF to evaluate the impact of oil dispersion on marine organisms.

In an effort to increase red drum egg production efficiency and reduce associated costs, a study to decrease the time brood fish are held and conditioned was initiated. Most of the costs associated with egg production are related to the length of time brood fish are held. The time is related to the current method of inducing sexual maturation, a process that is called photothermal manipulation. The use of injected or implanted hormones (gonadotropins) may be a way to greatly shorten the time required for inducing maturation and spawning. This study was on going at the end of 1998.

Scallop Production: Total bay scallop production at SERF during 1998 was 28,014 animals with an average valve height of 30 mm. These scallops were planted in Tampa Bay (13,000 animals) and offshore of Crystal River (12,231 animals). Scallop survival in SERF ponds averaged 73.2 % for the eight groups of juvenile scallops reared during year one of this project.

To begin year two production, one group of 44,852 juvenile Crystal River scallops was transported to SERF from the USF Scallop Aquaculture Facility during December.

Health Management and Disease Control

The primary objective of health management and disease control is to produce animals that are healthy and well adapted for survival after release into the wild. This serves to maximize the potential for successful stock enhancement, as well as to protect public health and our marine resources. A secondary objective is to minimize disease-related mortality during culture in order to maximize production efficiency. To achieve these objectives, we have developed an integrated and effective health management program that has minimized mortality cause by parasites, bacterial infections, and environmental stressors. Integrated and effective health management consists of the following: 1) superior husbandry; 2) constant disease surveillance; 3) experimental refinement of handling and culture methods to minimize stress and disease; 4) development, testing, and refining of treatment methods; 5) health training and information for staff, contractors, and aquaculturists; and 6) interaction and coordination with regulatory agencies, aquaculturists, and other fish health professionals.

We practice superior husbandry as it relates to marine animal culture. Superior husbandry is proactive (i.e., avoids disease by correcting conditions that lead to disease), is focused on the needs of the animal, and is fully integrated with other areas of hatchery management. Protocols that exemplify superior husbandry are prepared, tested, refined, and made available to train staff, interns, contractors, and state aquaculturists.

Constant and comprehensive disease surveillance, adapted to both tank and pond-culture, is necessary to detect developing disease conditions while stocks are still at a treatable stage. Advanced diagnostic methods and tools have been used as necessary to characterize a disease or pathological condition, e.g. necropsy, histology, light or electron microscopy, and bacterial culture. Diagnostic methods have been adapted to the unique health problems of each life history stage including eggs, larvae, juveniles, subadult, and broodstock. Early disease detection has resulted in reduced mortality and improved production efficiency. Supplying aquaculturists throughout the state with information on disease surveillance methods has been ongoing.

Culture methods are continuously refined to minimize stress and disease. When major stressors, such as those associated with harvest, handling, tagging, transport, and anesthesia are identified, methods are developed to reduce or mitigate them. Husbandry-based best management practices are identified and incorporated into the culture process. Reduction in some of the major culture stressors has resulted in an overall improvement in the health and vigor of released stocks. This has facilitated the survival and adaptation of cultured fish in the wild and improved the cost effectiveness of stock enhancement.

New disease treatment methods have been developed and tested using rigorous experimental methods. Parasitic problems are now largely under control after application of experimentally derived treatments and parasite-prevention strategies developed over the past nine years. Control of bacterial diseases remains a serious problem, however. Thus, this has become our highest health priority. Red drum losses due to *Vibrio* and *Aeromonas* infections have been significant for all stages of development except broodstock. Intensive bacterial monitoring of both red drum and bay scallop larval culture systems is ongoing because larvae are the most susceptible to bacterial infection. Survival of scallops from the egg to juvenile stage has improved from about 0.02% in 1997 to about

0.3% in 1998. Survival of 3% is possible but currently a rare outcome. Our ultimate goal will be to achieve 3% scallop survival with consistency. Probiotic and environmental methods of bacterial control are being developed as safe and inexpensive alternatives to antibiotic treatments which have limitations related to resistance, residues, withdrawal times, toxicity, and cost. As better bacterial control methods are developed for red drum and scallops, they will be applied to other species of aquaculture interest. Research results will be published in peer-reviewed journals to widely disseminate data necessary to support profitable commercial aquaculture and stock enhancement of finfish and bivalves within the state.

Hands-on health training, phone consultations, written material, and other forms of health support have been made available to staff and outside aquaculturists. Personal, hands-on training has been emphasized and integrated with the outreach efforts of other groups such as University of Florida/Institute of Food and Agricultural Sciences whenever possible. Consultations and other forms of health support have provided stakeholders with up-to-the-minute health data that may not yet be available in publications or is otherwise not readily accessible.

Interaction and coordination with other regulatory agencies, aquaculturists, and fish health professionals have been maintained to ensure the best available health information and support reaches the stakeholders. Health policy and certification requirements are in the process of being expanded and standardized for everyone involved in marine stock enhancement including FDEP. Increased responsibility is being allocated to the diagnostician to ensure health certifications fully reflect the health of the stocks to be released and that released stocks do not carry diseases that may adversely impact their survival, the survival of other fish stocks, or public health. Emphasis is being placed on the diagnostician's direct involvement with the culturists and culture system, including site visits and the immediate diagnostic evaluation of fish that become diseased during culture. Other health-related procedures

are being reviewed for incorporation into policies and rules related to commercial aquaculture.

Assessment

Fishery-dependent assessment of the impact of releasing hatchery-reared red drum continued in all release locations through 1998. The statewide total of reported angler captures passed the 1,200 mark by the end of 1998. In Biscayne Bay, more than 560 fish released as phase III have been reported captured by anglers. Anglers fishing in Biscayne Bay during 1998 caught and reported more hatchery-reared red drum than in any year since that project began. A fourth two-day fishing tournament was held in Biscayne Bay to promote angler awareness of the project and to increase fish recoveries. A fourth drawing, funded by the Atlantic Gamefish Foundation, was held during April 1998, and \$1,000 was awarded to an angler who had reported catching a hatchery-reared fish.

A fishery-independent assessment of red drum releases in Biscayne Bay was initiated through a partnership with MML. In October 1998, a MML scientist was relocated to Dade County to begin tracking hatchery released fish. Tracking and locating fish is accomplished using traditional fishing methods and gear as well as the use of sonically tagged fish. During 1998, approximately 60 legal size red drum were implanted with sonic tags having a battery life of fourteen months. These fish were released in two locations in south Biscayne Bay. The goal of this project is to have the sonically-tagged fish lead us to other red drum that were released earlier or at the same time as they were and to help us better understand the habitat preferences of red drum in Biscayne Bay. Preliminary results of this project are encouraging.

A tagging study comparing three internal anchor (external streamer) tags was expanded to two replicate ponds during 1998. Approximately half of the study fish were released in Biscayne Bay during February 1998 to assess tag retention as a field component of the pond-based study.

ENDANGERED SPECIES

Marine Mammals

The FDEP Marine Mammals Research Program is headquartered at the FMRI in downtown St. Petersburg. Additional staff is located at the Marine Mammal Pathobiology Laboratory in St. Petersburg and at field stations in Port Charlotte, Jacksonville, Melbourne, and Tequesta. Manatee research is organized into five projects: mortality and rescue, population monitoring, ecology and migration, life history and biology, and the manatee geographic information system. Research on the endangered North Atlantic right whale is out of the Jacksonville field station and a right whale GIS project is based in St. Petersburg.

During 1998, 231 manatee deaths were documented throughout the state. The 1998 total brings the total number of manatee deaths documented since 1974 to 3,501. Since 1974, deaths related to human activity (1,066) have accounted for 30% of all deaths. Watercraft-related manatee deaths (828) represent 24% of all deaths and 78% of deaths attributed to human activity. Deaths in the perinatal category (<150 cm) have accounted for 21% of the 25-year total. These animals did not die as a result of human activities but from natural or undetermined causes. Death from natural causes accounted for 17% (582) of the cases. Occasionally, natural phenomena such as extreme cold weather or exposure to biotoxins produced by red tides had a dramatically negative effect on manatees. Cases in which a cause of death could not be determined are categorized as undetermined and account for 32% (1,113) deaths in the last 25 years. Most of these manatee carcasses were decomposed to a point that an accurate identification of a cause of death could not be determined.

Manatee Mortality and Rescue

Watercraft-related Deaths. During 1998, 28% of manatees (66) died as a result of collisions with watercraft. As in years past, the majority of deaths resulted from impact with watercrafts and not by

being cut by the propellers. The leader of watercraft-related deaths for 1974–1998 is Brevard County with 159 and Lee County second with 104. In 1998, Brevard and Lee counties were tied for the highest number of watercraft-related deaths with nine each. Second highest for 1998 was Volusia County.

Flood Gates/Canal Locks. Deaths resulting from entrapment in water-control structures and navigational locks totaled nine for 1998. The greatest number of deaths since 1974 have occurred in Dade County (41%) and Glades County ranking second. During 1998, Dade County led the state in structure deaths with three. Glades and Martin counties came in second with two each.

Other Human Related. Deaths categorized as “other human-related” accounted for seven deaths in 1998. Only two other years have surpassed this total, with nine in 1979 and eight in 1997. Human-related deaths are those that are caused by entanglement in man-made materials (i.e., monofilament line, crab traps, etc.), entrapment in culverts and pipes, ingestion of foreign materials, trauma from unknown origin, poaching, and others. Historically, Dade County has had the greatest number of deaths attributed to various human activities with 21 followed by Brevard County with 14. During 1998, Lee County was highest for the year with three total.

Perinatal. Deaths of perinatal manatees (52) comprised 23% of the deaths during 1998. The majority (72%) of these carcasses were in bad condition, and none showed signs of trauma. Carcasses were most frequently recovered from Brevard County (14), 27% of annual total. The county with the second most frequent number was Lee (eight). Brevard County also leads the state for the most perinatals for the past 25 years with 188. Lee County is second with 101.

Natural. Natural-related deaths are those attributed to cold stress, red tide toxicity, infectious and non-infectious diseases, birth complications, and natural accidents and catastrophes. Natural-related deaths accounted for

9% (21) of the deaths in 1998. Lee County had the highest number with six followed by Brevard County with five. Historically, Lee County also ranks first in total deaths from natural causes with 155. Brevard County is second with 118.

Undetermined. The majority of the carcasses in the undetermined category are so badly decomposed that a cause of death can not be determined. Deaths in the undetermined category comprised 76 of the total in 1998. Brevard County leads the state with 22% (17). Overall, from 1974-1998, Lee County is the leader with 207 total, and Brevard County is second with 195.

Manatee Population Monitoring

Aerial surveys are an important method for acquiring information on manatee distribution, relative abundance, and use of habitat types. Synoptic aerial surveys of all manatee wintering habitats in Florida and southeast Georgia are useful in determining a minimum manatee population estimate. Data from aerial surveys, mortality, life history, and ecology studies are being combined to create a population model that will estimate trends in regional population sizes. One inter-agency synoptic manatee aerial survey was flown in 1998. A team of 31 observers, with observers in 19 aircraft and six ground teams which included staff from 13 agencies, research labs, and universities, searched for manatees on both coasts. A total of 2,022 manatees were counted on this survey, with 907 manatees on Florida’s west coast from Apalachicola to the Everglades, and 1,112 on Florida’s east coast from Brunswick, Georgia to the Florida Keys. These counts were somewhat lower than the 1996 synoptic counts, which had a high count of 2,639 in February 1996, primarily due to the warmer winter in 1997-1998. Twice-monthly aerial surveys were flown for manatee distribution in Wakulla, Lee, and Brevard counties. Sightings from these surveys are rapidly entered into the GIS system for analysis. Thirty-one aerial data sets are now available to users on the manatee GIS CD-ROM, with additional data sets in preparation. These data are widely used for management decisions.

Ecology and Migration

During 1998, 12 manatees with satellite transmitters were monitored from 13 days to one year. Three of the 12 animals were originally tagged in February 1997 during a study initiated in southwest Florida. Two of these three animals lost their tags in early 1998, but one was tagged for the entire year. All three of the animals used the Florida Power and Light power plant in Fort Myers during the winter. The remaining nine animals that were monitored during 1998 were rehabilitated animals, tagged upon release from captivity. Three of the nine manatees had been orphaned, three had been born in captivity, one was an older calf brought in due to a boat strike, and two of the manatees had survived exposure to red tide. Areas of primary habitat use ranged along the West Coast from Crystal River to Everglades National Park. The tags were removed by biologists on two of the rehabilitated manatees, one captive born and one brought into captivity as an older calf, after it was determined that they had successfully adapted to being in the wild.

The telemetry/GIS team analyzed data from the six-year West Coast Telemetry Project and began preparation of a technical report summarizing the data. The report is scheduled to be complete in summer 1999.

Manatee Life History and Biology

Information on aspects of manatee life history is essential in formulating an assessment of manatee population dynamics and recovery. Data on long-term growth and survival of individuals, reproductive capability of mature females, and health of wild manatees are essential to a population model and comes from a variety of research projects including the photo-identification catalog, use of PIT tags (briefly described above), and non-invasive body condition indices. The FMRI, in cooperation with the U.S. Geological Survey Sirenia Project and MML, is responsible for co-managing the photo-identification catalog data from areas extending south of Crystal River to the Everglades on the West Coast of Florida. The FMRI portion of the

photo-identification catalog consists of more than 3,000 images representing 550 photo-documented scarred manatees. About 5,400 sightings of these animals have been recorded. Animals photo-documented in central west Florida have been observed as far northwest as Louisiana and as far northeast as Coral Gables but most sightings are from southwest Florida.

Geographic Information Systems

The GIS component of the telemetry project progressed rapidly during 1998. All Tampa Bay animals have had travel paths generated using the costpath model. Each animal's travel history was mapped using Arcview as a layout for inclusion in a telemetry technical report that is nearing completion. A program was completed that converts the manatees travel paths to maps that display possible high-use areas and travel corridors. This program was designed so that the scientist can choose travel paths with selected characteristics to address a specific question, such as movement during the winter. Also, maps can be combined to build a composite view of manatee travel behavior for Tampa Bay and beyond.

Marine Mammals Geographic Information System (MMGIS) staff worked with the CAMRA staff at the FMRI and several external cooperators to produce the third version of the *Atlas of Marine Resources* on CD-ROM, version 1.2. This third release includes manatee aerial surveys in Sarasota County (MML), and Indian River (NASA/Dynamac), marine turtle stranding locations, and an improved shoreline cover. We enhanced the manatee mortality graphics and included charts for turtle strandings. FDEP's Annual Reports to the Legislature were converted to .pdf format and an Adobe Acrobat reader was added. Also introduced was ArcExplorer, a visualization tool produced by Environmental Systems Research Institute to view ARC shapefiles if ArcView is not available on your machine. Distribution of the CD has made considerable data and information from state, federal, and local agencies available to organizations involved with manatee and marine

resources protection. Copies are available upon request from the FDEP FMRI in St. Petersburg. Version 1.3 is in the works and will include new data layers, more turtle information, and web access. Meetings of the Manatee GIS Working Group continued with focus on application development, data sharing ethics, and habitat analyses.

Staff working on the MMGIS continued to create numerous manatee spatial data layers including carcass recovery sites, aerial survey locations of manatees and right whales, and locations of animals tracked by satellites. The MMGIS staff worked with both research and management project teams to provide manatee data and analyses for manatee protection and ecosystem management. Staff used analysis tools in GIS to estimate manatee and right whale density and distribution from aerial survey observations. Habitat evaluation methods using GIS are being tested in an effort to support decision making for manatee habitat management.

Data bases used to monitor the spring 1996 manatee mortality event in southwest Florida were created, including carcass location, aerial survey results, red tide sampling stations, and basic hydrological data. The GIS served as a primary research tool for synthesis, visualization, and analysis of spatial biological and environmental data. A right whale component was established as part of the MMGIS. Results of right whale aerial surveys, measurements of oceanic surface water temperature obtained from NOAA weather satellites, and offshore bathymetry were all created as data layers that can be mapped and analyzed with the GIS system. MMGIS research staff also worked to refine analysis techniques for aerial survey and telemetry data.

Right Whales

In addition to the manatee, the FDEP has responsibility for other endangered marine mammals, including the North Atlantic right whale, the most endangered large whale in the world. The NMFS has lead responsibility for recovery of the right whale and in December 1991

published a recovery plan for the right whale. Georgia and northeast Florida coastal waters are the only known calving area for this whale and were designated as critical habitat by the NMFS in June 1994. Accordingly, aerial surveys are conducted to monitor the seasonal presence of right whales in an effort to prevent collisions with the large number of vessels in the critical habitat. In addition, calf numbers are determined and through photo identification techniques the whales are individually identified which allows for reproductive rates to be calculated and movements to be monitored. During the 1997/1998 calving season, a total of five mother/calf pairs and more than 20 other individuals were documented by FDEP and other survey teams. Data are incorporated into FMRI's GIS right whale program. In addition, FMRI staff participates on a southeastern U.S. multi-agency task team to implement recovery plan objectives and to minimize ship collisions with right whales through educational seminars for the port communities and distribution of real-time sighting data to all involved parties. FMRI staff also participates on the right whale take reduction team in an effort to develop strategies to reduce right whale commercial fishing interactions.

SPECIMEN INFORMATION SERVICES

The invertebrate and fish collections maintained by members of the Specimen Information Services group are recognized as important repositories of reference specimens, voucher specimens, and ecological data dealing with Florida's unique ecosystems. A properly maintained reference collection helps to ensure continuity, consistency, and accuracy in taxonomic identification, and provides a trustworthy foundation for the veracity of the computerized portion of the long-term data base. It is vital for long-term monitoring studies that identifications be accurate, precise, and consistent. Without reference and voucher material to examine, the accuracy and reliability of the computerized portion of the database comes into question.

During 1998, 532 invertebrate specimens

were lent to 51 investigators at 42 domestic and nine foreign institutions, and 22 other loans of 704 specimens were used for educational purposes. Similarly, 464 fish specimens were loaned to 19 investigators at four domestic and two foreign institutions plus one artist, and 31 other loans of approximately 1,000 specimens were used for educational purposes. In addition to specimens loaned, 96 requests for information on specimens and/or field data associated with specimens were processed in 1998, 33 requests for assistance were handled, and 45 requests for educational material resulted in the distribution of 635 Specimen Information Services packets. In 1998, 734 lots of invertebrates containing 3489 specimens and 221 lots of fishes containing approximately 550 specimens were accessioned into the collections.

The Gulf of Mexico Ichthyoplankton Survey was initiated in 1982. The FMRI is the designated repository for the program, which is wholly funded by SEAMAP. The Ichthyoplankton Collection, now one of the largest collections dedicated to ichthyoplankton in the United States, is an important resource for state and federal managers, educators, and ecologists throughout the southeast U.S. The collection currently contains more than 185,000 lots of larval fishes. One spring sampling cruise was successfully completed during 1998. All of the associated hydrographic data from this cruise has been processed and sent to the SEAMAP data manager for inclusion in the Oracle system; the biological samples have been processed and delivered to the NMFS Pascagoula laboratory for shipment to the Polish sorting center. Samples collected during 1995-1997 representing thirteen cruises were received from the Polish sorting Center in 1998. Approximately 10,000 additional lots were catalogued in 1998. A total of nine loan requests and approximately 34 information requests were processed during 1998.

COASTAL AND MARINE RESOURCE ASSESSMENT

The FMRI's CAMRA group continues to support the FMFC through the creative

application of GIS and remote sensing technologies. Issues relative to habitat protection, user conflict, and seafood quality vary among regions requiring geographically targeted policy responses. CAMRA, Invertebrate Section, and FMFC staff continue to develop the Resource Impact Map series of eight chart-sized maps to assist the FMFC statewide in making resource decisions. Each map includes coastline, depth contours, and aids to navigation. Benthic communities such as mangroves, saltmarshes, seagrasses, oyster reefs, coral reefs, hard bottom, and bare bottom are included, as are managed area boundaries. Bathymetric depth contours are shown because depth is an important controlling factor for human and marine resources. In the last year, offshore bathymetry-with contours ranging from 60 feet to 6,000 feet for the southeast Atlantic, western Caribbean, and Gulf of Mexico were incorporated into the database. Channels and navigation aids such as buoys are displayed to help users orient themselves, like road networks on land-based maps. Currently, 57 shellfish harvesting zones are depicted in the series. There has been and continues to be ongoing dialogue to increase the activity of the three-mile, three-league natural resource boundary. These conversations are taking place between Minerals Management Service, National Ocean (NOS), and Florida

To tailor the maps for policy analysis, additional thematic information is added such as bycatch volumes or shrimp nursery areas. These maps have been used in the complex process of developing shrimp management plans and rules for the Big Bend and Northeast regions and analyzing bycatch reduction issues. Since August 1994, FMRI staff have been developing portable computer applications and databases to support taking this technology into FMFC meetings in place of traditional paper maps. The computer system was used to provide interactive policy analysis capabilities by displaying alternative shrimp zone closure alternatives on an overhead projector for open debate by FMFC, FDEP, citizens, and industry representatives. The representation of the shoreline conditions relative to the proposed zones reduced confusion and

fostered more expedient policy analysis. Most recently, computer applications were developed for Biscayne Bay. In addition, a map showing closure zones in Nassau County and acreage calculations for various zones were used at an FMFC meeting.

FMRI staff developed, *GIS Applications for Fisheries and Coastal Resource Management* following a workshop to enlighten fisheries managers to the potential of GIS.

SOUTH FLORIDA REGIONAL LAB

The spiny lobster research program continues to monitor harvest and other important fishery components for all three user groups harvesting spiny lobster. During the 1997-1998 fishing season, 90 onboard surveys of commercial lobster fishing vessels were completed. Landings were 7.6 million pounds, which approached a record high. On the other hand, estimates for the 1998-1999 fishing season indicate that commercial landings may be 5.3 million pounds, near the historic low for the fishery. However, onboard surveys of commercial lobster fishers were severely disrupted in September and October by Hurricane Georges and Tropical Storm Mitch. Trap retrieval after the Groundhog Day storm resulted in the recovery of 14,000 derelict traps and 28,000 pounds of plastic debris. Recreational lobster license holders returned nearly 2,000 surveys and preliminary estimates indicate that 379,000 lobsters were harvested by recreational fishers during the special two-day sport season. An additional 1.1 million lobster were harvested by these fishers during the first month of the regular season. The third user group are holders of special recreational crawfish licenses. Landings of the 368 license holders were approximately 47,000 for the entire 1997-1998 season. Additional research continues on numerous aspects of lobster life-history and ecology with the goal of relating recruitment and environmental fluctuations to future lobster harvest. The data gathering phase of a MARFIN project, which studied the reproductive potential of spiny lobster with respect to fishery impacts, was completed; data analysis and report writing

have now begun. A one-year extension of the grant will permit baseline surveys in the Tortugas Banks region during the spring 1999.

During 1998, the second year of a project examining the effects of marine reserves on spiny lobster populations was completed. Legal-size lobsters inside the marine reserves were 3 mm larger on average than those outside the protected areas. Overall abundance was lower than in 1997, but there was a dramatic increase in abundance at some offshore sites following Hurricane Georges.

Surveys of the south Florida queen conch spawning stock indicate that the population has declined from an estimated 20,500 adult conch in 1997 to approximately 14,000 in 1998. We continued assessing parameters that limit survival in hatchery-reared juvenile conch outplants. Surveys were completed that were designed to assess the optimal release size of juvenile conch relative to production costs. Additional experiments were completed to investigate the mitigation of predator avoidance deficits (i.e., burial) associated with hatchery-reared juveniles. Hatchery-reared conch were exposed to a predator, the spiny lobster, and burial behavior was observed. The results indicated that a period of one week was required to effectively train the juveniles to bury as a response to the predator. A one year acoustic telemetry study designed to assess home range and seasonal movements and migration in conch spawning populations within two offshore breeding aggregations indicated that there are no statistical differences in movement or home ranges between the sexes. The mean home range of adult conch was approximately 15,700 m² for the one-year period. The conch program continues to benefit from volunteers supplied by Nature Conservancy partners.

An opinion survey and trap count of Florida's stone crab fishery were completed to support the FMFC fishing effort limitation proposals. The evaluation of these proposals helped build a consensus among fishery representatives and fishery managers which resulted in the development of a legislative bill directed towards limiting capitalization of the stone crab fishery.

During 1998, monitoring continued on localized aggregations of the variegated sea urchin (*Lytechinus variegatus*) that has overgrazed a sea grassbed in western Florida Bay. Urchin densities declined from a high of 364 C m⁻² in 1987 to approximately 2 x m⁻² in early 1999.

OFFICE OF FISHERIES MANAGEMENT AND ASSISTANCE SERVICES

Staff are in the process of implementing a civil penalty assessment program relating to wholesale and retail saltwater products dealers that are delinquent in reporting fisheries statistical information on the production of saltwater fish, saltwater products, bait, and marine life to the department. Timely reporting of this information is vital for the management of Florida's marine resources. Therefore, the purpose of this program is to increase overall compliance with the statistical information reporting requirements. Collection of statistical data is still being enhanced through audits, improved communications with dealers, and other enforcement actions. The crawfish and stone crab trap retrieval program was continued in 1998 resulting in the removal of over 13,000 traps from state and federal waters during the closed season. The trap retrieval program was somewhat expanded for 1998 to include the removal of trap debris from parts of the shorelines of the Florida Keys. The Audit Section oversees the Saltwater Licenses and Permits Section and is still reducing the processing time required for license applications through process improvement and implementation of new management practices.

ARTIFICIAL REEFS

A Federal Aid in Sport Fish Restoration grant provided grants-in-aid reimbursement funding to five coastal cities and nine coastal counties which successfully completed fourteen artificial reef construction projects during 1998. The projects resulted in the construction of 37 patch reefs at fourteen permitted artificial reef sites off six Atlantic Coast counties and six Gulf Coast counties. Two projects used tugboats (three vessels total), one project utilized limestone

boulders, two projects constructed and deployed prefabricated concrete artificial reef modules, and the remainder used scrap pre-cast concrete, primarily concrete culverts. Under the grant, \$344,867 was spent on artificial reef development projects. An additional five artificial reef construction projects funded with saltwater fishing license revenues resulted in the construction of five additional reef complexes off four Gulf Coast and one Atlantic Coast counties. These included three engineered concrete artificial module projects, one limestone boulder project, and one culvert project. Also, two pilot artificial reef monitoring projects involving volunteer research dive teams in Palm Beach and Wakulla counties completed their year-long survey work.

A Florida State University socio-economic study of the use and value of artificial reefs in a five county area of the western Florida panhandle completed field work and data analysis. Bay, Walton, Okaloosa, Santa Rosa, and Escambia counties were the targeted counties in the study. Sampled populations included three categories of nonresident county visitors (nonboating visitors, boating visitors, and boating visitors that fished or dived and used artificial reefs), and two categories of boating residents of the counties (residents who fished or dived and used artificial reefs, or residents who used rental boats, party boats, or charter boats for fishing or diving). The question the study sought to answer was "What are the economic benefits of nearly \$5 million dollars in current value dollars in state and federal funding (including administrative support) sunk into artificial reefs in this panhandle region over a 20 year period?" Although results were broken down by county with a chapter devoted to each county, combined regional results were that visitors and residents in a 12 month period spent over \$415 million on goods and services which were associated with the use of artificial reefs by fishers and divers in Northwest Florida. This spending generated 8,163 full and part-time jobs with wages and salaries of nearly \$83.7 million. This economic impact represented about 2% of the entire northwest Florida economy (1997-1998). The study emphasized that this was only a relationship and could not predict if the visiting

and nonvisiting fishers and divers who used artificial reefs would continue to fish and dive if there were no artificial reefs in the area. Across the five county area, recreational days for divers and fishers (visitors and nonvisitors) was estimated at 4.349 million days/year spent on artificial reefs. A weighted combined willingness of visitor and nonvisitor fishers and divers to pay for daily use of artificial reefs (if required to do so through increased licensing or boat registration fees) was \$4.53 a day over and above all other fishing/diving expenses. The total annual use value was thus estimated at \$19.68 million dollars for artificial reefs in Northwest Florida (using the Turnbull method, the most conservative of three methods used). Other calculations included conservative estimates that for every state and federal dollar invested in the construction of artificial reefs, the Northwest Florida reef system has over the years returned \$131 in recreational value to fishers and divers.

A statewide artificial reef summit in Palm Beach County was hosted, and staff participated in several working group events to assist regulatory agencies in improving the process in artificial reef permitting in Florida.

MOSQUITO

Mosquito control liaison staff continue to closely communicate and coordinate with local mosquito control districts and other state and federal government entities to promote the safe and wise use of pesticides in and around the marine environment. Staff is also involved in evaluating the comparative merits of mosquito control efforts, including the use of adulticide chemicals versus use of larvacides in terms of impact on important fishery species, marine resources in general, and public benefit.

BUREAU OF COASTAL & AQUATIC MANAGED AREAS

EAST COAST

The Guana, Tolomato, and Matanzas estuarine ecosystem was previously nominated to become

Florida's third National Estuarine Research Reserve. The reserve has completed the environmental impact statement process and is awaiting formal designation by the NOAA. A manager has been selected and federal operational funds acquired. The reserve should contribute substantially to research, monitoring, resource management, land acquisition, and environmental education in the region as it develops.

Upland areas managed by the bureau on the east coast now total 3,849 acres at Pumpkin Hill (Duval County); 16,683 acres at St. Sebastian River (Brevard and Duval counties); and 1,713 acres at North Fork of the St. Lucie River (St. Lucie County). Other acquisitions in these three areas are pending. The first acquisition is a new project, the Indian River Blueway. This project will protect approximately 4000 acres of uplands and impounded wetlands along the lagoon. These areas are managed as state buffer preserves of which a primary goal is protection of the watershed of significant state waters such as aquatic preserves. Management activities include control of invasive exotic species, implementing ecological burning, watershed restoration, and habitat restoration.

Aquatic preserve staff have participated in numerous resource management activities including: a study to evaluate the impact of dock design on benthic resources, seagrass surveys and monitoring in the Indian River Lagoon, evaluation of potential marina siting areas to minimize impact to key habitats, fishery and avian surveys in the Tomoka Basin, technical comments on major permitting activities throughout the east coast area, and environment education on coastal resource issues throughout the east coast area.

APALACHICOLA NATIONAL ESTUARINE RESEARCH RESERVE

Environmental Education Activities

During 1998, education staff conducted lectures, presentations, field trips, tours, and workshops for 2,935 people. An additional 4,298 walk-in visitors were serviced at the reserve

visitor center. Staff participated in four festivals, the International Coastal Cleanup, and other cleanups on reserve lands. In addition, staff judged in four local science fairs, hosted field trips for the Association of Biology Lab Educators annual conference, helped with local career day events, and conducted periodic guest lectures and coastal management workshops. Program development activities included work on two grants from NOAA to construct visitor center facilities, development of a field-based lesson series for local alternative education students, hosting a panhandle turtle workshop, participating in archaeology monitoring training, and the "Ecoventures" middle school interactive computer program training. The *Oystercatcher* newsletter was distributed quarterly to a mailing list of approximately 500.

Research and Monitoring Activities

With NOAA support, system-wide monitoring continues as the reserve begins its seventh year of continuous monitoring of water quality parameters in Apalachicola Bay. A paper, titled "Time series models for salinity and other environmental factors in the Apalachicola Bay system," was published as part of the reserve's efforts to collect data for Florida's negotiations with Georgia and Alabama on water allocations for the Apalachicola River. The research staff have been heavily involved in water allocation issues, collecting data and sitting on several committees charged with developing allocation formulas to avoid impacts to the fisheries in the bay. A partnership project with NOAA continued into its second year. This project titled "Rescue of historical and recent coastal data and metadata to support the U.S. coastal monitoring network index sites," has enabled the reserve to set up an ArcView-based GIS and to utilize GIS in its research and monitoring programs. Under a grant from NOAA, a "site profile" or resource inventory is still being developed describing all the habitats, biological components, and issues related to the Apalachicola system.

Research and monitoring activities focusing on sea turtle protection, shorebird nest protection,

manatee monitoring, red wolf introduction on Cape St. George Island, and marine mammal stranding within the reserve continue from last year. Franklin County passed a lighting ordinance last year, with the help of the reserve and citizens, to minimize disorientation of turtles and to protect nests. A new program, begun last year, is looking at sea turtle nest temperatures in the panhandle and how many males/females are produced compared with south/central Florida. Research staff are also working on fisheries impacts, primarily oysters, and listed species impacts from the newly proposed St. George Island replacement bridge project. They are also looking at impacts on fisheries from a proposal by the Air Force to drop aluminum chaff and magnesium flares within the reserve boundaries and watershed. A trawling program was begun last year to mimic historical data collections on fish and benthic macroinvertebrates as a way to determine if any changes have occurred in the fisheries since the late 1970s and early 1980s.

Additional work continues on projects to determine metal contamination in the system, impacts of small-scale onsite domestic sewage systems, erosion and accretion of brackish marshes, and nutrient transport and primary productivity in the bay. Coliform concentrations and its sources are also being monitored in association with other FDEP programs.

Resource Management Activities

Resource management section staff have initiated a prescribed burn program on reserve-managed lands and continue with assisting other agencies within the reserve boundary with their burn programs. The section is active in removing illegal dumpsites from reserve-managed lands and other lands through the use of section staff directly and assisting with special public "clean-up" events. Resource management staff have developed and initiated public recreational access plans for reserve-managed lands within and outside the National Estuarine Research Reserve (NERR) boundary.

Resource management staff monitor and

control exotic plant species infestations on managed land and assist other lands managers within the NERR boundary. The section provides direct mapping, global positioning system (GPS), and computer technical assistance to the education and research programs, administrative staff, and aquatic preserves manager. The section actively assists state land acquisition efforts with environmental assessments, ownership research and GPS digital mapping products. The resource management section head and staff serve as burn coordinators assisting statewide with the Prescribed Burning Program. Section staff assisted university researchers with archaeological survey and assessments on managed lands and other sites within the NERR boundary.

ROOKERY BAY NERR

During 1998, the Rookery Bay NERR initiated a fisheries independent study in the Ten Thousand Islands south of the cities of Naples and Marco Island in Southwest Florida. These bays lie downstream of the Southern Golden Gate Estates, a failed development that built 813 miles of roads and 138 miles of canals during the 1960s to drain the swamps of Collier County in Southwest Florida. Overdrainage through the Faka Union Canal has resulted in a permanent 8-12 parts per thousand (ppt) salinity decrease in Faka Union Bay compared to adjacent Pumpkin and Fakahatchee bays. Canals and roads in the Southern Golden Gate Estates will be removed in 2001 to provide a more even distribution of water to the three bays. In July 1998, a stratified random fisheries independent trawling program was begun to establish baseline distributions and relative abundance of fish and invertebrates prior to the restoration.

The reserve maintained a monthly boating survey during 1998. These surveys are conducted within the Rookery Bay Aquatic Preserve. Fixed routes within randomly selected sections of the aquatic preserve are surveyed twice each week. Watercraft type, size, activity, registration numbers, and manatee sightings are recorded. This two-year database has been imported into a GIS format and will be used to guide future

coastal management decisions.

Monthly juvenile fish abundance and distribution along salinity gradients within two estuarine habitats and water quality and benthic oyster reef invertebrate monitoring are being conducted to determine the influence of upstream water control structure management on estuarine habitats. In addition, sediment heavy metal concentration from a core obtained upstream from the Henderson Creek water control structure was analyzed to determine the potential environmental impact of increased mixing of canal with estuarine sediments expected to occur as the result of a pending retrofit of this control structure. This is the second year of a project funded by the NMFS.

Two hundred and fifty acres of Australian Pines were removed from an eight-mile barrier island, Key Island. These invasive exotic trees were having a significant impact on nesting sea turtles, enhancing beach erosion, and adversely effecting down-current fishery habitats. Additional funding was secured to remove another invasive plant, Brazilian pepper that was found to be encroaching into mangrove habitats and displacing other native flora. These activities were funded through the FDEP Bureau of Invasive Plant Management, the NMFS, and using Conservation and Recreational Lands management funds.

The FWS funded a project to acquire sensitive barrier island property within the Ten Thousand Islands Aquatic Preserve. Fish and wildlife surveys along with bathymetry and seagrass mapping were conducted as part of this project for the shoals south of Cape Romano. The first draft of a compact disk containing this information was produced.

Reserve researchers and others from Florida A&M University and the Collier Mosquito Control District conducted tests for an improved pesticide application technology. This advancement should significantly reduce the amounts of unintentional deposition of pesticides into estuarine habitats. In addition, this new technology appears to significantly reduce the

impact of the drift and deposition of aerially-applied pesticides to intertidal crustaceans.

Reserve staff were trained in the use of GIS software. This training, along with recent equipment procurement, will allow staff to map marine habitats and conduct resource inventory and change analyses with more accuracy than previously available. Funding through the NOAA's Coastal Service Center provided supplemental funding for this activity.

Staff continues to collect data from six continuously recording long-term water quality monitoring stations and two weather stations in our management area. Data from two of these stations are part of the NERR system-wide monitoring program and are posted on the world wide web at: <http://www.inlet.geol.scarolina.edu/nerrshome.html> with accompanying metadata. Visiting researchers, local schools, and other agencies use data from all stations.

Reserve staff co-chair the Big Cypress Region science planning effort. The Big Cypress Basin Science Plan Steering Committee was established at the request of the Interior Secretary Bruce Babbitt and the South Florida Ecosystem Restoration Task Force (a federal/state partnership that is working to identify science, education and infrastructure requirements to support restoration of South Florida ecosystems). Comprised of public land managers, regional planners, researchers and agricultural landowners, the Steering Committee's efforts focus on the study area with the goal of accomplishing two tasks:

1. Conduct an inventory of existing research and monitoring information within the study area. This effort, given the name Big Cypress Basin Science & Monitoring Data Base Project, involves surveying local research and monitoring programs ranging from federal and state agencies to local interests. This data base includes fishery and essential fish habitat studies and is accessible via the world wide web at: http://library.fgcu.edu/big_cypress.
2. Plan and conduct three science workshops

in 1998 to review the Big Cypress Basin research and monitoring inventory, identify gaps in the scientific understanding of the ecosystem (includes fishery habitat or assessment needs), and present recommendations for a science plan to the South Florida Ecosystem Restoration Task Force. The draft science plan, which integrates management of natural and developed areas and identifies priority research and monitoring needs for Southwest Florida, is currently being completed. Upon completion and peer review, the plan will be used to provide guidance for future research initiatives with the support of the South Florida Ecosystem Restoration Task Force.

During 1998, the reserve contacted 7,000 individuals during classes, trips, workshops and events and hosted 250 students from local high schools, junior colleges, and universities. Most were taken out on a boat during which time the concepts of essential fish habitat, coastal stewardship, and water quality for healthy estuaries were discussed. Reserve staff also taught inshore fishing classes (approximately 80 students total), presented talks and seminars to the public (estimated 200 attendees total), and hosted several Coastal Zone Management Workshops for environmental professionals (90 attendees) on: red tide and harmful algal blooms; minimum flows for healthy estuaries; and watercraft impacts on natural resources. The Friends of Rookery Bay, a citizen's support organization, hosted a catch and release-fishing tournament with 170 anglers participating. During Estuaries Day 1998, 200 people attended open house during which the importance of habitat preservation and restoration for fisheries and ecosystem management was presented. Reserve staff assisted with the FDEP Kids Fishing Clinic held at the Naples Pier.

The reserve continues to fulfill its mission of facilitating coastal researchers by assisting with visiting investigators from both agencies and academia. Reserve staff collected weekly samples for analysis by the FDEP FMRI for red tide shellfish monitoring and harmful algal bloom

studies. The reserve also supplied the NOAA Strategic Environmental Assessment Division with historical and current fishery and water quality data as part of the NOAA essential fish habitat initiative.

Several visiting investigators were assisted in their work by reserve staff or volunteers. These projects include: population estimation studies of jewfish populations in backwaters of the Ten Thousand Islands, surveys of Kemp's Ridley sea turtles, shark nursery area requirements, bycatch of blue crab traps, long-term mangrove forest monitoring, and genetic identification of lemon shark stocks in the Gulf of Mexico.

Two NOAA-NERR graduate fellowship recipients were hosted whose research directly impacts fishery resources. Donna Surge (University of Michigan) is determining the historical salinity of the Southern Golden Gate Estates and the Ten Thousand Islands using paleontology methods. As no baseline data for historical salinities exist for this area, this study will provide salinity targets for the restoration process. Bill Ellis (USF) is examining the effects of trimming mangroves (as allowed by Florida's mangrove trimming law) on the diets, abundance, and species composition of fishes inhabiting these areas.

Reserve staff compiled a fish species list for the upper Ten Thousand Islands from published and gray literature for distribution to investigators.

FLORIDA KEYS NATIONAL MARINE SANCTUARY

The Florida Keys National Marine Sanctuary completed its second year under the federal/state cooperative partnership for implementing the final sanctuary management plan. A major focus of the plan is the marine zoning strategy that protects coral reefs and important fisheries resources. This has included the installation, maintenance, and replacement of numerous buoys that mark protected areas, as well as mooring buoys that allow public access. Additional buoy maintenance funds were procured with the

assistance of the tropical fish collectors. Another of this year's successes with the marine zoning strategy has been the monitoring and evaluation of their effectiveness. Preliminary observations find that several species of marine fish and spiny lobster are more abundant and larger in the protected areas. These results provide hard evidence supporting the creation of a new, larger marine reserve in the pristine Tortugas Banks. A final accomplishment of marine zoning has been the extension of the volunteer program called "Team Ocean" to the Lower Keys. In this program, volunteer boat captains and interpreters have delivered reef protection information directly to numerous visitors diving or snorkeling on the reefs.

Mooring buoy maintenance, monitoring, and education represent three functions of the sanctuary: management, research, and education. Another major management activity has been the response to and the assessment of vessel groundings that damage corals and seagrass beds. Because of the importance of water quality to the health of coral reefs and other essential fisheries habitats, the program has been working on a NMFS research grant to determine the extent of freshwater inflow impacts on the reef tract and to investigate ways of curing the black band disease, which some people believe to be associated with water quality problems. Other education highlights this year have included the Adopt-a-Reef Program, a new outreach program created with assistance of the dive shops.

Finally, successes have not been confined to below water environs of the marine sanctuary. Hard work by upland managers has resolved a mosquito breeding problem without chemicals. Ineffective mosquito ditches on public lands had actually become breeding grounds near a residential area. Refilling the ditches and re-contouring disturbed high marsh resulted in the reduction of breeding habitat.

BUREAU OF PROTECTED SPECIES MANAGEMENT

The Bureau of Protected Species Management

based in Tallahassee serves as the management component of the FDEP marine mammal and marine turtles programs. The bureau is responsible for the planning and implementation of management activities directed toward the protection and recovery of manatees, right whales, and five species of marine turtles. Marine turtle activities are funded from the Marine Resources Conservation Trust Fund. Manatee and right whale protection efforts are funded from the Save the Manatee Trust Fund.

MARINE TURTLES

Staff continue to work for the protection of threatened and endangered marine turtles and their critical nesting beaches along Florida's coast. The FDEP is listed as the lead or a cooperating agency for the implementation of approximately 91 tasks identified in the FWS and NMFS recovery plans for the five species of marine turtles that occur in Florida. Staff participate in development of the scientific information necessary to guide recovery efforts (research), in review of ongoing and proposed human activities that could impact marine turtles and their nesting habitat (management), and in public education about marine turtles. Accomplishments in 1998:

- The marine turtle license plate went on sale in February 1998. Initial sales, while indicating support for marine turtle conservation, did not produce sufficient revenue to support the department's Marine Turtle Protection Program. The Department hosted a media event announcing the plate in cooperation with Sea World of Florida and the Miami Seaquarium, featuring plate spokesperson model and volleyball player Gabrielle Reece. Ms. Reece also donated her time to record both audio and video public service announcements, which were produced by Sea World of Florida.
- In January 1998, the Marine Turtle Protection Section hosted the first annual Marine Turtle Permit Holders meeting to provide information and guidance to individuals holding permits issued pursuant to Florida Administrative Code Rule 62R-1 to conduct

conservation, research, and management work with marine turtles. A total of 207 people attended a series of talks on marine turtle topics in the morning, including nesting patterns, stranding, captive facility, fibropapilloma and federal regulatory programs, and a series of workshops on lighting, monitoring, education, research, and predator control in the afternoon. The response from the permit holders was overwhelmingly favorable; many requested this become an annual event.

- Approximately 124 Marine Turtle Permits were issued during 1998. Oversight of this program includes numerous meetings with permit holders in the field to provide training and technical advice.
- Staff continued to monitor the approximately 21 captive facilities in the state that rehabilitate marine turtles or hold turtles (loggerhead on non-releasable turtles only) for educational purposes.
- Permitted volunteers conducting nesting beach surveys documented a total of 65,038 loggerhead nests, 736 green turtle (*Chelonia mydas*) nests, and 397 leatherback turtle (*Dermochelys coriacea*) nests along 1,237 kilometers of Florida's shoreline during 1997.
- The Bureau of Protected Species Management recently received grant moneys from the FWS to enhance management activities. A biologist has been added to the Tequesta office to work with lighting impacts to marine turtles and their hatchlings. This person is responsible for managing the hatchling disorientation database and for formulating and pursuing appropriate actions to resolve problem lights on Florida's nesting beaches. Another project involves assessing the amount of coastal armoring on Florida's Index Nesting Beaches.
- Staff provide technical expertise on marine turtle protection during review of approximately 415 department and other state permits, including permits issued by the Bureau of Beaches and Coastal Systems pursuant to Florida Statute 161, permits issued by the department district and water management districts pursuant to F.S. 373,

and coastal zone consistency reviews. Staff participated in the design, implementation, and review of monitoring to assess the impacts of permitted activities on marine turtles, their nests and hatchlings. Field evaluations of proposed activities and inspections of permitted activities are often necessary.

Educational activities for marine turtle conservation included distribution of brochures, informational booklets, responses to numerous requests for information from interested parties, attendance and participation in coastal-related conferences and forums, providing slide shows and lectures to groups, and general promotion of the program and its fund-raising activities. Marine turtle program staff have developed seven, colorful marine turtle decals and two posters that depict the marine turtle species that occur in Florida and their marine habitat. Proceeds from the sale of these marine turtle decals, primarily associated with boat registrations, remain one of the primary source of dedicated funding for the education program.

MANATEES

The Bureau of Protected Species Management implements many tasks of the Florida Manatee Recovery Plan. The activities are focused in five program areas.

1. Development and implementation of county-based manatee protection plans.
2. Promulgation of boat speed regulations to protect manatees.
3. Review of permitted activities to minimize negative impacts to manatees.
4. Protection of manatee habitat, particularly seagrasses, through various directed efforts.
5. Providing education and information to the public through outreach activities.

1998 Highlights

The Tampa Bay Regional Planning Council's Agency on Bay Management established the

Manatee Protection Strategies Task Force.

The results of this consensus process include the designation of four main manatee aggregation sites for regulatory protection as well as designating a large portion of the Tampa Bay shoreline for an innovative stewardship-based voluntary compliance slow-speed zone. The bureau has been instrumental in developing the mechanisms by which these voluntary zones will be explained to the public, implemented, and monitored for effectiveness.

The Charlotte County Manatee and Seagrass Task Force was initiated by the County Commission in order to assess the development of both manatee and seagrass protection zones within the county.

Development of information packages for law enforcement, which includes general manatee information materials, laminated speed zone maps with citations, and speed zone reference wall maps. These were distributed to Florida Marine Patrol officers of Districts 2 (Broward and Dade), 2-B (St. Lucie), 3-B (Lee) and District 4 (Tampa Bay and Sarasota).

The bureau coordinated with FWS, USGS Sirenia Project, and industry to plan future research into the continued use of artificial warm water sites by manatees in an effort to focus on addressing the long-term effect of such artificial habitat on manatee population.

The efficacy of inboard motor propeller guards for the protection of manatees and their habitat was evaluated through a propeller guard assessment study funded by the Save the Manatee Trust Fund. The study suggests that currently available propeller guards for inboard engines provide only limited protection for manatees and affect vessel performance.

The bureau developed a report summarizing the establishment of seagrass protection zones around the state that address damage from motorboats. This summary provides a historical background of "no combustion engine operation zones" as a management tool for the protection of seagrass systems from the adverse effects of propeller scars.

A letter was sent to almost 200 city and

county authorities asking for voluntary installation of grates on existing culverts that may pose a risk of entrapment to manatees. To date, a few municipalities are proactively installing grates on existing culvert discharges in order to reduce the probability of death by drowning or starvation from entrapment in storm water drains and culverts.

- Citrus County was the first county to adopt a manatee protection plan. This year they became the first county to complete a five-year review of its comprehensive plan including the manatee protection plan elements. The protection plan was approved for an additional five years with only very minor changes.
- In response to petitions from Save the Manatee Club and others, additional manatee protection zones were established at the Florida Power and Light and Orlando Utilities power plants in Brevard County. Manatees, fish, and fishermen all gather in large numbers at these warm water outfalls in the winter. A combination of “no entry zones” and “no motor zones” were established to minimize conflict between fishermen and manatees.
- Proposed speed zone rules for Lee County had been challenged administratively delaying establishment of the rule. The FDEP negotiated a settlement agreement, completed the Statement of Estimated Regulated Cost, and published the revised rule.
- Staff performed 210 manatee impact reviews of a variety of projects including dredge and fill applications, marina development, underwater blasting proposals, and high speed boat races. Thirty-five of the cases were considered critical because of their complexity or potential to significantly impact manatees.
- Staff responded to more than 1,000 requests for manatee information from individuals, teachers, and other educational staff. Depending on the nature of the request, staff have many varied materials that can be distributed including brochures, technical reports, posters, and coloring and activity books.
- A comprehensive sign plan was developed

and signs were posted throughout Collier County to implement the speed zones that had been passed the previous year.

RIGHT WHALES

The FDEP coordinated and funded a complex communication network utilizing 25 alphanumeric pagers to facilitate the dissemination of right whale sight locations. A position was funded to coordinate right whale aerial surveys in Northeast Florida during the winter as part of an interagency right whale survey effort.

BUREAU OF MARINE RESOURCE REGULATION AND DEVELOPMENT

Sections 370.071 and 370.16, Florida Statutes (F.S.), set forth the department's responsibilities in management of shellfish resources and the public health protection aspects of the shellfish industry. Additionally, the bureau has been mandated broader responsibilities related to aquaculture pursuant to Chapter 370.26, F.S. The primary responsibilities of the bureau include the classification and monitoring of shellfish growing waters, the inspection of shellfish processing plants, resource assessment, and resource development, and aquaculture.

SHELLFISH RESOURCE DEVELOPMENT

The FDEP is actively engaged in collecting oyster shell from processing plants and constructing and restoring oyster reefs on public bottoms. During 1998, the Aquaculture and Shellfish Development Section collected 250,000 bushels of processed oyster and scallop shells, and deposited 184,320 bushels of shells to restore approximately 75 acres of public oyster reefs in Apalachicola Bay.

The Florida Legislature appropriated \$454,400 as part of a statewide commitment to rehabilitate and develop productive shellfish resources for 1998/1999. Funding was allocated among seven coastal counties, including Levy, Dixie, Wakulla, Franklin, Bay, Okaloosa, and Santa Rosa. In 1998, about 214,734 bushels of

live oysters were relayed and transplanted during oyster resource development projects in Levy, Dixie, Wakulla, and Franklin counties.

The FDEP has issued 748 Apalachicola Bay Oyster Harvesting Licenses for the 1997/1998 harvesting season, generating about \$75,000 in user fees. Reported oyster landings in 1998 were 1.9 million pounds valued at \$2.5 million. Reported hard clam landings in 1997 fell to 1.0 million pounds, valued at \$10 million. Production trends suggested that landings continued to decline in portions of the Indian River in Brevard County, resultant to low salinity levels and poor sets over the past three years. Shellfish aquaculture on Florida's Gulf Coast increased in spite of environmental conditions that resulted in extensive clam mortality and lowered potential production. Water quality was affected in confined areas by extended periods of freshwater associated with water movement, rainfall and the lingering impacts of El Niña. Clam farming is Florida's most rapidly growing form of marine aquaculture, with reported sales of \$12.7 million dollars in 1997. Production parameters suggest that landings from aquaculture operations will increase in 1999.

SHELLFISH PUBLIC HEALTH PROTECTION

More than 1.5 million acres of Florida's coastal waters have been classified in 37 Shellfish Management Areas. In 1998, eight comprehensive shellfish surveys were completed, reclassification was initiated for eight Shellfish Management Areas, and seven Shellfish Management Areas were reclassified as part of

continuing efforts to maintain proper classifications in all shellfish growing waters. The Shellfish Laboratory analyzed 60 shellfish meat samples and 19,066 water samples to ensure shellfish quality. In 1998, the FDEP licensed 123 shellfish processing plants and conducted 645 processing plant inspections.

AQUACULTURE

In 1996 and 1998, the Florida Legislature passed comprehensive bills relating to aquaculture. In response to this legislation, the FDEP implemented numerous program elements to accomplish new legislative mandates and to be more responsive to the needs of the aquaculture industry. The FDEP established the Aquaculture and Shellfish Development Section to manage the aquaculture leasing program and the shellfish resource development program. There are 122 shellfish leases and 574 aquaculture leases statewide. To encourage the development of aquaculture on sovereign lands, specific tracts of submerged lands in seven coastal counties were identified that are suitable for growing hard clams. Special aquaculture use areas were established in Volusia, Brevard, Indian River, Lee, Charlotte, Levy and Dixie counties. The department also entered into a management agreement with Citrus County to allow for an experimental bay scallop aquaculture project in the coastal waters off of Crystal River. During 1998, 51 Special Activity Licenses were issued to promote shellfish aquaculture activities, including hard clam hatchery and nursery operations. Seven Special Activity Licenses for the aquaculture of native and non-native sturgeon were also issued.

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES OFFICE OF FISHERIES

It is the mission of the Louisiana Department of Wildlife and Fisheries (LDWF), Office of Fisheries to conserve and protect Louisiana's renewable aquatic resources for present and future generations of Louisiana citizens by controlling harvest and by replenishing and enhancing stocks and habitat. This is accomplished by setting seasons, size, and possession limits, gear restrictions, or other means of protecting key resources; replenishing species and enhancing or developing species or habitats as needed to provide for the needs of consumptive and nonconsumptive users or environmental health; research to provide insights into the proper functioning of natural systems; and educating the public and promoting wise use of these resources.

The mission is accomplished through the activities of the various programs within the Marine Fisheries Division. These programs are: shellfish (shrimp and crabs), mollusc (oyster), finfish, habitat, and research. The clients served by the programs include present and future generations of Louisiana citizens, as well as national and international interests that derive benefits from consumptive and nonconsumptive use of Louisiana's fisheries resources. Program activities in support of this mission are described in the following:

SHELLFISH PROGRAM

Shrimp

Offshore Shrimp Program. The state's offshore territorial waters remained open throughout 1998, except that portion from the Atchafalaya River Ship Channel westward to the eastern shore of Freshwater Bayou. This area was closed April 6, 1998 to protect the large numbers of small white shrimp found there. It reopened with the inshore waters on May 18, 1998.

Inshore Shrimp Season. The 1998 Spring Inshore Shrimp Season opened in zone 2 on May 18 and Zones 1 and 3 on May 25, 1998. The waters of Breton and Chandeleur sounds opened on May 18. Inshore brown shrimp production was average as compared to the last three years and the long-term average.

The 1998 Fall Shrimp Season opened in Louisiana's inshore waters on August 17, 1998 and remained open until December 21, 1998. The portion of Zone 1 north of the Mississippi River Gulf Outlet remained open until January 11, 1999. The secretary extended the season in Breton and Chandeleur sounds until April 1, 1998 to allow the harvest of pink shrimp which are usually present in that area during late winter and early spring. Catches of pink shrimp were generally poor during this extended season. The fall and early winter seabob production was above average.

Preliminary 1998 NMFS total state landings figures (all species) show overall production at 70 million pounds (headless), which is above the five year average.

The Select Council on Shrimp Management delivered its report in August 1998 to the Senate and House Natural Resources committees as well as the Shrimp Industry Review Panel. The charge of the Select Council was to study the current and future management of Louisiana's shrimp resources and to make recommendations for future management objectives. The group ranked protection of shrimp habitat through the use of "protected marine areas" as its highest priority. Other highly ranked opportunities included deferred season openings, a limited entry program, more refined areal management, and a leadership development program. Also ranked highly were improvement of data collection actions, additional Territorial Sea closures, and habitat conservation actions.

The original Shrimp Industry Review Panel was formed by Senate Concurrent Resolution Number 11 of the 1997 Regular Session of the Louisiana Legislature to review the recommendations of the Select Council on Shrimp Management. The panel failed to establish a quorum and was reformed by the governor as the Shrimp Industry Review Panel II. This body met through the end of the year, reviewing and evaluating the final report of the Select Council on Shrimp Management and developing legislative initiatives for the 1999 regular session. After evaluating the report, the panel made several recommendations, including legislative instruments to increase funding for the Louisiana Seafood Promotion and Marketing Board to promote Louisiana shrimp and set up a leadership training program for commercial fishermen.

Crabs

The 1998 Louisiana blue crab landings were 43,480,000 pounds with a dockside value of \$29,344,900. Landings were slightly above the ten-year average. The crab license moratorium initiated in 1995 expired at the end of 1998. The regulations requiring mandatory escape rings (2 5/16" inside diameter) went into effect January 1998. Penalties for possession of excessive numbers (20%) of undersized crabs were increased. This became a class four violation that carries, in addition to other penalties, provisions for suspension of the gear license for six months. The Crab Task Force continued to meet and address issues, including limited entry, ghost traps, and crabber/shrimper user group conflicts. The GSMFC Crab Subcommittee continued their revision of the regional blue crab management plan.

There was renewed interest in stone crabs, especially in Terrebonne Parish. Historically, stone crabs were captured as bycatch in blue crab traps, although in 1998 a limited number of fishermen were targeting stone crabs.

MOLLUSC PROGRAM

Oyster Seasons

The 1997/1998 oyster season on Louisiana's public oyster seed grounds and at the Hackberry Bay, Bay Gardene, and Sister Lake Seed Reservations opened September 3, 1997 and remained open until April 1, 1998. The 1998/1999 season at the Hackberry Bay, Bay Gardene, and Bay Junop Oyster Seed Reservations began September 9, 1998; Hackberry Bay and Bay Gardene closed on April 1, 1999, and Bay Junop closed on May 15, 1999. The Sister Lake Oyster Seed Reservation was open from October 5-16, 1998. An area of the public grounds east of the Mississippi River in the Black Bay area was opened for sacking only, as prescribed by Act 46 of the 1992 Legislative Session.

Public grounds in Calcasieu and Sabine lakes were opened to fishing on October 15, 1997 and remained open until April 30, 1998. The public grounds reopened on October 16, 1998 and closed April 30, 1999. The Secretary of the Louisiana Department of Wildlife and Fisheries was authorized by the Louisiana Wildlife and Fisheries Commission to extend the season to compensate for those days lost to health closures.

Oyster production for 1998 continued on an above average trend, particularly on the public grounds east of the Mississippi River.

Oyster Leasing

During 1998, 32 leases containing 2,178 acres were auctioned. The moratorium imposed in May 1996 for taking applications for new oyster leases was lifted on July 13, 1998. Eight hundred twenty-three new and renewal applications were taken, and 75 new leases were issued.

The Oyster Lease Survey Section created a web page to better serve the public. The section's oyster lease GIS database is available for viewing on the Internet at: <http://www.oysterweb.dnr.state.la.us/oyster>.

Disaster Oyster Restoration Program

A \$5.1 million federal grant was obtained through the Dire Emergency Supplemental Appropriations Act (P.L. 102-368) to restore oyster resources damaged by Hurricane Andrew. Although the Louisiana Shellfish Restoration and Enhancement Project was completed with the submission of the final report on June 30, 1997, the LDWF continued to monitor production in the restored areas during 1998 to further evaluate the longer term success of the project. There was continued commercial and seed harvest from the reefs restored with federal funds received as the result of Hurricane Andrew damages in 1992.

Oyster Task Force

The Oyster Task Force was instrumental in getting legislation enacted regarding damages to oyster resources on leases, particularly the relocation legislation to compensate for coastal restoration projects.

FINFISH PROGRAM

The major objective of the finfish program is to develop and maintain a data base of scientific information that can be used to make rational recommendations for the management of coastal finfish stocks.

Monitoring

A comprehensive monitoring program was developed in 1985 to protect or enhance these valuable resources by providing information regarding the status of fish stocks that occur in the coastal waters of Louisiana at some time during their life cycle. Three gear types are used coast wide to sample various year classes of estuarine dependent fish. A bag seine is used to sample young of the year and provide information on growth and movement. The seine is 50' in length, 6' in depth, and has a 6'x6' bag as an integral part of and midway the length of the net. The mesh size for this seine is ¼" bar, ½" stretched, Delta 44 knotless mesh. A gill net is used to sample juvenile, subadult, and adult fish and provide

information on relative abundance, year class strength, movement, and gonadal condition. The gill net is 750' in length, 10' in depth, and constructed of monofilament. The net is composed of five panels each, of the following mesh sizes: (1) 150'x10', 1" bar, 2" stretched mesh, 0.4 mm diameter filament; (2) 150'x10', 1¼" bar, 2½" stretched mesh, 0.52 mm diameter filament; (3) 150'x10', 1½" bar, 3" stretched mesh, 0.52 mm diameter filament; (4) 150'x10', 1¾" bar, 3 ½" stretched mesh, 0.52 mm diameter filament; and (5) 150'x10', 2" bar, 4" stretched mesh, 0.52 mm diameter filament. A trammel net is used to provide information on relative abundance, standing crop, and movement. The trammel net is 750' in length, 6' in depth, and constructed of nylon. The entire net has a 2:1 sag, and the mesh sizes are as follows: inner wall—1⅝" bar, 3⅝" stretched, number six twine; outer wall—6" bar, 12" stretched, number nine twine.

Gill net samples are taken semi-monthly from April through September, and monthly from October through March; trammel net samples are taken monthly from October through March, and seine samples are taken monthly from January through August, and semi-monthly from September through December. Hydrological readings (conductivity, salinity, and water temperature) are taken each time a biological sample is taken. Also, estimates of cloud cover, sea state, tide, wind direction, and speed are taken each time a biological sample is taken. Samples are taken at specific locations arranged in such a manner so as to cover the beach, mid-marsh, and upper marsh of all major bay systems throughout coastal Louisiana. The catch and hydrological information is summarized for each coastal area on a monthly basis to give the resource managers information as to the current condition of the resource. The pertinent life history information for the important species is also used in developing analytical and predictive models.

State/Federal Cooperative Fishery Statistics

Since 1990, Louisiana has collected commercial monthly landing statistics, except for the shrimp and menhaden statistics that are

currently collected by the NMFS. Landings are self-reported by wholesale/retail dealers licensed to purchase fish in Louisiana. Louisiana also participates in the collection of trip interviews (TIP). Port samplers obtain interviews in Plaquemines, St. Bernard, Lafourche, Jefferson, St. Mary, Iberia, and Cameron parishes. The information provided by landing statistics and trip interviews has been used by the NMFS, the LDWF, the GSMFC, and the GMFMC to evaluate the status of various species currently under intensive management. The continuing goal of the program is to collect commercial fisheries data necessary to better manage those species of concern.

Sport Fish Restoration

In 1998, Louisiana used the marine share of its Sports Fish Restoration Funds in two activities: 1) development of access for fishermen, and 2) finfish age and growth research.

HABITAT PROGRAM

Artificial Reefs

The Louisiana Artificial Reef Program was established in 1986 to take advantage of obsolete oil and gas platforms which were recognized as providing habitat important to many of Louisiana's coastal fishes. Federal law and international treaty require these platforms to be removed one year after production ceases, at great expense to the industry. The removal of these platforms results in a loss of reef habitat.

Since the program's inception in 1986, 24 different petroleum companies have participated in the program and donated the jackets of 77 structures. In addition to the material, the participating companies also contributed over \$12.2 million into Louisiana's Artificial Reef Trust Fund, which also represents a similar savings on platform abandonment to the industry. In 1998, six projects across the coast were completed. Recently, the Louisiana program created the world's largest artificial reef from the Freeport sulfur mine off Grand Isle, Louisiana.

The sulfur mine, with over 1.5 miles of bridgework, is composed of more than 29 structures ranging from 16 four-pile bridge supports to a 35-pile power plant. The reef is in 60' of water and has 30' of clearance. For safety of navigation, it is marked by five lighted buoys. The reef program also developed reefs in Louisiana's inshore waters, primarily low profile reefs composed of shell.

Department of Energy (DOE)

The DOE is assembling environmental monitoring databases associated with the West Hackberry Strategic Petroleum Reserve and other DOE-related projects in the Calcasieu estuarine system. These are being integrated into a standardized data management system that will include other biological and environmental databases from Louisiana and Gulf of Mexico waters.

Southeast Area Monitoring and Assessment Program (SEAMAP)

SEAMAP is a state/federal/university program for collection, management, and dissemination of fishery-independent data and information in the southeastern United States. Louisiana participated in planning and resource survey activities during the seventeenth year of this NMFS-funded project. Planning activities included identifying priorities for fisheries-independent data acquisition, and coordinating gulf-wide resource survey activities by SEAMAP participants. The department also conducted summer, fall, and winter sample surveys in the Louisiana territorial sea and nearshore EEZ from the Mississippi River to Atchafalaya Bay. These seasonal day-night surveys were conducted in an effort to provide information on the abundance and distribution of critical life stages of major Gulf of Mexico species. Shrimp/groundfish and zooplankton communities were sampled as were associated environmental parameters. Summer and fall surveys coincided with NMFS resource survey activity off the Louisiana coast.

Oil Spill Contingency Planning and Response

The department's Oil Spill Task Force developed and implemented plans in 1998 to protect and restore the state's wildlife, fishery, and habitat resources from the adverse effects of oil spills. In addition, department representatives worked closely with the governor's office and state natural resource trustee agencies to develop regulations for implementation of Natural Resource Damage Assessment in Louisiana.

In May 1996, a rupture in a Marathon Pipeline near Gramercy caused a discharge of 475,000 gallons of unleaded gasoline into the Blind River and tributaries in St. James Parish. The spill resulted in injuries to public trust natural resources in the area; fish and wildlife and air and water quality were impacted. In 1998, Marathon bought a piece of mitigation bank near Montegut, Louisiana and contracted with St. James Parish for an educational kiosk in conjunction for the injuries sustained by natural resources as a result of this spill.

In May 1997, Texaco Pipeline had a 16" line rupture discharging 6,517 barrels of oil into Lake Barre in Terrebonne Parish. Department biologists worked with biologist and specialists from other state and federal agencies and Texaco to evaluate injuries that resulted from the spill. That work continued in 1998, as trustees and Texaco begin to quantify both the damages and evaluate the restoration alternatives for the area.

Seismic Monitoring

The seismic program was created in 1939 specifically to protect oysters, fish, shrimp, and other wildlife from injury due to seismic exploration. In 1998, the section continued to monitor these activities and develop new ways to reduce its impact. The seismic section set up a cooperative work group with fishers and the seismic industry to revise its regulations and provide guidance on issues of interest to seismic contractors, local communities, and other parties interested in coastal and estuarine activities.

Statewide Hydrographic Monitoring

The LDWF, through interagency agreements with the Louisiana Department of Natural Resources and the U.S. Geological Survey continued to collect constant records of salinity, water temperature, and tide level from stations located throughout coastal Louisiana. The LDWF provided database management for the program. Data were used for managing marine fisheries (shrimp, oysters, and finfish) and for investigating extent and impacts of hypoxia and red tide in Louisiana coastal waters. Data also were provided on request to other state and federal agencies as well as university researchers.

Caernarvon Biological Monitoring

Beginning in 1991, the U.S. Army Corps of Engineers with support from the LDNR and the LDWF has operated a project for the controlled diversion of freshwater from the Mississippi River into the Breton Sound estuary. The diversion structure is located in the mainline Mississippi River levee at Caernarvon, Louisiana and has a design flow capacity of 8,000 cubic feet per second. Diversion of nutrient and sediment rich freshwater has rejuvenated existing marsh, significantly reduced dependence on local rainfall as the principle source of freshwater input to the estuary, reduced peak salinity, and induced more regularity in the seasonal salinity pattern. Long-term benefits involve reducing land loss rates and increasing fish and wildlife production.

The LDWF conducts extensive monitoring activities in the Breton Sound estuary and is continuing a biological monitoring program to accurately measure the success of the diversion project. Biological monitoring of the project has been undertaken by LDWF in three phases: preconstruction (four years), to determine the conditions in the basin before the project went online; postconstruction (four years), an intensive study of the biological effects of the diversion; and long-term (46 years), to monitor the extended project effects. To determine how fish and shellfish populations may be affected, thousands of oyster, shrimp, crab, and finfish samples are

being taken at stations situated from the diversion outfall to the gulf. The third year of the long-term phase of the post-diversion monitoring program was 1998. The overall objectives of this program are to assess the long-term effects of diversions on the fisheries, waterfowl, wildlife, and vegetation as well as to determine the success of diversions in meeting project goals while helping to guide future project operations. These studies were designed to gather both fishery-dependent and independent data.

An analysis of the first eight years of data has shown few changes in finfish and crustacean populations directly attributable to the diversion project. The areas of best oyster production have shifted seaward with phenomenal production from seaward beds after years of high winter/spring diversions. The monitoring precision of commercial finfish landings was limited by coincident changes in the fishery from legislation. The ability to detect changes in the fisheries will increase as more information is collected.

Large beds of SAV, a component of prime aquatic habitat, developed in the landward zone, and a spectacular largemouth bass fishery has developed. Post-operation vegetative surveys have found increased species diversity, with seven of eight new species characterized as fresh or brackish-adapted; brackish marsh is encroaching into saltmarsh zones. A sample zone of 2,289 acres has shown an increase of 406 acres of emergent marsh or 5.9% per year for 1992-1994.

Davis Pond Biological Monitoring

A three-phase venture spanning more than 50 years to monitor effects of the Davis Pond Freshwater Diversion Structure has begun. The LDNR is leading the overall monitoring effort in coordination with the U.S. COE.

In January 1997, work began on Davis Pond in St. Charles Parish. By 2001, the project will divert up to 10,650 cubic feet per second of Mississippi River water into the Barataria Basin estuary. The diversion project aims to imitate spring overflows which historically brought a rush

of marsh-supporting freshwater, nutrients, and sediment to Louisiana's coastal zone. Levee construction along the Mississippi for flood control has since blocked spring overflows causing wetland loss across coastal areas. The Davis Pond project intends to compensate for this by providing a controlled flow of nutrients and freshwater from the Mississippi into a target area in the Barataria Bay estuary to benefit thousands of acres of marshland.

Biological monitoring of the preconstruction phase began in January 1998 and will continue three years. When the diversion is complete, the post-construction monitoring phase will begin a four-year-long intensive study of biological effects of the diversion. The final phase of the study is set to last 46 years and will monitor extended effects of the project. To determine how fish and shellfish populations change, thousands of oyster, shrimp, crab, and finfish samples will be taken at stations situated from the diversion outfall to the gulf. Commercial fishery harvests will also be monitored. In addition, LDWF biologists will take water quality readings at 38 locations within the basin each month, to provide a complete picture of how salinity and flow patterns are changing.

It has been predicted that over the next 50 years, Davis Pond will preserve about 33,000 acres of marshland and benefit about 777,000 acres of marshes and bays, providing important habitat for fish and wildlife. The project is expected to provide annual average benefits of \$15 million for fish and wildlife plus \$300,000 for recreation.

Monitoring the Impact of Environmental Perturbations on Commercial Fishermen

This three-year project, funded under a grant from the NOAA, has the objective of establishing a fisheries dependent monitoring program capable of determining the impacts of adverse environmental/climatological conditions on the fishing patterns and subsequent income of commercial fishers and charter boats. Events such as hurricanes, red tides, floods, oil spills, and the

occurrence of oxygen-depleted bottom waters affect the harvest of Louisiana's marine fishery resources and therefore, because of the importance of this industry, the economy of the state. Individual harvesters may be forced to spend additional time and effort in locating targeted species, prevented from working traditional fishing grounds, or prevented from fishing at all. An objective determination of the effects of such events on commercial fishing will allow integration of these events into the existing management regime for those fisheries, and form the basis for rational declarations of emergency.

Key components of the project include trip tickets, logbooks, and environmental monitoring. A trip ticket form will be used by wholesale/retail dealers to document purchases from commercial harvesters. Commercial harvesters and charter boats will use logbooks which identify vessel movement, fishing location, and catch. The environmental monitoring segment will document major climatological/environmental perturbations that affect the coast, particularly the offshore hypoxia zone in the vicinity of Jefferson, Lafourche, and Terrebonne parishes. These data will be analyzed to determine if changes in effort and fishing location can be documented in relation to known perturbations.

Other Habitat Issues

In 1998, the Louisiana Marine Fisheries Division continued to work with the state Wetlands Conservation and Restoration Task Force and the federal Coastal Wetlands Planning, Protection, and Restoration Act Task Force in developing projects and strategies for slowing the rate of coastal wetlands loss in Louisiana. A major effort was involved in the development of the "Coast 2050 Plan" to develop an overarching strategy to address most of the coastal deterioration occurring in Louisiana. The plan includes an unprecedented coastal fisheries characterization and trends analysis.

The state was represented in the development of the GMFMC EFH amendment as required by the Magnuson Sevens Act.

Personnel continue to work on the lease relocation procedure for oyster leaseholders that may be adversely impacted by coastal restoration projects.

RESEARCH PROGRAM

Lyle S. St. Amant Marine Laboratory

The primary mission of the Lyle S. St. Amant Marine Biological Laboratory is to conduct research needed to manage the state's marine fisheries. It is the only laboratory facility on the Louisiana coast devoted to marine fisheries. However, as most of the biological and hydrographical research done in the coastal environment is useful in management of marine fisheries, another mission of the laboratory is to support and provide a base of operations for research and educational groups wishing to work in the area.

To increase accuracy of stock assessments, the laboratory has also undertaken a long-term project to obtain age, growth, and fecundity data for important finfishes. Otoliths are collected by fishery independent sampling and by sampling from the commercial and recreational fisheries. These otoliths are sectioned, and annular rings (indicators of age) are counted. Gonads are also collected and examined histologically to obtain data for fecundity indices. During 1998, otoliths were collected and processed from 586 red drum, 1,897 spotted seatrout, 316 black drum, 469 sheepshead, 431 southern flounder, and 635 striped mullet. Gonads from 70 sheepshead, 47 southern flounder, and 100 striped mullet were collected and analyzed.



MISSISSIPPI DEPARTMENT OF MARINE RESOURCES

The Mississippi Department of Marine Resources (MDMR) is a highly technical and functionally diverse state regulatory agency with responsibilities ranging from marine fisheries and coastal wetlands management to seafood plant inspection and certification, boat and water safety administration, derelict vessel identification and removal, shellfish growing-waters management, and tidelands grants program administration.

While the agency's public image is typically linked to its regulatory functions, much of the organization's activity focuses on assistance, development, and public education regarding the wise use and conservation of coastal resources.

During 1998, the department made great strides in developing its capabilities to carry out its mandates and mission to enhance, protect, and conserve marine interests of this state by managing all marine life, public trust wetlands, adjacent uplands and waterfront areas to provide for the optimal commercial, recreational, educational, and economic uses of these resources consistent with environmental concerns and social changes. It is the intent of this report to provide a summary of those developments and activities.

Significant actions that were taken or events that occurred in the past fiscal year included:

- Authorization of \$1.5 million in Federal Disaster Relief Funding for fishermen through the NMFS to be used for the revitalization of oyster reefs which were damaged in coastal hurricanes.
- In August 1998, the NOAA commissioned the R/V GORDON GUNTER at the NMFS Pascagoula Laboratory. The new vessel, based out of Pascagoula, will be used to conduct fisheries research and stock assessment work in northern Gulf of Mexico waters.
- Dedication by Governor Fordice of the Grand Bay NERR in east Jackson County, Mississippi: The Grand Bay NERR is a 15,500 acre tract of representative Gulf Coastal marsh in southeastern Jackson County that has been set aside for preservation and research purposes. Its dedication was held in December 1998.
- Move into the new Eldon Bolton State Office Building in December 1997. The MDMR has moved into its permanent offices on the first and sixth floors of the new office building. The new facility will offer the agency both new challenges and opportunities in 1999.
- Disbursement of \$5.25 million in Tidelands Trust Funds in fiscal year 1998 for Tidelands public access and management projects in the three coastal counties. The Westside Community Pier in Gulfport and the D'Iberville Port Commission's public boat launch are several fine examples of the public access projects that were completed under the Tidelands Program.
- Toxic marine algae event requiring the delay of the opening of state oyster reefs in September.
- Nomination and confirmation of two new commissioners: 1) Harry "Chip" McArthur from Hattiesburg and 2) Philip D. Horn from Jackson County.
- Completion and publication of *Marine Resources and History of the Mississippi Gulf Coast*. Edited by Ms. Della McCaughan, this substantial work will provide readers with a complete background of the Mississippi Gulf Coast and its valuable resources. It should be available for distribution by January 1999.
- Sponsorship of the Region VI Mississippi State Science Fair and initiation of the MDMR *Excellence In Marine Science Award*. The department has been a long-time participant and supporter of the statewide science fair system, and official sponsorship

strengthens and solidifies this relationship.

FUTURE DIRECTIONS

The MDMR must grow to meet the challenges of the year 2000 and focus on its mission and on serving the public to maintain the viability of the state's valuable coastal and marine resources. Among the major plans for the coming year, the agency directorate will move toward accomplishing these goals and objectives:

- Development of more comprehensive strategic and implementation plans in both fisheries management and coastal ecology.
- Implementation of a more pre-emptive management approach to problems and issues that would address them before they become critical.
- Closer association and interaction with the marine research community, other resource management agencies, and commercial and recreational fishing interests to promote joint resource planning and program implementation.
- Development of stronger working relationships with our sister Gulf States through the GSMFC, GMFMC, and other regional forums.
- Development and implementation of an improved system for the management of the Tidelands Act Grant application evaluation and award administration.
- Emphasis on personal and professional development and leadership training for senior management level staff.
- Development of a more robust public relations program.
- Continued efforts to acquire needed staffing and funding at levels adequate to carry out legislative mandates.
- Pursuit of more aggressive management efforts in the area of Coastal Preserves, mitigation banking, and related wetlands restoration and enhancement work.
- Continued development of improved data management systems for the coastal environment utilizing geographic information systems, remote sensing, satellite imagery,

global positioning systems, and other innovative approaches.

- Improve federal grants management policies and procedures to avoid future audit problems.
- Continued removal of the 216 identified derelict vessels along the Gulf Coast with particular emphasis on those that pose a hazard to navigation.
- Pursuit of strategic goals and objectives as identified in the department's five-year strategic plan.

The following narratives provide a brief description of each of the agency's major marine fishery programs and projects, highlighting the principle objectives and accomplishments of each during the past fiscal year and underscoring what the department hopes to accomplish in marine fisheries management in the coming year.

MARINE FISHERIES OFFICE

Marine Fisheries Management

The saltwater fisheries projects and activities coordinated through this program include:

1. To design and initiate projects for the collection and analysis of data required for population dynamics estimates and other fisheries management related projects as may be required.
2. To develop management recommendations based on specific criteria.
3. To monitor the existing condition of the stocks and the fisheries that depend on them.
4. To provide information transfer and liaison activities with regional fisheries management entities and others.
5. To provide technical support to the Mississippi Commission on Marine Resources in developing fishery management plans, amendments, stock assessments, and technical analysis.
6. To provide a state representative to serve on fisheries related boards, committees, panels, etc. as may be required.
7. To provide for administrative services,

general maintenance, the locating of suitable funding sources, and other fisheries management support services as may be required.

During fiscal year 1998 the Marine Fisheries Office drafted changes to the following ordinances:

- Ordinance 7.022 (effective 11/24/97)
Established a one fish possession limit for greater amberjack; a ten fish bag limit for Spanish mackerel; and minimum size and possession limits for large, coastal pelagics, and small coastal sharks.
- Ordinance 2.014 (effective 12/23/97)
Eliminated the 36" restriction from January 1 through the third Monday in August on skimmer trawls.
- Ordinance 8.002 (effective 3/1/98)
Combined all marine fisheries ordinance definitions into one and created new definitions.
- Ordinance 1.012 (effective 3/1/98)
Required that oyster vessels have shading while harvesting and transport.

Public notices were published for opening and closing of the commercial seasons for shrimp, oysters, king mackerel, red snapper, red drum, and large coastal sharks. During fiscal year 1998, approximately 13,200 cubic yards of concrete rubble was deployed at 11 permitted inshore and offshore reef sites. In addition, over 4,000 cubic yards of crushed limestone was deployed as reef material on 11 nearshore shallow waters sites.

Personnel served on regional management activities of the GSMFC including: TCC Artificial Reef Subcommittee, Flounder Technical Task Force, Blue Crab Technical Task Force, TCC Data Management Subcommittee, Technical Coordinating Committee, and the State-Federal Fisheries Management Committee. Mississippi's Marine Fisheries Office was instrumental in preparing grant documents and proposals to secure funding for fisheries management projects Sport Fish Restoration Act, Cooperative Fishery Statistics Program, and the Interjurisdictional

Fisheries Act.

Marine Fisheries Statistics

Project objectives include:

1. To collect commercial fisheries landings and catch data for Mississippi in a timely manner.
2. To collect biological data for selected commercially important finfish species.
3. To obtain boat trip information and biological statistics on migratory pelagic and reef fishes such as red snapper, grouper, and amberjack and collect otoliths from red snapper.

Fisheries landing data have been collected weekly and monthly according to schedule. The data were processed, edited, and submitted to the NMFS in accordance with established data handling procedures. Fisheries landing data are an important part of the fisheries management process, both as an indicator of potential problem areas and as a gauge of the success of existing fisheries regulations and practices.

Biological data for selected commercially important finfish species were collected from the major fish houses along the Mississippi Gulf Coast. Some processing of this data was accomplished, while the remainder will be processed as personnel time permits. Some of the information collected will be utilized in the development of various fishery management plans, both on a state and regional level.

Information for selected pelagic and reef fishes was collected from the major landing sites for these species on a monthly basis. This information was submitted to the NMFS Trip Information System. These data are utilized by both state and federal fisheries managers to properly manage these valuable resources.

Monitor & Assess Shrimp Populations

Shrimp sampling was conducted as required by Mississippi Code Annotated of 1972 §49-15-64.1 to determine the count per pound for the commercial and recreational shrimp season.

Sampling of the nine stations was scheduled every four days, subject to weather conditions, from late April through June of each year. Trawling at each station involved towing a 16' unlined otter trawl for 15 minutes. Surface and bottom water samples were collected at each station measuring the salinity, temperature, and dissolved oxygen to record the variations of environmental conditions that may influence the growth rate of the shrimp. The shrimp were sorted by species (brown, white, or pink). Length and weight of 50 brown shrimp (an aliquot) were recorded as well as the total number and weight of each species. These data are used to calculate the count per pound of shrimp by species. Shrimp from all nine of the sampling stations must average 68 count per pound or greater in order to open the shrimp season in Mississippi territorial waters. The season was opened June 10, 1998, in conjunction with adjoining Alabama state waters.

Mississippi's Shellfish Restoration and Enhancement Project

Project objectives include:

1. Map Mississippi's oyster reefs.
2. Survey potential cultivation sites and cultch planting sites.
3. Cultivate oyster reefs.
4. Deposit cultch material.
5. Determine the influence of climatological factors on blue crab settlement.

During 1998, the following items were accomplished:

- Completed mapping of Mississippi's western Sound oyster reefs except for St. Joseph reef, which will be completed in 1999.
- Completed surveying of potential cultivation and cultch planting sites.
- Cultivated 145 acres of oyster reefs.
- Deposited cultch material at six different locations in the western Mississippi Sound with in excess of 30,000 cubic yards of oyster shell placed on the bottom.
- Currently ongoing - determining the influence of climatological factors on blue crab

settlement.

Mississippi Sound Creel Survey

The primary objective of this project is to conduct a point access creel survey of sportboat fishermen. Specifically, this project is designed to provide information on relative pressure at boat launch sites and piers along the Mississippi Gulf Coast. Data on species composition of the catch, size frequency distribution of economically and recreationally important finfish, estimates of total fishing pressure, estimates of total catch, and estimates of catch per unit of effort (CPUE).

A total of 48 aerial counts was conducted at the 42 boat launch sites and 39 pier and jetty sites. This information is used to determine relative pressure at each site for development of random weighted probabilities. The probabilities were used to schedule creel surveyors at the sites that received the most boat pressure. Interviews were conducted on 144 days throughout the year from sport boat trips and pier fishermen along the Mississippi Gulf Coast.

Charter Boat Survey

The object of this project is to implement a pilot state-federal cooperative program for the collection and management of marine recreational fisheries data from charter boats. Field interviews of charter boat anglers, using existing MRFSS methodology, will estimate angler catch. Additionally, telephone interviews with charter boat captains will estimate fishing effort that will be compared with existing MRFSS estimates.

During the pilot phase, a total of 438 field interviews of charter boat anglers was collected and provided to QuanTech, Incorporated for processing. From September to December, a total of 152 field interviews was conducted and sent simultaneously to QuanTech and the GSMFC for processing. Weekly telephone interviews of 10% of the charter boats, randomly selected, were coded and sent to GSMFC for processing. Estimates of catch and effort for the entire Gulf of Mexico charter fleet are underway.

Shellfish Sanitation

As sessile filter feeders, oysters are subject to the influence of environmental conditions to a greater extent than mobile fisheries. Consequently, oyster landings can change dramatically from year to year according to the quality of the water. In addition to fluctuations in the amount of rainfall, problems with upland pollution can render abundant supplies of oysters unavailable for harvest. During the oyster season, field sampling trips are made to stations located over the oyster reefs to collect water samples which are analyzed for fecal coliform content. Openings and closings of the reef areas are based on the amount of fecal coliform in the water column at the time of sampling. Multiple stations are sampled in each reef area (sub-area), and two consecutive clean samples separated by at least 48 hours must be obtained from each area in order for an area to be opened. Oyster harvesting is closed after significant rain events until it is determined that the water quality has improved to allow harvesting to resume. Water quality samples are obtained throughout the year to classify shellfish growing waters.

Along with monitoring the water quality of the oyster reefs, other work performed on the reefs involves revitalization of the reef. This includes reef turn over, oyster relaying, and the planting of cultch material.

A total of 366,142 sacks of oysters were harvested during the 1997-1998 season. Mississippi's state oyster harvesting waters are divided geographically into eight areas which are monitored closely and opened and closed accordingly.

Bonnet Carré Spillway Monitoring Project

The primary objective of this project was to acquire sufficient data to analyze the short-term effects on the western Mississippi Sound from the opening of the Bonnet Carré Spillway. The study was divided into three components:

- 1) oysters sampling;
- 2) finfish, aquatic vertebrates/invertebrates

- sampling; and
- 3) hydrological sampling.

This project was completed in September 1997, and a completion report was written summarizing all of the data collected and comparing it to the available historical data.

Interjurisdictional Monitoring and Assessment Project

This is an ongoing project that samples the estuarine and marine biota with gillnets, dredges, trawls, beam plankton nets, and seines.

In 1998 the MDMR received federal funds made possible from the Interjurisdictional Fisheries Act of 1986 (P.L. 99-659) and subcontracted with the GCRL for the work conducted for this project. Monthly samples utilizing variable mesh sizes and located at different habitats yielded information on various life history stages of the major species exploited in Mississippi estuarine and marine waters. Investigations of biological and environmental data in this project include collection and analysis of data on commercial species of marine shellfish and finfishes in Mississippi territorial waters; biological data collection of certain select fishes with emphasis on mark/recapture studies, reproductive state assessment, otolith collections for age and growth studies monitoring shrimp postlarvae and juveniles in coastal Mississippi waters; sampling survey of portunid crabs; continued monitoring of nearshore red drum populations; and commercial shrimp monitoring.

Investigations of the Cobia (*Rachycentron canadum*) in Mississippi Marine and Adjacent Gulf Waters

Project objectives are to determine seasonal movement patterns and growth by utilizing an extensive tag and release program within Mississippi marine and adjacent gulf waters.

In fiscal year 1998, the MDMR received federal funds made possible by the federal aid in Sport Fish Restoration Act (16 U.S.C. 669-669)

50 CFR Part 80, from the U.S. FWS. Part of these funds were passed on to the GCRL for the study of cobia.

Tagging fish to study movement patterns is being accomplished by GCRL staff, private fishermen, and charter boat fishermen along the Gulf Coast. GCRL staff is currently collecting, slicing, and reading otoliths for age determination and back-calculating lengths at annular formation for growth estimates. Aspects of reproductive biology, which have been done and are ongoing, are: 1) time of peak spawning; 2) ovarian maturation phases; and 3) egg counts for fecundity estimates.

Striped Bass Restoration Program for the Pearl and Pascagoula Rivers of Mississippi

The primary objective of this study was to restore the striped bass population to coastal waters of Mississippi. Secondary objectives include monitoring and evaluation of the stocking effort.

This project is funded through monies made available through the MDMR to the GCRL by the Anadromous Fish Act (P.L. 89-304) and the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 669-669i) 50 CFR Part 80. The project is ongoing and in fiscal year 1998, over 12 million striped bass fingerlings were stocked in the coastal tributaries of Mississippi. Evaluation of tag returns from fish tagged in previous years and interviews with sport fishermen, commercial fishermen, and fish camp operators indicate an increase in the striped bass population as a result of the restocking program.

Assessment of the Red Drum Spawning Population from Estimates of Reproductive Success

Project objectives include:

1. To continue monitoring changes in the offshore red drum population that resides in coastal waters between the Mississippi River delta and Mobile Bay (i.e., the spawning stock

that produces fish which support the nearshore/estuarine Mississippi red drum sport fishery).

2. To continue the time series of spawning biomass estimates which were begun in 1986.
3. To further refine and improve these spawning biomass estimates.
4. To continue tracking the effects of both state and federal management regulations, in particular Mississippi's size and bag limits which have been designed to increase escapement of maturing red drum from inshore sportfishing pressure.

The collection of larval red drum samples on offshore spawning grounds provides data on larval abundance and survival that are needed to estimate egg production. Ichthyoplankton samples and various environmental parameters were collected and sorted during two cruises in the coastal and inner shelf waters between Chandeleur Sound and Mobile Bay from the R/V TOMMY MUNRO.

Spotted Seatrout Sport Fish Studies in Mississippi

Project objectives include:

1. Assess and monitor the population of adult/subadult spotted seatrout in Mississippi coastal waters using protocols established in previously completed work.
2. Investigate and delineate the male to female ratio as it occurs in juvenile and sub-adult spotted seatrout in Mississippi coastal waters.
3. Tag and release spotted seatrout in Mississippi coastal waters in order to acquire information on seasonal movements within coastal Mississippi estuarine systems.
4. Coordinate a series of public workshops to provide for the exchange of information on fishery research and management procedures regarding the spotted seatrout sport fish fishery in Mississippi coastal waters.

Field sampling utilized a multi-mesh gill net and hook and line equipment sampling at various stations along the Mississippi coastline. All the

fish collected were returned to the laboratory for processing which included measuring length, total weight, sex, maturity, and removing otoliths for age determination during fiscal year 1998. Additional smaller specimens were taken to augment the database for growth estimates and further delineate the male to female ratio at younger ages.

Technology Applications/Seafood Quality Program

Project objectives include:

1. Provide technical advice to those in the Mississippi Seafood processing industry so that they can maintain safe seafood and comply with seafood sanitation and health safety regulations.
2. Conduct regulatory inspections of shellfish processing and transporting facilities to determine compliance with state and federal seafood sanitation and health safety regulations.
3. Provide technical advice to the seafood processing industry regarding new technologies and new products that provide added value, economic vitality, and new market and employment opportunities for the seafood industry.
4. Provide technical advice to those interested in becoming involved and those already involved in aquaculture to compete against the rapidly increasing U.S. seafood imports and to aid in creating expanded economic and employment opportunities.
5. Provide advice and support work for the Mississippi Department of Agriculture and Commerce regarding aquaculture regulatory matters.
6. Provide administrative support to the activities of the Mississippi Marine Fisheries Office, the MDMR, and the Mississippi Commission on Marine Resources.

The total number of technical assistance actions provided were 1,826. These included:

- Provided 524 seafood sanitation inspection

follow-up letters to certified seafood dealers to remind them of their inspection status results.

- Provided technical advice and conducted support inspections for the Mississippi Department of Agriculture and Commerce regarding regulated aquaculture activities.
- Served on the Mississippi Aquaculture Task Force.
- Attended the Annual Interstate Shellfish Sanitation Conference meeting in Massachusetts.
- Worked on the *Marine Discovery* publication.
- Provided technical advice to a number of persons involved and interested in becoming involved in aquaculture.
- Served as judge for science fair events.
- Inspected Mississippi certified shellfish processing, storage and distribution facilities to determine compliance with state and federal sanitation and seafood safety regulations and to provide the public confidence in Mississippi inspected seafood products. A strong public confidence in these products helps sustain a high market demand for Mississippi seafood products.
- Participated in the seafood processing plant regulatory review and evaluation by the FDA.
- Permitted and routinely inspected seafood facilities by type representing 146 certified facilities:

Type of Seafood Permitted	Number
Shrimp	30
Crab	19
Oyster	38
Scallop	1
Total Number of Permits	88

The following are examples of seafood sanitation and health safety regulatory activities that were conducted by the staff on the

Technology Applications/Seafood Quality Program:

- Shellfish sanitation and health safety regulatory activities including 592 seafood facility inspections; 149 source water sample testing; and 741 seafood sanitation regulatory activities.
- Conducted inspections and associated actions to determine compliance with the sanitation and seafood health safety regulations including Mississippi seafood sanitation/processing; molluscan shellfish sanitation specifications covered under the National Shellfish Sanitation Program (NSSP); and seafood species sanitation regulations other than molluscan shellfish sanitation regulations to aid the industry in meeting compliance conditions when official inspections were conducted by the Food and Drug Administration (FDA).
- Conducted quarterly inspections of all certified facilities and conducted follow-up inspections as needed.
- Conducted sanitary surveys along the shoreline areas of all three counties to identify new actual and/or potential pollution sources.
- Prepared three FDA draft partnership agreements.
- Worked with a seafood processor to correct deficiencies to meet FDA seafood compliance criteria.
- Prepared Ordinance 17.000(I), a proposed ordinance to establish regulations for handling, transporting, and processing seafood products other than molluscan shellfish and chaired a public hearing for the ordinance.
- FDA conducted the annual standardization of a MDMR seafood inspector.
- Coordinated efforts between the MDMR and the Mississippi Department of Health regarding trucks used to transport molluscan shellfish.
- Began review work to become knowledgeable about the new NSSP Ordinance that will be used to determine shellfish processing compliance with the new program.
- Participated in three FDA seafood safety-related training courses.

Coastal Ecology Office/Coastal Zone Management Assistance

The primary objective of this program is to implement the provisions of the Mississippi Coastal Program. The Mississippi Coastal Program is legislatively mandated in Mississippi Code, Section 51-15-6 and was approved by the federal government under provisions of the Coastal Zone Management (CZM) Act of 1972, as amended. The Mississippi Coastal Program was adopted as state policy by the (then) Mississippi Commission on Wildlife Conservation. Coupled with coastal management responsibilities are those needed to carry out the mandates of the amended Marine Litter Act of 1989, as well as those found in the Clean Vessel Act.

Project objectives include:

1. Develop and maintain grants and programs for MDMR for marine resource management and protection.
2. Provide MDMR strategic planning.
3. Implement and evaluate Coastal Zone projects and programs.
4. Develop new Coastal Zone programs.
5. Develop and coordinate MDMR policy (internal and external).
6. Provide technical assistance to other MDMR operations, provide assistance to other state agencies and local governmental bodies.
7. Implement the Mississippi Coastal Nonpoint Pollution Program (CZM Section 6217).
8. Track national legislation pertaining to coastal and marine resources management.
9. Coordinate a Comprehensive Resource Management Planning Effort to address cumulative and secondary impacts from rapid development on the coast.

The MDMR received federal funds from the NOAA, Office of Ocean and Coastal Resource Management to meet coastal management objectives. Coastal management staff participated in various public outreach efforts of the department and provided comments to the local news media when requested concerning coastal

management issues. Under the NOAA federal consistency requirements, staff reviewed all federal actions in the coastal zone (181 total actions) to determine consistency with the Mississippi Coastal Program. The reviews included dredging projects, oil and gas activities in the federal continental shelf area, and all federal wetland permits issued by the U.S. ACOE.

Coastal Ecology permitting staff administered the provisions of the Mississippi Coastal Program by reviewing and acting on 440 wetlands permits within the jurisdiction of the MDMR. The size of permitted projects and the complexity of the permit applications has increased dramatically during fiscal year 1998 when compared with past years. Emphasis during the permit review process is placed on the state's policy of "no net loss" of coastal wetlands. The Coastal Preserves Program contributed to this emphasis by acquiring, protecting, and enhancing tidal wetlands all along the coast. The proposed Grand Bay NERR in Jackson County, expected to be dedicated in fiscal year 1999, will facilitate more wetlands research directed toward coastal management problems and solutions.

As directed by the Mississippi Commission on Marine Resources, the Comprehensive Resource Management Planning Effort is making progress toward addressing cumulative and secondary impacts resulting from rapid development in the coastal zone. Most federal, state, and local

agencies and governing bodies are participating, as well as environmental groups, community organizations, and economic development organizations.

Derelict Vessel Removal

Project objectives include enacting state laws by implementing the removal and disposal of derelict vessels, and restoring coastal wetlands and navigable waterways. Eight derelict vessels have been removed (from the Back Bay of Biloxi, the Mississippi Sound outside Gulfport harbor, and St. Louis Bay) in May and June 1998. Fourteen derelicts are targeted for removal by October 1998.

Coastal Wetlands Acquisition

The objectives of the Coastal Preserves Program are to increase land acquisition in the state's twenty coastal preserve areas, protect sensitive coastal habitats, coordinate biological surveys and assessments, and develop individual coastal preserve management plans. This program is also charged with developing a public outreach and education program to increase public awareness and interest in Mississippi's coastal wetlands, developing partnerships with federal, state, and local agencies, and identifying alternative approaches to protecting and restoring wetlands along the Mississippi Gulf Coast.

Acquisition Status Report

Preserve Sites		
Graveline Bayou	Jackson County	617 acres
Grand Bay	Jackson County	4,500 acres
Pascagoula River Marsh	Jackson County	10,000 acres
Old Fort Bayou	Jackson County	80 acres
Mary Walker Bayou	Jackson County	764 acres
Biloxi River	Harrison County	270 acres

Preserve Sites		
Wolf River	Harrison County	223 acres
Hancock County Marsh	Hancock County	6,844 acres

Grand Bay NERR - Environmental Impact Statement and Designation into the NERR System

Project objectives include:

1. Write and submit a draft environmental impact statement (DEIS) to the NOAA.
2. Obtain approval of DEIS by NOAA and publish availability for review in the Federal Register.
3. Conduct public hearing and notify all members of the comment period.

4. Complete final edits and publish the final Environmental Impact Statement after DEIS review.
5. Designate the Grand Bay NERR into the NERR System.

The DEIS was completed and accepted by the NOAA in July 1998. The DEIS was distributed during August, and the public hearing was held in September. Following the review schedule, the Grand Bay NERR will be ready for designation into the NERR in December.



TEXAS PARKS AND WILDLIFE DEPARTMENT

COASTAL FISHERIES DIVISION

Texas Parks and Wildlife Department (TPWD) Coastal Fisheries Division is responsible for making management recommendations regarding the state's fishery resources within the bays and estuaries and out to nine nautical miles in the Gulf of Mexico. Estimated value of the fisheries within the four million acres of marine habitat is in excess of \$2 billion.

COASTAL DIVISION OBJECTIVES

The goal of the Coastal Fisheries Program is to develop management plans for selected fisheries using the concept of optimum yield. These plans include recommended harvest regulations, resource stock enhancements, or habitat enhancements based on fisheries independent and dependent monitoring program data utilizing the best scientific information available. Objectives of the division are:

- 1) to recommend management strategies for aquatic marine resources to the executive director, the Texas Parks and Wildlife Commission (TPWC), and the Texas Legislature based on sound scientific data;
- 2) to determine trends in abundance of finfish and shellfish populations affected by environmental conditions and fishing;
- 3) to determine landings of marine species and associated social and economic characteristics of the fisheries;
- 4) to restore, manage, and enhance existing fishery populations through stock identification, life history, genetic and reproductive physiology research, establishing appropriate stocking ratios for selected marine organisms in Texas bay, and assessing impacts of stocking on present populations and existing fisheries; and
- 5) to promote, develop, maintain, monitor, and

enhance the artificial reef potential in the marine waters off Texas.

To achieve these objectives, the division is organized into four major functions: administration, ecosystem monitoring, science, and enhancement. Effective management of finfish and shellfish populations must be based on a thorough knowledge of the population dynamics of the resources. Long-term trend data based on routine monitoring are necessary to assess trends in abundance. Commercial and recreational landings information is necessary to assess impacts of user groups on the fisheries and to determine economic importance of these fisheries to the state.

Activities in 1998 included participation in the development, review, and revision of GMFMC and GSMFC FMPs. Personnel participated in workshops and advisory meetings as state representatives on both the council and commission as well as other management authorities. In addition, numerous technical reports and scientific journal articles about various aspects of the Texas coastal fishery resources were completed.

RESOURCE AND HARVEST MONITORING

Monitoring of the relative abundance of adult finfishes in Texas waters is accomplished using 600' long gill nets with individual 150' sections of 3", 4", 5", and 6" stretched mesh. Bag seines (60' long) and trawls (20' long) are used to determine abundance of juvenile finfish, shrimp, blue crabs, and associated organisms. Oyster dredges (19.5" wide) are used to collect oyster abundance data.

Gulf of Mexico waters from Alabama to the Rio Grande were sampled to a depth of 300' during November 1997 and June-July 1998 with the other Gulf States and the NMFS. This effort,

SEAMAP, was coordinated by the GSMFC. Results of sampling were used to evaluate closure of gulf waters to shrimping and to determine relative abundance of associated organisms.

Sport landings (private and guided boat) and associated fishermen activities are derived from on-site creel interviews of recreational fishermen at the completion of their trips. Roving trailer and wet slips counts are used to assess relative pressure at sampling sites. Relative pressure is used to determine how often a site should be selected for a survey; higher use sites are surveyed more often than low use sites.

A total of 1,014 survey days was spent to estimate landings and pressure of private and party boat fishermen. There were 800 gill net samples; 2,160 bag seine samples; 2,640 bay and gulf trawl samples; and 1,080 oyster dredge samples collected. A total of 5,746 fishes was tagged and released. About 6% were returned for rewards. Percent of tags returned was consistent with prior years.

Landings of headboat fishermen are collected by the TPWD for the NMFS and are coordinated by the GSMFC. Headboat catch, effort, and bioprofile data are collected on the upper and middle Texas coast. Lower coast data are collected by the NMFS port agents. Landings and effort estimates of the headboat fishery in the Gulf of Mexico are provided to the NMFS.

Commercial landings are obtained from commercial seafood dealers through submission of monthly aquatic products reports (MAPR). MAPR continues the routine collection, editing, summarization, and publication of self-reported commercial landings data and is funded through a formal cooperative statistics agreement with the NMFS. The TPWD collected commercial landings statistics on crabs, oysters, and finfish while the NMFS continued to gather landings statistics on shrimp.

RESEARCH

The Perry R. Bass Marine Fisheries Research

Station at Palacios provides information and techniques necessary for improvement of Texas fisheries management strategies. Effort is directed toward methods for improving fisheries management techniques which include spawning and rearing of marine organisms. Division personnel cooperate with other coastal states in marine fisheries enhancement efforts through transmittal of information and supply of available fishes.

Electrophoretic studies of the population structure of sand seatrout and Atlantic croaker continued. Electrophoretic studies of the population structure of black drum and southern flounder continued as did DNA analysis of the southern flounder population. Development of a library of protein profiles of Texas fishes and shellfishes to be used for species identification and forensics continued. Red drum were collected from Galveston Bay, East Matagorda Bay, Matagorda Bay, and lower Laguna Madre to assess stocking success from "gene marked" and "OTC" marked fingerlings. To further evaluate stocking, a comparison of red drum populations in the unstocked Cedar Lakes to populations in stocked bays continued. Collections of otoliths from red drum and spotted seatrout were continued to estimate age structure of these populations in Texas waters and to develop age-length keys for these fishes. Reproductive biology of lower Laguna Madre spotted seatrout is being studied to evaluate recovery of the fish following winter kills of the fish in January 1997. Age structure and growth rates of Texas Atlantic croaker and southern flounder populations are being investigated. Tarpon life history in Texas waters is being examined. Tarpon work includes genetics studies, juvenile abundance, and tagging of juveniles and adults.

Two studies addressing information needs for management of shrimp continued. One study addressed the commercial shrimp catch rate (pounds/trip), size and species composition of shrimp landed, and characterized gear and methods used. The second study tested three bycatch reduction devices (BRDs) during September-November in Aransas Bay. The

effectiveness of the fish-eye, large mesh extended funnel, and the 2" space bar TED/BRD was evaluated in the fall bay-food fishery. Reduction rates reveal BRDs hold promise for reducing bycatch, but further testing is required.

An additional study involved shrimp viruses. The TPWD began a baseline virus monitoring program for juvenile and sub-adult (≤ 80 mm TL) brown, white, and pink shrimps in nine bay systems beginning October 1997. Ten shrimp of each species were collected in each bay during January through March and in December. Up to 30 shrimp of each species were collected in the remaining months. Shrimp were individually injected with Davidson's fixative immediately after collection. After 12-24 hours, shrimp were transferred to 70% ethyl alcohol, then shipped to the Texas A&M Veterinary Diagnostic Laboratory in College Station. Dr. Ken Johnson and his associates are processing the shrimp looking for several common shrimp viruses.

LEGISLATIVE AND REGULATORY CHANGES

The Texas Legislature last met in January 1997, so no new legislation occurred in 1998. The Texas Parks and Wildlife Commission adopted one rule change to ensure stability of the resources. In the recreational fishery and commercial fisheries, greater amberjack bag and possession limits were reduced from three and six, respectively, to a bag and possession limit of one and two.

There were no changes in the commercial shrimp fishery except that the extension of the Atlantic croaker bait season (allowance for harvest of croaker during shrimping operations for sale as bait) was extended from a temporary to permanent status. The Texas Parks and Wildlife Commission established the blue crab fishery limited entry program beginning September 1998. In addition, more options in materials were added to the mandatory use of degradable panels in crab pots.

FISH STOCKING

Effort directed toward spawning and rearing marine fish continued. Controlled photoperiod and temperature regimes to induce sexual maturity and spawning resulted in over 35 million red drum fingerlings and seven million spotted seatrout fingerlings stocked into marine water. Technical information concerning fish hatchery development was provided to other coastal states in a cooperative effort to enhance coastal marine fisheries.

A new state-of-the-art marine fish hatchery and visitors center opened in Lake Jackson in March 1996 and was operated very successfully during 1998. Sea Center Texas is a joint venture between the TPWD; The Dow Chemical Company, Texas Operations; and the Coastal Conservation Association and was constructed using \$13 million in Sportfish Restoration funds. The facility represents a unique merging of fisheries science and visitor education. Touted as the world's largest red drum (redfish) hatchery, Sea Center Texas has become a major attraction both locally and for visitors to the area and has welcomed 310,000 visitors since opening.

Sea Center's visitor appeal centers around its interpretive displays, a touch tank, and 25,000 - 52,000-gallon aquaria. The center's facilities include the largest red drum hatchery in the world, and during 1998, over 20 million fingerlings were produced for stocking Texas coastal waters. Brood fish are spawned in the facility's 22,000-square-foot hatchery, which houses 24, 12'-diameter spawning tanks. During peak spawning periods, hatchery personnel collect between 1.5 and 2 million eggs each night from the brood stock tanks. After hatching, the larvae are then transferred to the 35 one-acre rearing ponds. Although established primarily as a red drum and spotted seatrout production hatchery, Sea Center will also serve as a testing ground for production of other marine species such as flounder, Atlantic croaker, snook, and tarpon.

ARTIFICIAL REEF PROGRAM

The Artificial Reef Program enhanced three deep water and one near shore reef sites in 1998. The program is now responsible for maintaining 33 permitted reef sites and seven unlighted buoys at Port Mansfield Liberty Ship Reef, George Vancouver Liberty Ship Reef, Port Isabel/South Padre Island Reef, North Padre Island A-72 Reef, North Padre Island 967 Reef, and High Island A-515 Reef sites. The U.S. Coast Guard granted a waiver on light requirements at Port Mansfield Liberty Ship Reef, Basco's Reef, and High Island-A-532 Reef.

The program received the donation of three obsolete oil and gas structures in Outer Continental Shelf leasing blocks High Island-A-515 (HI-A515), North Padre Island A-72 (PN-A72), and Galveston A-125 (GA-A125). The structures in NP-A72 and GA-A125 were partially mechanically cut at 85' leaving the lower portion attached to the bottom, and the upper portion of the jackets was placed next to the standing structures. The third structure was toppled in place in 202' of water in the HI-A515 Reef site. The cost savings to these oil companies resulted in the donation of \$563,245 to the Texas Artificial Reef Fund.

An additional donation was received by Mitchell Energy Corporation for three jackets located 12 miles offshore of Galveston. Although construction was started on this shallow water reef site, weather delays have caused this reef conversion operation to have an anticipated completion date in 1999. This donation will result in a realized savings of \$300,000 for the Artificial Reef Fund.

A Navy repair barge (YR-26) in Ingleside, Texas was transferred as surplus property to the Artificial Reef Program in July 1998 for \$2,500. The Artificial Reef Fund paid \$38,325 to prepare it for sinking and \$25,000 to tow it offshore of Aransas Pass to the Port Isabel/South Padre Island Reef in August. This donation resulted in \$65,825 to the Artificial Reef Fund.

The R/V GYRE (Texas A&M University) transported 32 reef balls 400 miles south to the Port Isabel/South Padre Island Reef in August at a cost of \$14,400 to the Artificial Reef Fund.

The Artificial Reef Program had an exhibit at the Sea Space Exposition in May 1998 to promote the understanding and identification of artificial reefs and the fish and invertebrates that live on these reefs. Also, staff published their conclusions of an underwater trap tagging monitoring study at the George Vancouver Liberty Ship Reef in *The Journal of Gulf Science* in December 1998. In May 1998, staff also published papers in meetings proceedings and made presentations on the program's policy on the partial mechanical removal method at the Offshore Technology Conference in Houston. In October, Artificial Reef Program staff were given an award and inducted into the Offshore Technology Hall of Fame at a special gala in Houston.

BROWN TIDE

A persistent algal (brown tide) bloom continues in the upper Laguna Madre area. This algal bloom began in 1990 and continues unabated. The extensive seagrass beds continue to be at risk because of reduced light penetration. About 25% of seagrass beds in water over three feet deep have disappeared, and the long-term impacts of this event are unknown. Research continues on the effects of this record setting bloom.

RED TIDE

A third major red tide event in 11 years on the Texas coast began offshore near Pass Cavallo and Sargent's Beach on September 18, 1997. The bloom moved southward into Mexico during October, with the majority of the bloom occurring in the gulf waters off Padre Island. Duration of the offshore bloom was from September 18 through November 23, 1997. On November 21, red tide was reported inside bay waters near Corpus Christi and Port Aransas. The duration of this bloom lasted from November 21 through

December 10, with areas of high cell counts lasting through January 19, 1998. The TPWD uses ground truth, airplane flights, and shoreline counts to estimate species and number of animals killed. A minimum estimate of mortality was 21.8 million aquatic organisms (16.5 million occurring in the surf and 5.3 million in the bays). The species most affected (in millions) were anchovies, *Anchoa* species (5.5); gulf menhaden,

Brevoortia patronus (4.6); Atlantic bumper, *Chloroscombrus chrysurus* (3.9); beach ghost shrimp, *Callichirus islagrande* (1.8); scaled sardines, *Harengula jaguana* (1.7); and striped mullet, *Mugil cephalus* (1.2). As in previous red tide events (1986 and 1996), Gulf of Mexico filter feeding and schooling species were predominate species observed to be affected.

NATIONAL OCEANIC & ATMOSPHERIC ADMINISTRATION U.S. DEPARTMENT OF COMMERCE NATIONAL MARINE FISHERIES SERVICE

SOUTHEAST REGIONAL OFFICE

The National Marine Fisheries Service (NMFS) is an agency of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration. The mission of the NMFS is stewardship of the nation's living marine resources. Through conservation and wise use, these marine resources and their habitats can be managed effectively and efficiently to maximize the benefit to the nation without jeopardizing future options.

The NMFS administers programs to promote the conservation, management, and development of living marine resources for commercial and recreational use. These programs include services and products to support the administration of fisheries management operations; international fisheries affairs; fishery development and industry assistance activities; protected species and habitat conservation operations; law enforcement activities for marine mammals, endangered species, and regulated fisheries; and scientific and technical aspects of marine fisheries research programs.

The NMFS comprises five regional offices and five centers located along the coastal United States. The Southeast Region covers the coastal states from North Carolina to Texas (including Alabama, Florida, Georgia, Louisiana, Mississippi, and South Carolina); the inland states of Arkansas, Iowa, Kansas, Kentucky, Missouri, Nebraska, New Mexico, Oklahoma and Tennessee; as well as the Commonwealth of Puerto Rico and the U.S. Virgin Islands.

The NMFS Southeast Regional Office (SERO) is in St. Petersburg, Florida. The regional administrator serves as the regional representative of the assistant administrator with state

conservation agencies, recreational interests, commercial industries, consumers, environmentalists, and the public. The region is responsible for planning, organizing, and implementing fishery management and conservation programs including regulatory requirements, FMPs, recreational fisheries, international fisheries and services through the range of NMFS programs. It provides administrative and technical support to regional fishery management councils and is responsible for programs planning and evaluation, budgeting, and administrative support services. These support services are also provided to other NOAA and NMFS elements collocated with the regional office.

The NMFS Southeast Fisheries Science Center (SEFSC) is in Miami, Florida, with laboratories in Beaufort, North Carolina; Charleston, South Carolina; Oxford, Maryland; Pascagoula and Stennis Space Center, Mississippi; and Galveston, Texas. The SEFSC conducts multi disciplinary research programs to provide management information to support national and regional programs of the NMFS and to respond to the needs of regional fishery management councils and other user groups. The SEFSC develops the scientific basis required for status of stocks and status of fisheries reports; environmental assessment and environmental impact statements for management plans and/or international negotiations; and pursues research to answer specific needs in the subject areas of habitat conservation, aquaculture, fishery engineering, marine mammals, endangered species, fishery oceanography, food sciences, and fishery economics.

FISHERY RESOURCE CONSERVATION AND MANAGEMENT

- Amendment 9 to the Shrimp FMP was implemented to require BRDs in most shrimp trawlers in the Gulf of Mexico.
- Amendment 6 to the Stone Crab FMP was approved and implemented to extend the federal moratorium on stone crab vessel registrations in preparation for a future limited access system.
- An emergency rule was published to implement a 3,000-lb trip limit for the commercial king mackerel fishery in the western Gulf of Mexico to improve safety of fishing operations by relieving derby fishing and to reduce the likelihood of overfishing.
- A control date was established for the recreational for-hire fisheries for reef fish and coastal migratory pelagic resources in federal waters of the Gulf of Mexico to announce that the GMFMC is considering future action to control the number of participants in the fisheries.
- The quota for the commercial run-around gillnet fishery for gulf group king mackerel off the Florida Keys was monitored, and the fishery was closed when the quota was met.
- An emergency interim rule was published to address the 1998 total allowable catch and recreational bag limit for red snapper in federal waters of the Gulf of Mexico.
- An emergency rule was published to require shrimp trawl vessel observers, log books, and monitoring systems in the Gulf of Mexico.
- An emergency interim rule was published to certify the Jones-Davis and gulf fisheye BRD for use in shrimp trawls to accomplish further reductions in red snapper bycatch in this fishery.
- An emergency interim rule was published to release the remaining 1998 recreational and commercial quota reserves and close the recreational fishery on September 30, 1998 for red snapper in federal waters of the Gulf of Mexico.

PROTECTED SPECIES MANAGEMENT

- The NMFS SERO assisted the Department of State (DOS) in revising guidelines implementing P.L. 101-162, the Sea Turtle Conservation bill, as a result of a ruling by the World Trade Organization (WTO) Appellate Panel.
- Scientific and technical information was provided to the DOS and the U.S. Trade Representative for the appeal on implementation of P.L. 101-162 under the WTO.
- The NMFS evaluated and provided an opinion to the DOS on applications for TED exemptions from Australia and Taiwan. The NMFS recommended to reject the Taiwan proposal and require additional information from Australia.
- Eleven foreign nations were visited to evaluate their TED use programs to assist the DOS in its annual certification under P.L. 101-162.
- The NMFS provided training in the use of TEDs to Indonesia and Thailand. The NMFS reviewed a technical proposal to evaluate TEDs by Costa Rica.
- The NMFS scheduled TED evaluations for flounder fly nets which are suspected to taking sea turtles.
- Discussions were held with Australia, Malaysia, and Thailand on initiating an Indian Ocean Sea Turtle Conservation Agreement.
- The NMFS coordinated with the SEFSC to develop a five year sea turtle research/management plan.
- Nine formal and 110 informal ESA section 7 consultations were conducted on federal activities in the region. The NMFS provided consultation on amendments to highly migratory species regulations, the Brunswick Nuclear Regulatory Plant, the Sargassum FMP, and COE dredging of the Kings Bay, Georgia channel, and Capron Shoal, Florida which were significant and highly controversial.
- The NMFS inspected the hopper dredge working in the Kings Bay channel to ensure adequate turtle sampling and protection

- measures were in place.
- The NMFS participated in the final listing (October 14, 1999) of Johnson's sea grass as a threatened species.
 - The NMFS met with FDEP personnel after the Johnson's sea grass listing to coordinate state/federal protection programs.
 - The NMFS compiled an administrative record and responded to a FOIA request on Johnson's sea grass for litigation on the listing.
 - A settlement agreement was developed with a litigant over the listing of Johnson's sea grass.
 - A recovery team was established to develop a recovery plan for Johnson's sea grass, and an initial meeting of the team was held.
 - The NMFS SERO conducted and coordinated with the Habitat Division on eight consultations/reviews on Johnson's sea grass.
 - The NMFS provided examples of "harm" to Johnson's sea grass for a regulatory impact review.
 - An agency response was developed to a petition which proposed to list 11 new species and one new genus of Bryozoans. The response did not support the listing.
 - The NMFS SERO participated in a meeting with Louisiana shrimpers to help solve problems with the operation of TEDs in sea bob shrimp harvesting.
 - The NMFS SERO participated in a meeting with North Carolina Fisheries Department regarding increasing registration and reporting of sea turtle and marine mammal interactions with commercial gill net fisheries.
 - The NMFS SERO assisted law enforcement and the SEFSC observer program under the Atlantic large whale regulations in stimulating reporting of fishing in the southeast Florida shark gill net fishery.
 - The NMFS SERO assisted F/PR and the NER in revising the large whale regulations.
 - The NMFS SERO participated in several meetings and discussions with the state of Florida Sturgeon Aquaculture Working Group and the FWS regarding a Florida rule to culture gulf, shortnose, and white sturgeon. Gulf and shortnose sturgeons are threatened species.
 - F/PR was assisted in development of a MOU with the EPA regarding their Section 7 responsibilities for nation wide discharge permits.
 - Eight permits were issued for TED testing authorizations.
 - A five-year regional sea turtle research permit and a CITES permit were applied for from the FWS. An annual report of activities was provided under the current research permit. Eight permit delegations under the RA's blanket sea turtle research permit were issued.
 - The NMFS SERO coordinated the issuance of a CITES permit from Mexico with the Galveston laboratory to authorize the annual importation of 180 Kemp's ridley sea turtles for research purposes.
 - A draft MOU was developed with the Harbor Branch Foundation to conduct a bottlenose dolphin public education program.
 - Projects were developed with South Carolina and Georgia under Section 6 of the ESA for cooperative work on sea turtles and right whales. Additional information was acquired from Puerto Rico to support their application for a Section 6 cooperative agreement.
 - The Right Whale Early Warning System was operated which notifies ships of the presence and location of right whales off Georgia and Florida.
 - Contract studies to survey offshore areas for the distribution of right whales outside their present critical habitat were supported.
 - The F/PR was assisted in developing a Federal Register notice evaluating the present status of candidate species.
 - Contract studies were completed and drafts were reviewed in developing status reviews of three candidate species in south Florida.
 - The annual list of fisheries required under the MMAP and the 1994 amendments to the MMPA were developed.
 - A comprehensive Marine Mammal Stranding Directory was revised, and 450 copies were distributed to appropriate individuals/institutions.
 - The NMFS SERO participated in a budget review exercise (the Pennoyer exercise) to identify PR funding sources and needs.

- The NMFS SERO participated in a status review of base and temporary funding (the Hilda exercise) to allow for adjustments to base PR programs.
- The NMFS SERO participated in a series of conference calls with F/PR and other regions to develop amendments to the MMPA.
- Weekly conference calls were held over a four-month period to develop agency initiatives for 2001 funding.
- Two SERO PR staff participated in the annual sea turtle biology and management conference.
- One hundred twenty letters of authorization under the MMAP program were issued.
- Diversity hiring within the NMFS SERO included one black female, one Hispanic male, and a white male for permanent vacant positions in the division and two white females for temporary positions in the division.

HABITAT PROTECTION

The NMFS conducted 291 preapplication consultations for proposed water development projects. This process is especially useful in protecting fisheries habitat because potential permit applicants usually have not invested heavily in project plans. Recommendations are thus more often acceptable from resource agencies aimed at reducing environmental impact. The process also allows the NMFS to deal with the regulated public in a forum that is less adversarial than when project plans have been developed and advertised for public review.

The NMFS reviewed 5,914 individual proposals to develop in wetlands. Most of these activities (about 64% and 2%, respectively) were found to either pose no significant threat to fishery resources or were deferred to other agencies. Many of the projects with minimal environmental impact resulted as a consequence of preapplication planning. About 12% were of concern because they involved substantial environmental impact. These projects required modification or denial of federal authorization to protect fisheries resources. Over 22% of the

review opportunities could not be accommodated because of manpower and funding constraints.

Federal water development projects include construction and maintenance of federal navigation channels, beach erosion and hurricane protection, flood control, port expansion and deepening, and other similar actions. The COE is the principal federal agency in the coastal zone for the planning, design, and implementation of such projects. Environmental review is conducted by the COE, FWS, EPA, NMFS, and state natural resource agencies. The NMFS review of federal projects is conducted largely in connection with provisions of the Fish and Wildlife Coordination Act; however, other statutes such as the MSFCMA and NEPA also apply. These laws encourage our review and input with respect to anticipated impacts and means by which adverse impacts can be avoided and offset. The HCD reviewed 104 federally constructed or sponsored projects during the year.

The NEPA requires preparation of an environmental impact statement for major federal actions having significant effects on the human environment. The NMFS reviews these documents to ensure that they adequately address impacts to fishery resources and to provide recommendations on least damaging alternatives. The review process can be a powerful tool for the NMFS in its advocacy role on behalf of fishery resources and their habitat. The NMFS comments must be considered and addressed by the lead federal agency. If NMFS views are not adequately considered, NEPA provides for an appeals process that allows the issue to be mediated at higher organizational levels.

The NMFS participated in numerous activities associated with mitigation planning and habitat restoration that are unrelated to other habitat restoration programs and activities addressed in this report. The majority of these opportunities are related to federal regulatory programs. The NMFS devoted considerable effort in planning for mitigation bank development, mitigation guideline development, and general mitigation planning. Activities related to the Coastal

Wetland Planning Protection and Restoration Act (CWPPRA) continue to be a major habitat restoration activity in the Southeast. This year was extremely active in this arena of the habitat program and substantial accomplishments are evident in all parts of the habitat program. We conservatively estimate that we interacted on proposals this year that will preserve, enhance, restore, or create more than 157,796 acres of fisheries habitat. This includes 23,610 acres associated with mitigation banks and 65,000 acres of NMFS-sponsored restoration projects under the CWPPRA program.

The National Estuary Program is a comprehensive, multi-agency evaluation, planning, and action oriented initiative for preserving, protecting, and restoring the aquatic resources within entire estuarine ecosystems. The EPA is the lead federal agency. The NMFS represented NOAA and provided technical assistance. Estuary programs in effect and requiring effort include: Galveston Bay and Corpus Christi Bay, Texas; Barataria-Terrebonne Bays Complex, Louisiana; Tampa Bay, Sarasota Bay, Indian River, and Charlotte Harbor, Florida; Mobile Bay, Alabama; and Albemarle-Pamlico Sound, North Carolina.

Both the NOAA and NMFS have responsibilities related to habitat protection in the Southeast, and these responsibilities are often intertwined. The NMFS SERO also performs actions directly for NOAA and NMFS headquarters. Consequently, coordination and cooperation among these entities is essential and forms a large share of the habitat protection activities undertaken during the year.

Outreach efforts included formal and informal presentations, production of reports and informational materials, and publication of research and management related material for peer and public use. Information requests by private, local, state, and federal entities were answered. The NMFS disseminated habitat information through presentations at scientific and management meetings, journal publications, poster sessions, classroom and organization

lectures, and interaction with environmental groups and the media.

COOPERATIVE AGREEMENT AND GRANT PROGRAMS

In 1998, 70 grants and cooperative agreements totaling \$13,043,944 were awarded to states, universities, non-profit/profit institutions, and individuals through the programs mentioned below.

SEAMAP is a state/federal/university program for the collection, management, and dissemination of fishery-independent data in the southeast. Three components currently exist in partnership with NMFS: SEAMAP-Gulf of Mexico; SEAMAP-South Atlantic; and SEAMAP-Caribbean. The program allocates funds to the southeastern states for surveys and studies, and to the GSMFC, ASMFC, and Caribbean Fishery Management Council as coordinating agencies, through programmatic appropriations mutually agreed-upon by the participants.

The State-Federal Cooperative Fishery Statistics Program is a NMFS Southeastern U.S. Program for collection of landings data from the commercial and recreational fisheries of the region. This information is used by the states and the SEFSC in determining yields and by the Southeast Regional Administrator and Regional Fishery Management Councils to assist them in formulating fisheries management plans.

The Anadromous and Interjurisdictional Fisheries Programs are national programs that provide funding for grants and cooperative agreements to obtain catch and effort statistics and other fisheries information. This information is used to support management decisions both at the state level and those required under the Magnuson-Stevens Fishery Conservation and Management Act, and the Atlantic Coastal Fisheries Cooperative Management Act. Also, under the Atlantic Coastal Act, financial assistance is provided in order to support and encourage the development, implementation, and

enforcement of effective interstate conservation and management of Atlantic Coastal resources.

The MARFIN Program promotes and endorses projects which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts that evoke the best research and management talents of the Southeast Region. The intent is to focus projects funded by MARFIN into cooperative efforts that provide clear answers for fishery needs covered by the NMFS Strategic Plan. An annual MARFIN Report is distributed throughout the United States. The Annual MARFIN Conference was conducted in December 1998 in Tampa, Florida.

The NMFS participates in the Saltonstall-Kennedy (S-K) Grant Program which is a national competitive program administered by the NMFS headquarters. The program provides financial assistance (grants or cooperative agreements) for research and development projects to benefit the

U.S. fishing industry.

Three fishery management councils in the Southeast U.S. received a total of \$3.67 million in 1998 to conduct fisheries management activities in accordance with the Magnuson-Stevens Fishery Conservation and Management Act.

Under the Unallied Science Program, grants and cooperative agreements in the amount of nearly \$1.86 million were provided to several states and research groups. Work included research on aquaculture and enhancement of wild stocks and included efforts to protect endangered species.

The Unallied Management Projects provided \$1.24 million for shrimp trawling and red snapper research, and the Cooperative Science and Education Program funded research to investigate fisheries interactions with marine mammals and to study life history components of coastal migratory bottlenose dolphins.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

OPERATIONAL ACTIVITIES

Budget Committee

The 1998 budget was reviewed, and future cost saving measures were discussed. Annual state liaison funding was increased, and a habitat cooperative agreement with the GSMFC was reviewed and approved. The 1999 budget was reviewed and approved. The Council selected Rivero, Gordimer and Company to conduct the 1997/1998 financial and compliance audit. The Council approved paying 100% of staff's health insurance premiums for dependents.

STATUS REPORT ON FMP RULES

- Western zone king mackerel fishery closed
- Control date for recreational for-hire vessels published
- Recreational fishery for red snapper was closed
- Notice of availability of Reef Fish Amendment 16a published
- Emergency/interim rule for red snapper bag limits implemented
- Ending date for Texas shrimp closure announced
- Stone Crab Amendment 6 implemented

STATUS OF PLAN DEVELOPMENT

Fishery Management Unit	Completed Implementation as of December 31, 1998	Target Date	Remarks
Billfish Plan ^{1,2}		1988	Draft Amendment 1 developed by the NMFS
Coastal Herring	Final profile completed	None	No further action
Coral	Amendments 1, 2, and 3 implemented	1984	
Groundfish	Draft completed, FMP development suspended	None	
Mackerel ^{2,3}	Amendments 1-8 implemented	1983	Amendment 9 approved Amendments 10 and 11 pending approval Amendment 12 in development

¹Secretarial FMP affecting gulf. The Council has a consultation role and may convene Scientific and Statistical Committee, Advisory Panel, or committees for advice on regulatory measures. Shark, tuna, and swordfish will become a single FMP.

²Operations plan completed or under development.

³Monitoring report completed.

Fishery Management Unit	Completed Implementation as of December 31, 1998	Target Date	Remarks
Reef Fish ^{2,3}	Amendments 1-15 implemented Amendments 8 and 10 withdrawn	1984	Amendment 16a and 16b submitted for implementation Amendment 17 in development
Red Drum ^{2,3}	Amendments 1, 2, and 3 implemented	1986	
Shark/ Swordfish/ Tuna ¹		1999	Draft FMP developed by the NMFS
Shrimp ^{2,3}	Amendments 1-9 implemented	1981	Amendments 10 and 11 under development
Spiny Lobster ^{2,3}	Amendments 1-4 implemented	1982	
Stone Crab ^{2,3}	Amendments 1-6 implemented	1979	Amendment 7 proposed

OTHER MEETINGS

Council members and/or staff participated in the following meetings:

- NMFS HMS AP (2 meetings)
- NMFS Billfish AP (1 meeting)
- Council Chairmen's Meeting
- SEAMAP Meeting
- NMFS Technical Meeting on SFA
- Council Technician Meeting on TSA Red Snapper Analyses
- South Atlantic Fisheries Management Council Meetings (2 meetings)
- GSMFC Meetings
- Operations Plan Meeting
- ICCAT Advisory Committee Meeting
- NMFS/Council Budget Meeting
- Tortugas Sanctuary Incursion Meeting
- Stone Crab/Shrimp Workshop
- NMFS Orientation Session
- Gulf & South Atlantic Development Foundation Meeting



ANADROMOUS FISHERIES

Doug Frugé, of the U.S. Fish and Wildlife Service's (FWS) Gulf Coast Fisheries Coordination Office (FCO) (Ocean Springs, Mississippi), continued serving as chairman of the GSMFC Anadromous Fish Subcommittee during 1998 and participated in the March (Destin, Florida) and October (San Antonio, Texas) subcommittee meetings.

Pascagoula River Water Temperature Study

The GSMFC funded a field project by the U.S. Geological Survey, Water Resources Division, in summer 1997 to conduct a water temperature survey of the Pascagoula River and portions of the Leaf and Chickasawhay rivers to help locate thermal refugia for striped bass in the river system. Data were collected in August and September of that year. Final raw data were received in early December 1997, and the Gulf Coast FCO analyzed the data in early 1998 using ArcView GIS and presented a report at the Anadromous Fisheries Subcommittee meeting in March 1998.

Fisheries Stewardship Initiative Project

The FWS funded a project titled *Restoration of striped bass in three Gulf of Mexico river systems* under its Fisheries Stewardship Initiative beginning in 1997. The project focuses on striped bass restoration in the Apalachicola-Chattahoochee-Flint (ACF) rivers system of Alabama, Florida, and Georgia; the Pascagoula River, Mississippi; and the Lake Pontchartrain basin, Louisiana and Mississippi. Funding in the amount of \$296,000 per year is being provided for federal fiscal years 1997-1999. The FWS and GSMFC enacted a cooperative agreement in June 1997 to facilitate cooperative efforts in implementing the multi-faceted project.

The project is being carried out by state fish and wildlife agencies and universities, most of which are under subcontract to the GSMFC, including the Florida Fish and Wildlife Conservation Commission (FFWCC), the Georgia Department of Natural Resources (GDNR), the Gulf Coast Research Laboratory (GCRL), the Louisiana Department of Wildlife and Fisheries (LDWF), and Mississippi State University (MSU). The FWS developed a separate intra-agency agreement with the Louisiana Cooperative Fish and Wildlife Research Unit for certain aspects of the project in the Lake Pontchartrain basin.

The Gulf Coast FCO provided field assistance to an MSU graduate student in attempts to capture striped bass with radiotelemetry in the lower Pascagoula River in March 1998. Assistance was also provided in releasing radio-tag implanted striped bass in the river in April. During summer 1998 efforts were made to coordinate FWS aircraft support for aerial radio-tracking of striped bass in the Pascagoula River. As this was not successful, additional funding was provided to MSU through the GSMFC for this aspect of the project.

The Gulf Coast FCO also funded and coordinated a special contract for analysis of molecular genetics (mitochondrial DNA) of striped bass collected in the Stewardship Project sampling programs. A total of 190 samples were submitted for analysis under the contract.

The FWS prepared a FY1998 progress report on the Fisheries Stewardship Initiative Project in October.

Apalachicola-Chattahoochee-Flint Rivers Striped Bass Restoration Technical Committee

Numerous FWS personnel attended the annual *Morone* workshop of the ACF rivers Striped Bass

Restoration Technical Committee in Chattahoochee, Florida on February 4-5, 1998. Status reports were presented by participating agencies, and Gulf striped bass stocking goals and priorities for 1998 were determined.

A meeting of the Technical Committee was held at the FWS Panama City Field Office (FO), Florida, in fall 1998. Representatives from the three states involved discussed broodfish collection, fish stocking evaluation, habitat issues, and the 1999 *Morone* Workshop, which was scheduled for February 3-4, 1999, in Apalachicola, Florida.

Striped Bass Fry/Fingerling Production and Stocking

Laura Jenkins of the FWS Panama City Fisheries Resource Office (FRO) continued coordinating gulf race striped bass broodfish collection, fry and fingerling production, and stocking across the Gulf of Mexico. Several special efforts were made in 1998 to utilize specific mitochondrial DNA genotypes as genetic markers in the stocking efforts.

Over 203,000 Phase II striped bass fingerlings were stocked in the lower Apalachicola River in late 1997 and early 1998, far surpassing the 1997 management goal of 100,000. Welaka National Fish Hatchery (NFH), Florida, raised and stocked most of the Phase II fish, with others being provided by Inks Dam NFH (Burnet, Texas); Private John Allen NFH (Tupelo, Mississippi); and Warm Springs NFH (Warm Springs, Georgia). The FWS, in cooperation with the FFWCC tagged 3,000 of the Phase II striped bass to help evaluate survival and effectiveness of stocking these fish in the lower Apalachicola River. The Panama City FRO continued efforts in 1998 to sample striped bass by electrofishing near White City, Florida to evaluate the Phase II stocking success.

National fish hatcheries (Ink's Dam, Texas; Natchitoches, Louisiana; Private John Allen, Mississippi; Warm Springs, Georgia; and Welaka, Florida) stocked a total of 743,000 Phase I gulf

race striped bass in Gulf of Mexico rivers in 1998, and Natchitoches NFH stocked an additional 391,000 Atlantic race striped bass in Toledo Bend Reservoir on the Sabine River (Texas/Louisiana border). All of these fingerlings were stocked in support of the GSMFC's striped bass restoration program and will also contribute to recreational fisheries in the five gulf states.

The FWS Southeast Regional Office began efforts during 1998 to develop a memorandum of understanding between the FWS and the Alabama Department of Conservation and Natural Resources covering the stocking of trout in reservoir tailwaters in exchange for gulf striped bass fry production at state fish hatcheries.

In November and December 1998, over 50,000 Phase II striped bass were stocked in the lower Apalachicola River. These 4"-6" fish were raised at Private John Allen NFH (Tupelo, Mississippi) and Warm Springs NFH (Warm Springs, Georgia). Post-stocking holding tests showed very good survival. Stocking of 1998 Phase II fingerlings was to be completed in early 1999.

Gulf Striped Bass Restoration Workshop

The FWS and the GSMFC cooperatively sponsored a workshop on gulf striped bass restoration at Pensacola Beach, Florida on November 18-19, 1998. Approximately 40 people attended the workshop, including a number of prominent striped bass specialists. The purpose of the workshop was to review the progress thus far in the Fisheries Stewardship Initiative project and to begin discussions preliminary to a revision of the GSMFC's Striped Bass FMP over the next few years.

Other Striped Bass Activities

During 1998 a number of striped bass fingerlings were sent by Welaka NFH to the FWS Warm Springs Regional Fisheries Center (RFC) for evaluation of yellow grub infestation. This is an on-going study conducted by Welaka NFH in conjunction with the Warm Springs RFC to

evaluate causes of and methods to prevent and treat these infestations.

Warm Springs NFH stocked 7,200 Phase II striped bass fingerlings into Lake Blackshear, a reservoir on the Chattahoochee River in Georgia. These fish were in support of a cooperative study between GDNR, the Georgia Cooperative Fish and Wildlife Research Unit, and the FWS to evaluate the use of thermal refugia by Phase II and adult striped bass in the reservoir. Secondary objectives are to evaluate differential abilities of hatchery versus "wild" fish, and fall versus spring stocked fish in finding refugia. The hatchery also provided eight adults (16-22 lb) as part of the study.

Gulf Sturgeon Recovery Activities

The Panama City FRO completed a sampling program for a population estimate of gulf sturgeon in the Apalachicola River below the Jim Woodruff Lock and Dam in Florida. Gill net sampling was conducted once a week for ten weeks, and a population estimate was made using the Schnable method. Results indicated a total population increase from the estimate of 95 fish in 1993 to 205 fish in 1998. However, large sturgeon (>100 pounds) accounted for 20% of the population in 1993, while only 6% of the 1998 population estimate was made up of large fish.

A project initiated in 1997 by a Ph.D. student from North Carolina State University, with support from the Panama City FRO, to track gulf sturgeon with sonic transmitters in Choctawhatchee Bay continued on a weekly basis. Fish were generally using the same habitats as found the previous year, with the exception of a small number of fish recorded at stationary remote receivers located at the entrances to the Gulf of Mexico and Santa Rosa Sound. A similar project in Pensacola Bay began in 1998, assisted by personnel of FFWCC.

The Baton Rouge FRO provided assistance to the Southeast Louisiana District Fisheries Office of the LDWF with gulf sturgeon sampling in the Tchefuncte River of the Lake Pontchartrain basin.

The Panama City FRO also sampled for gulf sturgeon in Mobile Bay, Alabama, although no sturgeon were caught.

Coordination and discussion continued on Florida's plan to promote commercial aquaculture of various sturgeon species in Florida. The Panama City FRO submitted an issue paper to the FWS Regional Office outlining concerns and options. Comments were also provided to the state on the draft *Implementation Plan for the Commercial Culture and Conservation of Native Sturgeon in Florida*.

The Warm Springs RFC began a three-year comparative study to evaluate the influence of rearing environment and water temperature on morphological and physiological development of gulf and Atlantic sturgeon. One of the primary morphological characteristics that distinguishes gulf sturgeon from Atlantic sturgeon is an elongated and enlarged spleen in gulf sturgeon. It is theorized that higher water temperature and lower oxygen levels in the gulf sturgeon's rearing habitat has created a greater demand on the circulatory system resulting in a larger spleen for platelet production. Raising both subspecies under identical environmental conditions may help to determine whether this characteristic is genetically predetermined or the result of differences in rearing habitat.

Personnel of the Panama City FRO equipped eight gulf sturgeon being held at the Welaka NFH with external "dummy" radio and sonic tags to evaluate retention of various types of tags and alternative placement on the fish.

In July, the Panama City FRO held a "mini" gulf sturgeon workshop in Long Beach, Mississippi. The purpose of the workshop was to discuss current gulf sturgeon studies and identify areas that need more attention. Thirteen gulf sturgeon management researchers from Louisiana, Mississippi, and Florida attended the workshop.

Gail Carmody, Panama City FRO Project Leader, participated in the first joint meeting of the NMFS and FWS on Atlantic and gulf

sturgeon. A number of issues (and potential cooperative actions) were discussed.

Frank Parauka of the Panama City FRO attended a sturgeon workshop in Gainesville, Florida. The objective of the workshop, sponsored by the SeaGrant Extension Program, was to develop an initiative for sturgeon research in the United States.

OTHER COASTAL FISHERIES

The FWS Corpus Christi FRO (Texas) completed a final report on edible brown mussel (*Perna perna*) monitoring in Texas coastal waters.

The Panama City FRO completed a survey in 1998 titled *Fisheries and Aquatic Resources Management Needs and Priorities on NWRs in the Southeast Region*. This report included information on coastal fisheries concerns on national wildlife refuges (NWR).

Wilson Laney (South Atlantic Fisheries Coordination Office, Raleigh, North Carolina) participated in meetings of the FIN as the FWS representative.

Sam Hamilton, FWS Southeast Regional Director; Deputy Regional Director Dale Hall; and Assistant Regional Director (ARD) for Fisheries Columbus Brown met with Larry Simpson and Ron Lukens of the GSMFC in Atlanta, Georgia in May. The purpose of the meeting was to brief Hamilton on the GSMFC, its programs, and partnership activities with the FWS in coastal fisheries management.

The Panama City Ecological Services Field Office (ESFO) cooperated in a study to determine if sea turtle incubation temperatures and the ratios of male to female turtles being hatched in the Florida Panhandle area are similar to other southeastern U.S. nesting beaches.

The St. Vincent NWR staff was helpful in convincing the Franklin County Commission, Florida, to pass a sea turtle lighting ordinance in June. Also, a green sea turtle nest was recorded

on the refuge for the first time ever during June.

HABITAT PROTECTION/ENHANCEMENT

Gulf of Mexico Program

Gulf Coast Fisheries Coordinator (FC) Doug Frugé participated in the Gulf of Mexico Program's Nutrient Enrichment Focus Team meeting at Stennis Space Center, Mississippi on August 12-13.

Essential Fish Habitat

In January, Gulf Coast FC Doug Frugé re-drafted two sections of the GMFMC draft FMP amendment to designate EFH in accordance with the Magnuson-Stevens Sustainable Fisheries Act. The sections revised were on "exotic species" and "global environmental shifts." Mr. Frugé later participated in a May meeting in New Orleans, Louisiana, of the GMFMC Technical Review Panel to review the next draft of the amendment. Panama City FRO personnel attended the EFH public hearing at Panama City Beach, Florida during summer 1998. Comments by numerous FWS offices on the EFH amendment were compiled and forwarded to the GMFMC through the FWS Southeast Regional Office.

Other Habitat Protection Activities

At its January meeting the GMFMC took action to send letters to the FFWCC and the U.S. EPA endorsing concerns by the FWS on a National Pollutant Discharge Elimination System (NPDES) permit revision proposal by Buckeye Florida, LP (a pulp paper mill) for discharge into the Fennholloway River. The proposed revision involved moving the discharge point downstream to near the mouth of the river, thus posing greater impacts to coastal habitats. The GMFMC had already gone on record opposing the permit revision.

The Panama City and Daphne, Alabama ESFOs continued participation in numerous meetings regarding water allocation in the ACF and Alabama-Coosa-Tallapoosa river basins.

Those offices were also heavily involved in evaluating the effects of water allocation alternatives on water quality and in developing models for predicting effects of alternatives on various biological resources in the basins. Panama City ESFO Project Leader Gail Carmody represented the Department of the Interior at the first ACF water commission meeting.

Gulf Coast FC Doug Frugé and Fisheries ARD Columbus Brown attended a symposium on EFH and marine reserves at the MML in Sarasota, Florida on November 4-5, 1998. Mr. Brown presented a paper that he jointly authored with a number of other FWS personnel titled *Managing overlapping fisheries and wildlife habitats*.

Doug Frugé was appointed chairman of the GMFMC's Habitat Protection Committee for 1999 at the GMFMC's November 1998 meeting.

The Panama City ESFO initiated an experimental seagrass protection project in St. Andrew Bay involving warning buoys and subsequent evaluation to determine adequacy of materials and installation as well as effectiveness in reducing propeller damage to seagrass beds.

The FWS's ESFOs were active in reviewing and commenting on various federal construction and/or permit-related actions involving habitat alteration activities throughout the year. These mostly encompassed COE permitted activities through the Fish and Wildlife Coordination Act and Section 7 consultations under the Endangered Species Act. Mitigation for coastal habitat damages were recommended in FWS comments on these projects.

PUBLIC OUTREACH/EDUCATION

The Panama City FRO posted signs in several locations along the lower Apalachicola River displaying striped bass size limits and tag return

requests. Personnel of the Panama City FRO also set up gulf sturgeon and sea turtle exhibits at Choctawhatchee Bay Day in Niceville, Florida. Over 2,000 people attended the event, which featured exhibits and activities celebrating Choctawhatchee Bay.

Frank Parauka of the Panama City FRO gave a presentation on gulf sturgeon to the Geneva, Alabama Rotary Club again this year to provide updated information on the sturgeon research being conducted in the Choctawhatchee River, where sturgeon spawning sites have been located near the town of Geneva. The local people are very interested in the project. A similar presentation was made in 1997.

The Panama City FRO also provided questions and answers about gulf sturgeon to be placed on the FFWCC Choctawhatchee Bay ecosystem Internet site.

Numerous coastal FWS offices participated in a variety of public events by staffing information tables, participating in special youth fishing events, and presenting programs to civic groups, school classes, and other organizations.

FEDERAL AID FUNDING

The FWS continued providing funds to Gulf of Mexico states for a number of estuarine or marine sport fish restoration projects under the Federal Aid in Sport Fish Restoration Act. This also included provision of funds to the GSMFC through an administrative grant under that act.

Doug Frugé attended a meeting at the Mississippi Sandhill Crane NWR on June 12 regarding a north central Gulf of Mexico wetlands initiative being developed by the FWS Federal Aid Division. Several potential partners in this initiative were represented at the meeting.

GULF STATES MARINE FISHERIES COMMISSION

**Report on Examination of Financial Statements,
Supplemental Data, Internal Control, and Compliance**

for the year ended
December 31, 1998

We have retained the original page numbering sequence on the following pages.

Financial Statements

Gulf States Marine Fisheries Commission
Ocean Springs, Mississippi

December 31, 1998

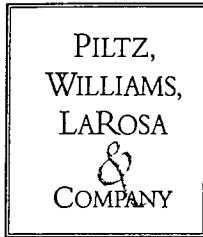
Gulf States Marine Fisheries Commission
Ocean Springs, Mississippi

Financial Statements

December 31, 1998

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Independent Auditors' Report

Board of Commissioners
Gulf States Marine Fisheries Commission
Ocean Springs, Mississippi

We have audited the accompanying statements of assets, liabilities and net assets-modified cash basis as of December 31, 1998 and 1997, and the related statements of revenues, expenses and net assets-modified cash basis, and cash flows-modified cash basis for the years then ended. These financial statements are the responsibility of Gulf States Marine Fisheries Commission's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards and the standards applicable to financial audits contained in Government Auditing Standards, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

As described in Note A, these financial statements were prepared on the modified cash basis of accounting, which is a comprehensive basis of accounting other than generally accepted accounting principles.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Gulf States Marine Fisheries Commission as of December 31, 1998 and 1997, and the changes in its net assets-modified cash basis, and its cash flows-modified cash basis for the years then ended in conformity with generally accepted accounting principles.

In accordance with *Government Auditing Standards*, we have also issued our report dated April 26, 1999 on our consideration of Gulf States Marine Fisheries Commission's internal control over financial reporting and our tests of its compliance with certain provisions of laws, regulations, contracts and grants.

Our audit was performed for the purpose of forming an opinion on the basic financial statements of Gulf States Marine Fisheries Commission taken as a whole. The accompanying financial information listed as supplemental information in the Index to Report, including Schedule of Expenditures of Federal Awards which is required by U.S. Office of Management and Budget Circular A-133, *Audits of States, Local Governments, and Non-Profit Organizations*, is presented for purposes of additional analysis and is not a required part of the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and, in our opinion, is fairly stated, in all material respects, in relation to the basic financial statements taken as a whole.

Pitz, Williams, Johnson & Co.
Certified Public Accountants

Biloxi, Mississippi
April 26, 1999

Section I

Financial Statements

Gulf States Marine Fisheries Commission
Statements of Assets, Liabilities and Net Assets-Modified Cash Basis

Assets	December 31,	
	<u>1998</u>	<u>1997</u>
Current assets		
Cash	\$ 219,291	\$ 288,174
Salary advance	<u>175</u>	<u> </u>
Total current assets	<u>219,466</u>	<u>288,174</u>
Property & equipment		
Land	20,000	20,000
Building	182,817	182,817
Vehicles	61,746	61,746
Equipment	<u>279,612</u>	<u>142,543</u>
Totals	544,175	407,106
Less accumulated depreciation	<u>141,215</u>	<u>104,551</u>
Total property & equipment	<u>402,960</u>	<u>302,555</u>
Totals	<u>\$ 622,426</u>	<u>\$ 590,729</u>
Liabilities & Net Assets		
Current liabilities		
Unexpended insurance proceeds	\$ 21,515	\$
Note payments, due within one year	<u>6,072</u>	<u>11,837</u>
Total current liabilities	<u>27,587</u>	<u>11,837</u>
Long-term liabilities		
Note payments, due beyond one year	<u>135,592</u>	<u>141,372</u>
Net assets		
Unrestricted:		
Operating	202,532	163,551
Temporarily restricted	62,531	194,263
Investment in property and equipment, restricted	<u>194,184</u>	<u>79,706</u>
Total net assets	<u>459,247</u>	<u>437,520</u>
Totals	<u>\$ 622,426</u>	<u>\$ 590,729</u>

See Notes to Financial Statements.

Gulf States Marine Fisheries Commission
Statements of Revenues and Expenses – Modified Cash Basis

	Unrestricted		Temporarily Restricted		Total	
	1998	1997	1998	1997	1998	1997
Revenues & reclassifications						
Member state appropriations	\$ 135,000	\$ 90,000	\$	\$	\$ 135,000	\$ 90,000
Grant/contract support			1,780,252	1,062,087	1,780,252	1,062,087
Rental income	18,934	11,275			18,934	11,275
Fees	6,165	4,483			6,165	4,483
Interest income	7,555	7,070			7,555	7,070
Other	193				193	
Net assets released from restrictions	<u>1,903,135</u>	<u>946,231</u>	<u>(1,903,135)</u>	<u>(946,231)</u>		
Total revenues & reclassifications	<u>2,070,982</u>	<u>1,059,059</u>	<u>(122,883)</u>	<u>115,856</u>	<u>1,948,099</u>	<u>1,174,915</u>
Expenses						
Programs:						
Fishery Management Council	24,680	25,409			24,680	25,409
Port Samplers	126,398	28,103			126,398	28,103
Fish & Wildlife	22,630	16,727			22,630	16,727
Interjurisdictional Fisheries	272,090	231,749			272,090	231,749
SEAMAP	80,362	85,590			80,362	85,590
RECFIN/COMFIN	473,228	170,072			473,228	170,072
Sportfish Restoration	214,510	235,954			214,510	235,954
Striped Bass	290,579	203,966			290,579	203,966
Habitat	46,649	14,696			46,649	14,696
Transition	<u>350,200</u>				<u>350,200</u>	
Totals	<u>1,901,326</u>	<u>1,012,266</u>			<u>1,901,326</u>	<u>1,012,266</u>
General & administrative	<u>139,524</u>	<u>120,215</u>			<u>139,524</u>	<u>120,215</u>
Total expenses	<u>2,040,850</u>	<u>1,132,481</u>			<u>2,040,850</u>	<u>1,132,481</u>
Excess (deficiency) of revenues and reclassifications over expenses	30,132	(73,422)	(122,883)	115,856	(92,751)	42,434
Change in net assets						
Transfers in (out)	<u>8,849</u>		<u>(8,849)</u>			
Total changes in net assets	<u>38,981</u>	<u>(73,422)</u>	<u>(131,732)</u>	<u>115,856</u>	<u>(92,751)</u>	<u>42,434</u>
Net assets, beginning of year	<u>163,551</u>	<u>236,973</u>	<u>194,263</u>	<u>78,407</u>	<u>357,814</u>	<u>315,380</u>
Net assets, end of year	<u>\$ 202,532</u>	<u>\$ 163,551</u>	<u>\$ 62,531</u>	<u>\$ 194,263</u>	<u>\$ 265,063</u>	<u>\$ 357,814</u>

See Notes to Financial Statements.

Gulf States Marine Fisheries Commission
Statement of Cash Flows-Modified Cash Basis

	Year Ended December 31,	
	<u>1998</u>	<u>1997</u>
Cash flows from operating activities		
Changes in net assets	\$(92,751)	\$ 42,434
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Salary advance	(175)	
Depreciation	9,670	7,639
Collection of prior year grants receivable		17,709
Acquisition cost of vehicles and equipment included in operating activities	135,908	67,579
Copier lease payments included in operating activities	<u>5,564</u>	
Net cash provided by operating activities	<u>58,216</u>	<u>135,361</u>
Cash flows from investing activities		
Purchase of building		(202,817)
Purchase of vehicles & equipment	(137,069)	(77,621)
Unexpended insurance proceeds	<u>21,515</u>	
Net cash used in investing activities	<u>(115,554)</u>	<u>(280,438)</u>
Cash flows from financing activities		
Note proceeds, building		150,008
Note proceeds, equipment		33,696
Note payments	(11,545)	(39,628)
Net cash provided by financing activities	<u>(11,545)</u>	<u>144,076</u>
Net decrease in cash	(68,883)	(1,001)
Cash, beginning of year	<u>288,174</u>	<u>289,175</u>
Cash, end of year	<u>\$ 219,291</u>	<u>\$ 288,174</u>
Interest paid	<u>\$ 12,568</u>	<u>\$ 7,735</u>

See Notes to Financial Statements.

Gulf States Marine Fisheries Commission
Notes to Financial Statements
Year Ended December 31, 1998

Note A – Summary of Significant Accounting Policies

Operations – The Gulf States Marine Fisheries Commission, a not-for-profit organization, was formally created, with the consent of the 81st Congress of the United States, granted by Public Law 66 and approved May 19, 1949. Congress authorized an interstate compact relating to the better utilization of the fisheries of the Gulf of Mexico. Parties to the agreement are the states of Alabama, Florida, Louisiana, Mississippi and Texas. The commission's office is centrally located in Ocean Springs, Mississippi.

The Commission receives and expends such sums of money as shall from time to time be appropriated for its use by the participating governing authorities, and makes application for and receives and expends funds available under appropriated Federal Programs. The Commission may also receive and expend funds from any other sources not "prohibited by law".

Basis of accounting – The accompanying financial statements have been prepared on the modified cash basis of accounting. That basis differs from generally accepted accounting principles because the Commission has not recognized balances, and the related effects on earnings, of grant receivables from third party agencies, acquisition and depreciation of equipment and of accounts payable to vendors.

Revenues – Revenues consist principally of the member state appropriations, which represent the estimated cost of operating the Commission, grants and procurement/service contracts. The member state appropriations are considered to be available for unrestricted use and are reported as unrestricted net assets. Grants and procurement/service contracts are considered to be restricted in their use and are therefore reported as temporarily restricted net assets.

Fixed assets – The Commission has adopted a policy of capitalizing assets with an acquisition cost of \$500 or more. Fixed assets purchased from unrestricted funds are recorded at cost. Fixed assets purchased from restricted funds are expensed in the fund making the expenditures. They are then recorded as a capital addition at cost, with an offsetting entry to an equity account. Depreciation is computed on the straight-line method over the estimated useful lives of the assets.

Cash and cash equivalents – Cash and cash equivalents for purposes of the Statement of Cash Flows exclude permanently restricted cash and cash equivalents.

Income taxes – The Commission is exempt from income taxes under Internal Revenue Code Section 501(c)(5) and is classified by the Internal Revenue Service as an agricultural organization.

Estimates – The preparation of financial statements in conformity with generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from these estimates.

Gulf States Marine Fisheries Commission
Notes to Financial Statements
Year Ended December 31, 1998
(Continued)

Note B – Concentration of Credit Risk

The Commission maintains two bank accounts at one financial institution. The carrying amount of the Commission's deposits with the financial institution was \$219,266 and the bank balance was \$437,988. Accounts at the financial institution are insured by the Federal Deposit Insurance Corporation (FDIC) up to \$100,000. Cash in these accounts exceeded the federally insured limit. The uninsured bank balance at December 31, 1998 and 1997 was \$337,988 and \$302,531, respectively. The uninsured bank balance was collateralized in the amount of \$400,000 with securities held by the pledging financial institution's trust department or agent in the Commission's name.

Note C – Property, Plan and Equipment

The Organization's land, depreciable property and equipment may be stated as follows:

	December 31,	
	<u>1998</u>	<u>1997</u>
Land, pledged	\$ 20,000	\$ 20,000
Building, pledged	182,817	182,817
Vehicles	61,746	61,746
Office equipment	<u>279,612</u>	<u>142,543</u>
Totals	544,175	407,106
Less accumulated depreciation	<u>141,215</u>	<u>104,551</u>
Total property and equipment	<u>\$ 402,960</u>	<u>\$ 302,555</u>
Depreciation expense	<u>\$ 36,664</u>	<u>\$ 21,575</u>

Note D – Temporarily Restricted Net Assets

Temporarily restricted net assets are available for the following purposes or periods:

	December 31,	
	<u>1998</u>	<u>1997</u>
RECFIN/COMFIN	\$ 2,537	\$
Sportfish restoration	677	
Striped Bass		12,852
Fishery Management Council	118	
Port Samplers	59,199	178,114
DNA		1,680
Chevron		<u>1,617</u>
Total temporarily restricted net assets	<u>\$ 62,531</u>	<u>\$ 194,263</u>

Gulf States Marine Fisheries Commission
Notes to Financial Statements
Year Ended December 31, 1998
(Continued)

Note E – Property & Equipment – Restricted

This account represents the federal funds equity in property and equipment acquired with federal funds. Following is the current year activity in this account:

	December 31,	
	<u>1998</u>	<u>1997</u>
Balance, beginning of year	\$ 79,706	\$ 58,689
Add:		
Federal funds expended for capital additions	<u>141,472</u>	<u>73,836</u>
Totals	<u>221,178</u>	<u>132,525</u>
Deduct:		
Balance due on copier purchased		6,258
Assets disposed of during year		6,916
Adjustment to record beginning of year accumulated depreciation		25,710
Current year depreciation	<u>26,994</u>	<u>13,935</u>
Total deductions	<u>26,994</u>	<u>52,819</u>
Balance, end of year	<u>\$ 194,184</u>	<u>\$ 79,706</u>

Note F – Release of Net Assets

Net assets were released from donor restrictions by incurring expenses satisfying the restricted purposes or by the occurrence of other events specified by donors.

	December 31,	
	<u>1998</u>	<u>1997</u>
Purpose restriction accomplished:		
Fishery Management Council	\$ 24,882	\$ 25,206
Port Samplers	126,398	28,103
Fish and Wildlife	24,771	9,394
Interjurisdictional Fisheries	274,788	216,572
SEAMAP	85,097	80,524
RECFIN/COMFIN	485,417	157,884
Sportfish Restoration	225,882	224,582
Striped Bass	282,947	203,966
Habitat	40,452	
Transition	<u>332,501</u>	
Total restrictions released	<u>\$ 1,903,135</u>	<u>\$ 946,231</u>

Gulf States Marine Fisheries Commission
Notes to Financial Statements
Year Ended December 31, 1998
(Continued)

Note G – Notes Payable

During the prior year the Commission acquired the building that it had previously been renting. This acquisition was financed in part with a loan from Hancock Bank. Details of the financing are as follows:

Original loan amount	\$ 150,008
Interest rate	8.5%
Payment terms	60 monthly payments of \$1,488, plus 1 of remaining balance
Collateral	Land and building at 204 Government St. Ocean Springs, Ms

During the prior year the Commission acquired a new copy machine. The financing details are as follows:

Cost of copier	\$ 25,032
Payment terms	Initial payment of \$4,172 plus 10 payments of \$2,086
Collateral	Ricoh 8980 copier

	December 31,	
	1998	1997
Hancock Bank, building purchase	\$ 141,664	\$ 146,951
Copier purchase		6,258
Totals	141,664	153,209
Less amounts due within one year	6,072	11,837
Amounts due beyond one year	\$ <u>135,592</u>	\$ <u>141,372</u>

Maturities by years are as follows:

<u>Year Ending</u>	
12/31/99	\$ 6,072
12/31/00	6,609
12/31/01	7,193
12/31/02	<u>121,790</u>
Total	\$ <u>141,664</u>

Note H - Functional Allocation of Expenses

The costs of providing the various programs and activities have been summarized on a functional basis in the Statement of Revenues, Expenses and Changes in Net Assets-Modified Cash Basis. Accordingly, certain costs have been allocated among the programs and supporting services benefited.

Gulf States Marine Fisheries Commission
Notes to Financial Statements
Year Ended December 31, 1998
(Continued)

Note I – Retirement Plan

The Commission has a tax sheltered annuity plan for all employees that have been employed for at least six (6) months. The Commission contributes seven (7) percent of each eligible employee's base pay with the amounts being fully vested upon payment by the Commission. The total expenses for the year ended December 31, 1998 and 1997 was \$24,735 and \$19,375, respectively.

Note J – Lease

During the current year, the Commission entered into a lease for a 1998 GMC Suburban. This lease is treated as an operating lease. It is for a term of 60 months with payments of \$464 per month. Lease payments under the terms of this lease may be shown as follows:

<u>December 31,</u>	
1998	\$ 5,568
1999	5,568
2000	5,568
2001	5,568
2002	<u>5,568</u>
Total	<u>\$ 27,840</u>

Note K – Subsequent Event

Subsequent to the end of the year, the Commission entered into a lease-purchase agreement for the purchase of a Xerox Copier. The terms of the lease are for 60 monthly payments of \$810.

Lease payments under the terms of this lease may be shown as follows:

<u>December 31,</u>	
1999	\$ 7,290
2000	9,720
2001	9,720
2002	9,720
2003	9,720
2004	<u>2,430</u>
Total	<u>\$ 48,600</u>

SEAMAP Funds	RECFIN/ COMFIN	Sportfish Restoration	Restricted			Transition	Total
			Striped Bass	Habitat			
\$ 32,929	\$ 44,258	\$ 66,163	\$ 14,322	\$ 30,249	\$ 78,687	\$ 375,078	
2,519	3,354	5,061	1,096	2,208	6,020	28,662	
4,679	6,438	11,883	2,186	4,072	10,168	54,792	
1,854	3,209	3,600	867	910	4,335	21,010	
						3,735	
27	61	66				242	
1,460	2,956	2,843	79	430	6,294	18,234	
3,479	6,676	1,599	57	71	354	17,878	
18,594	57,563	47,451	13	4,327	20,703	237,128	
2,978	8,072	4,753	455	1,465	5,740	30,457	
1,267	3,076	850	356	506	179	8,716	
4,915	82	4,006	7	23	477	11,529	
1,198	5,731	4,650		259	799	22,253	
174	344	775	23	86	595	2,539	
20	23	7,617		252	48	8,638	
307	650	654	52	133	11,218	13,986	
755	1,641	1,794	55	227	866	7,672	
1,110	2,372	2,570	4	516		10,046	
575	1,012	1,223	112	284	870	5,810	
25	322,035	40,935	270,737		71,535	870,625	
618	1,296	1,836	73	352	958	6,961	
392	818	902	49	203	793	4,317	
487	1,561	3,279	36	76	129,561	141,018	
<u>\$ 80,362</u>	<u>\$ 473,228</u>	<u>\$ 214,510</u>	<u>\$ 290,579</u>	<u>\$ 46,649</u>	<u>\$ 350,200</u>	<u>\$ 1,901,326</u>	

See Independent Auditors' Report.

Gulf States Marine Fisheries Commission
Schedule of Federal Awards – Modified Cash Basis
For the Year Ended December 31, 1998

<u>Federal Grantor/Program Title</u>	<u>Catalog of Federal Domestic Assistance</u>	<u>Federal Revenues Received</u>	<u>Federal Amount Expended</u>
U.S. Department of Interior			
Striped Bass Stewardship Project	15.600	\$ 270,095	\$ 290,579
Sports Fish Restoration Program	15.605	<u>226,559</u>	<u>214,510</u>
Total U. S. Department of Interior		<u>496,654</u>	<u>505,089</u>
U.S. Department of Commerce			
Interjurisdictional Fisheries Management Plan	11.407	274,788	272,090
Recreational fisheries Information Network (RECFIN) and Commercial Fisheries Information Network (COMFIN)	11.434	487,953	473,228
Cooperative Fishery Statistics (Transition)	11.434	332,501	350,200
Southeast Area Monitoring and Assessment Program (SEAMAP)	11.435	<u>85,097</u>	<u>80,362</u>
Total U. S. Department of Commerce		<u>1,180,339</u>	<u>1,175,880</u>
Totals for all federal awards		<u>\$ 1,676,993</u>	<u>\$ 1,680,969</u>

Note – This schedule was prepared using the same basis of accounting and the same significant accounting policies, as applicable, used for the financial statements.

See Independent Auditors' Report.

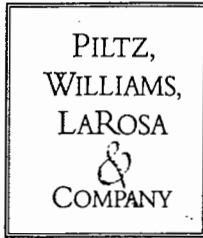
Section II
Supplemental Information

Gulf States Marine Fisheries Commission
Schedule of Functional Expenses-Modified Cash Basis
For the Year Ended December 31, 1998

Expenses	<u>Unrestricted</u>				
	<u>General</u>	<u>Council Funds</u>	<u>Port Samplers</u>	<u>Fish and Wildlife</u>	<u>Interjurisdictional</u>
Salaries	\$ 48,363	\$ 18,807	\$	\$ 13,017	\$ 76,646
Payroll taxes	3,700	1,439		996	5,969
Health insurance	6,952	2,746		1,866	10,754
Retirement	3,725	1,479		870	3,886
Office rent				3,735	
Equipment rental				5	83
Office supplies	4,461			167	4,005
Postage	1,240			43	5,599
Travel	9,393			8	88,469
Telephone	3,400	71		776	6,147
Copy expense	236			636	1,846
Printing	3,581			6	2,013
Meeting costs	12,960			1	9,615
Subscriptions & dues	759	12		33	497
Auto expense	1,799				678
Maintenance	727			55	917
Janitorial	4,029			60	2,274
Professional services	1,932			176	3,298
Other taxes	3,447	126		90	1,518
Contractual			126,398		38,960
Insurance	3,473			4	1,824
Utilities	2,021			6	1,154
Courtesies	868				
Equipment	220			80	5,938
Depreciation	9,670				
Interest expense	12,568				
Totals	<u>\$ 139,524</u>	<u>\$ 24,680</u>	<u>\$ 126,398</u>	<u>\$ 22,630</u>	<u>\$ 272,090</u>

Section III

Reports on Compliance and Internal Control



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Independent Auditors' Report
On the Compliance and Internal Control over Financial Reporting
Based on an Audit of the Financial Statements
Performed in Accordance with *Government Auditing Standards*

Board of Commissioners
Gulf States Marine Fisheries Commission
Ocean Springs, Mississippi

We have audited the general purpose financial statements of Gulf States Marine Fisheries Commission as of and for the year ended December 31, 1998, and have issued our report thereon dated April 26, 1999. We conducted our audit in accordance with generally accepted auditing standards and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States.

Compliance

As part of attaining reasonable assurance about whether Gulf States Marine Fisheries Commission's financial statements are free of material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts and grants, noncompliance with which could have a direct and material effect on the determination of financial statement amounts. However, providing an opinion on compliance with those provisions was not an objective of our audit and, accordingly, we do not express such an opinion. The results of our tests did not disclose any instances of noncompliance that are required under *Government Auditing Standards*.

Internal Control Over Financial Reporting

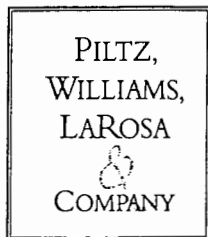
In planning and performing our audit, we considered Gulf States Marine Fisheries Commission's internal control over financial reporting in order to determine our auditing procedures for the purpose of expressing our opinion on the financial statements and not to provide assurance on the internal control over financial reporting. However, we noted certain matters involving the internal control over financial reporting and its operation that we consider to be reportable conditions. Reportable conditions involve matters coming to our attention relating to significant deficiencies in the design or operation of the internal control over financial reporting that, in our judgment, could adversely affect Gulf States Marine Fisheries Commission's ability to record, process, summarize and report financial data consistent with the assertions of management in the financial statements. Reportable conditions are described in the accompanying Schedule of Findings and Questioned Costs as Item 98-1.

A material weakness is a condition in which the design or operation of one or more of the internal control components does not reduce to a relatively low level the risk that misstatements in amounts that would be material in relation to the financial statements being audited may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions. Our consideration of the internal control over financial reporting would not necessarily disclose all matters in the internal control that might be reportable conditions and, accordingly, would not necessarily disclose all reportable conditions that are also considered to be material weaknesses. However, we believe none of the reportable conditions described above is a material weakness.

This report is intended solely for the information of the Commission, management, others within the organization and federal awarding agencies and pass-through entities and is not intended to be and should not be used by anyone other than these specified parties.

Pitz, Williams, Jr. Rose & Co.
Certified Public Accountants

Biloxi, Mississippi
April 26, 1999



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Independent Auditors' Report on Compliance with Requirements Applicable to Each Major Federal Program and Internal Control Over Compliance in Accordance with OMB Circular A-133

Board of Commissioners
Gulf States Marine Fisheries Commission
Ocean Springs, Mississippi

Compliance

We have audited the compliance of Gulf States Marine Fisheries Commission with the types of compliance requirements described in the *U.S. Office of Management and Budget (OMB) Circular A-133 Compliance Supplement* that are applicable to each of its major federal programs for the year ended December 31, 1998. Gulf States Marine Fisheries Commission's major federal programs are identified in the summary of auditors' results section of the accompanying Schedule of Findings and Questioned Costs. Compliance with the requirements of laws, regulations, contracts and grants applicable to each of its major federal programs is the responsibility of Gulf States Marine Fisheries Commission's management. Our responsibility is to express an opinion on Gulf States Marine Fisheries Commission's compliance based on our audit.

We conducted our audit of compliance in accordance with generally accepted auditing standards; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and OMB Circular A-133, *Audits of State, Local Governments, and Non-Profit Organizations*. Those standards and OMB Circular A-133 require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about Gulf States Marine Fisheries Commission's compliance with those requirements and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion. Our audit does not provide a legal determination on Gulf States Marine Fisheries Commission's compliance with those requirements.

In our opinion, Gulf States Marine Fisheries Commission complied, in all material respects, with the requirements referred to above that are applicable to each of its major federal programs for the year ended December 31, 1998.

Internal Control Over Compliance

The management of Gulf States Marine Fisheries Commission is responsible for establishing and maintaining effective internal control over compliance with requirements of laws, regulations, contracts and grants applicable to federal programs. In planning and performing our audit, we considered Gulf States Marine Fisheries Commission's internal control over compliance with requirements that could have a direct and material effect on a major federal program in order to determine our auditing procedures for the purpose of expressing our opinion on compliance and to test and report on internal control over compliance in accordance with OMB Circular A-133.

We noted certain matters involving the internal control over compliance and its operation that we consider to be reportable conditions. Reportable conditions involve matters coming to our attention relating to significant deficiencies in the design or operation of the internal control over compliance that, in our judgment, could adversely affect Gulf States Marine Fisheries Commission's ability to administer a major federal program in accordance with applicable requirements of laws, regulations, contracts and grants. Reportable conditions are described in the accompanying Schedule of Findings and Questioned Costs as Item 98-1.

A material weakness is a condition in which the design or operation of one or more of the internal control components does not reduce to a relatively low level the risk that noncompliance with applicable requirements of laws, regulations, contracts and grants that would be material in relation to a major federal program being audited may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions. Our consideration of the internal control over compliance would not necessarily disclose all matters in the internal control that might be reportable conditions and, accordingly, would not necessarily disclose all reportable conditions that are also considered to be material weaknesses. However, we believe none of the reportable conditions described above is a material weakness.

This report is intended solely for the information of the Commission, management, others within the organization and federal awarding agencies and pass-through entities and is not intended to be and should not be used by anyone other than these specified parties.

Ritz, Williams, Fulson & Co.
Certified Public Accountants

Biloxi, Mississippi
April 26, 1999

Section IV

Other Items

Gulf States Marine Fisheries Commission
Schedule of Findings and Questioned Costs
For the Year Ended December 31, 1998

Section 1 – Summary of Auditors' Results

1. An unqualified opinion was issued on the general-purpose financial statements.
2. The audit of the general-purpose financial statements did not disclose any material weaknesses in internal control.
3. The audit did not disclose any noncompliance which is material to the general-purpose financial statements.
4. The audit did not disclose any material weaknesses in internal control over major programs.
5. An unqualified opinion was issued on compliance for major programs.
6. The audit disclosed one audit finding which was required to be reported under Section ____ .510(a) of OMB Circular A-133.
7. The major programs were: Recreational Fisheries Information Network and Commerical Fisheries Information Network – 11.434; Cooperative Fishery Statistics (Transition) – 11.434; Southeast Area Monitoring and Assessment Program – 11.435.
8. The dollar threshold used to distinguish between Type A and Type B Programs was \$300,000.
9. The auditee does qualify as a low-risk auditee.

Section 2 – Findings Related to the Financial Statements

Finding 98-1

Travel – During the course of our examination, we noted that a travel advance had been charged to specific programs. However, the travel was subsequently cancelled because of a hurricane. Rather than refunding the advance, it was applied against the travel costs of another program. This resulted in travel costs being charged to inappropriate programs. The costs were later reclassified and charged against the proper program.

Recommendation – This appeared to be an isolated instance that the Commission's internal controls failed to detect. We recommend that advances only be applied against program travel for which they were obtained and if the travel is cancelled that the advance be refunded.

Gulf States Marine Fisheries Commission
Schedule of Findings and Questioned Costs
For the Year Ended December 31, 1998
(Continued)

Section 3 – Findings and Questioned Costs for Federal Awards

Finding 98-1

Program (Cooperative Fishery Statistics 11.434) - The finding outlined above occurred in this program.

Requirement – Only costs associated with a program should be charged to that program.

Effect – The above finding had no impact on any of the Commission's programs.

Questioned costs – This finding did not result in any questioned costs.



Larry B. Simpson
Executive Director

GULF STATES MARINE FISHERIES COMMISSION

P.O. Box 726, Ocean Springs, MS 39566-0726
(601) 875-5912 (FAX) 875-6604

Auditee's Corrective Action Plan

As required by Section ____ .315(b) of OMB Circular A-133, Gulf States Marine Fisheries Commission has prepared and hereby submits the following corrective action plan for the finding included in the Schedule of Findings and Questioned Costs for the year ended December 31, 1998.

Finding 98-1 - Corrective Action Plan Details

Contact person:

Mrs. Virginia K. Herring
Executive Assistant
P.O. Box 726
Ocean Springs, MS 39564

Corrective Action Planned

Gulf States Marine Fisheries Commission has complied with federal requirements in its travel practices. Management will review its travel practices and take appropriate action. It is anticipated that this will be undertaken during the upcoming year and be resolved by the Fall.



Larry B. Simpson
Executive Director

GULF STATES MARINE FISHERIES COMMISSION

P.O. Box 726, Ocean Springs, MS 39566-0726
(601) 875-5912 (FAX) 875-6604

Auditee's Summary Schedule of Prior Audit Findings

As required by Section ____ .315(b) of OMB Circular A-133, Gulf States Marine Fisheries Commission has prepared and hereby submits the following summary schedule of prior audit findings as of December 31, 1998:

Findings

Status

97-1

Appropriate action was taken and a written purchasing policy was adopted.

-Alabama-

-Florida-

-Louisiana-

-Mississippi-

-Texas-