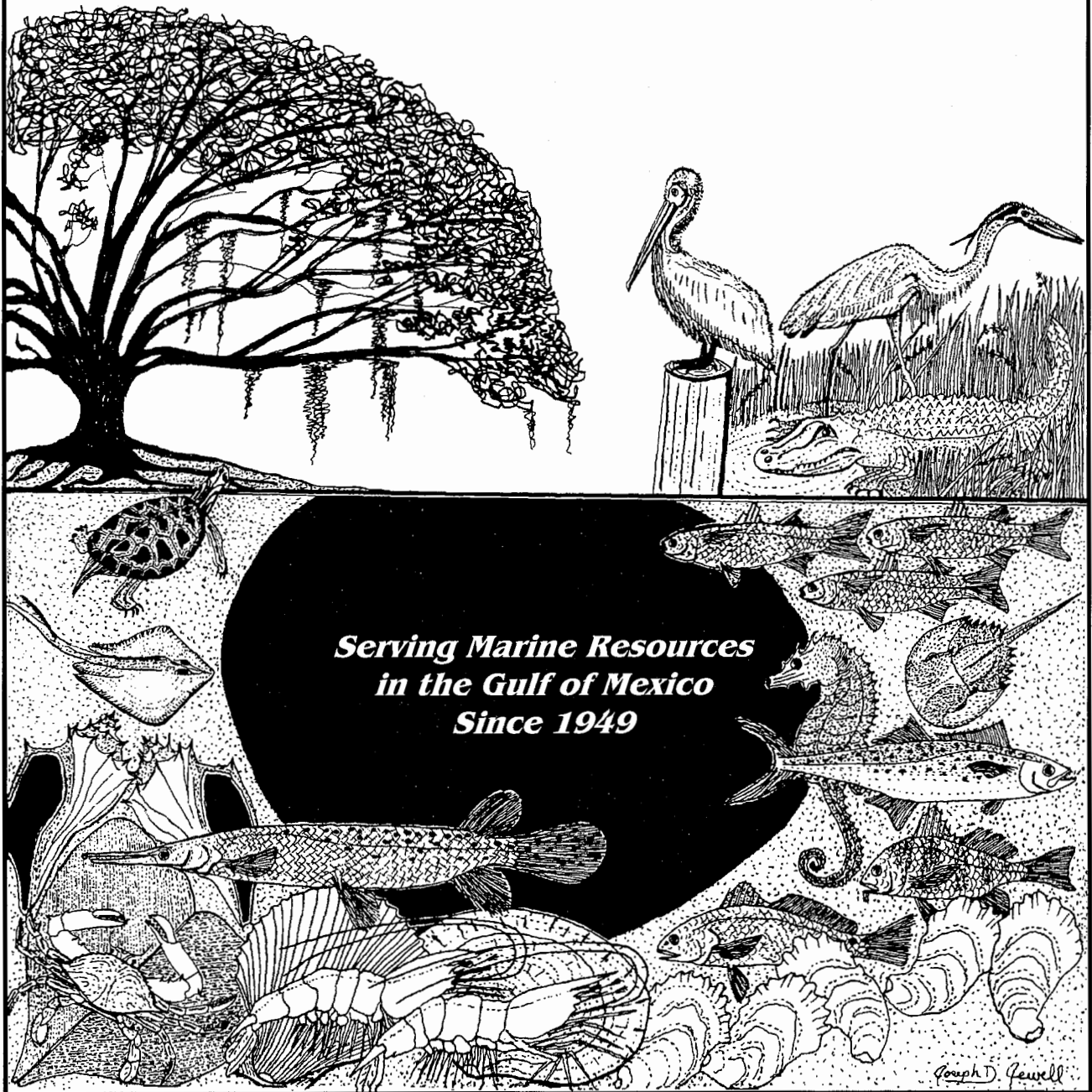


Fiftieth Annual Report
of the
**GULF STATES MARINE
FISHERIES COMMISSION**

For The Year 1999



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

FIFTIETH ANNUAL REPORT
(1999)

*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

**Commemorating Fifty Years of Service
to the Marine Resources of the
Gulf of Mexico**



edited by:
Cynthia B. Yocom
Gulf States Marine Fisheries Commission
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Preserving the Past • Planning the Future • A Cooperative Effort

Dedication



1913 - 1998

This, the Fiftieth Annual Report of the Gulf States Marine Fisheries Commission, is dedicated to Mr. Charles Harper Lyles, Executive Director of the Commission from 1977 through 1983. Mr. Lyles served four years of active military duty in the European theater and took part in the defense of St. Vith, Belgium during the Battle of the Bulge in World War II. These four years were an honorable exception to a lifetime given to fisheries. From 1939 until 1970, Mr. Lyles served our government in the agencies which were to become the National Marine Fisheries Service. When he retired he was division chief of statistics for NMFS in Washington. Before being assigned to Washington in 1960, he had been in charge of fisheries statistics for the Gulf and South Atlantic with offices in New Orleans. Lyles was instrumental in securing the research vessels OREGON and ALASKA from the Pacific Northwest for research in the Gulf of Mexico. These acquisitions subsequently led to the establishment of research laboratories in Pascagoula, Mississippi, and Galveston, Texas.

After two years of retirement in Ocean Springs, Mississippi, he was back at work at the newly developed statistics division of the Gulf Coast Research Laboratory. In 1974, Governor Waller named Mr. Lyles director of the Mississippi Marine Conservation Commission. It was during his tenure there that the laws creating the Gulf of Mexico Fishery Management Council were formulated.

In 1977, Mr. Lyles was appointed Executive Director of the Gulf States Marine Fisheries Commission. During his administration, he laid a foundation of stability and growth. Mr. Lyles left the Commission in 1983, and shortly thereafter the Commission honored him through the establishment of its yearly "Charles H. Lyles Award." This award is given annually to the betterment of the fisheries of the Gulf of Mexico through significant biological, industrial, legislative, enforcement, or administrative activities. He was, naturally, first recipient of the award.

Charles Harper Lyles died Monday, January 19, 1998. Even in death, Mr. Lyles thought toward the future of fisheries. He established trust funds and student funds at Louisiana Technical University.

Charles H. Lyles Award Recipients

Charles H. Lyles	1984
Theodore B. Ford	1985
J.Y. Christmas	1986
John Breaux	1987
John Ray Nelson	1988
I.B. "Buck" Byrd	1989
Hugh A. Swingle	1990
John A. Mehos	1991
J. Burton Angelle	1992
Louis A. Villanova	1993
Theodore H. Shepard	1994
Edwin A. Joyce, Jr.	1995
Tommy D. Candies	1996
Walter M. Tatum	1997
Thomas L. Heffernan	1998
Trent Lott	1999

Acknowledgments

In submitting this Fiftieth 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 fifty 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,

George Sekul, *Chairman*
Ed Conklin, *First Vice Chairman*
Fred Miller, *Second Vice Chairman*
Larry B. Simpson, *Executive Director*

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Commission Roster

Commission Officers

Chairman: George Sekul

First Vice Chairman: Ed Conklin

Second Vice Chairman: Fred Miller

Commissioners

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

ALABAMA

Riley Boykin Smith
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

Allan L. Egbert
Florida Fish & Wildlife Conservation
Commission
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*
Victoria D. DeOrnellis, *Receptionist/Data Entry Clerk*

David M. Donaldson, *Data Program Manager*
Steven J. VanderKooy, *Program Coordinator*
Jeffrey K. Rester, *Program Coordinator*
Joseph P. Ferrer, III, *Network Administrator*
Gregory S. Bray, *RecFIN(SE) Programmer/Analyst*
Jason S. Keenum, *Accountant*
A. Mike Sestak, III, *FIN Programmer/Analyst*
Douglas J. Snyder, *RecFIN(SE) Survey Coordinator*

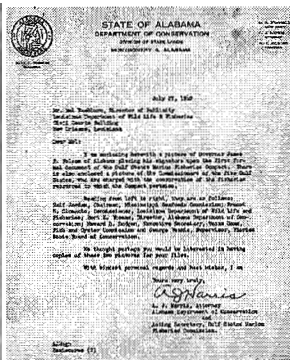
Committee Officers

Executive Committee	George Sekul Fred Miller Chris Nelson Virginia Vail
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	Harriet Perry, Chairman
Flounder Technical Task Force	Mike Johnson, Chairman
Menhaden Advisory Committee	Vince Guillory, 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	Mike Buchanan, Chairman Jan Culbertson, Vice Chairman
TCC Crab Subcommittee	Harriet Perry, Chairman
TCC Data Management Subcommittee	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 Gulf States Marine Fisheries Commission turned 50 years old this year. The files of the Commission indicate the signing of the official paper took place in Mobile, the summer of 1949. The photo and letter of the signing included here came from Mr. John Roussel, Louisiana Department of Wildlife and Fisheries Archives. Alabama Governor Jim Folsom is shown here signing the Compact document for the state of Alabama.



In the half century of its existence, the Commission fostered many programs, and its many accomplishments favor natural marine resources. The Commission has conducted research, coordinated research, published research, planned and implemented programs, and provided a forum for countless meetings among state, federal, university, and industry personnel. The Commission has provided a voice for the Gulf States in Washington and throughout the states' legislatures. The Commission has been active and involved over its history.

The men and women who have contributed positively to advancement of our programs are the real foundation on which we operate. I thank all of you who have given so unselfishly to marine fisheries. Without you, we would not have been able to do our work. The following pages briefly describe the current year's work so all can see what is occurring within the realm of marine resources in the Gulf. Be proud of what you do, be challenged by what needs to be done, and be strengthened by the fact that the work is worthy.

MEETINGS/ACTIVITIES OF THE EXECUTIVE DIRECTOR

Gulf States Marine Fisheries Commission Meetings

- Joint Interstate Executive Directors' Meeting, Washington, D.C. - January 1999
- Travelers Retirement Plan Meeting, Ocean Springs, MS - January 1999
- Xerox Equipment Meeting, Ocean Springs, MS - February 1999
- Gulf States Marine Fisheries Commission Spring Meeting, New Orleans, LA - March 1999
- Conference Call, Dr. Livingston's Texas A&M Fisheries Class, Ocean Springs, MS - April 1999
- State Directors' Summer Meeting, Turtle Recovery Program Tour, Rancho Nuevo, MX - May 1999
- Alabama Trip Ticket Meeting, Dauphin Island, AL - July 1999
- Alabama Trip Ticket Meeting, Ocean Springs, MS - August 1999
- Conference Call, GulfFIN Program, Ocean Springs, MS - September 1999
- Gulf States Marine Fisheries Commission 50th Annual Meeting, Biloxi, MS - October 1999

Gulf of Mexico Fishery Management Council Meetings

- Biloxi, MS - January 1999
- Baton Rouge, LA - March 1999
- Austin, TX - May 1999
- Key West, FL - July 1999
- Gulf Shores, AL - September 1999
- Orlando, FL - November 1999
- Public Hearing, Marine Reserves, Biloxi, MS - August 1999
- Public Hearing, Charter Boat Moratorium, Biloxi, MS - December 1999

Congressional Activities

Field Hearings, Congressman Tauzin, Outer Continental Shelf Legislation, New Orleans, LA - May 1999

Field Hearings, Senators Breaux and Snow, Magnuson Act, New Orleans, LA - December 1999

Other Meetings and Activities

Marine Fisheries Advisory Committee (MAFAC), La Jolla, CA - March 1999

OMEGA Protein Shipyard Dedication, Moss Point, MS - April 1999

Texas Shrimp Association, South Padre Island, TX - April 1999

Fish and Wildlife Service, Federal Aid Program, Atlanta, GA - September 1999

Marine Fisheries Advisory Committee (MAFAC), Washington, D.C. - October 1999

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's Southeast Regional Office (SERO).

SEAMAP RESOURCE SURVEYS

In 1999, SEAMAP operations continued for the eighteenth consecutive year. SEAMAP resource surveys included the Spring Plankton Survey, Summer Shrimp/Groundfish Survey, Fall Plankton Survey, Fall Shrimp/Groundfish Survey, and plankton and environmental data surveys. Other 1999 activities included SEAMAP information services and program management. The surveys conducted during the year address distinct regional needs and priorities and provide information concerning the marine resources in the Gulf of Mexico.

Spring Plankton Survey

For the eighteenth year, plankton samples were collected during the spring in the northern Gulf of Mexico. The NOAA Ship CHAPMAN sampled offshore waters from the western edge of the West Florida Shelf to the Texas-Louisiana border from April 23 to June 1, 1999. A total of 184 stations was sampled. Florida's portion of the spring plankton survey was cancelled this year due to money constraints. Because of rising overhead, the number of days allocated for Florida's portion of the spring cruise has been drastically reduced over previous years. The NMFS felt that for this year, at least, it would be better to use some of the money allocated for the spring cruise to add a day to the fall cruise.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with 333-micron mesh. Tows were oblique, surface to near

bottom (or 200 m) and back to surface. Wire angle was maintained at 45 degrees. Neuston samples were taken with 947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin, and after 48 hours, the samples 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).

Summer Shrimp/Groundfish Survey

During the spring of 1999, 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 1999 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 1 to July 19, 1999.

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 388 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 1986-1999 covered Gulf waters from Florida Bay to Brownsville, Texas. A total of 154 stations was sampled by the R/V SUNCOASTER, R/V TOMMY MUNRO, R/V PELICAN, R/V GORDON GUNTER, and the R/V VERRILL. These samples were collected from August 31 to October 14, 1999.

Plankton samples were taken with standard SEAMAP bongo and neuston samplers. The bongo sampler consisted of two conical 61-cm nets with 333-micron mesh. Tows were oblique, surface to near bottom (or 200 m) and back to surface. Wire angle was maintained at 45 degrees. Neuston samples were taken with 947-micron mesh nets on 1 x 2-meter frames towed at the surface for ten minutes. Right bongo and neuston samples were initially preserved in 10% buffered formalin and after 48 hours were transferred to 95% ethyl alcohol for final preservation. Left bongo samples were preserved via an ethanol/ethanol transfer to aid in preservation of larval otoliths. In addition, hydrographic data (surface chlorophylls, salinity, temperature and dissolved oxygen from surface, midwater and near bottom, and Forel-ule color) were collected at all stations.

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

Fall Shrimp/Groundfish Survey

The Fall Shrimp/Groundfish Survey was conducted from October 16th to December 3rd, from off Mobile, Alabama, to the United States-Mexican border. Vessels sampled waters out to 60 fm, covering 409 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 269 stations from Mobile Bay, Alabama, to Brownsville, Texas, at depths out to 60 fm. The R/V VERRILL sampled eight inside the mouth and outside Mobile Bay. The R/V TOMMY MUNRO sampled 28 stations south of Mississippi Sound along a 30-minute grid. The R/V PELICAN sampled 24 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 52 stations was sampled with bongo and/or neuston nets, as encountered along cruise tracks. The NMFS completed 45 ichthyoplankton stations, Mississippi completed two stations, and Louisiana completed five 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: 1) to collect plankton samples throughout the survey area; and 2) to collect associated hydrographic and environmental data at each plankton station. Additionally, environmental data (salinity, temperature, and oxygen from surface, mid-depth and bottom waters, and chlorophyll from surface and bottom waters) were collected during the shrimp/groundfish surveys. Wind direction, wind speed, and wave height were taken at all trawl stations.

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

Chlorophyll samples were filtered at each station using GF/C filters. All filters were put in petri dishes 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 NMFS-SEFSC. Raw data are edited by the collecting agency and verified by the SEAMAP Data Manager prior to entry into the system. Data from all SEAMAP-Gulf surveys during 1982-1998 have been entered into the system and data from 1999 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 227 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 1999 including:

- 1) Evaluating the abundance and size distribution of penaeid shrimp in federal and state waters to assist in determining opening and closing dates for commercial fisheries;
- 2) Evaluating and plotting the size of the hypoxic (Dead Zone) area off of Louisiana;
- 3) Assessing shrimp and groundfish abundance and distribution and their relationship to such environmental parameters as temperature, salinity, and dissolved oxygen;
- 4) Identifying environmental parameters associated with concentrations of larval finfish;
- 5) Compiling the 1997 and 1998 SEAMAP Biological and Environmental Atlas; and
- 6) 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 during FY1990 on the new distributed SEAMAP DMS. New modules completed include those for data entry, edit, upload, data query and download. All of the Gulf States are now equipped with the necessary computer hardware

and software.

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

This system decreases the time necessary to enter and retrieve data and provides powerful and flexible local data analysis and display capabilities. Under the system, each SEAMAP site enters, verifies, and edits their data. This eliminated 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.

Due to the cancellation of near-real-time data distribution during the Summer Shrimp/Groundfish

Survey in 1998, the SEAMAP Subcommittee decided to produce near-real-time data for the Fall Shrimp/Groundfish Survey. This was the first time the data were distributed during the fall. Plots of station locations and catch rates of red snapper were prepared and edited at the NMFS Mississippi Laboratories, and processed by GSMFC for a summary distribution at the end of the Survey to management agencies, fishermen, processors, and researchers. These plots were also available through the SEAMAP home page.

In January 1999, the Gulf of Mexico Fishery Management Council asked the NMFS to not produce the near-real-time data during the 1999 survey. At their request, no near-real-time data were produced or distributed in the summer 1999.

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 1999, 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 20,691 lots from the Polish Sorting and Identification Center during 1999.

The SEAMAP Archiving Center, which is managed in conjunction with Florida Fish and Wildlife Conservation Commission (FWC) in St. Petersburg, Florida, processes both specimen loans and requests for associated plankton survey environmental data. Thirty-five requests have been accommodated in the present year to nine different researchers.

SEAMAP Invertebrate Plankton Archiving Center

The SIPAC is in its fifteenth year of operation. Ken Stuck at the 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.

One graduate student is employed by SIPAC. In addition to cataloging new samples, maintenance,

and curation of the existing collection, he is utilizing flatfish from the SEAMAP collections for his thesis research project. Due to a reduction in available support, the SIPAC technical position was not filled during this reporting period, and it is not anticipated that it will be filled in the next fiscal year. Therefore, activities were limited to maintenance and curation of the existing collection. The number of samples currently catalogued in the SIPAC collections is 6,947, and 153 samples are 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 ¼ their original volume and placed into 100 ml vials. When possible, the remaining ¾ aliquots are donated to educational institutions for use as teaching materials. If the remaining sample must be discarded, sample jars are cleaned and returned to NMFS-Pascagoula for reuse. To date, approximately 1,600 samples collected from 1982-1986 have been aliquoted and prepared for long-term storage. Due to the recent addition of samples to the collection during the year, there is currently no space available for additional samples to be deposited into the SIPAC archives. However, once the ongoing aliquoting of the 1986 SEAMAP samples has been completed, there should be sufficient space available for archiving additional samples.

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

PROGRAM MANAGEMENT

The SEAMAP program is administered by the SEAMAP Subcommittee of the TCC through the SEAMAP Coordinator, who is under the technical direction of the Subcommittee Chairman and administrative supervision of the GSMFC's Executive Director.

Personnel associated with SEAMAP program management include the Coordinator, Data Manager, SEAMAP Archiving Center Curator, SIPAC Curator, and the NMFS-Pascagoula Laboratory Director, serving as Program Monitor.

Planning

Major SEAMAP-Gulf Subcommittee meetings were held in October 1998 and March 1999, in conjunction with meetings of the GSMFC. All meetings included participation by various work group leaders, Coordinator, Data Manager, Program Monitor, and other GSMFC staff. Representatives from the Gulf program also met with the South Atlantic and Caribbean representatives in August 1999 to discuss respective program needs and priorities for FY2000.

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 1999. 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 1999:

- 1) *1999 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.
- 2) *SEAMAP Subcommittee Report to the GSMFC Technical Coordinating Committee -October 1, 1998 to September 30, 1999*. A detailed summary of program accomplishments, emphasizing survey design, material collected, data dissemination, budget information, and future survey activities.
- 3) *Annual Report of the SEAMAP Program - October 1, 1998 to September 30, 1999*. A summary of FY1999 activities and proposed FY2000 events for the SEAMAP-Gulf, South Atlantic, and Caribbean Programs.
- 4) *Environmental and Biological Atlas of the Gulf of Mexico, 1997*. A compilation of information obtained from the 1997 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 1999, 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. 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. Minutes, general correspondence, meeting notices, agendas, and other required materials were prepared and distributed to the appropriate persons. Minutes, correspondence, reports, and publications are available from the GSMFC office upon request. A brief report on program progress follows.

ADMINISTRATIVE ISSUES

During the year, the GSMFC was informed that there was a shortfall anticipated in funds available from the Federal Aid Administrative Fund. As a result of that anticipated shortfall, the GSMFC was asked to agree to amending the 1999 grant agreement to reduce the amount of funding from \$200,000.00 to \$165,000.00. That reduction required an adjustment in the schedule of activities which was agreed to between the GSMFC and the Federal Aid office.

ARTIFICIAL REEF ACTIVITIES

Data Base

The TCC Artificial Reef Subcommittee continued to work on entering data to establish the Gulf of Mexico Artificial Reef Data Base. Data base work in 1998 indicated that there are missing and duplicate files, primarily for Florida records. Because of this, the GSMFC is continuing to work with the state of Florida to complete its data base. Work continued to refine and update the artificial reef data base. At the point when records contained in the data base are deemed to be complete, the data base will be made available on the GSMFC web site.

National Artificial Reef Plan

The Artificial Reef Subcommittee continued to work toward completion of the 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 provided funding to accomplish some of the associated tasks. This activity was carried out in conjunction with the Atlantic States Marine Fisheries Commission (ASMFC). The draft revision of the Plan was completed and submitted to the NMFS for processing. The NMFS conducted an internal review and will soon 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.

Literature Data Base

The GSMFC began an activity to enter artificial reef literature, both journal articles and gray literature, into a literature data base called ProCite. In excess of three hundred articles have been entered into the data base and have also been made available on the GSMFC Home Page at www.gsmfc.org. 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 the GSMFC staff can locate the document, copy it, and send it to the individual. We plan to continue this exercise by entering additional articles into the data base during 1999. Future activities will continue to include compiling and entering literature into this data base, toward the end of developing the most comprehensive clearinghouse/library of artificial reef literature available.

White Paper Development

The GSMFC began development of a white paper designed to provide thorough discussions of issues related to artificial reef development and management. Those issues included permit eligibility, the use of large area permits, Navy and commercial

ships as artificial reef material, attraction versus production, among others. It is anticipated that the paper will be amended by adding new issues. This is currently not an official document of the GSMFC and has not been approved for distribution; however, it represents work conducted by the Subcommittee to accomplish the goal of a distributable document that establishes our official position regarding the included issues.

FISHERY DATA ACTIVITIES

With the conclusion of the 1999 federal appropriations process that goal has been attained, and the GSMFC office and the Gulf States began collecting recreational fisheries data in January 1999. During 1999, the Program Coordinator worked through the Fisheries Information Network (FIN) to begin the transition of collecting and managing commercial fisheries data through the states and coordinated by the GSMFC. Again, the primary FIN program functions are supported by a separate appropriation through the NMFS. 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 DMS, will continue to provide coordination of those important activities.

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

- 3/1/99 - Gulf Council meeting and presentation regarding charter boat study and vessel monitoring programs
- 3/16/99 - GSMFC Data Management Subcommittee meeting in support of RecFIN/ComFIN work.
- 4/5-9/99 - Annual FIN meeting
- 6/16/99 - FIN planning meeting - presentation development
- 7/6-7/99 - ComFIN implementation meetings
- 7/26-28/99 - Liaison meeting with Pacific RecFIN
- 8/4/99 - FIN cooperative agreement meeting
- 9/14-16/99 - Gulf Council meeting and presentation regarding charter boat study
- 9/21-23/99 - Annual FIN meeting
- 10/19/99 - Meeting of the Data Management Subcommittee.

ANADROMOUS FISH ACTIVITIES

Striped Bass Genetics

The third in a three year study (1998) to evaluate the allelic heterozygosity for striped bass samples collected in Gulf of Mexico drainages was

extended into 1999 with no costs included. A completion report was finalized in late 1999. That report is available from the GSMFC office upon request. There were not enough good samples of archived DNA to be able to definitively answer the question posed; however, Dr. Wirgin has indicated that he will continue to work on the project without additional funds. He has agreed to provide the results of this additional work to the GSMFC. The project, though not as successful as we would have liked, has been completed as per our subcontract with Dr. Wirgin and has been closed out.

Striped Bass FMP Revision

The GSMFC approved the request by the Anadromous Fish Subcommittee to begin revision of the Striped Bass Fishery Management Plan no sooner than 2000. During 1999, the Subcommittee conducted a review of the existing FMP to determine the scope of the work to be conducted. Progress on other FMPs through the GSMFC Interjurisdictional Fisheries Program has indicated that initiation of the revision of the Striped Bass FMP will not begin until the three plans under development are completed. They include spotted seatrout, blue crab, and flounder. While we are not sure when revision of the Striped Bass FMP will begin, the Subcommittee has made progress, outlined below.

- Section 2.0 needs to be completely revised. Most of Section 2.0 will be available from GSMFC staff
- Sections 2.1 and 2.2 should be moved to Section 3.0
- Section 2.3 needs to be updated and moved to another section
- Section 2.5, FMP Objectives, needs to be revisited by the Subcommittee
- Section 3.0 needs to be updated and reformatted
- Section 4.0 needs to be completely updated and reformatted to include essential fish habitat provisions
- Data and information from "Habitat Criteria for Striped Bass" needs to be incorporated into Section 4.0
- Amendment 1 to the FMP needs to be incorporated into the appropriate sections, using current regulations
- All genetic data and information needs to be incorporated into the appropriate sections
- Appendix A in the current FMP needs to be taken out
- Appendix B in the current FMP needs to be fully discussed by the Subcommittee

These items represent the most significant findings of the review process to date. The Subcommittee will continue to review information and

data in preparation of the full revision process.

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 workshop was held on November 18-19, 1998, in Pensacola Beach, Florida. The proceedings of that workshop have been completed; however, due to many inconsistencies in writing styles and formats provided by the presenters, a full edit must be conducted. Recommendations from the workshop will be incorporated into the review and revision of the Striped Bass Fishery Management Plan. The draft proceedings is available from the GSMFC office upon request.

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 drainages. 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 stewardship projects before holding a workshop. The timing of the workshop did indeed allow for presentations from stewardship project managers. The GSMFC staff continues to provide administrative and coordination support to the stewardship projects. Current progress reports of the stewardship projects are available from the GSMFC office upon request.

The GSMFC continues to manage the striped bass data base. New data have been provided during 1999 and will be included in the data base. In the meantime, the GSMFC has significantly upgraded its computer and Internet communications capabilities and will be making the data base available on the Internet in the future.

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 the 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 the EFH provisions. The Program Coordinator was instrumental in establishing a joint habitat program between the GSMFC and the Gulf of Mexico Fishery Management Council to address EFH and other, broader habitat issues.

As a 1998 activity, the Habitat Subcommittee discussed whether the Commission FMPs should include EFH or essentially 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 Gulf of Mexico Fishery Management Council (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 performed by the Council would be prudent. In this regard, the Subcommittee has begun to provide input into the FMP development process, among other activities as evidenced below.

- The Subcommittee developed and finalized a new Commission Mariculture Policy.
- A summary of aquaculture programs by each state was updated.
- The Protecting Fish Habitat Brochure was reprinted in April. This brochure was distributed to anglers and boaters throughout the Gulf of Mexico.
- The Subcommittee developed ideas and a draft poster stressing the importance of healthy habitat to fish populations.
- At the October Subcommittee meeting, presentations were made on community based habitat work and the possibility of spreading shrimp viruses from seafood processing facilities.
- At the October meeting, the Subcommittee reviewed the Habitat Section of the Commission's Menhaden Fishery Management Plan.
- Another major accomplishment of the Subcommittee during 1999 was the completion of an annotated bibliography on fishing impacts on habitat. This bibliography now contains references for over 550 papers. It is available in pdf format on the GSMFC web site.

RECREATIONAL FISHERIES ADVISORY COMMITTEE ACTIVITIES

The GSMFC Recreational Fisheries Advisory Committee (RFAC) met twice in conjunction with the spring and fall GSMFC meetings. The following are issues taken up by the RFAC.

- Standard Gulf of Mexico recreational license exemptions - While this issue was recommended by the RFAC, it was rejected by the Commission because of potential state revenue issues and a concern over political fallout from potentially reducing a state's benefit to its older population.
- Review of the GSMFC FIN - The generic trip ticket system was presented. In addition the RFAC provided programmatic recommendations regarding coding and outreach activities.
- Limited entry for the for-hire fishery - The RFAC agreed to review proposals to limit entry into charter, guide, and head boat fisheries.
- Kemp's Ridley sea turtle restoration presentation - Activities associated with the sea turtle restoration program in Mexico were presented.
- Marine refuges and sanctuaries - A panel discussion of invited experts was held to discuss the pros and cons of marine refuges and sanctuaries.

MISCELLANEOUS

February 3-4, 1999. The Program Coordinator attended and participated in the annual Morone Workshop which provides coordination among the partner agencies for striped bass restoration in the Apalachicola-Chattahoochee-Flint River System.

February 23, 1999. The Program Coordinator participated in a meeting to discuss problems and issues related to the National Fish Hatchery System.

March 25-29, 1999. The Program

Coordinator attended the mid year meeting of the International Association of Fish and Wildlife Agencies.

April 28-June 1, 1999. The Program Coordinator attended the National Aquatic Nuisance Species Task Force meeting.

July 22, 1999. The Program Coordinator met with Federal Aid staff of the U.S. Fish and Wildlife Service at the Region 4 Office.

August 17-20, 1999. The Program Coordinator participated in the National Aquatic Nuisance Species Task Force meeting.

September 17-20, 1999. The Program Coordinator attended and participated in the annual meetings of the International Association of Fish and Wildlife Agencies.

October 26 - 28, 1999. The Program Coordinator participated in the Management Committee meeting of the Gulf of Mexico Program, specifically related to non-indigenous species issues.

November 8-10, 1999. The Program Coordinator attended the Tampa Bay Estuary Program workshop on ballast water management.

November 29-December 2, 1999. The Program Coordinator attended the National Aquatic Nuisance Species Task Force meeting.

December 13 - 14, 1999. The Program Coordinator attended and participated in a meeting of a national task force to make recommendations to revise the National Fish Hatchery System.

INTERJURISDICTIONAL FISHERIES MANAGEMENT PROGRAM

Steven J. VanderKooy, Program Coordinator

The IJF staff continued to work on fishery management plans (FMPs) and supported the technical task forces (TTFs) in this regard. In addition, staff continued to build the FMP literature repository and publish several documents including the Annual Law Summary and License and Fees. Activities in 1999 were focused primarily on FMP development and are summarized by the following activities:

The Blue Crab Technical Task Force (TTF) met twice in 1999. In March, the TTF presented the plan to both the Technical Coordinating Committee (TCC) and the State-Federal Fisheries Management Committee (S-FFMC) at the GSMFC spring meeting in New Orleans, Louisiana. Concerns were raised regarding the stock assessment for the gulf blue crabs by several reviewers and by the Stock Assessment Team (SAT). To address those concerns, a meeting was held in July, and the stock assessment underwent critical review by the SAT and representative members of the blue crab TTF. The TTF committed the remainder of the year to revisit the stock assessment.

The Spotted Seatrout TTF completed the FMP via mail and electronic correspondence. The FMP was presented to the TCC in March at the GSMFC spring meeting. The TCC continued to review the plan following a major format revision to the FMP which took place until the fall meeting.

The Flounder TTF completed the FMP via mail and electronic correspondence. The FMP was presented to the TCC in March at the annual spring meeting of the GSMFC. The TCC continued to review the plan but approved it for concurrent review with the State-Federal Fisheries Management Committee (S-FFMC) through the end of the year.

The fifth revision of the gulf menhaden FMP began in the summer of 1999 as an in-house effort by the GSMFC staff. Significant changes were made to a few sections – habitat, description of the fishery, economics, sociology, and the stock assessment. Revision of the menhaden FMP continued on an “as time permits” basis.

The blue crab subcommittee hosted a symposium in conjunction with the Crustacean Society’s 1999 Annual Meeting in Lafayette, Louisiana. The May 1999 symposium on blue crab mortality was well attended. Sixteen presenters, two

from the subcommittee, submitted abstracts for the symposium, and the IJF staff attended for recording and support purposes. A proceedings of the symposium will be published by the GSMFC in FY2000.

The SAT discussed development of the Otolith handbook. In an effort to advance development of the handbook, a work group of state biologists who are currently involved in the cutting and reading process would be brought together. It was decided that six meetings over two years would allow the team to have an organizational meeting and attend each subsequent meeting at a different state laboratory to observe the techniques being utilized first-hand. The Otolith Handbook Work Group members were identified and the organizational meeting was scheduled to be held in the spring of FY2000.

Support and travel were provided to the C/RFAP in 1999 to attend the annual meetings of the GSMFC. Several topics were discussed including the three FMPs currently in review, the FIN program, TED and BRD issues in the Gulf of Mexico, marine reserves, the Fishery Information Radio Initiative, and participation by each group in the GSMFC data collection programs.

The GSMFC Habitat Program completed the Gulf of Mexico Fishery Management Council’s Essential Fish Habitat Amendment and submitted it to the Secretary of Commerce. In addition, the Habitat Program developed a habitat web page in January of 1999. The web page can be accessed on the GSMFC web site (www.gsmfc.org). The web page briefly describes the development of the habitat program, its goals, and other habitat related information. The text of the Council’s Essential Fish Habitat Amendment is also located on the web page. The Habitat Program has reprinted the Protecting Fish Habitat brochure which was originally produced in coordination with the Atlantic and Pacific States Marine Fisheries Commissions several years ago.

The GSMFC Habitat Subcommittee met in 1999 during the annual GSMFC meetings. Issues discussed included the Commission’s fishery management plans, essential fish habitat, an update of the 1990 “Summary of Aquaculture Programs by State” report, and formulation of a Commission policy on mariculture. The Habitat Subcommittee is currently producing a poster on habitat conservation in the Gulf

of Mexico and is compiling an annotated bibliography on fishing operation impacts on habitat throughout the world.

The IJF Staff Assistant supported the Law Enforcement Committee in their efforts to develop a

Cooperative Strategic Plan for Law Enforcement in the Gulf of Mexico. Staff provided assistance during the LEC's regularly scheduled meetings during the spring and fall of 1999. A spring 2000 work session was planned for the Bayou Segnette State Park in Louisiana.

Commercial Fisheries Information Network (ComFIN) & Southeast Recreational Fisheries Information Network [RecFIN(SE)] *David M. Donaldson, Program Manager*

The Commercial Fisheries Information Network (ComFIN) and the Southeast Recreational Fisheries Information Network [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 National Marine Fisheries Service 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 FIN which is composed of both the ComFIN and RecFIN(SE). The MOU confirmed the intent of the signatory agencies to participate in implementing 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 U.S. Fish and Wildlife Service, 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 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 are 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 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

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

FIN Committee, the ComFIN and RecFIN(SE) Committees, three geographic subcommittees (Caribbean, Gulf, 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 Gulf States Marine Fisheries Commission.

The ComFIN and RecFIN(SE) Committees are divided into three standing subcommittees representing the major geographical areas of the Region: Caribbean, Gulf, 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) is accomplished through the Gulf States Marine Fisheries Commission.

It should be noted that during the annual fall meeting in 1998, the FIN Committee elected to forward a recommendation to the 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 comprised of coordinated data collection activities, an integrated data management and retrieval system, and procedures for information dissemination. Activities during 1999 were associated with addressing issues and problems regarding data collection and management and developing strategies for dealing with these topics. In addition to committee activities, ComFIN and RecFIN(SE) were involved in various operational activities concerning the collection and management of marine commercial and recreational fisheries data. These activities were conducted by the various state and federal agencies involved in FIN.

ComFIN and RecFIN(SE) Committees

Major ComFIN and RecFIN(SE) meetings were held in April and September 1999. The major issues discussed during these meetings included:

- identification and continuation of tasks to be addressed in 1999 and instruction to Committees, 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 1999 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 2000 FIN Operations Plan;
- review of activities and accomplishments of 1999;
- 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 2000;
- preparation and submission of a proposal for financial assistance to support activities of the FIN; 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 RecFIN Biological/Environmental Work Group met in April 1999 to begin discussing, in conjunction with the Caribbean, the development of marine recreational fishery surveys methodologies for the Caribbean; review of compilation of metadata related to changes in fishing regulations; review materials concerning night fishing activities and develop recommendations; and develop sampling methodologies for fishing tournaments.
- The FIN/ACCSP Compatibility Work Group met in May 1999 to discuss and develop the mission of the work group. The group determined the direction of the work group and developed a plan for addressing the issues related to both Fisheries Information Network (FIN) and Atlantic Coastal Cooperative Statistics Program (ACCSP).
- The FIN Social/Economic Work Group met in July 1999 to review the current social and economic activities under FIN and develop a section for the FIN Quality Assurance/Quality Control (QA/QC) document regarding mail surveys as well as a briefing on the pilot work that the Atlantic Coastal Cooperative Statistics Program (ACCSP) is undertaking regarding collection of social and economic data.
- The FIN Administrative Subcommittee met (via conference call) in July 1999 to discuss a proposed change in the meeting schedule for FIN as well as select members for an ad hoc work to address sampling methods for head boats.
- ComFIN implementation meetings were held in July 1999 to get all the players involved in commercial data collection activities in the Gulf of Mexico and discuss who is to be responsible for the various tasks involved in the collection and management of these data. There were several presentations and after the presentations, the group discussed various issues related to implementation of trip tickets.
- The Data Collection Work Group met in August 1999 to review the differences between the ComFIN and ACCSP trip ticket programs; development of a quality assurance/quality control document for commercial data collection; development of standard codes for FIN; further development of the biological sampling program; and discussion about the fishery and discards modules under ComFIN.
- The Implementation Work Group met in August

1999 to discuss the results from the ComFIN implementation meetings that were held early this month. The group reviewed the products developed from the implementation meetings and developed a report from the materials. In addition, the group examined the ACCSP implementation strategy, questionnaire, and program decision document and similar documents in development for the FIN.

- The Gulf of Mexico Geographic Subcommittee met in August 1999 to initiate the development of the FY2000 cooperative agreement for RecFIN/ComFIN.
- The Caribbean port samplers met in October 1999 to discuss an overview of ComFIN and the Cooperative Statistics Program (CSP), review of sampling methods used by Puerto Rico and U.S. Virgin Islands personnel, conducting field operations such as review of sampling techniques, fish identification methods, and other related sampling procedures; and discuss future meetings.

Coordination and Administrative Support

Working closely with the Committees 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 1999 via a variety of different methods such as distribution of program documents, presentation to various groups interested in the ComFIN and RecFIN(SE), and via the Internet:

- FIN Committee. 1999. *1999 Operations Plan for Fisheries Information Network (FIN)*. No. 65, Gulf States Marine Fisheries Commission, Ocean Springs. 22 pp + appendix.
- FIN Committee. 1999. *Annual Report of the Fisheries Information Network for the*

Southeastern United States (FIN) January 1, 1998 - December 31, 1998. No. 66, Gulf States Marine Fisheries Commission, Ocean Springs. 16 pp + appendices.

- 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.
- NPS personnel periodically provided information

concerning the ComFIN and RecFIN(SE) (meeting notices, available documents, etc.) to the EPA's Gulf of Mexico Program computer Bulletin Board System.

- NMFS provides a user-friendly data management system for the MRFSS.
- GSMFC has developed a home page for the world wide web which provides programmatic and operational information regarding ComFIN and RecFIN(SE).

Joint Commission/Gulf of Mexico Fishery Management Council Habitat Program

Jeffrey K. Rester, Program Coordinator

In January, the Gulf of Mexico Fishery Management Council's (Council) Habitat Protection Committee reviewed the President Casino expansion project in Biloxi, Mississippi. The Council agreed with the National Marine Fisheries Service, Fish and Wildlife Service, and the Environmental Protection Agency that this project would have unacceptable impacts on the marine environment in Mississippi Sound, and a letter was written to express the Council's views to the Corps of Engineers. The expansion project would dredge and fill more than 100 acres in Mississippi Sound.

Also in January, the Habitat Program designed a web page on the Commission web site. The web page describes the Joint Habitat Program and lists recent activities. The Council's Essential Fish Habitat Amendment is also located on the web page along with minutes from the past Habitat Subcommittee meetings.

In February, the Habitat Program received a grant from the FWS's Division of Federal Aid for the reprinting of the Protecting Fish Habitat brochure. This brochure was first produced a few years ago in coordination with the Atlantic and Pacific States Marine Fisheries Commissions. It was very popular with boaters and fishermen. Twenty-three thousand brochures were produced and distributed to all five Gulf States and the Commission in April. The brochures were then distributed to docks, marinas, Sea Grant offices, and other areas throughout the Gulf of Mexico.

The Commission's TCC Habitat Subcommittee met at the March Commission meeting and discussed a very full agenda. The Habitat Subcommittee reviewed and finalized a Commission policy on mariculture, and also updated the *Summary of Aquaculture Programs by State* report. The Subcommittee discussed the design of a new habitat poster stressing the importance of healthy habitat throughout the Gulf of Mexico. Another item discussed at the meeting was an annotated bibliography of fishing impacts on habitat.

The annotated bibliography began as an effort to gather available research papers on the impact that

fishing, both commercial and recreational, had on fish habitat. At a September nationwide EFH meeting with Council and NMFS representatives, NMFS Habitat Conservation Division personnel became interested in the annotated bibliography. They decided to contribute \$4,000 toward the printing and completion of the bibliography. The bibliography was finished in January 2000 and is now available both in printed form and through the Habitat Program web page. The bibliography contains over 570 references for research papers examining fishing impacts on habitat.

Due to changes in the Magnuson-Stevens Act, the Council's Habitat Policy was updated. The update included new essential fish habitat provisions and consultation procedures. The three Habitat Protection Advisory Panels of the Council met in September to review the Council's Habitat Policy and Procedures and other local habitat related issues. These meetings generated several good comments concerning the policy.

In November, the Council reviewed the Advisory Panels' comments and approved the revised Habitat Policy. The Council also wanted to develop a submerged aquatic vegetation policy and revise the existing wetland management policy. Due to the joint nature of the Habitat Program, the Commission's Habitat Subcommittee was asked to develop and revise these policies.

In December, a meeting with NMFS personnel was held to discuss gear impacts on habitat in the Gulf of Mexico. Discussions included the status of gear impact research in the Gulf of Mexico and South Atlantic regions and possible future gear impact studies. A future research need will be to analyze the papers identified in the Commission's fishing impacts annotated bibliography.

Also in December, the EFH section of the Council's Dolphin/Wahoo Fishery Management Plan (FMP) was completed. A new joint FMP is being developed with the South Atlantic Fishery Management Council for these highly migratory species. The FMP is in its final stages of development.

ALABAMA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES, MARINE RESOURCES DIVISION

Vernon Minton, Director

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 42 employees of the Administrative, Enforcement, and Fisheries sections during fiscal year 1999.

SIGNIFICANT ACCOMPLISHMENTS

The project to propagate red snapper continued with the development of a cooperative program between Alma Bryant High School's mariculture program, Auburn University, Gulf Coast Research Laboratory in Mississippi, Mote Marine Laboratory in Florida, and the Oceanic Institute in Hawaii.

An additional shallow artificial reef was constructed in Mobile Bay, and permits were obtained for the construction of ten more in the next several years. Plans have been set for the first two of these with materials stockpiled. This new program for artificial reefs in Mobile Bay and Mississippi Sound has been named "Roads to Reefs" and involves a cooperative partnership among local conservation organizations, the U.S. Fish and Wildlife Service, National Marine Fisheries Service, National Fish and Wildlife Foundation, local industry, and the Marine Resources Division.

In November, the Marine Resources Division sank an old dry dock, formerly owned and operated by the Atlantic Marine Corporation, in 100 feet of water approximately 17 miles south of Mobile Pass. This large new reef should provide excellent fishing and diving opportunities well into the next millennium.

Enforcement officers worked with the Southern Alabama Enviro Crimes Task Force (SAETF) investigating and prosecuting environmental crimes. SAETF obtained multiple indictments and convictions because of the various agencies involved in the SAETF working together. Additionally, Alabama Department of Conservation and Natural Resources, Marine Resources Division officers issued eighteen misdemeanor criminal littering citations and warnings.

A trip ticket program was designed to collect commercial fisheries information. This program is part of a Gulf-wide effort to generate more specific

information for each fishery. The program, once fully implemented, will replace the current method of collecting landings information by National Marine Fisheries Service (NMFS) and Marine Resources Division personnel. Implementation is planned for the year 2000.

The Marine Recreational Fisheries Statistics Survey (MRFSS) sampling in Alabama, formally conducted by the NMFS, was taken over entirely by the Division in order to increase the amount of data collected and to increase the accuracy of the data at the state level.

SIGNIFICANT PROBLEMS AND SOLUTIONS

Controversy continued over the state of red snapper stocks in the Gulf of Mexico. Federal waters were closed to recreational red snapper fishing on August 29, 1999. This closure eliminated an even greater portion of the fishing year than in 1998. This continued to cause considerable social and economic hardship to that fishery. The Division continued 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.

Abuse of the privileges granted under the live bait law continues to cause tremendous user conflict between recreational fishermen, commercial shrimp fishermen, and live bait fishermen. Efforts will continue to find solutions to the problems.

Commercial crab fishing was banned from most coastal rivers to reduce pressure on small crabs and eliminate navigation problems resulting from increasing numbers of traps in the rivers. Recreational crab fishermen may use a maximum of five traps attached by lines to the shoreline or a dock. These traps must not extend more than ten feet from shore.

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, six clerical, and one marine mechanic employee. Offices are maintained at Dauphin Island, Gulf Shores, and Bayou La Batre.

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 Alabama's congressional delegation, Alma Bryant High School's mariculture program, and Auburn University resulted in the acquisition of approximately \$275,000 for research on propagation of red snapper at the Claude Petet Mariculture Center.

Approximately 5,000 cubic yards of shell were hauled to a staging area at Heron Bay Cutoff and loaded on oyster boats and planted in Heron Bay. The oystermen planted the shell on public reefs with funds from a grant awarded to the town of Bayou La Batre from the United States Department of Labor.

In another cooperative effort under this same USDL grant, Marine Resources Division personnel worked with local municipalities and fishermen to clean up debris deposited in Mississippi sound and other Mobile County waters by Hurricane Georges. Tons of material were removed from the area waters.

A 1999 informational calendar was created and published by the division. The document includes twelve monthly tide tables, complete with moon phases, sunrise and sunset times, and tidal times and amplitudes. The document also includes fishing rules and regulations, information regarding Alabama's inshore and offshore artificial reef programs, artificial reef coordinates, helpful fishing tips, and much more. The demand for this calendar has been extremely high and the feedback very positive.

A cooperative high school mariculture program continued 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 has proven to be a very successful program, which expands students' ability to participate in future fisheries.

A cooperative effort among state, local, and

federal governments, conservation groups, and private industry named "Roads to Reefs," will use blemished and recycled concrete road-construction materials and other appropriate materials to enhance ten reef sites in Mobile Bay and Mississippi Sound.

In November, the Marine Resources Division sank an old dry dock, formerly owned and operated by the Atlantic Marine Corporation, in 100 feet of water approximately 17 miles south of Mobile Pass. This large new reef should provide excellent fishing and diving opportunities well into the next millennium.

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.

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 14 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. One officer transferred to the Marine Police Division and will be replaced FY1999-2000.

Accomplishments

Enforcement officers conducted 14,677 hours of boat and shore patrol; 8,351 boat checks; 1,786 seafood shop inspections; 11,320 recreational fisherman checks; and issued 1,246 citations for illegal activities. Forty percent of the citations and warnings (494) were for violations of recreational fishing laws and regulations. The 268 violations of commercial fishing laws and regulations comprised 22% of the citations issued. Officers also issued 353 citations and warnings for violations of boating safety, 56 game and fish, and 75 citations for other state and federal laws and regulations. A total of 9,302 hours was spent on administrative duties, court attendance, training, and equipment maintenance. Officers worked 1,833 hours with the National Marine Fisheries Services 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 Coastwatch mission is to support enforcement efforts of the Marine Resources Division to ensure the future availability of our coastal marine resources. To date, 92 citizens have been trained during 11 training sessions held in Mobile, Baldwin, and Jefferson counties. The response to the program continues to be very positive.

Enforcement officers worked with the Southern Alabama Enviro Crimes Task Force (SAETF) investigating and prosecuting environmental crimes. SAETF obtained multiple indictments and convictions because of the various agencies involved in the SAETF working together. Additionally, Marine Resources Division officers issued eighteen misdemeanor criminal littering citations and warnings.

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

Future Plans

- Continue to develop mechanisms to improve the Coastwatch Program and better communicate important information.
- Continue to review enforcement policies and procedures for consistency and uniformity.
- Work with other Gulf states and the National Marine Fisheries Service to develop a Gulfwide strategic fisheries enforcement plan.

FISHERIES SECTION

The activities of the Fisheries Section are directed toward management of commercial and recreational fisheries in Alabama's marine and estuarine waters. Activities also include 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. 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 Peteet Mariculture Center in Gulf Shores and the Marine Resources Laboratory on Dauphin Island. Personnel consisted of one Biologist V, one Biologist IV, one Biologist III, three Biologist II's, one Biologist I, four Biologist Aide III's, seven Biologist Aide I/II's, one Data Entry Operator II, two bi-weekly laborers, and three temporary laborers.

Accomplishments

The Alabama Department of Conservation, Marine Resources Division planted 55,813 cubic yards of oyster cultch material in FY1999. A total of 10,000 yards of oyster shell was planted on Whitehouse reef which was to serve not only as material for potential spat setting but also as a fish attractant to create an inshore artificial fishing reef. There were 23,865 yards of cultch material consisting of oyster shell and crushed limestone placed east of the Dauphin Island bridge to restore reefs that were damaged by Hurricane Danny. Also, 21,948 cubic yards of cultch material (oyster shell and crushed limestone) were placed west of the Dauphin Island bridge to rebuild the area of this main reef damaged by Hurricane Georges. The amount of cultch planted in FY1999 was the most cultch planted on Alabama reefs in a single year since 1986. Plantings were funded by the Economic Development Administration and the Fisheries Restoration Act. Funds from the Fisheries Restoration Act were also used to replace pilings and signs affixed to pilings that serve to protect Alabama oyster reefs from shrimping

activities. Hurricanes Danny and Georges had destroyed most of the former markers.

The first full year of sampling was completed under a cooperative program with the Alabama Department of Environmental Management (ADEM) to integrate the division's assessment and monitoring program with ADEM's water quality monitoring program. The combined program allowed both organizations to increase the intensity of sampling and improve data collection at little or no increase in cost.

Cooperative efforts increased with other research facilities in Florida, Mississippi, and Hawaii. The infrastructure of the hatchery was improved 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 Peteet 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 700 pounds of large shrimp per pond for a total of 6,288 pounds.

During the year, 946 fisheries assessment samples were taken, 145 habitat assessments were performed, and 3,741 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; and 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. 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.

Federal aid funds for the Cooperative Statistics program are administered by the National Marine Fisheries Service, Department of Commerce and are utilized by the Marine Resources Division 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, flounder, 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 data base and forwarded to the National Marine Fisheries Service. Funds from the Southeast Area Monitoring and Assessment Program (SEAMAP) program are administered by the National Marine Fisheries Service, Department of Commerce and are 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 provides funds to manage the Alabama shrimp fishery and evaluate spawning success and juvenile survival for important recreational and commercial species. It also provides funds for a project to independently assess red snapper population by video camera and fish trap sampling. This study is being conducted in Alabama's offshore artificial reef permit areas in the Gulf of Mexico.

Beginning in January of 1999, Division personnel conducted the The Marine Recreational Fisheries Statistics Survey (MRFSS) survey for all types of recreational saltwater fishing in Alabama. So far this year, the total number of interviews has exceeded quota by 10%. The increased number of interviews will provide greater accuracy in the estimate of Alabama's recreational harvest. A pilot telephone survey to collect more detailed information on fishing effort by Gulf coast for-hire anglers was accepted by the National Marine Fisheries Service and will become the standard method for estimating charter boat effort starting in the year 2000. This method was proposed in order to increase the accuracy of harvest by the recreational for-hire sector.

Federal funds became available in 1999 to

develop a trip ticket program in Alabama to collect fishery information from each commercial fishing trip. This program is part of a Gulf-wide effort to generate more specific information for each fishery. This program, once fully implemented, will replace the current method of collecting landings information by the National Marine Fisheries Service and Division personnel. Trip tickets will be printed in triplicate form and supplied to Alabama seafood dealers. Seafood dealers will be required to complete the trip ticket for each transaction. Data from the completed trip tickets will be scanned into a computer, verified, edited, and sent monthly to the Gulf States Marine Fisheries Commission. The data will ultimately be supplied to the National Marine Fisheries Service.

The money ADCNR/MRD received from the Fisheries Restoration Act fund was expended in each of the three FY1999 cultch planting efforts. The Whitehouse reef planting and the planting west of the Dauphin Island bridge were completely paid for by this program. The planting east of the Dauphin Island bridge was partially paid for by this program. This source of monies was the only one used for the reef marking effort.

Economic Development Administration (EDA): ADCNR/MRD received money from this agency to help restore hurricane damaged oyster reefs. This fund paid for most of the cultch planting effort that occurred east of the Dauphin Island bridge.

All reported "fish kills" were investigated by the division during the fiscal year; all were associated with low dissolved oxygen and principally affected menhaden. Algal blooms and reports of discolored water were investigated to determine if these were incidents of harmful algae blooms such as "red tide." One occurrence of red tide occurred beginning in August and lingered into the fall. However, organism levels never became high enough to cause fish kills. Several advisories were issued by the Department of Health to alert the public to possible hazards, but no harmful effects were reported. The "red tide" never came into Alabama's bays though it lingered along the front beach for a considerable length of time. 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 increasing the accuracy of assessment of the health of Alabama's oyster resource. The Biological Section monitored shell planting activities in which 55,813 cubic yards of oyster cultch were planted on various public reefs.

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.

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 continued the cooperative endeavor with Auburn University and the new Alma May Bryant High School in Mobile County to provide a mariculture training center at the high school. This has proven to be a very successful program which expands students' ability to participate in future fisheries.

Personnel maintained and improved the home page for the Division which is associated with and accessed through the Departmental home page at 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 the second 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 year 2000 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 will continue, 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 benefits and red snapper production enhancement.

The commercial fisheries trip ticket system will be implemented.

Inshore assessment and monitoring work will be continued in coordination with the Alabama Department of Environmental Management in order to provide a more comprehensive depiction of Alabama's

marine waters and resources.

The Division will continue 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.

F LORIDA FISH & WILDLIFE CONSERVATION COMMISSION DIVISION OF MARINE FISHERIES *Russell S. Nelson, Director*

MARINE FISHERIES MANAGEMENT

On July 1, 1999, the Florida Marine Fisheries Commission merged with the Florida Game and Freshwater Fish Commission. The merger was mandated by public approval of a constitutional amendment that placed management responsibility for all of Florida's fish and wildlife resources in a single, constitutional agency. Prior to the merger, the Governor and Cabinet gave the final approval of the rules of the Marine Fisheries Commission, while final approval of rules for the Game and Freshwater Fish Commission (a constitutional agency) was given by the Commissioners.

The 1999 Florida Legislature passed legislation creating the Florida Fish and Wildlife Commission, further implementing the constitutional amendment. The Florida Marine Patrol was transferred from the Department of Environmental Protection (DEP) to the Fish & Wildlife Commission's Division of Law Enforcement, creating the Bureau of Marine Enforcement. The DEP Division of Marine Resources was abolished; three of its bureaus were transferred to the Commission, one was transferred to the Department of Agriculture and Consumer Services, and one remained with DEP. The Florida Marine Research Institute was transferred to the Commission under the Office of the Executive Director. The Bureau of Fisheries Management and Assistance Services, with the Marine Angler Outreach and Education program, was transferred to the Commission's Division of Marine Fisheries. The Bureau of Protected Species Management was transferred to the Commission's Office of Environmental Services. The Bureau of Marine Resource Regulation and Development was transferred to the Department of Agriculture and Consumer Services Division of Aquaculture, which was clearly designated as the "lead agency" over aquaculture in Florida. The Bureau of Coastal and Aquatic and Coastal Managed Areas remained in DEP.

The Florida Fish and Wildlife Conservation Commission is governed by a seven member Commission. Commissioners, appointed by the Governor and confirmed by the Florida Senate, serve for terms of four years. However, the first Commission consisted of 12

Commissioners, a merger of all Commissioners from the former Marine Fisheries Commission and the Game and Freshwater Fish Commission. Through normal attrition, there are currently nine seated Commissioners. Commissioner vacancies, occurring as terms expire, will not be filled until such time as there are seven seated Commissioners.

DIVISION OF MARINE FISHERIES

The major responsibilities of the Division of Marine Fisheries include: (1) development and implementation of marine fisheries management policies, (2) issuance and reconciliation of commercial fishing licenses, (3) angler outreach and marine aquatic resource education, (4) the state artificial reef program, (5) monitoring and evaluating the accuracy of the marine fisheries trip ticket reporting requirements through audits of applicable fish house records, (6) implementation and administration of the spiny lobster and stone crab effort management (i.e., trap certificate) programs, (7) oversight of landings for fisheries managed by quota with closure of the fishing seasons as quotas are reached, and (8) civil penalty assessments for violations of certain fisheries regulations. Highlights of staff efforts in 1999 include:

Marine Fisheries Management and Policy Development

Staff drafted and solicited public input on a rule that caps effort (i.e., trap number) in the stone crab fishery at the current level and establishes a procedure to gradually reduce the number of traps being fished. Subsequently, the Commission approved this rule, to be effective July 1, 2000, at their February 2000 meeting.

Angler Outreach and Aquatic Resource Education

Staff continue to provide information on fishing license requirements, fishing opportunities, Commission fisheries management projects, and the importance of habitat to the fisheries. In 1999 staff participated in more than 34 scheduled events (boat shows, the Florida State Fair, 15 Kids Fishing Clinics, three Ladies Let's Go Fishing Clinics) reaching an estimated 110,000 people.

All 5,367 participants in the Kids Fishing Clinics received rods and reels. The Florida Foundation for Responsible Angling, a not-for-profit organization, raised \$45,000 in support of these events. In addition, staff were frequently featured on local radio and television shows to discuss issues of importance to anglers. The Ladies Let's Go Fishing Coordinator, Betty Bauman, was named 1999 "Woman of the Year" by the American Sportfishing Association and among the Top 12 Most Influential Marine Industry Leaders in the 21st Century by Boating Magazine. EcoVentures Field Activities (aquatic resource education activities) conducted at the Cedar Key Field Laboratory attracted 1,250 participants.

Artificial Reef Program

A Federal Aid in Sport Fish Restoration grant, in concert with state fishing license revenues, provided funding to 14 local coastal governments and two non-profit organizations for development of marine artificial reefs. All 16 projects were successfully completed, resulting in the construction of 28 reefs using vessels, limestone rock, and concrete materials. The Northwest Florida socio-economic study of use and value of artificial reefs was completed during this period. A sidescan sonar project initiated to locate and map some northwest Florida artificial reefs was not as successful as hoped because of inadequate planning and access only to small vessels which were not up to the task.

FLORIDA MARINE RESEARCH INSTITUTE

Finfish

Gamefish, Reefish, and Directed Life History Studies

During 1999, we provided the Division of Marine Fisheries, Florida Fish and Wildlife Conservation Commission with stock assessments (or data to support stock assessments) on snook (*Centropomus undecimalis*), spotted seatrout (*Cynoscion nebulosus*), hogfish (*Lachnolaimus maximus*), and ballyhoo (*Hemiramphus brasiliensis*).

Work describing the life history of bonefish has been completed. However, cooperative work involving the University of Florida and the University of South Florida was expanded to continue an evaluation of potential genetic differences between *Albula vulpes* and an undescribed species from the Florida Keys. This

work should be completed by the end of June 2000 and may support description of a new species of bonefish in the Florida Keys.

We continued work on evaluating the feasibility of using ultrasonic tags for tracking tarpon in the Florida Keys. During 1999, research focused on tarpon movements and behavior in relation to environmental disturbances—such as background shallow-water boat traffic—and in estimating the release mortality of captured fish in order to determine if angling conditions can be improved or fishing mortality reduced.

We completed a two-year project to evaluate if capture and release of snook caught from spawning aggregations along the Florida East Coast is detrimental to reproduction. That knowledge may help in establishing site-specific, seasonal fishing regulations which will assure maintenance of an adequate spawning potential ratio for this avidly-sought sport fish. Data are in the final stages of analysis, and work on a manuscript will start soon after. Two additional manuscripts on snook biology have been also submitted for publication in peer-reviewed journals: "Age, growth, maturation, and protandric sex reversal in the common snook, *Centropomus undecimalis*, from the east and west coasts of South Florida" was submitted to *Fishery Bulletin*, and "Catch and release mortality of common snook, *Centropomus undecimalis*, in Florida" was submitted to the *North American Journal of Fisheries Management*.

We completed collections of spotted seatrout from Florida's east coast and data analysis is underway to prepare a manuscript on seatrout reproduction in that area. Seatrout collections in Tampa Bay started last fall to support a three-year study on age-specific spawning frequency and batch fecundity, geographically-specific maturity schedules as well as an evaluation of spawning habitat in Tampa Bay.

Most of the work on a project evaluating the potential use of otolith elemental composition to determine the recruitment source of adult red drum in west Florida shelf waters has been completed. A co-authored manuscript entitled "Elemental signatures of red drum (*Sciaenops ocellatus*) otoliths from the Gulf of Mexico and western Atlantic was accepted for publication in the *Proceedings of the 52nd Annual Meeting of the Gulf and Caribbean Fisheries Institute, Key West, Florida. November 1-5, 1999*. A second manuscript on the stock composition and status of

red drum in the southeastern U.S. is now in preparation.

Work on reef fish abundance and biology in southeast Florida was greatly expanded during 1999. Life history work on yellowtail snapper, *Ocyurus chrysurus*; gray snapper, *Lutjanus griseus*; mutton snapper, *Lutjanus analis*; and lane snapper, *Lutjanus synagris* was expanded into the Florida Keys, and an intensive fishery-independent sampling program for the southeastern Florida mainland was initiated.

A two-year research project on dolphin (*Coryphaena hippurus*) that will focus on collecting fishery and biological data for stock assessment purposes was initiated. Samples will be collected primarily from the Florida Keys, but comparative specimens will also be collected from offshore waters near Melbourne (central east coast of Florida) and Apalachicola (Florida panhandle).

We completed a study outlining the spawning grounds of two halfbeaks species—ballyhoo (*Hemiramphus brasiliensis*) and balao (*H. balao*)—in south Florida. Both of these species are targeted by a net fishery for bait. Manuscripts are now being prepared for publication in the peer-reviewed literature.

We continued work on a two-year MARFIN study describing the life history of hogfish in Florida waters. This study should be completed by December 2000. Manuscripts on age, growth, and reproduction of permit (*Trachinotus falcatus*); gray triggerfish (*Balistes capricus*); and Florida pompano (*Trachinotus carolinus*) in Florida were completed and submitted for publication in *Fishery Bulletin*.

Baitfish

In this fiscal year, we conducted a fifth acoustic/trawl survey during month of April along the west central coast of Florida. This survey was conducted to determine 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 along with previous surveys were used to develop a stock assessment report on sardine/herring stocks in Florida. We began to develop a trophic dynamic fisheries ecosystem model that will be used to investigate the ecosystem impacts of fishing and/or environmental anomalies on forage species such as sardine/herring species.

Monthly sampling of striped mullet continued along the East Coast of Florida for life history studies. This is a part of a MARFIN grant being conducted in association with three other state agencies (Georgia, South Carolina, and North Carolina).

Bivalve Fisheries Research

Bivalve fisheries research at the Florida Marine Research Institute encompasses bay scallops (*Argopecten irradians*), calico scallops (*Argopecten gibbus*), and hard clams (*Mercenaria* spp.), with consideration of other indigenous (e.g., *Chione*, *Macrocallista*) and non-indigenous (e.g., *Dreissena*, *Perna*) genera as needed. Assessment and monitoring of oysters (*Crassostrea*) are conducted by a separate branch of the Florida Department of Environmental Protection.

Bay scallop research continues to be directed towards 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 the 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. The success of the restoration program will be assessed by quantifying the abundance of a unique genetic “tag” in subsequent year classes.

Hard clam research is focused on developing methods to enhance natural populations in the Indian River lagoon, Florida. Three methods of enhancement (spawner transplants, seeding, direct larval injection) are being compared for the biological and economic suitability. Preliminary results suggest that releasing recently fertilized eggs directly into the lagoon may provide a cheap and effective means of enhancing local populations.

The green mussel (*Perna viridis*) was recently discovered in Tampa Bay waters. FMRI scientists are monitoring the distribution of adult mussels, and the pattern of larval distribution and recruitment both within Tampa Bay and in neighboring waters.

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 1999, four manuscripts were prepared: "Effectiveness of bycatch reduction devices in small otter trawls used in the Florida shrimp fishery," to be submitted for publication in *Fisheries Bulletin*; "GIS and modeling: coupling habitats to Florida fisheries," published in the *Journal of Shellfish Research* 17:1451-1457; "The blue crab fishery of the Gulf of Mexico, United States: a regional management plan," and "Annotated bibliography of fishing impacts on habitat" written by the TCC Crab and Habitat subcommittees (both of which P. Steele is a member) for the GSMFC. Staff also 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 continued 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 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 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 Florida Marine Fisheries Commission. Two manuscripts were published: Tringali, M.D., T.M. Bert, and S. Seyoum, 1999, "Genetic identification of centropomine fishes," *Transactions of the American Fisheries Society* 128:446-458; and Tringali, M.D., T.M. Bert, S. Seyoum, E. Bermingham, and D. Bartolacci, 1999, "Molecular phylogenetics and ecological diversification of the transisthmian fish genus *Centropomus* (Perciformes:

Centropomidae)," *Molecular Phylogenetics and Evolution* 13:193-207. Laboratory analysis of genetic stock structure in sheepshead and in spotted seatrout was nearly completed and manuscripts that identify the geographic ranges of stocks of these fish species and also address issues of putative subspeciation within these species. Laboratory analyses of genetic stock structure of pink shrimp, white shrimp, brown shrimp, and bay scallops are also nearing completion. Collection of samples for scheduled genetic stock structure studies of vermilion snapper, yellowtail snapper, grey snapper, and dolphin fishes were initiated.

Genetic monitoring of the SERF red drum stock enhancement program and of the joint University of South Florida/ FMRI/ SERF bay scallop stock enhancement program continued. A Master's thesis in which the genetic diversity of red drum hatchery broods is compared to that of the wild population, parent/offspring identification, and developing genetically efficient breeding protocols has been completed. Three additional manuscripts were accepted for publication or published: Bert, T. M. and M. D. Tringali, "The effects of various aquacultural breeding strategies on the genetic diversity of successive broods," in press in, Z. Zakariah, ed., *Proceedings of a Conference on Mariculture and the Environment: Towards Sustainable Development*, Maritime Institute of Malaysia; Seyoum, S., M.D. Tringali, T.M. Bert, D. McElroy, and R. Stokes, "An analysis of genetic population structure in red drum (*Sciaenops ocellatus*) based on mtDNA control region sequence," *Fishery Bulletin* 98:127-138; and "Genetic considerations during the experimental and production phases of snook stock enhancement." 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. Data from all studies are provided to appropriate fishery management agencies and are routinely presented at scientific meetings and other public forums. Two symposia on the genetic and ecological implications of aquaculture activities (particularly stock enhancement and other activities in which cultured animals are purposefully or accidentally released into the environment) were conducted. The proceedings of these symposia are being compiled for publication as a book in the series entitled "Reviews in Fish Biology and Fisheries."

Fisheries Statistics

Fisheries Independent Monitoring Program

Fisheries independent monitoring (FIM) of fishes continues in the Tampa Bay, Charlotte Harbor, Indian River Lagoon, Cedar Key, Apalachicola, and the Florida Keys. 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. Staff has spent much time developing models that describe fish abundance associated with different habitats. 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. Approximately 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, for quota monitoring, for design of sampling programs, and for 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. In 1999, the commercial fisheries harvest in Florida was over 120 million pounds with a dockside value worth over \$213 million. Also in 1999, the reporting of aquaculture-raised saltwater products to the department was no longer required, but we still received and computerized this information when supplied to facilitate qualification for license endorsements for these fishermen.

The programming effort to convert the trip ticket data, associated biological profiles used for editing, and the editing application from

Adabase/Natural to an Oracle data base and application was completed in May, 2000. After parallel testing of the systems is completed next month, we will use the Oracle system to process the trip ticket data exclusively. The ACCSP and the FIN have proposed data standards that we are evaluating for incorporation into the Florida trip ticket. 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, and we have supplied this program with edited data for 1998 and 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 1999, samplers measured 115,657 organisms (fish and invertebrates) from 1,401 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

The Florida Fish and Wildlife Commission issues Saltwater Fishing Licenses and computerizes all license information. For recreational landings estimates and other types of analyses, data from the NMFS MRFSS are utilized. Since September 1997, the Fishery Dependent Monitoring group has participated in the 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. Fishing effort for the pilot charter boat survey was obtained through

telephone interviews of a randomly selected 10% sample of charter boats (including fishing guides) on the Gulf Coast. The goal of the pilot charter boat survey is to compare the experimental method (telephone interviews of charter boat captains to improve precision) of estimating fishing effort to that obtained during the standard MRFSS random-digit dialing of households with telephones to interview recreational anglers. The pilot charter boat survey was continued through 1999.

Beginning in November 1998, Florida (along with Alabama, Mississippi, and Louisiana) also conducted the field intercept portion of the MRFSS for all fishing modes (shore-based, charter boats, and private/rental boats). Florida conducts its portion of the survey on both the Atlantic and Gulf of Mexico coasts, and we employ 30 or more samplers at field locations around Florida (Jacksonville, New Smyrna Beach, Melbourne, Tequesta, Miami, Marathon, Port Charlotte, St. Petersburg, Cedar Key, Apalachicola, Panama City, Destin, and Pensacola). Two researchers in St. Petersburg provide coordination for the field sampling and are responsible for the training of new staff, reviewing status of the sampling, and quality assurance for the project. Docksides/shore sampling during 1999 exceeded the base level of sampling normally conducted by the MRFSS for all modes of fishing in Florida. In 1999, we provided a total of 14,558 angler interviews for the Atlantic Coast of Florida (base quota for interviews was 12,811; an increase of 1.23 over base). On the Gulf Coast in 1999, we interviewed a total of 25,119 anglers (base quota for interviews [including 6X for charter boat surveys] was 20,458; an increase of 1.24 over base). We measured the lengths and/or weights from more than 34,000 fish caught by recreational anglers during 1999. 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 docksides sampling program.

STOCK ASSESSMENT AND POPULATION MODELING OF FLORIDA'S INSHORE SPECIES

In November 1999, the assessment group produced an annual trends report that summarized fisheries-dependent and independent data through 1998 and provided detailed narratives on 47 popular species in Florida. The assessment group developed stock assessments in 1999 for bluefish,

weakfish, spotted seatrout, common snook, spiny lobster, and white grunt. 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 spotted seatrout. Based upon the results of these models, the FWC reduced the bag limit for the Northwest region (Escambia-Pasco counties) from seven fish to five fish.

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. In 1999, we participated in the development of the GSMFC fishery management plan for gulf flounder; the Gulf of Mexico Fishery Management Council's assessment of the condition of red drum, reef fishes, and mackerels; the Atlantic States Marine Fisheries Commission's 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 FWC and to participate on graduate student committees.

Besides the activities above, members of the group contributed presentations at professional meetings and at FWC meetings. Gary Nelson presented "Abundance, distribution, and mortality of young-of-the-year spotted seatrout (*Cynoscion nebulosus*) in three estuaries along the Gulf coast of Florida" at the Southern Division of the American Fisheries Society, February 25-28, 1999, in Chattanooga, Tennessee. Michael Murphy presented "Age structure of offshore red drum populations in nearshore waters off west-central Florida" at the American Fisheries Society's annual meeting in Charlotte, North Carolina. Michael Murphy also presented "Can tournaments be valuable to fisheries research and management?" at a FWC sponsored symposium on catch, release, and tournaments in Sebring, Florida. Robert Muller presented "Why we have fisheries regulations" at the same catch and release symposium. Also in 1999, Behzad Mahmoudi with others submitted three papers for publication: "Microstructure growth analysis of scaled sardine (*Harangula jaguna*) along the east and west coast of Florida" by Pierce, D.J., B. Mahmoudi, and R.D. Wilson submitted to Fishery Bulletin, "Nearshore fish assemblages along the central west

coast of Florida” Pierce, D.J. and B. Mahmoudi submitted to Bulletin of Marine Science, and “Spatial and temporal variations in species composition of bycatch collected during a striped mullet (*Mugil cephalus*) survey” Pierce, D.J. and B. Mahmoudi submitted to Gulf of Mexico Science.

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 2004, 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 conditions in Florida’s nearshore waters using a set of physical, chemical, and biological indicators. Florida’s effort is a single component of a nationwide assessment initiative known as Coastal 2000. These indicators include water quality measurements, fisheries, macrobenthos, and 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 the five Water Management Districts. The inshore marine monitoring and assessment program (IMAP) will be coordinated by staff of the Florida Fish and Wildlife Conservation Commission’s Florida Marine Research Institute (FMRI), headquartered in St. Petersburg, Florida. FMRI operates field labs in Melbourne, Marathon, Charlotte Harbor, Tampa Bay, Cedar Key, Tequesta, and East Point (Apalachicola). These field labs will be used as bases of operation for implementing IMAP statewide. Full scale field monitoring is set to begin in July 2000.

Coral Reef and Hardground Monitoring and Assessment

During the past year, the fourth annual sampling of 40 previously established reef sampling sites including 160 stations from Key Largo to Key West was conducted by Coral/hardbottom Monitoring Project (CRMP) scientists. Three additional CRMP monitoring sites were installed and sampled in Dry Tortugas during summer 1999. One of these is located in the proposed Tortugas 2000 marine reserve.

Researchers are using a combination of species count methods and video to document coral species distribution and cover of coral and other selected benthos to determine change over time. Point count analysis of video data for 1996 through 1998 has been completed. Initially funded for five years by EPA, the grant, managed by FWC Florida Marine Research Institute, will be extended through 2000/2001.

Last summer, FMRI coral researchers participated in a Sustainable Seas Expedition in the Dry Tortugas. Staff used the Deep Worker submersible to survey and document deeper reef habitats with video in the vicinity of Sherwood Forest, Riley’s Hump, and Black Coral Rock.

FMRI continues to provide expertise in surveys and litigation of ship groundings. Funds from the Hind grounding have provided additional staff and equipment necessary to conduct the work. Responsibility for surveys of live rock aquaculture potential leases on state submerged lands has been transferred to the Department of Agriculture, Division of Aquaculture. FWC FMRI staff provided training to DOA staff during site inspections in fall of 1999 and continue to provide assistance and guidance in preparing lease review documents.

Staff assisted in finalizing the South Atlantic Fishery Management Council’s comprehensive Essential Fish Habitat Management Plan, which has been completed. This document has been integral to staff’s input into consistency reviews for proposed beach renourishment projects along Florida’s East Coast. Staff also continue to provide technical expertise to the Florida Keys National Marine Sanctuary and the state of Florida in reviewing collecting permit requests, zoning issues, and the proposed Tortugas 2000 marine reserve.

Aquatic Health

During 1999 numerous reports of ulcerated or lesioned fish continued to be received from the St. Lucie River (Stuart, Florida) area. Investigative work has determined that an aquatic fungus is often associated with affected fish. A similar type of fungus has been implicated in fish lesion events in hot spot areas worldwide, including some events on the eastern seaboard thought to be caused by *Pfiesteria piscicida* or related toxic algae. We believe this fungus prefers lower salinities and our current hypothesis is that sustained low salinities in the St. Lucie estuary

associated with large-scale freshwater inputs allow the fungus to proliferate and contribute to the increased occurrence of lesions on some fish species. Reports of ulcerated fish, including some freshwater species, have been received from other areas of Florida, although in much lower numbers. It is not certain whether the fungus alone induces lesions, or acts in concert with other stressors to produce the fish lesions. Also, ongoing work will determine if any of the dinoflagellates collected during the lesion event in 1998 or a minor event in December 1999 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 and the FDEP-Southeast District on the water release and water quality issues in the St. Lucie estuary. We are confident that our scientific perspective relative to fish health is being considered in the decision-making process. Based on data from and our 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 and our current knowledge of the lesion event in 1998, we do not anticipate an increase in the frequency of lesioned fish under minimal freshwater release. However, advance notification of larger releases will allow FMRI to modify the monthly fish sampling protocols and collect other data that may provide information as to the cause(s) of the fish lesions.

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. The objectives of the health components are to provide health support for successful restoration of bay scallops in Florida. There are two phases, scallop health and effects of microalgae on scallops. The health portion provides health support for the culture, stocking, and restoration phases of the project. The health evaluation covers different aspects of potential disease and mortality factors that may affect the successful rearing and stocking of the bay scallop. With preliminary data based on limited numbers, we have developed a health profile for wild scallops from archived histological material

available at FMRI and from wild scallops screened for bacteria, parasites, and pathologies. The health of cultured and restored adult scallops has been monitored throughout the project. The microalgae portion of the project has investigated the effects of potentially harmful microalgae on the growth and survival of bay scallops based on composition of microalgae available and consumed.

Harmful Algal Blooms (HAB)

Marine microalgae or phytoplankton are significant positive and negative players in estuarine and coastal systems and their communities. Positive aspects are reflected in the primary production of the sea and its support of biological communities. The negative aspects include risks to natural resources and public health caused by only a few of the species. For example, natural biotoxins in red tide microalgae can cause neurotoxic shellfish poisoning in humans or cause marine mortalities in coastal waters. Three simultaneous red tides occurred in the fall of 1999 in the northeast, southwest, and northeast. Shellfish harvesting areas were closed when red tide presented a threat, and in red tide areas that were experiencing onshore winds, people on the beach experienced respiratory irritation. Fish kills due to red tide occurred offshore and inshore. It lasted the longest in northwest and southwest Florida. Northwest Florida has only had documented red tides in 1964, 1974, 1982, 1995, 1996/97 while southwest Florida is an epicenter and has had red tides in almost every year since the early 1970s when monitoring increased. As in 1996, a northwest Florida red tide was transported to our neighboring Gulf states. Manatee deaths in southwest Florida and dolphin deaths in northwest Florida are still being investigated as being possibly caused by red tide toxins called brevetoxins produced by the dinoflagellate, *Gymnodinium breve*. Blooms were tracked and studied in Apalachee Bay and in the southwest as part of a project called ECOHAB: Florida, supported by NOAA, EPA, and the state of Florida. This project is conducted by investigators at 13 institutions who are focused on several objectives including modeling the initiation, maintenance, and export of *G. breve* red tides on the west Florida shelf at different time and space scales to predict landfall and determining the sources of inorganic and organic nutrients that allow growth and persistence of large *G. breve* populations in coastal waters. The 1999 blooms helped address sources of nutrients, processes, and even fate and effect of toxins in the food chain. Results were presented at the Ninth International

Conference on Harmful Algal Blooms.

Other projects that continue involve monitoring for *Pfiesteria* and *Pfiesteria*-like organisms in Florida coastal waters and setting up an offshore volunteer sampling program for early warning of red tides. One is an inshore program that is being expanded to be more intensive while the other involves offshore charter boat captains, fishermen, recreational boaters and others frequently on the water. The volunteer program is being expanded to have transects off of at least eight areas along northwest and southwest Florida. It has already been successful in detecting blooms of *G. breve* that are ten to 30 miles offshore but never come inshore! In addition to monitoring and research projects in 1999, Florida's Harmful Algal Bloom Task Force was formalized by the Florida Legislature and continued to make recommendations for research needs. State funds were set aside by the Legislature for specific recommendations for the Task Force, and the Florida Marine Research Institute administered over a dozen contracts for increased survey work and toxin analyses, development of new toxin detection techniques, development of molecular probes for species and toxins, identification of bioactive compounds produced by *Pfiesteria*-like organisms, economic loss assessment, testing of fish removal machinery at sea, public health risks of red tide aerosol, and survey of toxic blue green algae blooms in Florida waters, among others. The Task Force released a document entitled "Harmful Algal Blooms in Florida" by Steidinger, Landsberg, Tomas, and Burns in March 1999. A major publication during this year was an EPA Gulf of Mexico Program Office sponsored document entitled "Harmful Microalgae and Associated Public Health Risks in the Gulf of Mexico" by Steidinger and Penta, 1999. This manual is on-line at:

www.fmri.usf.edu/redtide.htm

and has procedures, references, and even photographic slides. Another GOMP sponsored publication published in 1999 was "The Gulf of Mexico Large Marine Ecosystem" by Kumpf, Steidinger, and Sherman.

Habitat Assessment and Restoration

Habitat assessment projects seek to assess the ecological status of coastal fisheries habitats, identify physical and biological factors that stress coastal plant communities, and evaluate trends in coastal ecosystem health. FMRI staff also develop

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 conducted 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 also evaluate biological monitoring techniques to assess environmental stress and estuarine health.

FMRI staff members 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.

FMRI staff members 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: Between 1994 and the present, FMRI staff have participated in multi-agency studies of phytoplankton blooms, seagrass dynamics, mangrove mortality, and continuous light monitoring in Florida Bay. Many of these studies have laid the ground work to evaluate the impact of future hydrologic restoration efforts in the Everglades on downstream systems in Florida Bay. Seagrass assessment and light monitoring will continue for one more year, but FMRI involvement in Florida Bay is decreasing as

funding levels decline.

FISHERIES STOCK ENHANCEMENT

The Fisheries Stock Enhancement Program began its fifteenth year on July 1, 1999. During 1999, 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 ninth year in August 1999 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. With the agreement of the Marine Stock Enhancement Advisory Board (MSEAB), large-scale releases of red drum into Biscayne Bay were discontinued. An increased emphasis on assessment of the impact of previous releases is on going. A total of 1,671,178 hatchery-reared red drum were released in Biscayne Bay including 1,060,548 phase I, 427,339 phase II, and 183,291 phase III. A total of 2,287,781 hatchery-reared red drum have been released statewide since December 1988. When releases of red drum into Biscayne Bay were discontinued, several ponds of East Coast red drum remained at the Stock Enhancement Research Facility (SERF). It was decided to release these fish in the Indian River Lagoon. Two locations were chosen, one in the northern Lagoon and one in the southern Lagoon. Releases in these two locations began in February 1999 and continued through December 1999. A total of 11,362 fish were released.

With the agreement of the MSEAB, a new project was begun in Tampa Bay. This project is designed to more clearly answer the questions of size at release, season of release, and release habitat as well as improve the catch rates of red drum by recreational anglers by 25%. When the project began, no West Coast red drum broodstock were held at SERF (red drum from the East and West Coasts of Florida are genetically distinct). To begin the project, eggs from West Coast red drum were obtained from the Crystal River Mariculture Center (CRMC) operated by Florida Power Corporation. The CRMC later donated five brood fish to FWC. Efforts to capture West Coast red drum for brood stock were under way at year's end, but only a few had been captured. Using fingerlings produced from the eggs obtained from

CRMC releases for Project Tampa Bay were scheduled to begin in March 2000. For the first time in the history of this program, we are collaborating with the fisheries independent and fisheries dependent monitoring programs. This collaboration will help us identify appropriate release habitat and provide a mechanism for tracking the fish from the time they are released through their entry into the fishery at minimal additional cost.

A pilot project to develop and evaluate release and sampling strategies for common snook in Sarasota and southern Tampa bays, begun in 1996, continued through this reporting period. This project is a partnership between MML, NMFS, and FWC. Approximately 38,000 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 FWC and Harbor Branch Oceanographic Institution. 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 third year July 1, 1999. This is a cooperative effort between University of South Florida (USF), MML, and FWC. 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 this reporting period, approximately 22,200 bay scallops were planted in cages at three locations on Florida's West Coast.

The queen conch restoration project, located at the FWC Keys Marine Laboratory, continued through this reporting period. 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.

The MSEAB, organized in 1998, met one time during this reporting period. During this meeting it was decided to focus all red drum stock enhancement efforts in Tampa Bay for the next three to five years. The Board agreed that there is a critical need for documented successes of enhancement in Florida; Tampa Bay provides the best chance to demonstrate the use of stock enhancement and to develop the strategies to

maximize the probability of success.

Hatchery Operations

Red Drum Production: As indicated earlier, eggs were obtained from West Coast red drum maintained at the Florida Power CRMC and approximately 418,236 two day old larvae were stocked into three phase I ponds during fall 1999. The CRMC donated five brood fish to FWC and an additional 143,208 larvae were produced at SERF and stocked in a fourth pond. Approximately 204,566 phase I fingerlings were harvested from these four ponds and restocked into five bird netted ponds for phase II and phase III rearing for Project Tampa Bay.

Scallop Production: Total bay scallop production at SERF during 1999 was 61,297 animals with a mean planting size of 27-mm (shell height). Approximately 15,300 scallops were planted into 51 field cages in Crystal River (March 29), Homosassa River (March 30), and Anclote Bay (May 4). A second planting of Anclote Bay scallops was completed July 20 with 1,500 animals stocked into nine cages for a density experiment and 5,400 scallops into larger enclosures in Anclote Bay. Scallop survival in three SERF ponds averaged 83.0 % for two scallop groups during year two nursery rearing.

To begin year three nursery production, one group of approximately 100,000 juvenile Crystal River scallops was transported to SERF from the USF Scallop Aquaculture Facility during December 1999.

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. Our health-management program is effective, and the objectives are being met.

Effective health management consists of: 1) superior husbandry, 2) constant disease surveillance, 3) refining handling and culture methods to minimize stress and disease, 4) testing and refining of treatment methods, 5) health training and information for staff, interns, volunteers, and aquaculturists, and 6) interaction

and coordination with regulatory agencies, aquaculturists, and fish-health professionals. Each of these areas is explained below.

Superior husbandry is focused on the needs of the animal and is fully integrated with other areas of hatchery management. It avoids disease by detecting and correcting conditions before they lead to disease. Protocols that exemplify superior husbandry are prepared, tested, refined, and made available to train staff, interns, volunteers, and aquaculturists.

Constant and comprehensive disease surveillance 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. Thirty-two health reports were prepared and distributed during 1999. Most reports were necropsy-based evaluations of subadult or younger red drum. Red drum parasites and disease conditions encountered in 1999 included *Amyloodinium*, *Caligus*, *Trichodinella*, *Trichodina*, *Cryptobia*, peritonitis related to internal anchor and sonic tagging, spinal cord damage from dart tag insertion, systemic *Vibrio* infections, and gas bubble disease. Early disease detection has resulted in reduced mortality and improved production efficiency. Finfish aquaculturists have been provided with information on our disease surveillance methods.

Our culture methods are continuously being refined in order 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.

Many new disease treatment methods have been developed and tested over the past decade. The most lethal parasites, such as *Amyloodinium* in red drum, are now largely under

control after application of various experimentally derived treatments and parasite-prevention strategies. Likewise, control of opportunistic bacterial diseases is improving; however, debility and mortality due to bacterial infection is still a serious problem. Red drum losses due to *Vibrio* infections have been significant for all stages of development except broodstock. *Aeromonas* infections can also be a problem during low-salinity culture. Bacterial monitoring of both red drum and bay scallop larvae is intensive while incubators are in use, because larvae are typically more susceptible to bacterial infection than any other stage. For example, mortality of scallop larvae routinely exceeds 99% within a few days after hatch. This mortality is usually associated with *Vibrio* proliferation. 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. There is a serious need for more applied bacterial research, particularly collaborative efforts that cross traditional institutional barriers. 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 more successful commercial aquaculture and stock enhancement of finfish and bivalves.

Hands-on health training, phone consultations, written material, and other forms of health support have been made available to SERF staff and outside aquaculturists. This training has been integrated with the outreach and training 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 related to marine stock enhancement are still slowly evolving with input from many sectors. We are encouraging diagnosticians to become more directly involved with the culturists and their culture system, including site visits and the immediate diagnostic

evaluation of fish that become diseased during culture. We are assisting the Florida Department of Agriculture and Consumer Services as they develop policies and rules related to health and best management practices in commercial aquaculture.

Assessment

Fishery-dependent assessment of the impact of releasing hatchery-reared red drum continued in all release locations through the reporting period. The statewide total of reported angler captures passed the 2,200 mark by the end of the period. In Biscayne Bay, more than 760 fish released as phase III have been reported captured by anglers. The number of angler reported captures in the Indian River Lagoon exceeded 775. A fifth two-day fishing tournament was held in Biscayne Bay to promote angler awareness of the project and to increase fish recoveries. A fifth drawing, funded by the Atlantic Gamefish Foundation, was held during April 1999, 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, initiated in 1988 through a partnership with Mote Marine Laboratory, continued through the end of 1999. Tracking and locating fish is accomplished using angler intercepts, traditional fishing methods and gear, and the use of sonically tagged fish. During 1998 and 1999, approximately 100 red drum, including both legal size and reproductive age fish, 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.

ENDANGERED AND THREATENED SPECIES

Marine Mammals

The FWC Marine Mammals Research Program is headquartered at the FMRI in downtown St. Petersburg. Additional staff are located at the FMRI Marine Mammal Pathobiology Laboratory (MMPL) 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 GIS. Research on the endangered North Atlantic right whale is coordinated by program staff at the Jacksonville field station.

Manatee Mortality

Watercraft-related Deaths – During 1999, 30% of the manatee deaths (82) were a result of collisions with watercraft. As in years past, the majority of deaths resulted from impact with watercrafts and not being cut by the propellers. The county leader of watercraft-related deaths for 1974-1999 was Brevard County with 171. Lee County was second with 114. In 1999, Brevard had the highest number of watercraft-related deaths with 12. Lee and Collier counties were the second highest for 1999 with ten each.

Flood Gates/Canal Locks – Deaths resulting from entrapment in water-control structures and navigational locks totaled 15 for 1999. The greatest number of deaths since 1974 have occurred in Dade County. During 1999, Dade County also led the state in structure deaths with five. Martin County came in second with four.

Other Human Related – Deaths categorized as “other human-related” accounted for eight deaths in 1999. Only one other year has surpassed this total, with nine in 1979. 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 24, followed by Brevard County with 15. During 1999, Dade County was highest for the year with three other human related deaths.

Perinatal – Deaths of perinatal manatees (52) comprised 19% of the deaths during 1999. The majority, 67%, of these carcasses were in bad condition, and none of these showed signs of trauma. Carcasses were most frequently recovered from Brevard County (15), 29% of the annual total. The county with the second most frequent number was Lee (14). Brevard County also led the state for the most perinatals for the past 26 years with 203. Lee County was second with 107.

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 16% (43) of the deaths in 1999. Brevard County had the highest number with nine, followed by Lee County with six. Historically, Lee County ranks first in total deaths from natural causes with 161. Brevard County is second with 127.

Undetermined – The majority of carcasses in the undetermined category are so badly decomposed that a cause of death can not be determined. Deaths in the undetermined category comprised 69 of the total in 1999. Brevard County led the state with 16% (11). Overall, from 1974-1999, Lee County was the leader with 216 total, and Brevard was second with 206.

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. Three inter-agency synoptic manatee aerial surveys were flown in 1999 – January 6 with 1,873 manatees; February 23 with 2,034 manatees; and March 6 with 2,353 manatees. These counts were somewhat lower than the 1996 synoptic counts which had a high count of 2,639 in February 1996 which was probably due to a warmer winter. Teams totaling 41 observers from 15 state, federal, and county agencies, research labs, and universities searched for manatees in 26 areas on both coasts. Observers in 19 aircraft and seven ground teams counted manatees at power plants and waterways. FWC also conducted year-round manatee aerial distribution surveys in Brevard County, and FWC funded aerial surveys by Mote Marine Lab in Charlotte County. The Brevard County study obtained the record highest count of manatees in one area, 790 on March 17-18, 1999. Sightings from these surveys are rapidly entered into the GIS system for analysis. Thirty-six aerial data sets are now available to users on the new manatee GIS CD-Rom, and additional data sets are in preparation. Tandem aerial surveys were conducted in Sarasota County to estimate manatees missed in year-round distribution surveys. Two planes, from

FWC and Mote Marine Laboratory, covered the same route 30 minutes apart to compare the two counts then estimate the number of manatees missed using mark-recapture methods. A new study to calibrate winter aerial counts at Tampa Bay power plants was conducted. Replicate counts were made to test our survey procedures, assess their accuracy, and to better track population trends. A total of 49 flights was made from November 1999 to March 2000. Flights were made twice per week from November to March and every day before and after three cold fronts. The two power plants were counted twice each day. Ground and boat counts were also made for comparison on some days. Manatee adult survival rates are being estimated for the first time from photo-identification data from Tampa Bay and southwest Florida. Over 6,000 photos of recognizable manatees since 1983 are being analyzed using Jolly-Seber mark-recapture models.

Ecology and Migration

During 1999, seven manatees with satellite transmitters were monitored from one week to four months. Two of the manatees, a male and female, were animals that had suffered from red tide during outbreaks in southwest Florida in 1995 and 1996. The animals were tagged and released upon their recovery. One of the animals was monitored off and on for approximately four years; the other was monitored for 2½ years and successfully had a calf in the wild. Four of the animals monitored during 1999 were rehabilitated animals, including three orphaned and one captive-born manatee. One of the orphans, tagged as an adult in 1997, was released into the Homosassa River. Due to human harassment, she was moved first to the Chassahowitzka River and then to Crystal River during the winter. She had a calf, and she and her calf began utilizing the Chassahowitzka River during both warm and cold seasons. Two of the rehabilitated orphans were tagged and released into the Buttonwood Canal, Everglades National Park. Their tags came off after the tethers broke, possibly due to entanglement in vegetation. They were tagged three and four months respectively. The captive-born manatee had also been released into the Everglades in May 1998. He utilized the Whitewater Bay area primarily until December when he moved through Florida Bay to the lower Keys and then began travelling north along the bay side of the Keys. When the manatee lost his tag on January 5, 1999, he was in the Miami River.

The technical report summarizing data

from the six-year West Coast Telemetry Project is in the final stages of review and should be completed by the end of the summer.

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 come from a variety of research projects including the photo-identification catalog, use of passive integrated transponder tags, and non-invasive body condition indices. The FMRI partners with the USGS Sirenia Project and Mote Marine Laboratory to co-manage photo-identification catalog data collected in the southeastern United States. FMRI actively collects data on the west coast of Florida from areas extending from Tampa Bay to the Everglades and on the east coast from areas near Jacksonville, Tequesta, and Melbourne. The FMRI also has cooperative agreements with Lee County Parks, the National Park Service, the U.S. Corps of Engineers, and others to assist with manatee-related photographic and environmental data collection. The West Coast portion of the catalog includes more than 3,000 images and 7,000 sighting records representing 591 fully photo-documented, scarred manatee individuals

Geographic Information Systems

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.

The GIS component of the telemetry project progressed during this past year. Travel paths for all the Tampa Bay animals were converted to maps that displayed possible high-use areas and travel corridors. All high-use areas mapped by the model were known by field biologists as areas of frequent manatee use. Summary statistics comparing high-use areas among males, females with calves, and females without calves revealed little differences among

these sex classes. A peer-reviewed manuscript describing the model and comparing the sex classes is being prepared, and this work was presented at two scientific meetings.

Progress continued on a preliminary habitat suitability model for manatees in Charlotte Harbor, Florida. A warm season model was created using summer aerial survey data and two environmental data layers. The model was presented at the Biennial Conference on the Biology of Marine Mammals in a GIS/remote sensing workshop. Habitat evaluation methods using GIS are being tested in an effort to support decision making for manatee habitat management.

Staff incorporated and facilitated verification of right whale sightings and effort data into GIS. Working with the federal NMFS, cooperative organizations including FWC, GDNR, and NEA collected these data in the southeast calving grounds. A pilot project for the effort analysis was completed and presented at the ESRI Southeast Users Conference in October 1999. The poster was awarded the distinction of "Most Innovative." Generation of ancillary spatial data continued, such as ship traffic, ship reporting, critical habitat boundaries, bathymetry, shipping lanes, and ports. These efforts are part of a project to build a comprehensive GIS for right whale managers and researchers.

Other accomplishments included acceptance of a manuscript entitled: "Aerial videogrammetry from a tethered airship to assess manatee life-stage structure" by R.O. Flamm, E. Owen, C. Owen, R. Wells, and D. Nowacek; submittal of the manuscript entitled: "Applying a variable-shaped spatial filter to map relative abundance of manatees (*Trichechus manatus latirostris*)" by R. Flamm, L. Ward, and B. Weigle; two meetings of the Manatee GIS Working Group which continued to focus on application development, data sharing ethics, and habitat analyses; and several presentations at professional conferences and workshops.

Right Whales

Florida manatees are not the only endangered marine mammal of concern for Fish and Wildlife Conservation Commission staff at the FMRI. Staff involved in the FMRI's Right Whale Conservation Project focus on efforts to aid in the recovery and protection of the endangered North Atlantic right whale. Right whales are the most endangered large whale in the world, and the

North Atlantic population contains less than 350 individuals. The NMFS coordinates the recovery effort and in 1991 published the Final Recovery Plan for the Northern Right Whale (*Eubalaena glacialis*). North Atlantic right whales range from Florida to Nova Scotia (Canada) with individuals ranging as far north and east as Labrador, Iceland, and Norway.

The coastal waters of Georgia and the Atlantic coast of Florida are the only known calving area for the species and were designated as one of three critical habitats in U.S. waters in 1994. FMRI has conducted aerial surveys of Florida and adjacent waters since 1991 to monitor the seasonal occurrence of right whales. This effort focuses on alerting vessels to the presence of right whales within the southeast critical habitat. Right whales are individually distinct; using photo-identification techniques, researchers can compile life histories of individual whales. On the calving ground, this includes knowing which females are giving birth and how frequently. All data collected during aerial surveys are incorporated into the FMRI's Marine Resources Right Whale Geographic Information System in St. Petersburg, Florida.

As charter members of the multi-agency Southeast Implementation Team for the Recovery of the Northern Right Whale, FMRI researchers continue to monitor the calving ground for right whales and other endangered or threatened species, as well as develop educational material, give presentations, and perform outreach activities. FMRI staff continue to organize a wide area communication network and work closely with the U.S. military, private organizations, and the shipping and fishing industries regarding potential issues pertaining to right whales.

Marine Turtles

The FWC Marine Turtle Research Program is headquartered at the FMRI in downtown St. Petersburg. Additional staff is located at field stations in Melbourne and Tequesta.

Salvage, Rescue, and Necropsy: FMRI staff coordinate the Florida portion of the Sea Turtle Stranding and Salvage Network (STSSN), an 18-state program administered by the NMFS. A total of 923 sea turtle strandings were documented in Florida during 1999. By species, there were 490 loggerheads (*Caretta caretta*), 248 green turtles (*Chelonia mydas*), 96 Kemp's ridleys

(*Lepidochelys kempii*), 28 hawksbills (*Eretmochelys imbricata*), 37 leatherbacks (*Dermochelys coriacea*), one olive ridley (*Lepidochelys olivacea*), and an additional 23 sea turtle strandings not identified to species. Staff reviewed, edited, and entered all stranding reports, responded to or coordinated the response to more than 300 strandings, conducted gross necropsies on 164 of the carcasses, and submitted another seven carcasses for detailed necropsy by pathobiologists at the University of Florida. Staff conducted five workshops around Florida to train STSSN participants in standardized data collection methodology. Florida stranding updates were provided weekly to NMFS for incorporation into the Sea Turtle-Shrimp Fishery Management Report. Detailed Florida stranding reports were generated monthly and included month-specific and year-to-date data by county and species. The narratives that were associated with each report addressed stranding trends by species and county and the most common and/or most notable carcass anomalies.

Population Monitoring: This long-term monitoring program involves the collection of nesting and habitat information throughout the geographic range of marine turtles in Florida. Approximately 90% of the world's largest loggerhead nesting population occurs in Florida, and the green turtle nesting population is one of regional significance. FMRI assesses nesting abundance and reproductive output by monitoring nesting beaches. A coordinated network of state, federal, and volunteer permit holders gathers information. FMRI establishes scientifically sound monitoring designs, provides training, resolves data collection problems, assesses data collection error rates, analyzes data trends, and serves as a clearinghouse for information on marine turtle populations and habitats. Two overlapping monitoring programs are carried out, each with separate objectives.

The Statewide Nesting Beach Survey Program, initiated in 1979, achieves nearly complete coverage of the state's nesting beaches to provide data on total nest numbers, nest geographic distribution, and nesting seasonality by each species. Managers use results to minimize human impacts to turtles and nesting beach habitats and to identify important areas for land acquisition or enhanced protection. In 1999, 180 survey areas were monitored, comprising 1,260 km of beaches. This program documented a total of 81,045 loggerhead nests, 479 green turtle nests, and 558 leatherback nests. FMRI disseminates

results of the Statewide Nesting Beach Survey Program through scientific publications, presentations, reports, the Internet, and the CD entitled "Florida Atlas of Marine Resources."

The Index Nesting Beach Survey program differs from the Statewide Nesting Beach Survey program in collecting more detailed data from a smaller set of index beaches. Staff conducting index surveys which identify each sea turtle track to species, identify the tracks as a nest or abandoned attempt, and locates nests within an approximate half-mile beach zone. Annual surveyor training, on-site verification, and consistency of the methods used during the eleven years of the program and among the 399 km of index beaches make the resulting data base a representative and unbiased assessment of sea turtle nesting. It is the most reliable indication of temporal and spatial trends in Florida sea turtle abundance. An analysis of these data has just been completed.

Other contributions to monitoring the population status of marine turtle species that occur in Florida included a worldwide review of the status of the critically endangered hawksbill turtle [1999, *Chelonian Conservation and Biology* 3(2):200-224] and a review of the status of the hawksbill in the Caribbean region [1999, *Chelonian Conservation and Biology* 3(2):177-184].

Ecology, Life History, Migration: Most research on marine turtles has been conducted on the nesting beach although turtles spend only a small fraction of their lives there. Recovery efforts depend on a broad knowledge of population biology, life history, ecology, and migrations. Complicated turtle management efforts necessitate both long-term and international approaches to conservation. Ongoing projects in the Western Florida Current, Florida Bay, Bermuda, and Panama involve capturing live animals at sea. Studies target four species of marine turtles and several life history stages, and address population structure (including natural sex ratios), growth rates, genetic identity, life history, health, diet, habitat preferences, and migrations.

In 1999, FMRI captured and released 111 post-hatchling loggerheads during 11 excursions to the Western Gulf Stream off Central Florida. Staff recorded physical oceanographic measurements, turtle behavior, their relationships to floating objects and other organisms, turtle weights and measures, and evidence of ingested plastics and

tar. The data help describe the importance of certain oceanographic surface features to young sea turtles and help researchers understand threats to sea turtle survival that occur there. Data were also collected from 285 loggerhead, two green turtle, and posthatchlings from one Kemp's ridley that washed ashore in rough weather.

In June of 1999, FMRI sea turtle recovery staff, in cooperation with researchers from the NMFS and the USFWS, attached satellite transmitters to three loggerheads that were nesting on Florida beaches. The transmitters send the locations (latitude and longitude) of all of the turtles, allowing staff to track post-nesting movements. This research focuses on locating the migratory routes and principle foraging habitat(s) of loggerheads that nest in Florida. Understanding migratory routes and locating foraging grounds will allow staff to determine threats and measures needed to protect the turtles and their habitats away from the nesting beach.

Sampling trips were made to Florida Bay during February, May, and September of 1999. FMRI captured, studied, tagged, and released 73 turtles representing three species (loggerhead, green turtle, and Kemp's ridley). Seven of the turtles were recaptures of turtles previously tagged by the Florida Bay Project, and one of the turtles was a recapture of a turtle that had been tagged at another location in Florida.

As part of a cooperative research project with the government of Bermuda, 197 green turtles and two hawksbills were captured in nets, tagged, and released during 1999. Over 2,000 green turtles have been tagged as part of this project which has been ongoing since 1968. DNA sequence data have shown that the one-third of the population of immature green turtles that inhabit Bermuda waters is derived from Florida nesting beaches. Eighty-three (42%) of the 197 green turtle captures in 1999 were recaptures of animals tagged in previous years, providing valuable information on growth rates, site fidelity, and residency times. Captures of conventionally tagged turtles from this project have documented migrations to feeding grounds in Nicaragua, Cuba, the Dominican Republic, Panama, Venezuela, St. Lucia, and Grenada, showing the need for international cooperation in research and management of this endangered species.

Marine Turtle Geographic Information System: In 1999, FMRI staff created and verified the first GIS coverages of turtle nesting data from

the Statewide Nesting Beach Survey Program. These coverages, companion tables, and text files were included on Version 1.3 of the "Florida Fish and Wildlife Conservation Commission's Atlas of Marine Resources" CD-ROM. The data were also presented in a poster at the 19th Annual Symposium on Sea Turtle Biology and Conservation. Nesting staff continue to regularly use the Statewide Nesting GIS to verify nesting data, assist in management decisions, and respond to information requests from the public. Index Nesting Beach Survey Data GIS coverages also continue to be updated and used by staff for information requests.

Marine turtle stranding staff finished verifying 19 years of mortality data and began analysis on trends in marine turtle strandings in Florida. Locations for an additional 960 strandings from 1999 were appended to that data base and used to fulfill data requests and assist in management decisions. Stranding staff presented a poster on the analysis of the distribution of stranded turtles with fibropapillomas at the 19th Annual Symposium on Sea Turtle Biology and Conservation.

GIS staff continued to collect locations on in-water marine turtle distributions, some of which were used extensively this year as an FMRI layer in the development of the "Florida Blueways Conceptual Model; an Exercise in Marine Ecosystem Management" and in the "Final Report to the Tampa Bay National Estuary Program."

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 data base comes into question.

During 1999, 6,504 invertebrate specimens were lent to 16 investigators at 13 domestic and three foreign institutions, and 27

other loans of 639 specimens were used for educational purposes. Similarly, 720 fish specimens were loaned to 12 investigators at four domestic institutions, and three other loans of approximately 520 specimens were used for educational purposes. In addition to specimens loaned, 103 requests for information on specimens and/or field data associated with specimens were processed in 1999; 105 requests for assistance were handled, and 39 requests for educational material resulted in the distribution of 2,426 Specimen Information Services packets. In 1999, 114 lots of invertebrates containing 629 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 1999. 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, and 1998 representing thirteen cruises were received from the Polish Sorting Center in 1999. Approximately 20,000 additional lots were catalogued in 1999. A total of 35 loan and information requests were processed during 1999.

Members of the SIS group provide quality assurance/quality control services to researchers in the FWC and provide technical advice and assistance to researchers in and out of the FWC.

COASTAL AND MARINE RESOURCE ASSESSMENT

The FMRI's Coastal and Marine Resource Assessment (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 (RIM) 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 data base. 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 accuracy of the three-mile, three-league natural resource boundary. These conversations are taking place between Minerals Management Service, National Ocean Service (NOS), and the state.

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 data bases 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, DEP, 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 continue similar activities in various regions of the state to support the Commission on an ad-hoc basis.

SOUTH FLORIDA REGIONAL LABORATORY

The spiny lobster research program continues to monitor harvest and other important fishery components for all three user groups harvesting spiny lobster. During the 1999 fishing season, 82 onboard surveys of commercial lobster fishing vessels were completed. Landings were 5.3 million pounds, which are considered a low but within the normal range of variation for the fishery. The landings estimate for the 1999-2000 fishing season is 7.3 million pounds which is above the historic average. Hurricane Irene struck the Keys on October 15, 1999, causing the loss of an estimated 101,000 lobster traps and 86,000 stone crab traps. We worked cooperatively with the fishing industry to procure FEMA funds for trap clean up. Recreational lobster license holders returned nearly 2,000 surveys and preliminary estimates indicate that 281,000 lobsters were harvested by recreational fishers during the special two-day sport season. An additional 976,000 lobster were harvested by these fishers during the first month of the regular season. Harvest of the 360 special recreational crawfish license holders were approximately 45,000 lobsters for the entire 1999 season.

We completed the third year of monitoring the effects of marine reserves of the Florida Keys National Marine Sanctuary on spiny lobsters. Lobsters were more abundant during 1999 than during previous years. There were more legal sized lobsters in Sanctuary Preservation Areas than in reference areas that could be fished all three years. Also, the legal lobsters are larger inside marine reserves than in fished areas indicating that some retention is occurring.

The analysis and final report for the MARFIN study comparing reproductive potential of spiny lobsters between the Keys and Dry Tortugas has been completed. Our principal findings elucidate that the Tortugas serve as a reproductive source as compared to the Keys. First, the size differential between male and female lobsters was 21 mm carapace length (CL) in the Dry Tortugas and 4 mm CL in the fishery. Egg bearing females produce an average of 800,000 eggs per clutch in the Dry Tortugas but only 300,000 in the Keys fishery, corresponding to a 39% difference in egg production between the two areas. In short, the small area that encompasses the Tortugas sanctuary produces more eggs than the Keys fishery.

The stone crab fishing effort allocation project was completed and presented to the FWC. Two independent estimates set the number of traps in the stone crab fishery at 1.38 and 1.30 million traps prior to the 1998-1999 fishing season. A limited entry program was approved by the FWC but was not enacted by the state legislature in 1999. The limited entry program will be revised and resubmitted for legislative approval in 2000.

Surveys of the south Florida queen conch spawning stock indicate that the population has declined from an estimated 14,000 adult conch in 1998 to approximately 10,700 in 1999. We continued assessing parameters that limit survival in hatchery-reared juvenile conch outplants. We determined that the most cost-effective size to release juvenile conch was approximately 10 cm. At this size, it costs approximately \$6.86 U.S. to produce an individual to survive in the wild to 14 cm. We completed a reciprocal transplant study where we moved conch between nearshore, non-spawning aggregations, and offshore spawning aggregations. Conch transplanted offshore from nearshore recovered their ability to spawn; those transplanted to nearshore aggregations from offshore lost their ability to spawn. Histological examinations indicated that the deficits had a physiological basis. We are investigating transplantation of conch from the nearshore zone to the offshore zone as a cost-effective alternative to releasing hatchery-reared, juvenile conch. We completed a two-year acoustic telemetry study where home ranges and seasonal movements and migrations in conch populations within two offshore, spawning aggregations and two nearshore, non-spawning aggregations were assessed. There were no statistical differences in movement or home ranges between the sexes. However, the conch in the nearshore zone moved significantly greater distances and had larger home ranges than those in the offshore zone; conch in the nearshore zone had home ranges of approximately 13.2 ha versus 6.18 ha for conch in the offshore zone. Habitat preference was highly site-specific. The conch program continues to benefit from volunteers supplied by our partners from The Nature Conservancy.

FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

Division of Aquaculture

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 Division has been mandated broader responsibilities related to aquaculture pursuant to Chapter 370.26, F.S. The primary responsibilities of the Division include aquaculture, the classification and monitoring of shellfish growing waters, the inspection of shellfish processing plants, resource assessment, and resource development. In 1999, the Florida Legislature passed comprehensive bills relating to aquaculture. In response to this legislation, the Division of Aquaculture was created with the DACS. The aquaculture leasing program, the shellfish resource development program, and shellfish public health program were transferred to the Division of Aquaculture.

Aquaculture

The aquaculture leasing program administers 122 shellfish leases and 600 aquaculture leases statewide, accounting for about 3,500 acres. 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.

Shellfish Resource Development

The Department is actively engaged in collecting oyster shell from processing plants and constructing and restoring oyster reefs on public bottoms. During 1999, 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 FY 1999/2000. Funding was allocated among seven coastal counties, including Levy, Dixie, Wakulla, Franklin, Bay, Okaloosa, and Santa Rosa. In 1999, about 168,059 bushels of live oysters were relayed and transplanted during oyster resource development projects in Levy,

Dixie, Wakulla, and Franklin counties.

Apalachicola Bay reported oyster landings in 1999 were 2,338,093 pounds valued at \$3,679,896. Reported hard clam landings in 1999 were 918,058 pounds, valued at \$8,096,681. Production trends suggested that landings continued to decline in the wild fishery, while production of cultured clams increased. Shellfish aquaculture on Florida's Gulf Coast increased as more seed stocks became available in 1998 and 1999. 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 1999, six comprehensive shellfish surveys were completed; reclassification was initiated for six Shellfish Management Areas. The Shellfish Laboratory analyzed 80 shellfish meat samples and 21,145 water samples to ensure shellfish quality.

BUREAU OF PROTECTED SPECIES MANAGEMENT

The Bureau of Protected Species Management (BPSM) based in Tallahassee serves as the management component of the Florida Fish and Wildlife Conservation Commission's marine mammal and marine turtle programs. The BPSM 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

Marine Turtle Protection Program staff continue to work for the protection of threatened and endangered marine turtles and their critical nesting beaches along Florida's coast. The state is listed as the lead or a cooperating agency for the implementation of approximately 91 tasks identified in the U.S. Fish and Wildlife Service and National Marine Fisheries Service recovery plans for the five species of marine turtles that occur in Florida. Staff participates 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.

Bureau accomplishments for 1999 include:

- The marine turtle license plate went on sale in February 1998. This year, the Sea Turtle Survival League coordinated with the Sea Turtle Preservation Society of Ft. Lauderdale and the private company, *Outdoor Advertising*, to create a billboard announcing the plate. The FWC hosted a media event announcing the billboard in cooperation with both entities.
- BPSM issued approximately 130 Marine Turtle Permits during 1999. 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 and non-releasable turtles only) for educational purposes.
- Permitted volunteers conducting nesting beach surveys documented a total of 81,045 loggerhead nests, 479 green turtle (*Chelonia mydas*) nests, and 558 leatherback turtle (*Dermochelys coriacea*) nests along 1,256.6 kilometers of Florida's shoreline during 1999.
- The Bureau of Protected Species Management continues to work with the U.S. Fish and Wildlife Service on a grant-funded project to minimize lighting impacts to marine turtles. An OPS biologist in the Tequesta office manages the hatchling disorientation data base, contacts local government, and formulates appropriate actions to resolve problem lights on Florida's nesting beaches.
- Staff provided technical expertise on marine turtle protection during review of approximately 129 Department of Environmental Protection (DEP) and other state permits. These included permits issued by the Office of Beaches and Coastal Systems pursuant to Florida Statute 161, permits issued by the DEP Districts or the 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.

- 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 nine, 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 sources 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 (MPPs); 2) promulgation of boat speed regulations to protect manatees; 3) review of permitted activities to minimize negative impacts to manatees; 4) various directed efforts to protect manatee habitat, particularly seagrasses; 5) outreach activities to provide education and information to the public.

Accomplishments in 1999 include:

- Manatee Protection Plan (MPP) staff continued its law enforcement outreach program by providing laminated speed zone maps, educational materials, and presenting information at district meetings and the Law Enforcement Academy. MPP staff met with outreach officers in Tallahassee and made presentations at the District meetings in Collier and Duval counties.
- BPSM reviewed and provided comments on a dozen local and State Wildlife Unit Management Plans in 1999.
- Staff continued involvement in the Tampa Bay Manatee Advisory Committee and Charlotte County Manatee and Seagrass Task Force meetings to provide recommendations and support for local voluntary manatee protection initiatives.
- On March 9, 1999, the Council of the City of Jacksonville adopted a local ordinance approving the Duval County Manatee

Protection Plan. The BPSM evaluated proposed speed zones as required by 370.12(2)(p) Florida Statutes and gave the plan final approval.

- BPSM staff chaired the quarterly meeting of the Dade County Manatee Education Advisory Group to focus on organization of volunteer effort, identification of volunteer duties, and an effort to promote Manatee Awareness Month within the county. The committee was reorganized with Coast Guard involvement.
- Volusia County's MPP was reviewed and final comments were provided on June 21, 1999.
- In September, BPSM announces legislative appropriation of grant funding in the amount of \$240,000 to Brevard, Broward, Indian River, Lee, Martin, Palm Beach, Sarasota, St. Lucie, and Volusia counties to aid or supplement manatee protection planning. Contracts and scopes of work were negotiated with St. Lucie, Martin and Lee Counties to develop boat facility siting plans. This work was subcontracted to the Regional Planning Councils.
- In March 1999, BPSM personnel met with Indian River County staff to discuss the County's MPP and several speed zone changes proposed in the plan. The Marine Advisory Narrows Watershed Action Committee endorsed the revised plan on June 21, 1999, for submission to the Indian River County Board of County Commissioners.
- The customized ArcView Palm Beach Seagrasses mapping project of 110 sites was completed and published in CD ROM format.
- Staff worked with the Florida Inland Navigation District to post signs and buoys to mark the additional manatee protection zones that were established in late 1998 at the Florida Power and Light and Reliant Corporation (formerly Orlando Utilities) power plants in Brevard County. Posting was completed in early 1999.
- Amendments to the Lee County manatee protection rule were adopted in November 1999 to address protection needs throughout the county. This rule was the first manatee protection rule to be approved by the FWC. FWC staff worked with county staff and others to begin sign posting by the time the rule took effect.
- At the direction of the Commission, staff began considering the need for and feasibility of a site-specific amendment to a zone that residents claimed would prevent them from being able to access their properties during low water conditions.
- An administrative challenge was filed in December 1999 contesting three specific zones in the Canaveral Barge Canal area of Brevard County. The challenge is scheduled for hearing in June 2000.
- Staff performed 420 manatee impact reviews of a variety of projects including environmental resource permit applications, marina development, underwater blasting proposals, and high speed boat races. Forty-two of the cases were considered critical because of their complexity or potential to significantly impact manatees.
- The Bureau's manatee Internet web pages were updated and new pages created in 1999. The web site now provides individuals with access to reports, forms, and information that were previously only available by request through the mail. The new format makes it easier to access information for both staff and visitors to the site.
- New multi-lingual waterproof boater's cards were created to help law enforcement officers explain the waterway signs and manatee guidelines to individuals using Florida's waterways. Text on the card is available in French, Spanish, German, and English. The cards were well received by county, state, and federal officers and are in high demand.
- 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 has many varied materials that can be distributed including brochures, technical reports, posters, and coloring and activity books.
- BPSM coordinated and participated in a public workshop held in Lee County that was devoted to the topic "The Interrelationship of Manatees and the FPL Ft. Myers Power Plant."
- BPSM staff gave presentations at the U.S. Fish and Wildlife Service's Warm-water Workshop pertaining to the status and direction of Power Plant Manatee Protection Plans and the importance of natural and non-industrial warm water sites to manatees. The workshop provided a forum that allowed for industry, government and public representatives to share their current and future concerns and ideas regarding manatees and warm water refugia.
- The regional effect of docks on seagrass growth was surveyed in Palm Beach County by BPSM. Analyzed data were prepared and

developed into a poster given at the 1999 Estuarine Research Federation International Meeting in New Orleans. A draft report was prepared from this presentation as well. Protection of natural warm-water refuge areas, in particular artesian springs, used by manatees was furthered by BPSM participation in the FDEP Springs Task Force

meetings.

RIGHT WHALES

BPSM staff participated in the bi-annual meetings of the Southeastern Right Whale Implementation Team held in Jacksonville, Florida, and Brunswick, Georgia.

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES OFFICE OF FISHERIES *James H. Jenkins, Secretary*

The mission of the Louisiana Department of Wildlife and Fisheries (LDWF) Office of Fisheries is 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. The mission is accomplished through the activities of the various programs within the Marine Fisheries Division. The programs are: Shellfish (shrimp and crabs), Mollusc (oyster), Finfish, Habitat, and Research. The clients served by these programs include present and future generations of Louisiana citizens, as well as national and international interests that derive benefits from consumptive and non-consumptive use of Louisiana's fisheries resources. The Department sets seasons and size and possession limits, restricts fishing gear use, or uses other means of protecting key resources. Other conservation/protection methods include replenishing species and enhancing or developing species or habitats as needed to provide for the needs of consumptive and non-consumptive users or environmental health. The Department also conducts research to provide insight into the proper functioning of natural systems and educates the public and promotes wise use of resources.

This report describes program activities that support this mission.

SHELLFISH PROGRAM

The Marine Fisheries Division continued its long-term fishery independent trawl sampling throughout coastal Louisiana. Data from these samples were used to set season frameworks for both the fall and spring inshore shrimp seasons and the winter offshore shrimp season. Additionally, these same data were used to recommend season extensions and special shrimp seasons.

Shrimp

Offshore Shrimp Season

The state's offshore territorial waters from the Atchafalaya River Ship Channel to the eastern shore of Freshwater Bayou were closed on February 8, 1999, to protect white shrimp smaller than legal size. The year began with the waters of Breton and Chandeleur sounds open to shrimping; they closed on March 31, 1999.

Inshore Shrimp Season

The year began with the waters of Zone 1 north of the Mississippi River Gulf Outlet open to shrimping; those waters closed on January 11, 1999. The 1999 Spring Inshore Shrimp Season and the territorial waters opened in Zone 2 on May 10 and in Zone 3 on May 17; in Zones 1 the inshore waters opened on May 17 except for the waters of Breton and Chandeleur sounds which opened on May 10. The western part of Zone 2 closed on June 28; the rest of Zone 2 and all of Zone 3 closed on July 6. Except for Breton and Chandeleur sounds, the waters of Zone 1 were closed to shrimping on July 19, 1999.

The 1999 Fall Shrimp Season opened in Louisiana's inshore waters on August 16 and remained open until December 21, 1999, in Zones 2 and 3; Zone 1 waters closed on December 31, except for Breton and Chandeleur sounds which remained open until March 31, 2000.

Preliminary 1999 NMFS total state landings figures (all species) show overall production at 96.2 million pounds, which is above the five-year average.

Crabs

Several bills relating to crabs were passed during the 1999 legislative session. One act established a 2½ inch minimum propodus size for stone crabs. The other act defined a serviceable crab trap and allowed shrimp fishermen to possess unserviceable traps for later disposal. In conjunction with this act, the Louisiana Wildlife and Fisheries Commission promulgated trap buoy and line specifications.

The Crab Task Force has continued to meet and address issues that confront the industry. The TCC Crab Subcommittee of the Gulf States Marine Fisheries Commission continued their revision of the regional blue crab management plan.

MOLLUSC PROGRAM

Oyster Seasons

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 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. The 1999/2000 oyster season on the public grounds began on September 8, 1999, in the Bay Gardene, Hackberry Bay, and Sister Lake Oyster Seed reservations.

The public grounds in Calcasieu Lake opened on October 16, 1998, and remained through April 30, 1999. The Secretary of the Louisiana Department of Wildlife and Fisheries was authorized by the Wildlife and Fisheries Commission to extend the season to compensate for those days lost to health closures. The Calcasieu Lake public oyster tonging reefs reopened on October 16, 1999, for the 1999/2000 season.

Oyster production for 1999 continued on an above average trend, particularly on the public grounds east of the Mississippi River.

Oyster Leasing

During 1999, 33 leases were auctioned containing 1,620 acres. Six hundred twenty-five (625) new and renewal applications were taken, and 440 new leases were issued.

The Oyster Lease Survey Section continued to update the web page to better serve the public. The section's oyster lease GIS data base is available for viewing on the Internet at:

<http://oysterweb.dnr.state.la.us/oyster>.

Disaster Oyster Programs

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 Department continued to monitor production in the restored areas during 1999 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.

The Department was awarded a NOAA grant in July 1999 to investigate the use of recovered oyster shells and alternative cultch materials for oyster reef restoration. Louisiana's Oyster Shell Recovery Pilot Project will develop a framework for an ongoing

program of oyster shell recycling and carry out a pilot project to collect and plant recycled shell in suitable areas, comparing recycled shell with other available cultch material.

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 primary 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 coastwide 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'x 6' 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, sub-adult, and adult fish and provide information on relative abundance, year class strength, movement, and gonadal condition. The gill net is 750' in length, 8' in depth, and constructed of monofilament. The net is composed of five panels each of the following mesh sizes:

- 1) 150'x8', 1" bar, 2" stretched mesh, 0.4 mm diameter filament;
- 2) 150'x8', 1¼" bar, 2½" stretched mesh, 0.52 mm diameter filament;
- 3) 150'x8', 1½" bar, 3" stretched mesh, 0.52 mm diameter filament;
- 4) 150'x8', 1¾" bar, 3½" stretched mesh, 0.52 mm diameter filament; and
- 5) 150'x8', 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 - 1 $\frac{5}{8}$ " bar, 3 $\frac{5}{8}$ " 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 areas 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

Starting January 1, 1999, Louisiana began collecting commercial landing statistics through a trip ticket program (TIP). Landings are self-reported by wholesale/retail dealers licensed to purchase fish in Louisiana. Louisiana also participates in the collection of trip interviews. 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 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 1999, Louisiana used the marine share of its Sport Fish Restoration Funds in two activities; (1) development of access for fishermen and (2) finfish age and growth research (described under the Research Program).

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, 30 different petroleum companies have participated in the program and donated the jackets of 86 structures. In addition to the material, the participating companies also contributed to Louisiana's Artificial Reef Trust Fund for operation, maintenance, and reef research. In 1999, 16 projects across the coast were completed.

Department of Energy (DOE)

The Department is assembling environmental monitoring data bases 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 dictionary that will include information about all identified data bases collected or managed by the LDWF as well as other biological and environmental data bases from Louisiana and Gulf of Mexico waters.

Southeast Area Monitoring and Assessment Program (SEAMAP)

SEAMAP is a cooperative state/federal/university program to collect, manage, and disseminate fishery-independent data and information in the southeastern United States. Louisiana participated in planning and resource survey activities during the eighteenth year of this NMFS-funded project. Planning activities included identifying priorities for 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 focused on developing restoration plans and coast-

wide monitoring designs during 1999. With other state and federal trustees, Department representatives developed a pilot plan for a regional restoration plan, which would provide restoration alternatives for small spills. In addition, the Department participated in the development of a coast-wide monitoring program that will provide important baseline information about Louisiana's natural resources along the coast.

In May 1997, Texaco Pipeline had a 16" line rupture discharging 6,517 barrels of oil into Lake Barre in Terrebonne Parish, Louisiana. The trustees and Texaco completed their assessment of injuries resulting from the spill, agreed upon enhancement of a CWPRRA project enhancement for suitable restoration, and signed a consent decree allowing the work to move forward in 1999. That enhancement project, planting of a created area on E. Timbalier Island, will be implemented in 2000.

The discovery in June of 1997 of a pipeline leak in coastal Vermilion Parish marsh led the Department and other state trustees to pursue a NRDA with the Apache Corporation. The leak had apparently been occurring for some time; the U.S. Coast Guard estimated that 2,000 barrels of oil may have been released over time. The area was burned, and vegetative recovery of the resulting six-acre burn area was monitored while restoration planning activities continued in 1999.

On August 8, 1997, a blowout from the Sonat Goins #7 well near Cravens, Louisiana, in Vernon Parish resulted in 55 acres of injured pine and streamside wetland habitat. In 1999, LDWF staff continued to work with other state and federal trustees to determine the extent of natural resource injuries resulting from the spill and develop suitable restoration alternatives.

A September 1998 blowout of the Equinox Cockerell-Moran #176 in Lake Grand Ecaille, Plaquemines Parish, Louisiana, oiled 1,233 acres in coastal marsh near the Gulf shore. In 1999 the Department continued to participate in field evaluations and settlement discussions of the resulting injuries to natural resources. Work also continues on development of a suitable restoration project.

A Chevron pipeline near Grand Terre Island, Plaquemines Parish, Louisiana, spilled crude oil onto beaches and marsh from Quatre Bayou Pass to Caminada Pass on November 24, 1999. The Department participated in the spill response to protect wildlife and fishery resources in the area and initiated natural resource damage assessment actions in cooperation with other state and federal trustees.

Seismic Monitoring

The Seismic Program was created in 1939 specifically to protect oysters, fish, shrimp, and other wildlife from injury due to seismic exploration. The Department promulgated revised seismic regulations in 1999, resulting in greater opportunity for public comment on proposed projects and greater accountability by the seismic contractor for potential damages.

Statewide Hydrographic Monitoring

The LDWF, through an interagency agreement with the U.S. Geological Survey, continued to collect constant records of salinity, water temperature, tide level, wind speed and direction, and barometric pressure from a network of 15 stations located across coastal Louisiana. The data are collected in near real-time, and LDWF provides data base management for the program. The 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. The data also were provided on request to other state and federal agencies, as well as university researchers. The near real-time data are also posted for public access on the internet at USGS' Louisiana Hydrowatch website:

<http://www.dlabrg.er.usgs.gov/hydrowatch.htm>.

These data are posted in raw, unedited form within approximately four hours of the time the instrument measurement was made in the field. The data are updated frequently to provide the best, most accurate information possible.

Caernarvon Biological Monitoring

Beginning in 1991, the U.S. Army Corps of Engineers, with support from the Louisiana Department of Natural Resources and the Louisiana Department of Wildlife and Fisheries, 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 Louisiana Department of Wildlife and Fisheries 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 on-line; 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 fourth year of the long-term phase of the post-diversion monitoring program was in 1999. The overall objective of this program is 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 fishery 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 submersed aquatic vegetation (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 salt marsh 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

Louisiana Department of Wildlife and Fisheries personnel have begun a three-phase venture spanning more than 50 years to monitor effects of the Davis Pond Freshwater Diversion Structure. The Louisiana Department of Natural Resources is leading the overall monitoring effort in coordination with the U.S. Army Corps of Engineers.

Work began on Davis Pond, in St. Charles Parish, in January 1997. By spring of 2001 the project will be capable of diverting 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. 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 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.

An extensive study of recreational fishing began in July 1999. This creel study covers the entire Barataria basin from the freshwater zones in the north to the Gulf barrier islands in the south. Species composition, sizes, catch rates, and amount and location of fishing effort will be monitored. Point-access surveys and aerial counting/mapping surveys are being employed. These data will help to define population changes and the health of the resource in general and will show how species composition, areas of concentration, growth rates, and fishing success change in the estuary as this critical restoration project takes effect.

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

The objective of this three-year project is to establish a fisheries dependent monitoring program capable of determining the impacts of adverse environmental and/or 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 oxygen-depleted bottom waters affect the harvest of Louisiana's marine fishery resources and, therefore, 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. This project is intended to provide an objective determination of the effects of such events on commercial fishing and allow integration of these events into the management regime for those fisheries.

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

LDWF processed 220,000 trip tickets that were turned in during 1999. During the same period, the logbook program varied between 27 and 45 participants (commercial shrimp fishers and charter boat operators, combined). The abnormally low rainfall in coastal Louisiana in 1999 was documented as well as the five hurricanes and tropical storms in the northern Gulf in 1998. Hypoxia in the monitoring zone showed a marked increase in 1999 over 1998.

Other Habitat Issues

In 1999, the 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. The Coast 2050 Plan, an overarching strategy to address most of the coastal deterioration occurring in Louisiana, is being used as a template for major new restoration efforts in the Barataria basin.

Marine Fisheries Division personnel continued 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.

Age, Growth, and Fecundity

To increase accuracy of stock assessments, the Laboratory has undertaken a long-term project to obtain age, growth, and fecundity data for important finfishes. Otoliths (ear bones) 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) counted. Gonads are also collected and examined histologically to obtain data for fecundity indices.

During 1999, otoliths were collected and processed from 586 red drum; 1,897 spotted seatrout; 514 black drum; 482 sheepshead; 480 southern flounder; and 605 striped mullet. Gonads from 139 sheepshead were collected and analyzed. In 1999 the laboratory began processing gray snapper otoliths taken from charter boat catches. Forty gray snapper otoliths were processed during 1999.

Cooperative University Research

During 1999, the Laboratory began cooperating in onsite research conducted by Louisiana universities under the Gulf Oyster Industry Program administered by the Louisiana Sea Grant Program. These research projects are: 1) "Novel methods for deterring black drum predation on oyster leases" (Louisiana State University, Biological Sciences); 2) "Modeling the response of the hooked mussel, *Ischadium recurvum* (Rafinesque 1820), to relaying as a remediation technique to reduce biofouling on oysters, and documenting its distribution in a Louisiana estuary" (Nicholls State University, Department of Biology); and 3) "Natural dermo

resistance and its role in the development of hatcheries
for the Gulf of Mexico” (Louisiana State University,

Department of Veterinary Science).

MISSISSIPPI DEPARTMENT OF MARINE RESOURCES *Earl Glade Woods, Executive Director*

Created as a new state agency in 1994, the Department of Marine Resources has broad-based authority to manage the state's coastal resources including marine fisheries and the wetlands habitat on which they depend. In only five years, the agency has made major inroads in leading the way into the twenty-first century.

One thing that distinguishes the Department from its sister agencies in other states is that all of Mississippi's marine resources management functions are under the same roof. Marine fisheries management, seafood licensing programs, shellfish growing waters management, seafood plant certification, wetlands permitting, coastal zone management, boat and water safety, the Clean Vessel, Derelict Vessel and Non-Point Source Pollution Act programs, and, most recently, the Marine Patrol are all housed at the Department's Eldon Bolton Building headquarters in Biloxi, Mississippi.

In addition, the agency is also mandated with managing the state's Tidelands Trust Fund, a responsibility unique to the state of Mississippi. Through this innovative program, grants are provided to city, county and other local, governmental agencies for conservation, reclamation, preservation, acquisition, education, and enhancement of public access to public trust tidelands – all objectives that clearly relate to the goals of the Coastal Zone Management Act.

Governed by a seven-member commission and staffed with a dedicated team of professionals – marine biologists, coastal geologists, engineers and other specialists – the Department is poised to meet tomorrow's challenges today using the latest in technological advances.

During Fiscal Year 1999, 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 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.

The following narratives provide a brief description of programs, highlighting the principal accomplishments of each during the past fiscal year and underscoring what the Department hopes to

accomplish in the coming year.

MARINE FISHERIES MANAGEMENT

Objectives:

The Saltwater Fisheries projects and activities coordinated through this program include:

- 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.
- To develop management recommendations based on specific criteria.
- To monitor the existing condition of the stocks and the fisheries that depend on them.
- To provide information transfer and liaison activities with regional fisheries management entities and others.
- To provide technical support to the Mississippi Commission on Marine Resources in developing fishery management plans, amendments, stock assessments, and technical analysis.
- To provide a state representative to serve on fisheries related boards, committees, panels, etc. as may be required.
- To provide for administrative services, general maintenance, the locating of suitable funding sources and other fisheries management support services as may be required.

Status:

During Fiscal Year 1999 the Marine Fisheries Office drafted changes to the following ordinances:

Ordinance 7.023 (effective 10/1/98) – Finfish

Changed the Spanish mackerel bag limit from ten to 15 and the recreational red snapper bag limit from five to four.

Ordinance 2.015 (effective 12/1/98) – Shrimp

Removed Section 7 which prohibited the use of bib nets from January 1 through the 3rd Monday in August.

Ordinance 1.013 (effective 12/1/98) – Oysters

Eliminated towing of extra, non-licensed boats

and clarified shading.

Ordinance 4.006 (effective 2/1/99) – Crabs

Prohibited night crabbing, included a size requirement on crab trap floats and required culling of peeler or buster crabs into separate containers.

Ordinance 1.014 (effective 4/1/99) – Oysters

Required a marine sanitation device on harvesting vessels.

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.

Marine Fisheries personnel served on regional management activities of the Gulf States Marine Fisheries Commission (GSMFC) including: the Flounder Fishery and Blue Crab Fishery Management Task Forces; the TCC Artificial Reef, Data Management, and Recreational Fishery subcommittees; the Technical Coordinating Committee; and the State/Federal Fisheries Management Committee. The Marine Fisheries Office was instrumental in preparing grant documents and proposals to secure funding for fisheries management projects from the Sport Fish Restoration Act, Cooperative Fishery Statistics Program, and the Interjurisdictional Fisheries Act.

MARINE FISHERIES STATISTICS

Objectives:

- To collect commercial fisheries landings and catch data for Mississippi in a timely manner.
- To collect biological data for selected commercially important finfish species.
- 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.

Status:

Fisheries landing data have been collected weekly and monthly according to schedule. The data were processed, edited, and submitted to the National Marine Fisheries Service 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 National Marine Fisheries Service for inclusion in their Trip Information System. This data is utilized by both state and federal fisheries managers to properly manage these valuable resources.

MISSISSIPPI'S SHELLFISH RESTORATION AND ENHANCEMENT

Objectives:

The specific objectives of the Shellfish Restoration and Enhancement Project are as follow:

- Mapping of Mississippi's oyster reefs.
- Surveying of potential cultivation sites and cultch planting sites.
- Cultivation of oyster reefs.
- Deposition of oyster cultch material.
- Determination of the influence of climatological factors on blue crab settlement.

Status:

- Mapping of Mississippi's western Sound oyster reefs except for St. Joseph reef was completed in Fiscal Year 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.

SHRIMP AND CRAB MANAGEMENT

Objectives:

The Shrimp and Crab Program provides management of the state's commercial and recreational shrimp and crab fisheries. Cooperation and coordination with adjoining state marine fisheries agencies, as well as regional and federal fishery

authorities, are integral to the success of shrimp and crab management activities. The program includes monitoring and research of both the shrimp and crab fisheries, coordination of the Mississippi Blue Crab Task Force, issuance of scientific collection permits, inspection and licensing of live bait shrimp fishery, installation and maintenance of constant recorder instruments, coordination of Wallop-Breaux grants with the U.S. Fish and Wildlife Service and administration of the federal brown shrimp disaster grant.

Additionally these fisheries are managed by the setting of seasons, gear regulations, and other related management measures as required. Shrimp and Crab Program biologists work cooperatively with federal agencies including the National Marine Fisheries Service, U.S. Fish and Wildlife Service, Gulf States Marine Fisheries Commission, Gulf of Mexico Fisheries Management Council, and the U.S. Geological Service. Cooperating state agencies and other organizations include the University of Southern Mississippi's Institute of Marine Science, Department of Environmental Quality, Department of Wildlife Fisheries and Parks, as well as other states marine resource management agencies.

Some of the key responsibilities of the Shrimp and Crab Program include:

- Long-term monitoring of shrimp populations in order to make management recommendations.
- Inspection of live bait shrimp operations and compilation of confidential live bait dealer reports.
- Continuation of the blue crab task force in order to allow the various user groups to provide input and voice concerns.
- Continued development of constant recorder instruments along the coast.
- Continued issuance of saltwater scientific collection permits.
- Coordination of Sport Fish Restoration grants with U.S. Fish and Wildlife Service.
- Administration of a federal brown shrimp disaster grant.

Program staff work with appropriate federal and state agencies and respective fishery user groups and the public to regulate and promote the shrimp and crab fisheries in Mississippi's marine waters. The issuance of saltwater scientific collection permits will be done in a manner as to protect the Mississippi's marine resources while allowing legitimate study to occur. Constant recorder instruments will be monitored and maintained to allow optimum data availability. Sport Fish Restoration coordination will be done to ensure grants are received and administered.

MISSISSIPPI SOUND CREEL SURVEY

Objectives:

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).

Status:

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.

SHELLFISH SANITATION

Objectives:

Oysters, sessile filter feeders, 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. Opening and closing of the reef areas is based on the levels of fecal coliform in the water column at the time of sampling. Oyster harvesting must be closed after significant rainfall events until it can be determined that the water quality has improved sufficiently to allow harvesting to resume. To accomplish this, multiple stations are sampled in each reef area (sub-area), and two consecutive clean samples separated by at least forty-eight hours must be obtained from each area before it can be reopened for harvest following a closure. 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.

Status:

A total of 306,897 sacks of oysters were harvested during the 1998-1999 season. Mississippi State oyster harvesting waters are divided geographically into eight (8) areas, which are monitored closely and opened and closed accordingly.

INVESTIGATIONS OF THE TRIPLETAIL (*LOBOTES SURINAMENSIS*) AND COBIA (*RACHYCENTRON CANADUM*) IN MISSISSIPPI MARINE WATERS AND ADJACENT GULF WATERS

Objectives:

The project objectives are to determine age, seasonal movement patterns, and growth by utilizing an extensive tag and release program within Mississippi marine waters and adjacent Gulf waters.

Status:

In Fiscal Year 1999 the DMR received federal funds made possible by the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 669-669:) 50 CFR Part 80, administered by the U.S. Fish and Wildlife Service. Part of these funds was passed on to the Gulf Coast Research Laboratory (GCRL) for the study of cobia and tripletail.

Tagging fish to study movement patterns is being accomplished by GCRL staff, private fishermen, and charter boat fishermen along the Gulf Coast. The 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.

Six scientific publications and many popular articles have been written on this research on these two fish.

STRIPED BASS RESTORATION PROGRAM FOR THE PEARL AND PASCAGOULA RIVERS OF MISSISSIPPI

Objectives:

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.

Status:

The project is funded through monies made available through the DMR to the Gulf Coast Research Laboratory by the Anadromous Fish Act (PL89-304) 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 1999 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.

CHARTER BOAT SURVEY

Objectives:

The principal objective 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 along the Mississippi Gulf Coast. Field interviews of charter boat anglers, using existing Marine Recreational Fisheries Statistics Survey methodology, will be used to estimate angler catch. Additionally, telephone interviews with charter boat captains will estimate fishing effort that will be compared with existing Marine Recreational Fisheries Statistics estimates.

Status:

During the pilot phase of this study a total of 438 field interviews of charter boat anglers was collected and provided to QuanTech, Incorporated, the contractor, for processing. From September 1, 1998 to December 31, 1998, a total of 152 field interviews was conducted and sent simultaneously to QuanTech and the GSMFC for analysis and processing. Weekly telephone interviews of 10% of the charter boat sampling universe, randomly selected, were coded and sent to GSMFC for processing. Estimates of catch and effort for the entire Gulf of Mexico charter fleet are currently underway.

ASSESSMENT OF THE RED DRUM SPAWNING POPULATION FROM ESTIMATES OF REPRODUCTIVE SUCCESS

Objectives:

- Monitor 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).

- Complete the time series of spawning biomass estimates which were begun in 1986.
- To further refine and improve these spawning biomass estimates.
- To track 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.

Status:

The collection of larval red drum samples on offshore spawning grounds provides data on larval abundance and survival which is needed to estimate egg production. Ichthyoplankton samples and various environmental parameters were collected and sorted during two cruises in September 1997 in the coastal and inner shelf waters between Chandeleur Sound and Mobile Bay from the R/V Tommy Munro. This project concluded in November 1998.

SPOTTED SEATROUT STUDIES IN MISSISSIPPI COASTAL WATERS

Objectives:

- Assess and monitor the population of adult/sub-adult spotted seatrout in Mississippi coastal waters using protocols established in previously completed work.
- Investigate and delineate the male to female ratio as it occurs in juvenile and sub-adult spotted seatrout in Mississippi coastal waters.
- Tag and release spotted seatrout in Mississippi coastal waters in order to acquire information on seasonal movements within coastal Mississippi estuarine systems.
- 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.

Status:

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 removal of otoliths for age determination during Fiscal Year 1999. Additional smaller specimens

were taken to augment the data base for growth estimates and further delineate the male to female ratio at younger ages.

TECHNOLOGY APPLICATIONS PROGRAM

Objectives:

- 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.
- Conduct regulatory inspections of shellfish processing and transporting facilities to determine compliance with state and federal seafood sanitation and health safety regulations.
- Provide technical advice to the seafood processing industry regarding new technologies and new products that provide added value, new market and employment opportunities, and economic enhancement for the seafood industry.
- 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.
- Provide advice and support work for the Mississippi Department of Agriculture and Commerce regarding aquaculture regulatory matters.
- Provide administrative support to the activities of the Office, the Department and the Commission on Marine Resources.

Status:

- Provided technical advice and conducted support inspections for the Mississippi Department of Agriculture and Commerce regarding regulated aquaculture activities.
- Provided technical advice to a number of people involved and interested in becoming involved in aquaculture.
- Inspected Mississippi permitted shellfish processing, storage, and distribution facilities to determine compliance with state and federal sanitation and seafood safety regulations, to provide the public confidence in Mississippi inspected seafood products and to aid in marketing Mississippi seafood products. A strong public confidence in these products helps sustain a high market demand for Mississippi seafood products.
- Participated in the shellfish processing plant regulatory review and evaluation by the FDA.

- Conducted quarterly inspections of all permitted facilities and conducted follow-up inspections as needed.

COASTAL ECOLOGY OFFICE

Objectives:

The primary objective of the Coastal Ecology Office is the implementation of the Mississippi Coastal Program. The Mississippi Coastal Program was legislatively mandated in Section 51-15-6 of the Mississippi Code of 1972, and approved by the National Oceanic and Atmospheric Administration (NOAA) under the provisions of the Coastal Zone Management (CZM) Act of 1972. In addition to coastal management responsibilities, Coastal Ecology also administers the Coastal Preserves Program, the Grand Bay National Estuarine Research Reserve (NERR), the Derelict Vessel Removal Program, and other special projects.

The Coastal Ecology Office also:

- Implements and evaluates Coastal Zone projects and programs.
- Develops new Coastal Zone programs.
- Coordinates a Comprehensive Resource Management Planning effort to address cumulative and secondary impacts from rapid development on the Coast.
- Implements the Mississippi Coastal Nonpoint Pollution Program (CZM Section 6217).
- Develops and maintains grants and programs for DMR for marine resource management and protection.
- Provides technical assistance to other DMR operations, other state agencies and local governmental bodies.
- Tracks national legislation pertaining to coastal and marine resource management.

Status:

The DMR receives annual funding from NOAA to meet coastal management objectives. Funds are used to provide personnel salaries and administrative support, purchase equipment, and cover required office expenses and travel. Funds are also used for legal assistance through the State Attorney General's office. Coastal management staff participates in various public outreach and education efforts and provides comments to local news media concerning coastal management issues when requested.

The Coastal Preserves program is acquiring, protecting, and enhancing tidal wetlands along the

coast. The newly designated Grand Bay NERR in Jackson County will facilitate wetland research and education. The Derelict Vessel Removal program continues identifying and removing derelicts from the coastal waters. The Comprehensive Resource Management Planning effort is making progress toward addressing cumulative and secondary impacts resulting from the rapid development along the coast. Many federal, state, and local agencies are participating, as well as community organizations, economic development agencies, and local environmental groups.

WETLANDS PERMITTING PROGRAM

Objectives:

The Permitting staff administers the 'one-stop' permit system under the Coastal Wetlands Protection Law. DMR provides information on the Wetlands Law to applicants, receives applications, distributes them for review, and conducts on-site inspections as needed. Information gathered during the review is compiled, and a DMR recommendation is made to issue, condition, or deny the permit. Some activities require a Coastal Program Consistency statement or a variance from the Wetlands Use Plan. If so, staff also compiles the necessary data to make such evaluations. Staff is also asked to give advice or review potential wetlands alterations before an application is filed. This may necessitate an on-site inspection and/or considerable office review time. Permitting staff also verify compliance of permitted activities and investigate potential violations of the permits on coastal wetlands, as well as Corps of Engineers Section 404 jurisdictional wetlands.

Status:

Coastal Ecology permitting staff administered the provisions of the Mississippi Coastal Program by receiving 734 permit applications and requests, and by conducting 714 wetland permitting actions within the jurisdiction of the program. The size and complexity of proposed projects has continued to increase, following a trend begun several years ago. Emphasis during the permit review process is placed on the policy of "no net loss" of coastal wetlands. Under the NOAA Federal Consistency guidelines, staff reviews all federal actions affecting the coastal zone to determine consistency with the Mississippi Coastal Program. The reviewed activities include dredging projects by the U.S. Army Corps of Engineers, oil and gas exploration, and production in the federal outer continental shelf area in the Gulf of Mexico, and all Corps of Engineers wetland permits in the coastal zone.

DERELICT VESSEL REMOVAL

Objectives:

The principal objectives of this program are to enforce state laws through removal and disposal of derelict vessels, and to restore our coastal wetlands and navigable waterways. Tidelands Trust Funds are requested each year to achieve these objectives.

Status:

Fifteen derelicts have been removed this fiscal year from the Back Bay of Biloxi, the Pascagoula River, and from the Mississippi Sound near Long Beach Harbor, bringing the total to twenty-three since program initiation in May 1998. Additional derelicts remain, and additional funding has been requested. Hurricane Georges in September 1998 marooned several boats, but all are known and have been removed, or the owners are working to that end.

COASTAL WETLANDS ACQUISITION

Objectives:

The Coastal Preserves Program was developed in 1992 to acquire, protect, and manage Mississippi's remaining coastal wetland ecosystems. The state has identified twenty Coastal Preserve sites of important coastal wetland habitat and associated uplands. Currently, the state has title to approximately 24,100 acres of critical Coastal Preserve habitat and is actively pursuing additional acquisitions. Acquired lands are managed to safeguard and protect their natural characteristics, ecological integrity, environmental functions, and values for future benefit. The Mississippi Secretary of State's Office is an active partner in the program.

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, develop partnerships with federal, state, and local agencies, and identifying alternative approaches to protection and restoring wetlands along the Mississippi Gulf Coast.

Grand Bay National Estuarine Research Reserve

In July, 1999, the Grand Bay National Estuarine Research Reserve was designated as the 24th

reserve in the National Estuarine Research Reserve System (NERRS). The Reserve is approximately 18,000 acres in size, of which about 80% is in public ownership. Reserve habitat includes a portion of Mississippi Sound, expansive saltwater marshes, maritime pine forest, pine savanna and pitcher plant bogs, which together provide a tremendously diverse and productive ecological system.

The area is used for hunting, recreational and commercial fishing, birding, and aesthetic enjoyment. Reserve management is led by the DMR, in partnership with NOAA, the Mississippi Secretary of State's Office, Mississippi State University, the U.S. Fish & Wildlife Service, and The Nature Conservancy.

Status:

The Grand Bay National Estuarine Research Reserve became the 24th such reserve in the NERRS following signing of "Findings of Designation" by the Undersecretary of Oceans and Atmosphere (NOAA) in July of 1999. Shortly after this, an administration facility was installed at the site, a research boat was purchased, and additional equipment was purchased to allow full-time on-site presence at the reserve. Year-end activities included conducting the official designation ceremony and initiating outreach, research, and education programs. During the year 2000, core staff will be hired, including the reserve manager, research coordinator, and education coordinator. The monitoring program and graduate research fellowship programs also will commence in the year 2000.

CLEAN VESSEL PROJECT

Objectives:

The mission of the Clean Vessel Act (CVA) Project is to enhance, protect, and conserve the coastal resources of Mississippi, especially the water quality of the Sound and neighboring coastal waters, through the installation and maintenance of marine pump-out stations. This cooperative effort between the Department of Marine Resources and the U.S. Fish and Wildlife Service is funded through the Sport Fish Restoration Act. Recent reauthorization of this legislation will provide a continued \$10 million annually to the Clean Vessel Act Program over the next four years.

Status:

By the end of Fiscal Year 1999 four marine pump-out stations had been installed along the Mississippi Gulf Coast with three additional sites under construction. Also, three inland pump outs were

installed, and three are under construction at this time.
The budget for Fiscal Year 1999 was \$119,000 for

coastal locations and \$108,000 for inland locations.

TEXAS PARKS AND WILDLIFE DEPARTMENT COASTAL FISHERIES RESEARCH MANAGEMENT PROGRAMS

Hal Osburn, Division Director

Texas Parks and Wildlife (TPW) 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 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 bays, 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 FY1999 included participation in the development, review, and revision of Gulf of Mexico Fishery Management Council and Gulf States Marine Fisheries Commission management plans. 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 finfish in Texas waters is accomplished using 600 foot long gill nets with individual 150 foot sections of three, four, five, and six-inch stretched mesh. Bag seines (60 feet long) and trawls (20 feet long) are used to determine abundance of juvenile finfish, shrimp, blue crabs, and associated organisms. Oyster dredges (19.5 inches 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 feet during October 1998 and June-July 1999 with the other Gulf States and the NMFS. This effort, Southeast Area Monitoring and Assessment Program (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 1,049 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.

Routine collection, editing, summarization, and publication of self-reported commercial landings data (MAPR) continued 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. Commercial landings are obtained from commercial seafood dealers through submission of Monthly Aquatic Products Reports (MAPR).

RESEARCH

The Perry R. Bass Marine Fisheries Research Station at Palacios provided information and techniques necessary for improvement of Texas fisheries management strategies. Effort was directed toward methods for improving fisheries management techniques which included 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. Research is conducted in genetics and life history.

Studies employing allozyme electrophoretic and PCR/RFLP analysis of the population structure of sand seatrout and Atlantic croaker continued. Electrophoretic studies of the population structure of black drum continued. Efforts to develop a library of nuclear DNA markers for use with spotted seatrout continued, and the usefulness of confamilial microsatellite markers in spotted seatrout were examined. 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. 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.

A study during May-July in Matagorda Bay testing three positions of a fish-eye BRD was conducted to evaluate the effectiveness to reduce bycatch in the spring bay-food fishery. Reduction rates reveal BRDs hold promise for reducing bycatch, but further testing is required.

TPW baseline virus monitoring program for juvenile and sub-adult (≤ 80 mm TL) brown, white, and pink shrimps in nine bay systems continued. 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. Another group of studies involved investigations of hatchery-reared marine fish released into the wild. Research focused on determining the short-term fate of released hatchery fish. Performance of hatchery-reared fish in relation to variables such as time of day, season of year, size of released fish, and the more stable features of release habitat in relation to more labile environmental factors such as salinity, pH, dissolved-oxygen concentration, and water temperature were examined. Survival, distribution, and growth of the recaptured fish are being analyzed as functions of release variables and environmental variables.

LEGISLATIVE AND REGULATORY CHANGES

The 76th Texas Legislature met in January 1999. Senate Bill 133 was passed making it a violation to retain a lightning whelk when caught in a shrimp trawl. The lightning whelk is the only left opening species of whelk and is the state marine mollusc. Senate Bill 130 was also passed, establishing a limited entry program for the commercial finfish fishery.

The Texas Parks and Wildlife Commission adopted one rule change to ensure stability of the resources. In the recreational fishery, king mackerel size limits were increased from 23 inches to 27 inches. This provided better enforcement and consistency with federal regulations.

FISH STOCKING

Effort directed toward spawning and rearing marine fish continued. Controlled photoperiod and temperature regime to induce sexual maturity and spawning resulted in over 26 million red drum fingerlings, four million spotted seatrout fingerlings, and 0.05 million Atlantic croaker fingerlings being 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 1999. *Sea Center Texas* (a joint venture between the Texas Parks and Wildlife Department; The Dow Chemical Company, Texas Operations; and the Coastal Conservation Association) 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 430,000 visitors since March 1996.

Sea Center's visitor appeal centers around its interpretive displays, a touch tank, and 25,000-52,000-gallon aquaria. Brood fish are spawned in the facility's 22,000-square-foot hatchery, which houses 24, 12-foot 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 one deep water and one near shore reef site in 1999. The program is responsible for maintaining 33 permitted reef sites; three unlighted buoys at Port Mansfield Liberty Ship Reef, George Vancouver Liberty Ship Reef, and the Port Isabel/South Padre Island Reef; and one lighted buoy at the Mitchell's 12-mile reef in Outer Continental Shelf (OCS) leasing block Galveston 189. The U.S. Coast Guard granted waivers on the buoy marking requirements at Basco's Reef, North Padre Island A-72 Reef, North Padre Island 967 Reef, High Island A-515, and Galveston A-125 reef sites. An experimental mooring buoy was installed at Basco's Reef in lieu of a marking buoy, which is no longer required. The

mooring buoy was lost within two months of operational use and was not replaced during 1999.

The program received the donation offer of one obsolete oil and gas structure, which was removed from High Island A-562 and towed to an existing artificial reef in OCS leasing block High Island-A-567. The cost savings to this oil company resulted in the donation of \$170,000 to the Texas Artificial Reef Fund.

An additional donation was received by Mitchell Energy Corporation for three jackets located 12 miles offshore of Galveston in a shallow water reef site with 60-ft depth. Although construction was started last year, weather delays caused the reef conversion to be completed in July 1999. The partial mechanical removal of the top portions of each of these three structures in order to maintain 50-ft clearance, resulted in a donation of \$300,000 for the Artificial Reef Fund. A ceremony was held in July 1999 at the Ocean Star Museum in Galveston to honor George Mitchell and his company for his conservation efforts. Larry McKinney presented the award to Mr. Mitchell. The Artificial Reef Program provided a display for the Museum for several months following the ceremony.

In May 1999, the Artificial Reef Program provided an exhibit and workshop for children at the Sea Space Exposition in Houston to promote the understanding and identification of artificial reefs and the fish and invertebrates that live on these reefs.

BROWN TIDE

A persistent algal (brown tide) bloom continues in the upper Laguna Madre area. This algal bloom began in 1990. In 1999, the algae bloomed sporadically in several hot spots in the upper Laguna Madre and Baffin Bay but at a much-reduced level. About 3% of seagrass beds in water over three feet deep disappeared during the bloom; however, these beds are now recovering. Texas Parks and Wildlife Coastal Fisheries Division monitoring programs have detected no harmful effects of the bloom on fisheries resources.

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

William T. Hogarth, Regional Director

The National Marine Fisheries Service (NMFS) is an agency of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (DOC/NOAA). 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 science 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, fishery management plans, 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 co-located with the regional office.

The NMFS Southeast Fisheries Science Center (SEFSC) is in Miami, Florida, with laboratories in Beaufort, North Carolina; Charleston, South Carolina; 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. Significant 1999 fishery actions include:

FISHERY RESOURCE CONSERVATION AND MANAGEMENT

Coastal Migratory Pelagic Fishes

- NMFS approved and implemented changes to the catch specifications for Gulf group king mackerel. The minimum size limit was increased from 20 to 24 inches fork length for both the recreational and commercial sectors. Also, a 3,000-pound daily trip limit was established for vessels fishing under the commercial quota for the western zone (Texas through Alabama) and a zero-fish bag limit was implemented for the captain and crew on for hire vessels.
- NMFS monitored quotas for the three commercial fisheries targeting Gulf group king mackerel and closed the western zone (Texas-Alabama) and the hook-and-line and run-around gillnet fisheries in the Florida west coast subzone when landings estimates indicated the quotas had been harvested.
- Under the procedures of the Magnuson-Stevens Fishery Conservation and Management Act, NMFS designated the Gulf of Mexico, South Atlantic, and Caribbean Fishery Management Councils (Councils) as joint preparers of a new fishery

management plan for dolphin (*Coryphaena hippurus*) and wahoo (*Acanthocybium solandri*) throughout their range in the exclusive economic zone (EEZ) of the Atlantic, Gulf of Mexico, and Caribbean Sea. NMFS believes this approach is an expedient and practicable method to manage dolphin and wahoo effectively and equitably throughout their ranges. Such a comprehensive management scheme should facilitate maintaining populations at levels sufficient to produce maximum sustainable yield on a continuing basis, and ultimately optimize the socioeconomic benefits of the resource.

Gulf Reef Fish Fisheries

- NMFS partially approved Amendment 16A to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. Approved measures (1) prohibit the possession of reef fish exhibiting the condition of trap rash on board any vessel without a valid fish trap endorsement; (2) recommend that NMFS establish a system design, implementation schedule, and protocol for a vessel monitoring system (VMS) for the fish trap fishery, subject to Council review and approval; (3) require fish trap vessels to submit trip initiation and trip termination reports until a VMS can be implemented; and (4) provide for an annual fish trap/vessel inspection/compliance/education period. NMFS did not approve the proposal to ban fish trap use in an area south of 25.05 degrees north latitude (near Cape Sable, Florida) after February 7, 2001 (accelerated area phase out) because the measure was determined to be inconsistent with National Standard 7 of the Magnuson-Stevens Fisheries Conservation and Management Act.
- NMFS implemented new, more conservative bag and size limits for several reef fish species effective November 24, 1999. The measures were proposed in Amendment 16B to the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. To address the confusion in species identification and to reduce the harvest of banded rudderfish, lesser amberjack, and misidentified greater amberjack, this rule established a "slot limit" of 14 inches to 22 inches fork length for the commercial and recreational harvest of banded rudderfish and lesser amberjack and a five-fish aggregate bag limit for banded rudderfish and lesser amberjack. Both species would be excluded from the 20-fish aggregate reef fish bag limit. Also, the rule removes queen triggerfish from federal regulations and allows Florida's more conservative management measures to regulate fishing for queen triggerfish in the EEZ. To establish regulations in federal waters that are compatible with Florida regulations, the rule establishes the following minimum size limits for recreational and commercial fisheries: cubera snapper [12 inches total length (TL)], dog snapper (12 inches TL), mahogany snapper (12 inches TL), schoolmaster (12 inches TL), mutton snapper (16 inches TL), scamp (16 inches TL), gray triggerfish (12 inches TL), and hogfish (12 inches fork length). In addition, the rule establishes a five-fish recreational bag limit for hogfish, excludes hogfish from the 20-fish aggregate reef fish bag limit, and excludes sand perch and dwarf sand perch from the 20-fish aggregate bag limit. Finally, to afford greater protection to speckled hind and Warsaw grouper this rule establishes a recreational bag limit of one fish per vessel. Both species are candidates for possible listing as threatened or endangered under the Endangered Species Act.
- In September, NMFS approved for Gulf red snapper a zero-fish bag limit for captain and crew of for-hire vessels and a four-fish bag limit for all other recreational anglers, and disapproved a proposal to reduce the minimum size to 14 inches. Mid-year to extend the recreational season, NMFS implemented an emergency action to increase the minimum size limit for the recreational fishery from 15 inches to 18 inches total length for a 90-day period beginning June 4, 1999.
- In mid December 1999, NMFS published an interim rule to implement new management measures for the 2000 red snapper season. These measures include: 1) a four-fish bag limit for all anglers including the captain and crew of for-hire vessels, 2) an increase in the minimum size limit in the recreational fishery to 16 inches, 3) a recreational season that will be open from April 21 through October 31, and 4) a change in the duration of the commercial spring season from the first 15 calendar days of each month to the first ten calendar days of each month. Commercial fishing during the spring season will begin at noon on the first day of each month and cease at noon on the tenth day of each month until the spring quota is reached. Measures in this interim rule are designed to reduce overfishing while allowing the total allowable catch to be harvested by fair, equitable, and effective means.
- For red snapper in the Gulf of Mexico, NMFS monitored the recreational quota (4.47 million pounds) and the two seasonal commercial quotas (3.06 million pounds for first season beginning February 1, 1999, and 1.58 million pounds for the second season beginning September 1, 1999). NMFS closed the corresponding fisheries when landing estimates indicated the quotas were met.

NMFS closed the fishery on April 15, 1999 for the first commercial season and on November 5, 1999 for the second season. The recreational fishery was closed August 29, 1999.

Essential Fish Habitat

NMFS partially approved the Generic Amendment Addressing Essential Fish Habitat (EFH) in the Fishery Management Plans for the Gulf of Mexico. NMFS approved the EFH designation for the 26 selected species and coral complex in Section 5.0 and only the fishing gear impact assessments discussed in the categories for trawls, recreational fishing, and traps in Section 6.1. No management measures and no regulations were proposed. Fishing-related management measures to minimize any identified impacts are deferred to future amendments when the Gulf Council has adequate information to decide whether additional measures are practicable.

Gulf Shrimp Fishery

- NMFS published a final rule to implement a protocol to test and certify bycatch reduction devices (BRDs) for use in the Gulf of Mexico shrimp fishery. The protocol was proposed in Amendment 9 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico. With limited exceptions, the regulations require that certified BRDs be used in shrimp trawls towed in the Gulf of Mexico EEZ shoreward of the 100-fm (183-m) depth contour west of 85 degrees 30 minutes west longitude, the approximate longitude of Cape San Blas, Florida. To be certified, a BRD must reduce the bycatch mortality of juvenile red snapper by 44% compared to the average mortality level during the years 1984-1989.
- NMFS closed federal waters off Texas to commercial shrimping on May 15, 1999 and reopened the fishery on July 15, 1999. This closure of federal waters corresponded with the period that Texas closed its waters to shrimp trawling. This annual closure of the shrimp fishery in the western Gulf off Texas was established to allow brown shrimp to reach a larger and more valuable size prior to harvest, and to prevent the discard and waste of brown shrimp smaller than the preferred market size.

PROTECTED SPECIES MANAGEMENT

- Published a 30 day rule implementing the leatherback turtle excluder device (TED) modification off northeast Florida based on high stranding numbers of leatherback turtles.

Strandings abated upon rule implementation.

- Implemented a 30 day rule closing the large mesh gill net fishery in most of Pamlico Sound, North Carolina in response to very high numbers of loggerhead and Kemp's ridley strandings. Strandings abated after the rule became effective. As part of this process SERO managers met with state of North Carolina fishery officials and most of the gill net fishery to explore a long-term solution to this problem. The state agreed to modify state regulations regarding net tending requirements and develop a conservation plan under section 10 of the Endangered Species Act (ESA). A section 10 agreement essentially delegates ESA authority for special purposes to the state.
- Developed an Advance Notice of Proposed Rulemaking (ANPR) to increase the size openings of TEDs. Initially held a meeting of key shrimp industry and state fishery officials to present the data justifying the need for the increased opening and presented several options for increasing the opening. The ANPR was filed in the Federal Register (FR) in late March 2000.
- Developed a proposed and final rule to establish critical habitat for Johnson's sea grass. Held two public hearings on the proposed rule as well as a meeting with commercial port and boating interests to hear their concerns. The final rule was published in March 2000 to fulfill terms of a court approved settlement agreement with the Biodiversity Legal Foundation.
- Reviewed a petition and prepared a Federal Register notice to conduct a status review of small tooth sawfish and candidate species.
- Extended the interim final rule authorizing use of the Parker Soft TED for one year to allow shrimpers more time to experiment with the only soft TED currently authorized and to collect more data on shrimp catch and turtle release.
- Modified TED requirements in net extensions in the summer flounder trawl fishery to prevent turtles from being entangled in the large mesh webbing. The large mesh webbing requirement had been imposed by the NE region as a management measure to avoid the take of small flounder without due consideration of sea turtle release requirements.
- Responded to numerous requests from fishermen regarding TED requirements and provided summaries of current TED rules.
- Reissued six permits to fishermen through the Gulf and Atlantic Fisheries Foundation for their project to evaluate TEDs as BRDs.
- Participated in a workshop in Perth, Australia, to lay a framework for development of an Indian Ocean sea turtle conservation agreement. The

workshop produced a resolution, agreed to by twenty-one Indian Ocean region countries, to begin negotiations for such an agreement. The first negotiating session is scheduled for Malaysia in June.

- Wrote a paper entitled "TED Development and its Application to Asian Nations" for publication in the proceedings of the Second Annual Seminar on Sea Turtle Conservation sponsored by state of Sabah, Malaysia.
- Coordinated and participated in TED certification visits to nine Central and South American countries and one Middle East country for the 2000 certification process.
- Conducted an initial TED training session and evaluated a TED design developed by fisheries officials in Bahrain.
- Secured \$300K through the annual Recover Protected Species (RPS) funding process for the TED technology transfer effort.
- Participated in the annual RPS funding processes for sea turtles, marine mammals, and other species. Secured \$687K in annual money and \$376K base funds.
- Revised procedures for developing and reviewing ESA section 7 consultations so that the region can obtain delegation authority.
- Coordinated responses to the annual RPS process with the SEFSC and the Northeast Region so that we are consistent with our position on the RPS process.
- Coordinated marine mammal stranding responses with the SEFSC marine mammal stranding coordinator and provided information and status reports to Headquarters on two episodes of bottlenose dolphin strandings during the period.
- Made available a Division biologist to work with NMFS SE Law Enforcement on several issues and meetings regarding swim with and dolphin feeding problems.
- Developed two posters and presented them at the 13th Biennial Conference on Marine Mammal Biology and Conservation. One poster on the mid Atlantic take reduction process was done in cooperation with the NER.

HABITAT PROTECTION

The NMFS National Habitat Plan (NHP), Strategic Plan, and Habitat Conservation Policy call for improved protection of fisheries habitats. The NMFS commits to protect and conserve habitats from human-induced degradation; restore degraded habitats; and to create habitats with greater value than at present. Current and new partnerships are maintained to foster program success; to provide the best science; and to inform constituents and the general public of issues

related to habitat conservation and the importance of healthy productive habitats to meet recreational and commercial needs for fish and shellfish.

The Region's habitat programs are highlighted along with the general and specific activities and accomplishments for fiscal year 1999 (FY99). The SER uses various statutory authorities found in federal laws. Activities during FY99 focused on individual and essential fish habitat consultations involving federal regulatory programs, pre- and post-application planning, federal projects affecting habitat, National Environmental Policy Act (NEPA) consultations, watershed planning, partnerships and coordination with others (e.g., fishery management councils), coordination between science and management, outreach efforts, and a heightened involvement in habitat restoration, enhancement, creation, and preservation activities. During the year we accomplished the following:

- The NMFS conducted 333 preapplication consultations for proposed water development projects. We believe this process to be especially useful in protecting fishery habitat because potential permit applicants usually have not invested heavily in project plans. The amount of habitat that can be involved in this process is substantial. During FY99, 36 of the 333 preapplication consultations we held involved more than 2,856 acres of fishery habitat.
- The NMFS reviewed 5,023 individual proposals (including preapplication consultations) to develop in wetlands. Most of these activities (about 63% and 4.9%, 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 14% (711 projects) were of concern because they involved substantial environmental impact. These projects required modification or denial of federal authorization to protect fisheries resources. Over 18% (909 projects) 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 Corps of Engineers (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, Fish and Wildlife Service (FWS), Environmental Protection Agency (EPA), NMFS, and state natural resource agencies. The

NMFS's review of federal projects is conducted largely in connection with provisions of the Fish and Wildlife Coordination Act (FWCA); however, other statutes such as the Magnuson-Stevens Fishery Conservation and Management Act (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 SER reviewed 87 federally constructed or sponsored projects during the year.

- Seventeen Essential Fish Habitat (EFH) findings have been completed or are in negotiation. The SER negotiated the first interagency finding and the first programmatic consultation (with the MMS) completed by the NMFS. Processes have been developed for consultation on fishery management plan amendments and damage assessment/restoration activities undertaken by NOAA. About 1,200 EFH consultations have been initiated by federal action agencies since approval of the Gulf of Mexico, South Atlantic, and Caribbean fishery management plan amendments. NMFS recommended detailed measures to conserve and protect EFH on 60 of the consultation requests.
- The NEPA requires preparation of an Environmental Impact Statement (EIS) 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. During FY99, 103 such consultations occurred. 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 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 Wetlands 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 96,594 acres of fishery habitat. This includes 16,497 acres associated with mitigation banks and more than 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 NMFS represents NOAA and provides technical assistance. Estuary programs in effect and requiring effort include: Galveston and Corpus Christi bays, 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.
- 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 1999, 69 grants and cooperative agreements totaling \$17,798,040 were awarded to states, universities, non-profit/profit institutions, and individuals through the programs mentioned below.

- The Southeast Area Monitoring and Assessment Program (SEAMAP) is a state-federal program for the collection, management, and dissemination of fishery-independent data in the Southeastern U.S. Three components currently exist in partnership with NMFS: SEAMAP-Gulf; SEAMAP-South Atlantic; and SEAMAP-Caribbean. The program allocates funds to the southeastern states for surveys and studies, and to the Gulf States Marine Fisheries Commission, Atlantic States Marine Fisheries Commission, and the Caribbean Fishery Management Council as coordinating agencies, through programmatic appropriations mutually agreed-upon by the participants. Eleven cooperative agreements totaling \$889,552 were awarded this year.
- 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. In 1999, \$997,287 was awarded by cooperative agreement to ten states.

- 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 (ACFCMA). 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. For 1999, three southeast states received \$111,720 for the Anadromous Fisheries program. The Interjurisdictional Fisheries program funded eleven recipients for \$1,013,174, and the ACFCMA programs provided \$772,830 to four states. This year was the first year that funds were provided for the Atlantic Coastal Cooperative Statistics Program (ACCSP) in the Southeast. Three states received \$213,398 under the ACCSP.
- The Marine Fisheries Initiative (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 Nation. In 1999, six MARFIN cooperative agreements were awarded totaling \$798,019.
- NMFS participates in the Saltonstall-Kennedy (S-K) Grant Program which is a national competitive program administered by the NMFS Headquarters office. The program provides financial assistance (grants or cooperative agreements) for research and development projects to benefit the U.S. fishing industry. Eight grants were awarded in the Southeast Region totaling \$877,060.
- Three fishery management councils in the Southeast U.S. received a total of \$3.97 million in 1999 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 \$2.69 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 \$1.23 million for shrimp trawling and red snapper research.
- In 1999, \$4.24 million was provided to the Gulf States to address fishery resource disasters. Programs included habitat restoration and investigations into better detection of red tide organisms and toxins in the wild.

ECONOMICS PROGRAM

- Worked with the three southeast fishery management councils to develop the economic and social portion of Operations Plans which list dated products and services to be delivered to the councils during FY99. Provided all three councils with progress reports.
- Began inquiry into status of existing data and economics information on the U.S. Caribbean fisheries. This is a prelude to a new economics effort that began in August 1999 and will continue into FY00 and beyond.
- Conducted commercial and recreational economic assessments for Gulf of Mexico red snapper, made presentations to the Gulf of Mexico's Socio-Economics Panel and presented the panel's report to the Gulf Council at their regularly scheduled fall red snapper meeting. Conducted economic assessment for emergency red snapper regulations on total allowable catch (TAC), size limits, and other management proposals.
- Conducted commercial and recreational economic assessments for the Gulf of Mexico and South Atlantic coastal migratory pelagics (king mackerel, Spanish mackerel, cobia, dolphin, and wahoo) fisheries and made presentations to the Gulf of Mexico's Socio-Economics Panel.
- Brought SAFE files up to date, provided Councils and others with latest SAFE listings and transferred files to the Sustainable Fisheries Division per decision by the Regional Administrator.
- Wrote proposals to obtain funding for mackerel costs and earnings study and to begin development of a southeast program within the Fisheries Economics Office to address National Standard 8 (Community Impacts).
- Wrote a commercial economics assessment of the effects of amberjack trip limits and related regulatory proposals for the South Atlantic Council.
- Began work to become familiar with existing simulation models of the Gulf of Mexico shrimp fishery to be able to update the economic effects of mandatory BRD use.
- Wrote an "Economic Consequences" document to

describe the expected economic impacts of a proposal to close the red porgy fishery in the South Atlantic on an emergency basis.

- Participated in development of annual wreckfish assessment for the South Atlantic Council.
- Conducted real-time surveys, within OMB restrictions, of fishermen to gather information of fishing derby effects on red snapper prices and economic impacts of closing the Oculina Habitat Area of Particular Concern to calico scallop fishing.
- Helped NMFS Headquarters economics office develop examples of criteria to be used to determine the overcapacity status of managed fisheries.
- Provided staff assistance to Joint Institute for Marine and Atmospheric Research for a project designed to collect new cost and earnings information for highly migratory species.
- Produced and distributed 20 staff reports on the results of analyses conducted for the Councils and other customers.
- Initiated efforts to build a database on Historically Black Colleges and Universities in the southeast. Its purpose is to establish contact with these institutions to determine their potential contributions to economic and social aspects of the fisheries, to explore joint future efforts and to establish contacts to ensure that these institutions are aware of new hiring or contract opportunities afforded by the Fisheries Economics Office. First contact was in regard to attempts to hire a social scientist.
- Initiated a new effort specifically designed to provide economic and social information to assist the Caribbean Council in making fishery management decisions. Citizens of the Commonwealth of Puerto Rico and the U.S. Virgin Islands represent a rich diversity of people in terms of ethnic and cultural backgrounds. This diversity represents a challenge for economics and the other social sciences because behaviors of the fishermen do not fit the "model" and experience gained from an examination of the mainland United States fisheries and participants. As the program evolves to include the ability of this office to provide the assistance of a sociologist it is hoped that the concepts of subsistence fishing and fishing for cultural heritage reasons can be investigated with the objective of more accurate models to establish the reaction and behavior change related to fishery regulations for this diverse group of citizens.

GULF OF MEXICO FIELD OFFICE OF NMFS' OFFICE OF INTERGOVERNMENTAL AND RECREATIONAL FISHERIES (IRF)

- IRF has successfully established a Gulf of Mexico

recreational fisheries field office in the region.

- In partnership with the Florida Foundation for Responsible Angling, IRF has cosponsored numerous "Take-A-Kid Fishing" programs aimed at increasing participation by children in marine recreational angling.
- In partnership with "Ladies, Let's Go Fishing" and the Florida Foundation for Responsible Angling, IRF has cosponsored fishing events aimed at increasing participation by women in marine recreational angling.
- In partnership with the Mississippi Department of Marine Resources, IRF cosponsored the Mississippi Very Special Fishing Rodeo," aimed at increasing participation by differently-abled children in marine recreational angling.
- In partnership with the Florida Foundation for Responsible Angling, IRF cosponsored an educational outreach program for children which was aimed at building appreciation and knowledge of marine resources through hand's-on learning experiences.
- In partnership with the Mote Marine Laboratory and the Florida Coastal Conservation Association, IRF cosponsored the 1999 Gulf Coast Shark Census Assessment. The shark census assessment is considered to be "The world's only 100% catch & release shark tournament for research where only information is landed."
- IRF staff has been named to represent NMFS on the Gulf States Marine Fisheries Commission (GSMFC) Technical Coordinating Committee (TCC) Anadromous Fish Subcommittee.
- IRF staff has been named to represent NMFS on the GSMFC's TCC Artificial Reef Subcommittee.
- IRF staff has been named to represent NMFS on the GSMFC Fisheries Information Network Education and Outreach Subcommittee.

SOUTHEAST FISHERIES SCIENCE CENTER

Red Grouper Assessment

The SEFSC completed its third stock assessment of red grouper in the U.S. Gulf of Mexico. The assessment concluded that red grouper in the Gulf is both overfished and undergoing overfishing.

Red Snapper Stock Status Update

An updated stock status assessment of Gulf of Mexico red snapper fishery with data through 1997 and projecting through 1999 was presented to the Gulf of Mexico Fishery Management Council. The stock continues to be overfished.

Reef Fish Data Base

A 20-year data base was summarized to form a baseline for assessing future changes in reef fish communities in the Florida Keys National Marine Sanctuary.

Highly Migratory Species Assessments

Under the auspices of the Standing Committee for Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT), stock assessments were conducted for swordfish, skipjack, albacore, and yellowfin tuna. Status evaluations and other analyses were also conducted for bigeye and bluefin tuna, blue and white marlin, and sailfish.

South Florida Ecosystem Program for Living Marine Resources

Research in 1999 continued to link changes in salinity and changes in salinity patterns on living marine resources in marine and estuarine areas.

Essential Fish Habitat

A new web site dedicated to Essential Fish Habitat activities was established at:

<http://www.galveston.ssp.nmfs.gov/efh>.

The web site includes maps that describe distributions of fishery species in the Gulf of Mexico and provides access to Essential Fish Habitat Amendments developed by the Gulf of Mexico Fishery Management Council.

Shrimp Habitat Research

A regression model was developed to predict juvenile brown shrimp and white shrimp densities in various habitats of Galveston Bay. Results from the model can be displayed in ArcView to map high-density areas. The model has been tested for other Texas Bay systems, and the approach appears to provide a useful tool for improving the delineation of essential fish habitats.

Mass Tagging of Kemp's Ridleys

Ten thousand Kemp's ridley sea turtle hatchlings were tagged in June of 1999. Tags used were 2 mm coded wire tags placed in the musculature of both front flippers as the hatchling turtles emerged from nests at Rancho Nuevo, Mexico. The intent is to

provide an archival marker that will be recognized throughout the life span of the turtle and provide critical information on mortality, distribution, growth, and reproduction.

Gear Impacts Workshop

A workshop on gear impacts was held December 1999. The meeting's focus was to determine the approach that the southeast should adopt in researching the impact of fishing gear on Essential Fish Habitats.

Large Marine Ecosystem Model for the Gulf of Mexico

Large Marine Ecosystem Model for The Gulf of Mexico Fisheries and environmental data were identified and formatted for inclusion in the model. Development of the model will continue through FY 2000. Fisheries and environmental data were identified and formatted for inclusion in the model. Development of the model will continue through 2000.

Gulf Menhaden Sampling

In 1999, over 10,600 gulf menhaden (*Brevoortia patronus*) were sampled for size and age composition at five ports in the northern Gulf of Mexico. This work was done in cooperation with the GSMFC. We continue to maintain data bases on catch and fishing effort of the purse-seine fleet, and we also compile daily logbook information, which when computerized provides a more geographically precise picture of catch patterns.

Gulf Menhaden Assessment

A comprehensive stock assessment of gulf menhaden was completed in 1999. Following peer review, the work has been accepted for publication as a NOAA Technical Report.

Dolphin Assessment

A stock assessment of dolphinfish (*Coryphaena hippurus*) was completed which covered an area composed of the Gulf of Mexico, Atlantic, and northern Caribbean.

King Mackerel Analysis

Research continues on stock identification and mixed-stock composition analysis of king mackerel (*Scomberomorus cavalla*) in the Gulf of Mexico and south Atlantic. A scientific manuscript on

that subject is under review and will be sent to the Transactions of the American Fisheries Society, Beaufort Laboratory.

Bioprofile Sampling

In 1999, 30,900 length/weight measurements, 1,165 otoliths, and 146 gonads were collected from the head boat fishery in Florida, Alabama, Louisiana, and Texas. These data were collected by the Southeast Region Head Boat Survey in cooperation with the GSMFC, the Florida Fish and Wildlife Conservation Commission, and the Louisiana Department of Wildlife and Fisheries.

Seagrass Research

Staff continued research on identifying Essential Fish Habitat characteristics of an extensive deep-water seagrass meadow on the west Florida Shelf, determining the density and distribution of seagrasses and making collections of crustaceans and fishes. Funds have been received from the SER through the SEFSC to conduct fishing gear experiments in this habitat and to conduct identifications of decapod crustaceans using the habitat.

Florida Bay Recruitment

Research continued on the recruitment to Florida Bay from the Gulf of Mexico by snapper and grunt larvae in order to define processes that cause

variability in juvenile numbers for fishes that spawn outside the bay but use the bay as a nursery area. In addition, research continued in the bay to evaluate growth, survival, and habitat use of fishes.

Gulf Marine Mammal Surveys

In a 4,609 km line-transect vessel survey, 217 cetacean groups, and 18 species were sighted. The 36-day effort was conducted in oceanic waters (>200 m) of the northern Gulf of Mexico during April-June 1999. A similar survey of 19 days over continental shelf waters (<200 m) during the same time frame resulted in 2,109 transect kilometers and the sighting of 130 cetacean groups. Bottlenose and Atlantic spotted dolphins were the only species sighted in shelf waters. Both surveys were conducted as part of an interagency agreement with the Minerals Management Service. The data will be used to monitor cetacean abundance.

List of Stock Assessments Completed in 1999

Gulf of Mexico - king mackerel, Spanish mackerel, red snapper, red grouper, red drum, gulf menhaden, white shrimp, pink shrimp, brown shrimp, dolphinfish.

Highly Migratory Species - swordfish, bluefin tuna, yellowfin tuna, bigeye tuna, skipjack tuna, albacore.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

Wayne Swingle, Executive Director

STATUS OF FISHERY MANAGEMENT PLAN RULES

- The National Marine Fisheries Service closed the run-around gill net fishery.
- The NMFS reduced the commercial king mackerel trip limit to 500 pounds in the Florida west coast subzone.
- The NMFS reduced the commercial Spanish mackerel trip limit to 1,500 pounds for the Atlantic.
- The NMFS closed the commercial king mackerel fishery in the Florida east coast subzone.
- The NMFS published the proposed rules for the 1998-1999 Mackerel Regulatory Amendment.
- The NMFS published the proposed rule and notice of availability for Reef Fish Amendment 16A.
- The NMFS closed the commercial red snapper fishery when the spring quota was taken.
- The NMFS issued an emergency interim rule to increase the recreational red snapper size limit to 18 inches total length (TL).
- The NMFS published the proposed rule for the shrimp trawl bycatch reduction device (BRD) certification protocol.
- The Notice of Availability of Mackerel Amendment 9 was published.
- Final rule for 1998-1999 Mackerel Regulatory Amendment was published.
- The commercial king mackerel fishery in the western zone was closed.
- The proposed rule for Mackerel Amendment 16B was published.
- The proposed rule for 1999-2000 Mackerel Regulatory Amendment was published.
- The proposed rule for Reef Fish Amendment 16B was published.
- The fall commercial red snapper season was closed.
- Notice of Availability of Reef Fish Amendment 17 was published.
- The interim rule implementing part of the CY2000 red snapper total allowable catch (TAC) actions was published.
- Final rule for the shrimp trawl BRD protocol was published for the Gulf of Mexico.
- Notice of Availability of the SFA Amendment was published.
- The proposed rule for SFA Amendment was published.
- Notice of the NMFS decision to partially disapprove the SFA Amendment was published.

STATUS OF FMP DEVELOPMENT

Fishery Management Unit	Completed Implementation as of June 30, 1999	Target Date	Remarks
Billfish Plan*	Amendment 1 implemented	1988	
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 ^{1,2}	Amendments 1 through 8 implemented	1983	Amendment 9 approved Amendments 10, 11, and 12 pending approval

Fishery Management Unit	Completed Implementation as of June 30, 1999	Target Date	Remarks
Reef Fish ^{1,2}	Amendments 1 through 16B implemented. Amendments 8 and 10 withdrawn	1984	Amendment 17 submitted for implementation.
Red Drum ^{1,2}	Amendments 1, 2, and 3 implemented	1986	
Shark/Swordfish/Tuna*	FMP implemented	1999	
Shrimp ^{1,2}	Amendments 1 through 9 implemented	1981	Amendments 10 and 11 under development
Spiny Lobster ^{1,2}	Amendments 1 through 6 implemented	1979	Amendment 7 proposed
Stone Crab ^{1,2}	Amendments 1 through 6 implemented.	1999	
SFA Amendment		1999	Amendment pending approval

¹Monitoring report completed.

²Operations plan completed or under development.

*Secretarial plan affecting Gulf. The Council has a consultation role and may convene panels or committees for advice on regulatory measures. Shark, tuna, and swordfish will become a single plan.

UNITED STATES FISH AND WILDLIFE SERVICE

Douglas J. Frugé, Gulf Coast Fisheries Coordinator

Fish and Wildlife Service (FWS) Deputy Director John Rogers and Southeast Regional Director Sam Hamilton attended the GSMFC 50th Anniversary meeting in Biloxi, Mississippi, in October. Mr. Rogers addressed a plenary session of the meeting on October 20.

ANADROMOUS FISHERIES

The FWS's Gulf Coast Fisheries Coordinator, Doug Frugé, continued serving as chairman of the GSMFC Anadromous Fish Subcommittee during 1999 and attended the spring (New Orleans, Louisiana) and fall (Biloxi, Mississippi) 1999 subcommittee meetings.

The FWS received a budget increase of \$800,000 in fiscal year (FY) 1999 to address fish passage problems. Of this, each region received \$30,000 to begin identifying specific impediments to fish passage and migration. The Southeast Region received \$140,000 to fund specific projects to remedy fish passage problems at specific sites. Out of this amount, one project was funded in Gulf rivers. This was a \$30,000 project in the Mobile River basin to investigate fish movements and potential for fish passage at Claiborne Lock and Dam on the lower Alabama River.

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 FY 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 was provided for federal FYs 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 (FWC), 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. A FY 1999 accomplishment report on the Fisheries Stewardship Project was prepared by the FWS in October.

As was also done in 1998, the Gulf Coast Fisheries Coordination Office (FCO, Ocean Springs, Mississippi) funded and coordinated a contract for analysis of molecular genetics (mitochondrial DNA) of striped bass collected in the Stewardship Project sampling programs. A total of 221 samples were submitted for analysis under the contract.

APALACHICOLA-CHATTAHOOCHEE-FLINT RIVERS STRIPED BASS RESTORATION TECHNICAL COMMITTEE

The FWS hosted, and numerous FWS personnel attended, the annual *Morone* workshop of the Apalachicola-Chattahoochee-Flint (ACF) rivers Striped Bass Restoration Technical Committee at Apalachicola, Florida on February 2-4. The purpose of this annual workshop is to review management strategies and status of striped bass in the ACF River system. Status reports were presented by participating agencies, and Gulf striped bass stocking goals and priorities for 1999 were determined.

Personnel of the FWS also attended an ACF Striped Bass Technical Committee meeting in September at the U.S. Army, Corps of Engineers (CE) office in Chattahoochee, FL. Representatives from the states of Florida and Georgia also attended. Progress towards the ACF striped bass restoration plan was evaluated. It was agreed that the plan would be reviewed and possibly revised based on the results of the Fisheries Stewardship Initiative studies.

STRIPED BASS FRY/FINGERLING PRODUCTION AND STOCKING

The Gulf Coast FCO again funded and administered a Gulf striped bass broodfish genetics screening contract for 1999. A total of 93 broodfish were screened under the contract.

Laura Jenkins of the FWS Panama City, Florida Fisheries Resource Office (FRO) continued coordinating Gulf race striped bass broodfish collection, fry and fingerling production, and stocking across the Gulf of Mexico. Welaka National Fish Hatchery (NFH), Florida produced 5,142,000 Gulf race striped bass fry for fingerling production in 1999. National fish hatcheries (Ink's Dam, Texas; Natchitoches, Louisiana; Private John Allen, Mississippi; Warm Springs, Georgia; and Welaka, Florida) produced and stocked a total of 245,600 Phase I and 171,547 Phase II Gulf race striped bass in Gulf of Mexico rivers in 1999 and early 2000. 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 Gulf Coast FCO coordinated with personnel of the Texas Parks and Wildlife Department (TPWD), LDWF and FWC during spring 1999 regarding proposed stocking of Gulf race striped bass in Toledo Bend Reservoir between Louisiana and Texas in order to establish the lake as an additional Gulf race broodstock source. The TPWD had some concerns about this, and a meeting on the issue was held in March at the Sabine River Authority office (Texas) at Toledo Bend Dam. Personnel of the LDWF, TPWD, and FWS attended. A decision was made to not stock Gulf race striped bass in the lake during 1999, but with the intent of continuing to consider this for the future.

GULF STURGEON RECOVERY ACTIVITIES

The Panama City, Florida FRO continued monitoring sonic-tagged Gulf sturgeon in Choctawhatchee Bay, Florida, to determine movement and habitat use in coastal waters.

The Gulf Coast FCO coordinated with personnel of the LDWF and FWS regarding the issue of Gulf sturgeon bycatch in Lake Pontchartrain and rivers that drain to the lake. Those discussions were formalized in a meeting with managers and staff of the two agencies on June 4 at the LDWF office in Baton Rouge, Louisiana, regarding recovery of Gulf sturgeon in the Lake Pontchartrain drainage basin. A number of actions by both agencies to address the issue were agreed upon.

In one of the action items referenced in the paragraph above, the FWS assisted the LDWF in developing a proposal that was submitted to the National Fish and Wildlife Foundation (NFWF) for a Gulf sturgeon habitat and population assessment

project in Lake Borgne, Lake Pontchartrain, the Pearl River, and other Lake Pontchartrain basin drainages. The LDWF was notified during fall 1999 that the proposal will be funded, and personnel of the FWS and LDWF met in Baton Rouge on November 30 to discuss project details. Substantial participation and cost sharing will be provided by the FWS's Baton Rouge FRO in this project, which is scheduled to begin in August 2000.

The Panama City, Florida FRO completed field work for a Gulf sturgeon population estimate below the Jim Woodruff Lock and Dam on the Apalachicola River in September. A total of 95 Gulf sturgeon were collected with an estimated population of 330 fish. The lower and upper confidence limit range was 191-1,219.

A telemetry study on Gulf sturgeon in the Apalachicola River to monitor winter migration and marine movement in that system was also conducted by the Panama City, Florida FRO. Thirty Gulf sturgeon, weighing from four to 186 pounds, were equipped with external sonic tags in order to follow their movements as they leave the river and enter Apalachicola Bay. Remote sensing devices were set at two locations in the river and moved to locations in the bay when migration out of the river was complete. Personnel from the Apalachicola National Estuarine Research Reserve assisted in monitoring the fish.

The Panama City, Florida FRO, with assistance from the Baton Rouge, Louisiana FRO, collected and tagged a total of 450 sub-adult and adult Gulf sturgeon during a 17-day gill netting study in the lower Choctawhatchee River in October and November. Based on the 1999 recapture data, the population of subadult and adult Gulf sturgeon in the Choctawhatchee River was estimated at 3,000 fish.

On October 14, personnel of the Gulf Coast FCO and the Ecological Services (ES) Field Office at Jackson, Mississippi, attended a meeting at Mississippi State University (MSU) in Starkville, Mississippi, regarding plans being developed by a committee of citizens in the Hattiesburg, Mississippi area to possibly develop one or more small reservoirs on the Bouie River. The Bouie River is a third-order tributary of the Pascagoula River. One proposed reservoir would inundate the only known spawning site for Gulf sturgeon in the system. The FWS voiced serious concern to project proponents with respect to potential impacts on Gulf sturgeon if the project includes dam construction.

Doug Frugé coordinated with the NMFS Panama City, Florida laboratory in October regarding the possibility of using Gulf sturgeon being held at aquaculture facilities for mortality studies in shrimp trawls in conjunction with NMFS testing of turtle excluder devices and bycatch reduction devices. This idea will be explored further with the NMFS Pascagoula, Mississippi laboratory, which actually conducts the testing.

The Baton Rouge FRO provided assistance to the LDWF at various times during the year in sampling for and radio-tracking Gulf sturgeon, primarily in the Pearl River drainage, Louisiana, as follow-up to a population assessment that had been on-going in that system in previous years.

The FWS, primarily through its Panama City, Florida Field Office provided comments and input into a draft plan for sturgeon conservation and aquaculture being developed by the FWC.

The FWS's ES Field Offices at: Daphne, Alabama; Panama City, Florida; and Lafayette, Louisiana consulted with federal agencies and a variety of private entities regarding potential impacts to Gulf sturgeon and habitat from construction and other types of development projects through the year.

ALABAMA SHAD

The FWS, primarily through the Gulf Coast FCO, resumed efforts in late 1998 to finalize a status review of Alabama shad that had been initiated by FWS ES field offices at Jackson, Mississippi and Panama City, Florida. In order to augment data available to assess population trends, a search was initiated for all existing data on specimens stored in museum collections. These data were geo-referenced by Fishery Biologist Cedric Doolittle of the Baton Rouge, Louisiana FRO, and the geo-referencing work was largely completed by end of summer 1999. However, other higher priority work at the Gulf Coast FCO hindered substantial progress being made on completion of the status review during the balance of 1999. Dr. Stuart Poss, the Gulf Coast Research Laboratory at Ocean Springs, Mississippi, and Mr. Jim Barkuloo, Panama City, Florida, are cooperating on completion of the review.

OTHER COASTAL FISHERIES

Doug Frugé participated in a conference call on July 21 of the Fisheries Information Network (FIN) Administrative Subcommittee. Doug Frugé replaced Wilson Laney (Assistant South Atlantic Fisheries

Coordinator, Raleigh, North Carolina) as the FWS representative on the FIN committees on August 13, and on September 20-23 attended FIN meetings in Tampa, Florida.

During sea turtle nest hatching season the Panama City, Florida ES Field Office provided assistance and advice to citizen sea turtle monitoring groups in the Florida panhandle in documenting disorientation from beachfront lighting. That office was also involved with other state, local, and federal agencies in exploring ways to better protect turtle nesting habitat from a variety of human activities, including beach driving, bonfires, and military exercises. The office also concluded a successful season on a cooperative loggerhead sea turtle incubation and beach temperature project. In that project, turtle nest temperatures and beach profiles are being collected in an effort to determine if nest temperatures in the Florida panhandle are similar to those in other portions of the species nesting range, and how this may affect the ratio of males to females produced. Other sea turtle work included FWS partnership efforts in a project targeted at protecting sea turtle nests from excessive predation.

HABITAT PROTECTION/ENHANCEMENT

The FWS continued participation in coastal habitat efforts of the Gulf of Mexico Program (GMP) through the Habitat, Nonindigenous Species and Nutrient Enrichment (NEFT) focus teams, as well as the Data and Information Transfer Committee (DITC). This included attendance at the GMP comprehensive meeting on May 27 in New Orleans, Louisiana.

Doug Frugé, of the Gulf Coast FCO met with Jeff Rester (GSMFC Habitat Specialist) and Dexter Mead of the NFWF on April 19 at Ocean Springs, Mississippi, regarding potential coastal habitat projects in south Mississippi.

The FWS, primarily through the Panama City, Florida and Daphne, Alabama ES field offices, continued participation with the states of Alabama, Georgia and Florida, as well as other federal agencies in defining instream flow needs for Tri-state water compacts involving the ACF and Alabama-Coosa-Talapoosa river systems.

The FWS ES field offices at Vero Beach, Florida; Panama City, Florida; Daphne, Alabama; Lafayette, Louisiana; Houston, Texas; and Corpus Christi, Texas continued efforts to protect and restore coastal habitats through a variety of activities, many involving review of CE permit applications,

consultations involving potential effects on species listed under the Endangered Species Act, and activities under the FWS Environmental Contaminants and Coastal programs.

PUBLIC OUTREACH/EDUCATION

Laura Jenkins of the FWS Panama City FRO coordinated development of a public information brochure on Gulf striped bass restoration under the guidance and direction of the GSMFC Anadromous Fisheries Subcommittee.

Earth Wave Productions, Inc. continued work on a 15-minute video on Gulf sturgeon that is being funded by the FWS and the CE. Footage of sturgeon field work, habitat types, and interviews with various sturgeon specialists was gathered during 1999.

Numerous coastal ES field offices, national wildlife refuges and FROs conducted public outreach events throughout the year, many of which focused on Gulf sturgeon, sea turtles, and other coastal resources.

As one of the few offices clearly identified in the Mississippi coast's telephone directory as a fish and wildlife agency, the Gulf Coast FCO serves as an initial

point of contact for many south Mississippi citizens, as well as some nonresidents, looking for fish, wildlife, and environmental information. Many of the information requests involve marine resources, and these are usually referred to the Mississippi Department of Marine Resources.

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.

A proposal was drafted during May by the Gulf Coast FCO and submitted under the FWS Federal Aid in Sport Fish Restoration reverted fund call for proposals. The proposal was for a cooperative project with Dr. Isaac Wirgin (New York University Medical Center) and Dr. John Waldman (Hudson River Foundation) to assess the taxonomic status of Gulf race striped bass. The project would also involve the Warm Springs Regional Fisheries Center and Welaka NFH, and perhaps other NFHs on the Atlantic coast. However, the project was not funded.

GULF STATES MARINE FISHERIES COMMISSION

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

for the year ended
December 31, 1999

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