

OFFICE COPY ONLY

THIRTY-EIGHTH ANNUAL REPORT OF THE GULF STATES MARINE FISHERIES COMMISSION



ALABAMA • FLORIDA • LOUISIANA • MISSISSIPPI • TEXAS

P.O. BOX 726 • OCEAN SPRINGS, MS. 39564 • (601) 875-5912

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. It has as its principal objective 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
THIRTY-EIGHTH ANNUAL REPORT (1986-1987)**

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
the State enabling Acts creating such Commission and
Public Law 66 - 81st Congress assenting thereto.

**GULF STATES MARINE FISHERIES COMMISSION
P.O. Box 726
Ocean Springs, Mississippi 39564
(601) 875-5912**

ACKNOWLEDGMENT

In submitting this Thirty-Eighth 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 thirty-eight years could not have been possible without such valued assistance. This acknowledgment is also extended to the directorates and staffs of Federal, state, and interstate agencies, and to representatives of all organizations and individuals who have contributed toward the realization of the objectives of the GULF STATES MARINE FISHERIES COMMISSION.

Respectfully submitted,

Frank J. Patti, Chairman
Taylor F. Harper, Vice Chairman
Larry B. Simpson, Executive Director

Published August 1988

GULF STATES MARINE FISHERIES COMMISSION

Thirty-eighth Annual Report (1986-1987)

CONTENTS

Roster of the Gulf States Marine Fisheries Commission	1
Commission Officers Elected for Year 1986-1987.	2
Commission Activities October 1986 - September 1987	3
Meetings/Activities of Executive Director	5
Alabama Department of Conservation and Natural Resources.	7
Florida Department of Natural Resources	13
Louisiana Department of Wildlife and Fisheries.	19
Mississippi Department of Wildlife Conservation	26
Texas Parks and Wildlife Department	44
Gulf State-Federal Fisheries Management Board	47
Southeast Region - National Marine Fisheries Service.	49
Gulf of Mexico Fishery Management Council	63
1988 SEAMAP Marine Directory.	66
Financial Report for the Fiscal Year Ended September 30, 1986	86

Roster of the
GULF STATES MARINE FISHERIES COMMISSION

October 1, 1986 - September 30, 1987

Chairman: Frank J. Patti

Vice Chairman: Taylor F. Harper

COMMISSIONERS

(order of listing - Administrator, Legislator, Governor's appointee)

ALABAMA

James C. Martin, Commissioner
Alabama Department of Conservation
and Natural Resources
Montgomery, AL
Taylor F. Harper
State of Alabama
Grand Bay, AL
John Ray Nelson
Bon Secour Fisheries, Inc.
Bon Secour, AL

Frank J. Patti, Representative
State of Louisiana
Belle Chasse, LA
Leroy Kiffe
Tom Kiffe & Sons Boats
Lockport, LA

FLORIDA

Elton J. Gissendanner
Executive Director
Florida Department of Natural
Resources
Tallahassee, FL
Sam Mitchell, Representative
State of Florida
Chipley, FL
Clyde Richbourg
Pace, FL

MISSISSIPPI

Joe Stone, Executive Director
Mississippi Department of
Wildlife Conservation
Jackson, MS
Ted Millette, Representative
State of Mississippi
Pascagoula, MS
Holton D. Turnbough
WGUF Radio Station
Gulfport, MS

LOUISIANA

J. Burton Angelle
Executive Secretary
Louisiana Department of
Wildlife and Fisheries
Baton Rouge, LA

TEXAS

Charles D. Travis
Executive Director
Texas Parks and Wildlife
Austin, TX
H. Tati Santiesteban, Senator
State of Texas
El Paso, Texas
Leslie E. Casterline, Jr.
Fulton, TX

STAFF

Larry B. Simpson
Executive Director

Virginia K. Herring
Executive Assistant

Thomas M. Van Devender
SEAMAP Coordinator

Ron R. Lukens
D-J Program Coordinator

Lucia B. Hourihan
Publication Specialist

Eileen M. Benton
Administrative Assistant

Nancy K. Marcellus
MARFIN Secretary

COMMISSION OFFICERS ELECTED FOR
FISCAL YEAR 1986-1987

Chairman: Frank J. Patti succeeding Clyde Richbourg
Vice Chairman: Taylor F. Harper succeeding Frank J. Patti

COMMITTEES

Executive Committee Frank J. Patti, Chairman

Technical Coordinating Committee. J.Y. Christmas, Chairman

 SEAMAP Subcommittee. Walter Tatum, Chairman

 Crab Subcommittee. Phil Steele, Chairman

 Statistical Subcommittee Henry "Skip" Lazauski, Chairman

 Anadromous Fish Subcommittee Larry Nicholson, Chairman

 Spanish Mackerel Subcommittee. Roy Williams, Chairman

Industry Advisory Committee Jim Gilmore, Chairman

Recreational Fisheries Committee. Fred Deegen, Chairman

Law Enforcement Committee Jerald Waller, Chairman

Gulf State-Federal Fisheries
 Management Board I.B. "Buck" Byrd, Chairman

 Menhaden Advisory Committee. J.Y. Christmas, Chairman

COMMISSION ACTIVITIES

October 1, 1986 - September 30, 1987

As Charles Dickens wrote "It was the best of times, it was the worst of times." That may well characterize this year of Commission activities. The Commission, a state organization with regional focus and deeply involved with federal coordinating actions, was thrust into the middle of the Gulf of Mexico's response to two highly volatile issues -- red drum and Spanish mackerel.

In March of 1985 the Commission voted to begin a regional fisheries management plan (FMP) for red drum. The plan was needed to coordinate the Gulf States' actions to address the ever growing pressure on the inshore juvenile population and provide some management measures by coordinated state action for the offshore purse seine fishery outside state waters. In the absence of a federal FMP a state's authority over its vessels and citizens will apply in the Exclusive Economic Zone (EEZ) or federal waters out to 200 miles.

While in the process of organizing the FMP effort the Federal Government under National Marine Fisheries Service (NMFS) action implemented emergency regulations on red drum to restrict purse seining for red drum in the EEZ. The NMFS under the authority of the Secretary of Commerce began and implemented a Secretarial Plan for Red Drum at the end of 1986. The Gulf of Mexico Fishery Management Council (GMFMC) subsequently amended the Secretarial Plan to further restrict the harvest and future take of red drum in the offshore waters and recommended the Gulf States take measures to limit the harvest of juveniles in the waters under their authority and jurisdiction. Because of these federal actions the States' ability to affect the red drum harvest was limited to their internal and territorial waters. The Commission's activity was refocused to coordinating the needed and necessary research to obtain the data to effectively describe and manage this resource properly. To accomplish this the Commission brought together the red drum experts formulate a three-year research plan that would meet immediate and long-term information needs. The plan focused on two general areas, biological profiles and stock management. The resultant plan, the Commission's State-Federal Cooperative Research Program for Red Drum in the Gulf of Mexico was received and accepted by the Marine Fisheries Initiative (MARFIN) for funding as an appropriate programmatic research effort. Individual contributors from state agencies, universities, Sea Grant and the Federal Government were funded at approximately \$500,000 the first year.

A key function in this effort is the Commission's coordination accomplished through monthly Sciaenops newsletters and conferences for the presentation and exchange of information. The first conference was held at the October 1986 Commission meeting in New Orleans. While the program had just been recently funded, actual work had already begun because of the importance to the States and their anticipation of approval of these important projects.

Our formal Spanish mackerel efforts began in October of 1986 when the Commission decided to develop a Territorial Sea FMP to be provided to the States after approval for their action. This was decided after the GMFMC had initially recommended the States look into the feasibility and appropriateness of taking over the management of Spanish mackerel in the Gulf of Mexico due to the nature of the fishery and problems, rather than continue under the Council system. After an ad hoc committee of the Technical Coordinating

Committee examined the issue they recommended to the Commission that formal request should be made to begin the process of removing Spanish mackerel from the Council's Coastal Migratory Pelagics Plan in favor of interstate management by the Commission. This recommendation was modified to continue under the present federal management system but to develop a Territorial Sea FMP for future coordinated effort by the States and the Council. The Spanish Mackerel Subcommittee is in the process of formal plan development and hopes to complete its work in the spring of 1987.

The Commission has also continued to administer the Southeast Area Monitoring and Assessment Program (SEAMAP) for the Gulf States. A full-time coordinator and support staff is employed by the Commission in this effort. The program is a State/Federal/university effort for collection, management and dissemination of fishery-independent data and information in the U.S. Gulf of Mexico. SEAMAP is not a research program. Its purpose is to make fishery-independent data (information collected without direct reliance on statistics reported by commercial or recreational fishermen) and environmental data available to fishery managers, developers and researchers for the least possible cost. This is done by coordinating sampling platforms and joint regional planning for fishery survey activities that produce cost effective activities by sharing expensive vessel and personnel time directed at common objectives. Fishery stocks emphasized include those subject to cooperative State/Federal management, among them shrimp and groundfish; oceanic, coastal and estuarine pelagic fishes; menhaden and other coastal herrings; reef fishes; squid; butterfish and crabs.

The Commission shares the administration of the Marine Fisheries Initiative with the NMFS regional office. This program was developed under the auspices of the Commission as a result of analysis of funding for marine fisheries program compared regionally based on volume, value and importance to the Nation. The inadequate knowledge of basic life history, assessment information and market potentials as noted in a report by Congressman Trent Lott (R-MS) was the single most important factor limiting fisheries in the Gulf of Mexico from realizing their full potential. Both recreational and commercial research needs were noted as needed so these resources could be best maintained for presently exploited resources and more economically utilized and even developed in some cases.

Funding uncertainties and administrative requirements have made the program complex when coupled with pressing needs for information on red drum, turtle excluder devices and mackerel work.

The Commission feels that these programs are necessary and needed for proper information on which to base recommendations and actions both at the State and Federal levels. Consequently, the time and effort expended to manage and administer is ever increasing. These are good times but difficult and the Commission has met the challenge and progresses into the future as a tool the States have and should use in the area of region-wide interstate and State-Federal coordination.

The Executive Director

MEETINGS/ACTIVITIES OF THE EXECUTIVE DIRECTOR

Gulf States Marine Fisheries Commission (GSMFC)

37th Annual Fall Meeting, New Orleans, Louisiana - October 1986
37th Annual Spring Meeting, Biloxi, Mississippi - March 1987
Interjurisdictional Fisheries Program (IJP) Consultants, Ocean Springs, Mississippi -
January 1987
Meeting with Commissioner Kiffe regarding turtle excluder device, Lockport, Louisiana
- January 1987
SEAMAP Subcommittee Meeting, Austin, Texas - January 1987
Attended Texas House Subcommittee Meeting regarding funding, Austin, Texas - January
1987
Mackerel Research Coordination Meeting, Atlanta, Georgia - February 1987
SEAMAP Shrimp and Groundfish Workgroup Meeting, Ocean Springs, Mississippi - March
1987
Meeting with Dick Roe regarding Commission's role in the Interjurisdictional
Fisheries Program (IJP), Washington, DC - April 1987
Meeting with independent Technical Panel regarding Red Drum Aerial Survey,
Pascagoula, Mississippi - April 1987
Conference Call with Red Drum Workgroup, Ocean Springs, Mississippi - May 1987
Spanish Mackerel Subcommittee Meeting, Gulf Shores, Alabama - May 1987
Meeting with Commissioner Millette regarding Mississippi legislative Commission
member, Gautier, Mississippi - August 1987
SEAMAP Subcommittee Budget Meeting, Ocean Springs, Mississippi - September 1987

Gulf State-Federal Fisheries Management Board (GS-FFMB)

Marine Fisheries Advisory Committee (MAFAC) DOC, San Francisco, California - October
1986
GS-FFMB Meeting, New Orleans, Louisiana - October 1986
GS-FFMB Meeting, Biloxi, Mississippi - March 1987
Marine Fisheries Advisory Committee (MAFAC) DOC, Austin, Texas - February 1987
Marine Fisheries Advisory Committee (MAFAC) DOC, Baltimore, Maryland - June 1987

Congressional Meetings

Dinner with Congressman Lott regarding south Mississippi Congressional actions, Moss
Point, Mississippi - November 1986
House and Senate Staff Meetings regarding NMFS FY 88 Budget, Washington, DC - March
1987
House and Senate Appropriations Staff Meeting regarding Gulf fisheries programs,
Washington, DC - April 1987

Gulf of Mexico Fishery Management Council (GMFMC)

October 1986	St. Simons Island, South Carolina	Joint South Atlantic/Gulf
January 1987	Tampa, Florida	
March 1987	San Antonio, Texas	
April 1987	New Orleans, Louisiana	Red Drum Advisory Panel
April 1987	Mobile, Alabama	Red Drum Public Hearing
April 1987	New Orleans, Louisiana	
July 1987	Key West, Florida	
September 1987	Tampa, Florida	

Marine Fisheries Initiative (MARFIN) Program Management Board

Tampa, Florida - October 1986
Conference Call, Ocean Springs, Mississippi - January 1987
Turtle Excluder Device (TED) Workshop, New Orleans, Louisiana - February 1987
Tampa, Florida - May 1987
Tampa, Florida - July 1987
Biloxi, Mississippi - September 1987

Other Meetings and Activities

International Association of Fish and Wildlife Agencies Executive Committee Meeting
regarding D-J Funding, Washington, DC - December 1986
Concerned Shrimpers of Louisiana Meeting, Thibodeaux, Louisiana - March 1987
Meeting with U.S. Fish and Wildlife Service regarding Commission D-J funding,
Washington, DC - March 1987
Speech to Rotary Club of Moss Point regarding Red Drum Research, Moss Point,
Mississippi - April 1987
International Association of Fish and Wildlife Agencies Annual Meeting, Winston-
Salem, North Carolina - September 1987
Judge Pensacola Blessing of the Fleet, Pensacola, Florida - September 1987

ALABAMA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

MARINE RESOURCES DIVISION

The Marine Resources Division is responsible for management, production and enhancement of the State's marine fishery resources. The Division conducts fisheries research aimed at increasing and protecting fishery resources, increasing the accessibility of fishery stocks to resource users and providing protection of those resources through enforcement of laws and regulations promulgated by the Commissioner.

The Division contains the Administrative, Fisheries and Enforcement sections and had 40 full time employees during FY 1986-87.

ADMINISTRATIVE SECTION

The Administrative Section contained the Division Director, five clerical and two custodial-mechanical personnel, with offices maintained at Dauphin Island and Bayou La Batre (Mobile County) and Gulf Shores (Baldwin County).

FISHERIES SECTION

The Fisheries Section contained the Chief Marine Biologist, two Biologists IV, three Biologists II, two Biologist Aides I, two Biologist Aides II, three Biologist Aides III, one Laboratory Technician III, one full-time laborer and two biweekly laborers. The Section conducted applied marine fishery research, collected biological data from which management recommendations were made and provided supervision and recommendations on the maintenance and construction of public access areas and artificial reefs. The hatchery facility at Gulf Shores produced striped bass, redbfish and speckled trout fingerlings for stocking in the estuarine area.

Fisheries Research and Development

During the period October 1, 1986 through September 30, 1987, work was performed to assess and monitor the marine resources of Alabama. Twenty-eight stations throughout Alabama's estuarine area were sampled monthly to determine size and relative abundance of shrimp, crabs and finfish. Oyster reefs were assessed using SCUBA divers to determine oyster density in Alabama's reefs. Supplemental samples were taken when needed to address special problems.

Postlarval brown shrimp began to appear in samples in February 1987. Juvenile brown shrimp numbers during the spring of 1987 indicated that the potential harvest during the summer of 1987 would be average. A growth curve for the brown shrimp was generated in May and predicted that shrimp would reach legal size in early June.

White shrimp appeared in samples in July 1987. Numbers of white shrimp indicated that the potential harvest in the fall would be about average compared to other years. Landings thus far have supported this prediction as well as that for brown shrimp.

Average numbers of blue crabs were taken in samples throughout the year. While less than last year, the number was adequate to maintain the fishery.

The average production witnessed this year was probably due to the water conditions. Although salinities were well within acceptable ranges, the water temperature was several degrees below normal throughout the year.

Among targeted finfish in the assessment and monitoring program, the catch per unit effort (CPUE) totals of Gulf menhaden, sand seatrout, spot, Atlantic croaker and striped mullet all exceeded those of 1986. The year classes of southern flounder, spotted seatrout and red drum were smaller than in 1986.

Dive samplings of Alabama oyster reefs indicated Cedar Point reef was the only producing oyster reef in 1987. A combination of Hurricane Elena two years ago and oyster drill predation over the past two summers decimated Buoy and King's Bayou reefs. Cedar Point had a low concentration of harvestable size oysters, but there was an increase in illegal size (less than three inches) oysters from 1986. The final funds appropriated for shell planting were expended in June 1987. A total of \$246,213 purchased 22,588.35 cubic yards of shell. This shell was planted on the northeastern area of Cedar Point reef in Mobile Bay.

From October 1, 1986 to September 30, 1987, a total of 2,718 recreational anglers were interviewed. Alabama marine anglers fished an estimated 661,400 hours, landing 401,800 fish weighing 350,200 pounds. Marine recreational anglers, during 225,200 fishing trips, spent an estimated \$1,760,000 on trip costs (gas, food, bait and lodging). During this year of the survey, an estimated \$23,000,000 was spent on durable goods, such as rods, reels, boats and motors. Fish length information was collected on red drum, Spanish mackerel, king mackerel, flounder, speckled trout and red snapper. All figures are to be considered minimally estimated as night fishing and charterboat information was not included.

Cooperative State/Federal Statistical Program

Two port samplers from the Marine Resources Division and one from the National Marine Fisheries Service made routine visits to all seafood processors/dealers in Alabama to gather seafood landings statistics. These data are tabulated and forwarded to the Gulf Shores office where they are entered into an "Alabama Landings" data file for storage and manipulation. This project additionally provides for the collection of biological data from certain fishery stocks (i.e., king mackerel, red snapper and mullet) from which crucial management data may be obtained.

Perdido Bay Study

A special project to monitor the biological health of the Perdido Bay system was initiated in April 1987. Residents of the area were afraid increased pollution levels may have damaged the bay. The samples from the area showed that Perdido Bay was in good biological shape, but the dissolved oxygen levels in one of its tributaries, Eleven Mile Creek, Florida, were chronically low.

State/Federal Cooperative SEAMAP

The SEAMAP program (Southeast Area Monitoring and Assessment Program) is a cooperative state/federal program which emphasizes a regional approach in the planning and execution of resource surveys in the Gulf of Mexico and its estuaries. Alabama participated in all SEAMAP-sponsored resource surveys including: (a) squid/butterfish cruise, (b) summer shrimp/groundfish survey, (c) late summer king mackerel ichthyoplankton survey, (d) fall groundfish survey and (e) fall juvenile king mackerel survey. The SEAMAP

program was the nucleus for the formation of the MARFIN program's research. The Marine Resources Division Fisheries Chief served as the Chairman of the SEAMAP subcommittee and two of its biologists were active members of work groups under the subcommittee.

MARFIN Projects

Several special projects were conducted under the federal MARFIN funding program. Data were collected on king mackerel and Spanish mackerel to develop catch statistics and length/age relationships. Data were collected on mullet to aid in age validation, obtain catch per unit effort information, investigate stock identification and evaluate the socio-economic impacts of the fishery. In addition, data were collected for red drum to assist in age validation and determine changes in age composition of offshore and inshore fisheries. More than 20,000 red drum were raised, tagged and released to obtain data on movement, recruitment to the offshore fishery, verification of aging techniques, estimate fishing mortality and estimate inshore and offshore harvest.

Weeks Bay National Estuarine Reserve

Marine Resources Division personnel managed the Weeks Bay National Estuarine Reserve. Work was conducted throughout the year to assess and monitor the animals living within the estuary. More than 10,000 shrimp were tagged and released to study movement of shrimp within and out of the estuary. A number of activities were begun to develop the reserve for educational opportunities. Plans continue for the development of nature trails around the reserve and several projects were funded to investigate the terrestrial animals and the hydrology of the estuary.

Data from all projects are being entered into computers at the Gulf Shores office of the Marine Resources Division and is available as reference for further work.

Wallop-Breaux (Expanded Dingell-Johnson)

During Fiscal Year 1986-87, the Marine Resources Division received \$266,510 of the expanded Dingell-Johnson or Wallop-Breaux funds for sportfish restoration projects in coastal Alabama. These funds were made available by a clause in the federal enabling act which required an equitable split between marine and freshwater management agencies. The Marine Resources Division developed, submitted and had approved two Wallop-Breaux projects for Fiscal Year 1986-87:

F-45, "The Enhancement of Recreational Fishery and Boating Access in Coastal Alabama." This project was designed to refine culture techniques for spotted seatrout, Cynoscion nebulosus, with an ultimate goal of spawning, rearing, tagging and releasing 20,000 tagged individuals. The second goal of this project was to develop a viable maintenance and renovation program for boat access areas in the coastal areas.

During FY 86-87 a total of 13,649 fingerlings were harvested and 9,328 tagged and released. The total number of tagged fish released was lower than the target due to extended periods of rainfall which dramatically lowered salinities. Overall survival during phase 1 culture was approximately one-third of that experienced in FY 85-86.

F-47, "The Installation of Impermeable Membranes Comprised of High Density Polyethylene into Production Ponds at Claude Peteet Mariculture Center." Seepage from culture ponds at the Division's Claude Peteet Mariculture Center, Gulf Shores, had become so severe over the past few years that almost constant pumping was required during the production season. Additionally, the possibility of contaminating shallow aquifers in the

immediate area with salt water forced the Division to take immediate steps to control the seepage. After a thorough review of available seepage control products and their compatibility with fish cultural operations, a 60-mil, high density polyethylene liner was selected. A three year capital outlay project for pond liner installation was submitted to the U.S. Fish and Wildlife Service. A unique feature of the Wallop-Breaux Act enabled the use of federal funds for capital outlay projects utilizing an installment purchase. This approach was used in the pond liner installation, enabling up to 75% of the project costs to be borne by Wallop-Breaux funds. During FY 86-87, the second payment was received.

Anadromous Fish Act PL 89-304

Project Number AFS-23-2 is a cooperative project between the states of Alabama and Mississippi and is jointly funded by the U.S. Fish and Wildlife Service and the states on a 66 2/3 to 33 1/3 match, respectively. The cooperative project utilized facilities at the Gulf Coast Research Laboratory (GCRL), Ocean Springs, Mississippi, to culture Phase I striped bass, after which the facilities at Claude Peteet Mariculture Center (CPMC), Gulf Shores, Alabama, were utilized to culture advanced striped bass fingerlings. Personnel from the two states then worked together in the harvest, tagging and release of the cultured fish.

In October 1986, a total of 12,257 striped bass were harvested and tagged with 6,058 going to Alabama and 6,199 going to Mississippi. Twelve ponds at the CPMC were stocked with approximately 63,000 Phase I fingerlings on June 10-11, 1986. Out of these stockings 32,578 sub-adult striped bass were tagged and released from the CPMC. Under this joint Alabama/Mississippi restoration project, 14,885 tagged fish were released in Alabama and 17,693 in Mississippi coastal waters. Release points in Alabama were: Dog River at Dauphin Island Parkway; Intracoastal Waterway at Oyster Bay and Gulf Shores; and Perdido Bay at Lillian. In Mississippi, fish were released in the Escatawpa River at Shingle Mill Landing and at Popp's Ferry.

Approximately 6,000 smaller striped bass were retained in ponds at the CPMC. The fish will be tagged and released in the spring of 1988.

During the 1986-87 fiscal year, the Marine Resources Division received 68 reports of tagged striped bass caught by area sport fishermen.

Environmental

Marine Resources Division personnel investigated 34 U.S. Army Corps of Engineers permit requests for construction in the coastal area for Departmental comments. Marine Resources Division personnel met with an inter-agency group comprised of representatives from the Environmental Protection Agency, Corps of Engineers, Alabama Department of Environmental Management, U.S. Fish and Wildlife Service and National Marine Fisheries Service at bi-monthly intervals during Fiscal Year 1986-87. Division staff met with applicants on site when possible and revisited sites on numerous occasions with other commenting agencies and attended public hearings and briefings.

Marine Resources Division staff participated in an Environmental Day Camp established at Gulf State Park. All Division biologists presented both a seminar and a field demonstration on sampling techniques. Division biologists also participated in numerous presentations to students and teachers in Mobile and Baldwin counties throughout the year.

ENFORCEMENT SECTION

The Enforcement Section contains 14 conservation enforcement officers, eight in Mobile County and six in Baldwin County. Officers patrolled the approximately 800 square miles of Alabama's brackish and salt waters, enforcing state laws pertaining primarily to seafood protection. In addition, the officers conducted numerous search and rescue operations for overdue or disabled vessels and assisted various governmental and volunteer agencies with seafood festivals, fishing rodeos and sailboat races.

Marine Resources Division officers worked a total of 25,240 boat and shore patrol hours. Officers worked 154 hours on search and rescue missions and 2,225 hours patrolling the beach and dune areas of Dauphin Island. There were 539 citations issued for violations of Marine Resources laws and regulations with illegal shrimp activities the major violation (40%) followed by illegal oystering (17%). There were an additional 223 citations issued for violations of water safety and game and fish laws and regulations.

Marine Fish Kills

A total of five fish kills was investigated by Marine Resources Division biologists during the fiscal year. Two of the kills which occurred in the winter were due to extremely low water temperature. The other three were due to low oxygen conditions.

Marine Fish Kills FY 1986

<u>Location</u>	<u>County</u>	<u>Date</u>	<u>Total Killed</u>	<u>Species</u>
Bon Secour River	Baldwin	1/24/87	50	White Mullet
Mobile Bay	Baldwin	1/27/87	383	White Mullet Gulf Menhaden
Oyster Bay	Baldwin	5/25/87	25,000	Gulf Menhaden
Oyster Bay	Baldwin	6/18/87	924,000	Gulf Menhaden
Bon Secour River	Baldwin	8/3/87	<u>340,000</u>	Gulf Menhaden
		Total	1,289,433	

COMMERCIAL FISHERIES LANDINGS

Commercial landings during 1986 totaled 36,690,000 pounds valued at \$64.0 million, an increase of 23% in volume and an increase of 63% in value compared to 1985. Shrimp landings were 22,716,000 pounds valued at \$55.7 million dockside accounting for 62% and 87% of the 1986 volume and value, respectively. Shrimp prices were up considerably from 1985, resulting in \$21.3 million increase in value even though the volume increased only 2.3 million pounds. Oyster landings during 1986 were down from 1985. A total of 946,000 pounds of meats valued at \$1,564,000 was reported, a 34% decrease in volume and 14% decrease in value over 1985. Finfish landings were about equal to 1985 at 10,091,000 pounds at a value of \$5,740,000.

PUBLICATIONS

Marine Resources Division personnel authored the following articles or reports during FY 86:

Heath, Stevens R., "A Fair Chance," Alabama Conservation Magazine, Jan/Feb 1987: p. 18.

Heath, Stevens R. and Mark Van Hoose. 1987. Alabama coastal fishery resources assessment and monitoring. Completion Report 2-421-R. Alabama Department of Conservation and Natural Resources Mimeo File Report.

Minton, R.V. 1987. Spawning methodology for spotted seatrout (Cynoscion nebulosus), presented at the 117th American Fisheries Society meeting Sept. 1987, Winston-Salem, NC.

Minton, R.V. 1987. Production of tagged spotted seatrout (Cynoscion nebulosus) for release into coastal Alabama. 41st Annual Conference Southeastern Association of Fish and Wildlife Agencies, October 4-7, 1987, Mobile, AL.

Van Hoose, Mark. 1987. Early life habitat preference of spotted seatrout and red drum in Alabama. Proceedings of the Symposium on the Natural Resources of the Mobile Bay estuary. (ed. Tony A. Lowery). pp. 26-37.

FLORIDA DEPARTMENT OF NATURAL RESOURCES

DIVISION OF MARINE RESOURCES

BUREAU OF MARINE RESEARCH

Advisory and research assistance was provided to various Federal, State and local agencies by biologists of the Florida Department of Natural Resources, Bureau of Marine Research in 1987. They also reviewed and commented on Gulf of Mexico and South Atlantic fisheries management plans by supplying research data and critiques. They were active participants in workshops on marine fisheries that were conducted by the Florida Marine Fisheries Commission and the National Marine Fisheries Service. Programs initiated in 1986 were continued and numerous manuscripts were published or in review in 1987.

FINFISH

Red drum were tagged and released in several estuarine systems in 1987: Apalachicola Bay, 805 fish; Tampa Bay, 794; Charlotte Harbor, 396; in the upper Indian River/Mosquito Lagoon, 169; and in the Marco Island area, 186 red drum. In offshore waters, 505 red drum (15-25 pounds) were tagged and released off St. Joseph Point.

Otoliths and gonads of 4,821 spotted seatrout were processed and analysis begun. More than 7,500 measures of length, weight and sex were recorded. Preliminary analysis of these data should be completed in 1988.

Nearly 18,000 black mullet were tagged and released in the Pensacola, St. Joe/ Apalachicola, Tampa Bay and Charlotte Harbor estuarine systems. Mullet were collected for age analysis, reproductive studies and genetic identification of stocks. Fishery independent studies of ichthyoplankton, juvenile abundance and hydroacoustic survey were also conducted.

In the 1970's and 80's, king mackerel length-frequency data was collected from the commercial fishery (approximately 95,000 measurements) and more than 14,000 fish were tagged. This large data base is being analyzed for publication and for more accurate assessment of this valuable resource.

Annual tagging of snook in the Naples/Marco Island area was continued in June and July 1987. A total of 1,047 snook were captured, 928 new tags were introduced into the population and 60 of the 1987 tags were recaptured. Nineteen reproductively active fish were provided to Rosenstiel School of Marine and Atmospheric Sciences and the Florida Department of Natural Resources hatcheries. Using the Petersen method, the population estimate of snook for the year was 8,539 (95% confidence interval; 6,661-10,943).

Florida's 1987 participation in the Southeast Area Monitoring and Assessment Program (SEAMAP) included:

1. Planning and execution of two ichthyoplankton collection cruises in May and September, which comprised a total of 65 stations occupied over the West Florida Shelf. Sampling included measurements of chlorophyll concentrations and neuston and bongo trawling at each station, along with the collection of pertinent hydrographic information.

2. Curation and maintenance of the SEAMAP Ichthyoplankton Archiving Center. Current holdings include approximately 29,000 lots of larval fishes collected from throughout the Gulf of Mexico in 1982 through 1984. Specimens collected in 1985 through 1987 are currently being incorporated into the collection.

INVERTEBRATES

Hard clam research in the Indian River Lagoon continued, with an effort to determine the seasonal pattern of recruitment in the primary spawning area. Distribution, age, growth and genetic sampling was completed and data analysis is underway.

Field sampling to compare population structure and life history strategies of two stone crab species and hybrids was completed in the northwest Florida hybrid zone. Proceedings of a symposium on stone crab biology and management are in preparation. Laboratory studies of reproductive success and larval physiological responses to salinity/temperature/time variations are in progress.

Data from blue crab field studies 1980-85 are being analyzed and written. Four reports are in preparation. Field sampling was initiated to determine if coastal waters near Apalachicola Bay, Florida, are primary spawning grounds for blue crabs. Electrophoretic analyses for genetic variations in the Apalachicola Bay stock are in progress. Preliminary work on development of a Gulf blue crab management plan was begun under the auspices of GSMFC.

Investigations of escape gap design and comparative bait assessments for spiny lobster were completed, as work continued on studies of migration and morphometrics. A year of field sampling to investigate population dynamics, offshore recruitment and comparative population assessment techniques at Looe Key National Marine Sanctuary was completed. More than 300 den sites were observed and tracked on a bi-weekly basis.

A project to assess existing stocks of queen conch and evaluate the feasibility of stock enhancement with hatchery-reared juveniles neared completion of its first year. More than 544 hectares of sea floor were surveyed by towed divers, using a randomized sampling program stratified by season and habitat. These data are currently being analyzed. Wild-caught juvenile queen conch were reared in a large-scale raceway system and laboratory rearing of juvenile conch from the egg was attempted. Tag-recapture studies provided data for analysis of growth and mortality in both laboratory and wild populations.

HABITAT

The Bureau of Marine Research has continued to assess coastal and estuarine fisheries habitat changes, under contract with the Florida Department of Environmental Regulation. Areal fisheries habitat component loss, e.g., mangroves, seagrasses, saltmarshes, mud flats and oyster reefs, have been documented through time series evaluation of aerial photographs, satellite imagery and maps for portions of Charlotte Harbor, Tampa Bay, Indian River, Loxahatchee River, northeast Florida, the Big Bend area, Ponce Inlet and the Florida Keys. Quantification techniques to establish the relationship of habitat to fisheries will be tested in order to define carrying capacity of wetlands. Completed reports are published, or ready for publication. Initial fisheries habitat mapping is completed for the entire state.

Numerous studies looking at physiological, physical and environmental relationships in marine habitats are also being conducted. This includes a habitat restoration research

program to plant marsh vegetation, mangroves and seagrasses for evaluation of planting techniques, colonization and habitat utilization.

Other habitat studies are also in progress. A seagrass stress study to evaluate the effect of sediment sulfide on seagrass die-back and the define metabolic stress indices is in its second year; various techniques have been developed to utilize both field and laboratory conditions for study. In cooperation with HRS, mosquito impoundment sites have been sampled in order to recommend management plans to improve water quality and prevent sulfide-associated fish kills. Field work on another cooperative study to survey the present condition of restoration/mitigation sites was concluded. Among the insights gained are (1) unvegetated sites can be vegetated if appropriate elevations and slope are selected for the species of interest, (2) present recommendations for planting density are probably too low for healthy establishment and (3) follow-up management to ensure compliance is lacking. Other studies concerning the reproductive biology of seagrasses, non-destructive propagation using tissue culture techniques and the requirements of seedling development are ongoing.

A Marine Resource Geographic Information System (MRGIS) was established for habitat managers and researchers. MRGIS houses habitat data and other ancillary data.

PLANKTON

Continuing studies of toxic dinoflagellates include identification of species in culture, evaluation of shape/size analyses as a taxonomic tool and maintenance of cultures of toxic or potentially toxic species from state, national and international sites. Major culture facility renovations are in progress so that life history studies can proceed.

Blooms of Ptychodiscus brevis red tide affected the Florida southwest coast from September 1986 through March 1987, from May through July 1987 and from August to October 1987. Bivalve shellfish harvesting areas were closed and reopened as necessary. North Carolina experienced its first toxic P. brevis red tide in late 1987. Bureau of Marine Research personnel provided assistance and information to North Carolina natural resource personnel on request.

ENDANGERED SPECIES

The green sea turtle headstart program, utilizing improved facilities, began an assessment of sex ratios of green turtles produced by Florida's population recovery project in Jensen Beach. The assessment was initiated in response to concerns that some hatchery practices may bias sex ratios of sea turtles reared in headstart programs. Approximately 500 turtles are being held for sex determination via blood testosterone levels.

The West Indian manatee recovery program amended two manatee protection zones to reduce mortalities associated with boat kills. In 1987, 18 manatees were tagged in cooperation with the U.S. Fish and Wildlife Service. Manatee mortalities totaled 113 in 1987, 39 of which were due to boat/barge collisions, 5 were crushed/drowned in flood gates or canal locks, other human-related deaths totaled 2, 30 were perinatal deaths, 16 were other natural and 21 deaths were of undetermined causes. Brevard, Duval, Collier and Lee counties led the list of deaths; boat-related deaths were highest in Brevard, Collier, Broward, Duval, Dade and Lee counties.

Manatee abundance and distribution were assessed by aerial census at several selected sites. The Florida Marine Patrol made 187 arrests for various manatee-related violations. Manatee protection planning activities were accelerated and boating study methodologies are being finalized.

FISHERIES STATISTICS

The commercial fisheries statistics cooperative effort with the National Marine Fisheries Service continued. The Marine Fisheries Trip Ticket program currently has approximately 650 dealers reporting 30,000 to 40,000 fishing trips per month. The program provides catch and effort data on all state fisheries and real time effects of management decisions. Fisheries independent sampling methods for multispecies complexes are being evaluated over a three-year period. Procedures must eventually produce quantitative measures of juvenile and pre-fishery abundance, food webs and habitat preferences. Synoptic fisheries independent sampling of Tampa Bay will begin in the summer of 1988. Recreational fishing sites have been inventoried and weighted by activity and facilities during the past two years. The data are the basis for future surveys on recreational fishing and boat traffic and their effects on endangered marine species, as well as planning of state recreational facilities.

BUREAU OF MARINE RESOURCE REGULATION AND DEVELOPMENT

The primary responsibilities of the Bureau include the classification and monitoring of shellfish growing waters and the inspection of shellfish and blue crab processing plants to insure that shellfish and blue crabs are processed in a sanitary manner. Other programs include oyster reef construction and oyster transplanting, shellfish leasing and artificial reef construction.

More than 20,238 shellfish growing water samples were tested for fecal coliform contamination to monitor Florida's shellfish harvesting areas. Ten environmental specialists routinely monitor all approved, conditionally approved, restricted and prohibited areas. In addition to routine water monitoring, personnel are responsible for red tide sampling and comprehensive shellfish area surveys or reappraisals.

The Processing Plant Inspection Program is staffed by five environmental health specialists responsible for ensuring that oyster, clam and blue crab processing plants throughout Florida maintain strict adherence to sanitary standards. As of January 1988, a total of 217 shellfish processing plants and 46 blue crab processing plants were certified.

Approximately 2,080 acres of State-owned submerged lands are currently being leased for shellfish propagation. Leases located in the Indian River were used intensively during 1985 and 1986 to relay hard clams from closed areas to leases in open waters. This significantly increased hard clam landings. Many of these leases are now being used to grow out hatchery-reared hard clams.

The Artificial Reef Program, which provides funds to local governments to help defray the costs of constructing an artificial fishing reef, was enhanced by receipt of Wallop-Breaux funds from the U.S. Fish and Wildlife Service. Nineteen projects were funded during 1987 and proposals for 24 new projects were received for review.

Nine staff members are assigned to the Oyster Culture Program and are responsible for the construction of artificial oyster reefs to enhance the production of oysters in

selected areas around the state. Shucked oyster shells are collected from oyster shucking establishments, stockpiled and "cured" before being used as cultch for the "planting" of these reefs. In addition to this ongoing program, the State of Florida received a \$1,570,000 grant to reconstruct Apalachicola Bay oyster reefs damaged during Hurricane Elena. During 1986, \$918,000 were spent to plant 56,470 cubic yards of clam shell which rehabilitated approximately 230 acres of oyster reef. The remainder of the grant was expended during the spring of 1987 to plant 39,760 cubic yards of clam shell which rehabilitated approximately 150 acres of oyster reef.

Legislative appropriations for relaying seed oysters and rehabilitating oyster reefs totaled \$300,000 during fiscal year 1987-88. Funds were committed to programs in the following Florida counties: Bay County received \$64,000; Wakulla County \$47,500; Levy County \$47,500; St. Johns County \$25,000; Santa Rosa County \$47,500; Dixie County \$21,000; and Franklin County \$47,500. Funds were administered through contracts between the Department of Natural Resources and local fishermen's associations. Programs were supervised by representatives of the Division of Marine Resources.

Depuration is a process whereby bacteria-free water is circulated through shellfish harvested from polluted areas. After a minimum of 48 hours, the process will render shellfish safe for human consumption. Ultraviolet radiation is used to kill bacteria and viruses which are purged by the contaminated shellfish. Six depuration plants are currently licensed by the Department.

BUREAU OF MARKETING AND EXTENSION SERVICES

The seafood industry today plays an important role in Florida's economy and the Florida Department of Natural Resources. The Bureau of Marketing and Extension Services is a vital factor in its continuous growth. The Bureau's prime function is to spearhead the State's seafood marketing activities, not only in Florida, but in existing and potential markets both foreign and domestic. With headquarters in Tallahassee, the Bureau consists of five offices located in Florida and Georgia.

The market potential for Florida seafood continues to grow. Problems known to be limiting the growth of domestic fisheries centers around production of traditional species. While allocation of the resource is a common concern affecting the consumer supply, the Bureau's attention will be focused on the production of less known fisheries and the utilization of by-products. The underutilized species will continue to receive product education and enhancements within the scope of extension efforts while utilization of by-products and less desirable food fish will be set forth in the economics development component.

Several new fisheries will be given study including work with coastal herring and deep water marine eel. A major work effort will be directed to the Rex eel. Coordinated plans are underway with the University of Florida Sea Grant staff to stay current with research development to expand production and test markets of oriental and European origin. Product forms and speciality processing such as smoking may open up markets both domestic and internationally.

In addition to marine products, the Bureau will attempt to seek funding support for aquacultural products such as catfish, crawfish, alligator, fresh water eel and tilapia. These products have the potential to greatly enhance the critical shortage of fish products currently demanded in the market place. An aquacultural development tracking report will be completed in 1988 and updated each year for information and market development purposes.

The U.S.'s competitive position on the international front appears favorable for increased efforts to expand exports. Coordinations of Florida's program will be improved by closer liaison with the Florida Department of Commerce's Division of International Trade and Economic Development.

The international marketing expansion work will also provide closer liaison with the U.S. Department of Commerce, International Trade Administration, U.S. and Foreign Commercial Service offices in Florida and in export trading companies in Atlanta, Georgia to improve trade opportunities. Special industry tours will be planned to introduce product to export trading companies located in the Southeast. International Food Shows and Exhibits along with Florida Trade Missions will also be coordinated with the Gulf and South Atlantic Fisheries Development Foundation and the Florida Department of Commerce.

Domestic Market Expansion will be centered around the combined efforts of the Bureau, Southeastern Fisheries Association, Florida Sea Grant, Florida Department of Agriculture and Consumer Services and other groups to formulate a quality certification program. A fish and seafood component is being considered with the aid of industry representatives and Florida Sea Grant personnel, to establish a quality certification promotion for all Florida products.

The Bureau now maintains a growing library of video tapes to tell the Florida seafood story. The tapes can be used at seafood retail counters as point of sale information and other tapes offering information on capture, handling, processing and food demonstrations are available.

With the placement of a new position in Gainesville, seafood nutritionist specialist, the Bureau will provide technical guidance and nutrition research and findings to further promote the benefits of Florida seafood. This program will be in association with the seafood technology program in the Food Science and Human Nutrition Department at the University of Florida, IFAS. The focus of this program will be in the areas of nutrition labeling for the seafood industry, a nutritional newsletter, seafood extension presentations, recipe development, seafood nutrition computerized database and professional development.

A new photographic component of the Bureau will provide graphic support for all phases of the program. The primary medium will be still photography of the industry to serve the interest of food service, retail and consumer education. Video presentations will be added as grant funds become available on a contractual basis.

Future plans for service in the institutional area is scheduled to be directed through improved cooperation with the Florida Restaurant's Association and related groups in food service. The past efforts of the Bureau have been related to food competition with professional chefs. The Bureau will continue this approach and further expands efforts to reach food distributors, food and beverage managers and owners to maximize service and information about seafood.

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES
OFFICE OF COASTAL AND MARINE RESOURCES

The Office of Coastal and Marine Resources is the office within the Department of Wildlife and Fisheries charged with managing and regulating Louisiana's marine and estuarine fisheries resources within the framework and policy established by the Louisiana Legislature. The activities of the Office are organized into six major subprograms: Administration, Shrimp Management, Oyster Management, Finfish Management, Research and Environmental Protection and Regulation.

ADMINISTRATIVE SUBPROGRAM

This subprogram administers and issues permits for various special activities. During 1987, 114 Scientific Collecting permits were issued to scientists to collect marine and estuarine fish and invertebrates for research and education; 29 Special Bait Shrimp permits were issued to bait dealers wishing to harvest live shrimp between the spring and fall inshore shrimp seasons; 18 Pompano permits and no Experimental Fishery Permits were issued. The 1987 Legislature authorized the issuance of up to ten permits for mariculture operations.

SHRIMP MANAGEMENT SUBPROGRAM

Since the late 1950s, the Department has maintained recorders along coastal Louisiana which are mounted on platforms in the wetlands. Parameters measured include wind, tide, salinity and water temperature. Recorder measurements are made approximately once each hour. These data are augmented by rainfall, river discharge and air temperature information provided by the U.S. Corps of Engineers and NOAA. For over 25 years these data have been used in the annual prediction of the relative success of the brown shrimp harvest. Within recent years, these data, particularly salinity and water temperature, are being used for assessing oyster and menhaden production.

The use of hydrological parameters enables the Department to determine the suitability of environmental conditions for a particular species. The 1987 brown shrimp season demonstrated the importance of these parameters in assessing the forthcoming harvest. Although severe cold fronts impacted the coast during late March and early April of 1987 and very few juvenile brown shrimp were found in the bays, salinities remained favorable for shrimp, and water temperature after April 11 warmed to above 20C. The resulting brown shrimp harvest was one of the higher harvest years in Louisiana.

In addition to the predictive value of these data, the long term data base is used to determine, after the fact, causes of events which impact fisheries.

It has only been within the last few years that the Department has had the means to carry out offshore biological and environmental studies. The confinement of sampling to only inshore areas has been a problem as only conditions during a segment of the life history of many of Louisiana's important recreational and commercial species could be studied and assessed. The coupling of inshore with offshore data enables the Department to better understand and manage the marine resources by providing biological and

environmental data throughout the life history of many species. Extensive offshore data are obtained from the LOOP, DOE and SEAMAP projects.

OYSTER MANAGEMENT SUBPROGRAM

Salinity is the prime factor determining oyster production on Louisiana's public oyster seed grounds and reservations. Low rainfall and/or low river discharge during 1985, 1986 and 1987 were responsible for extremely high salinities throughout the coastal area. As a result, unfavorable salinity conditions existed over those portions of the public grounds which typically produce the bulk of the public seed oyster and market oyster crop. However, in some typically unproductive areas, the higher than normal salinities resulted in unusually high levels of production.

In the usually productive areas, specifically east of the Mississippi River in Plaquemines Parish, oyster density sampling in 1986 and 1987 indicated the availability of seed oysters on only 2,000 of the 13,000 acres of reef. It is projected that the 1987-88 seed production from this area will be less than 50,000 barrels, representing a decrease of 50% from the average of the previous four seasons. Likewise, market oyster production from this area for 1987-88 is predicted to be only 32,000 sacks -- a decrease of 85%.

In the Atchafalaya-Vermilion Bay area, which is a typically unproductive portion of the public grounds due to the overwhelming influence of the Atchafalaya River, oyster production increased dramatically in response to the drought conditions and the higher than normal salinities. This portion of the public grounds, from which essentially no production was recorded from 1979 through 1985, is predicted to produce 100,000 barrels of seed and 250,000 sacks of market oysters during the 1987-88 season. The high levels of production from the Atchafalaya-Vermilion Bay area, however, will not completely offset the decline in production east of the Mississippi. For these reasons, overall production from the public oyster seed grounds and reservations for the 1987-88 season will be poor.

There are several activities associated with either Health Department closures or the other efforts associated with health aspects of harvesting of shellfish, particularly oysters. A "Conditionally Managed Area" was created in the Calcasieu Lake system. This was critical since the area would not have been opened to oyster harvesting due to water quality. The factor causing the water quality deterioration had to be isolated, and a management plan for safe harvesting developed around that condition. A rather lengthy management plan had to be formulated and presented to the Federal Food and Drug Administration for final acceptance. This resulted in the safe harvest of approximately 40,000 sacks of oysters that otherwise would not have been allowed to enter commerce. The commercial value of this to the fishermen who have been receiving an average of \$16.00 a sack was about \$640,000 at dockside. Another conditionally managed area was created at "Sandy Point", Plaquemines Parish. This was also an area that was closed; our efforts resulted in the safe harvesting of several thousand sacks of oysters. In both cases the subprogram provided the motivation and technical knowledge to place these two areas into production.

FINFISH MANAGEMENT SUBPROGRAM

Redfish and Speckled Trout

A milestone in management of finfish was realized during the 1987 regular session of the Louisiana Legislature. A package of recommendations was developed regarding spotted seatrout and red drum. These recommendations were designed to reduce harvest of those

fish from Louisiana waters. Cooperative efforts between Department personnel, Louisiana State University CFI personnel, NMFS, GSMFC, SEFC, and GMFMC provided data indicating that overfishing has and is occurring in Louisiana waters. Because of this, offshore spawning stocks have declined to potentially dangerous levels. In order to restore those stocks, escapement from inshore waters must increase.

Recommendations to initiate a quota on commercial fishermen, adopt minimum mesh sizes, increase minimum sizes and prevent filleting at sea were approved by the Legislature. Recreational fishermen were also affected by the filleting prohibition and adoption of minimum size. Recommendations to reduce the creel limit and suggested sizes were not implemented. With compliance, these management techniques should enhance the finfish stocks in Louisiana and offshore waters.

Menhaden

In addition to opening and closing the shrimp seasons, information from the trawl samples is used each year to develop a forecast for menhaden production. Meetings are held every year with menhaden industry personnel prior to the opening of the menhaden season to present catch forecasts and to discuss other matters relative to the menhaden industry. This year's meeting was held on February 24 and 25, 1987 at the Wildlife and Fisheries Marine Lab at Grand Isle.

Models for predicting commercial catches of gulf menhaden have been developed by department biologists. These predictive models are based on abundance of juvenile menhaden taken in the shrimp monitoring trawl samples the previous year and on hydrological and climatological data such as salinity, temperature, river discharge, wind direction, and tides, also from the previous year. Catch-per-effort of age-1 menhaden is predicted. Since age-1 menhaden comprise 90% and 67% of the catch in western and central Louisiana, respectively, the age-1 forecast also reflects on total catch.

In addition, optimum hydrological/climatological conditions have been identified for the critical early life history stages, which occur from December to March. Relatively cold, dry winters are associated with good recruitment of age-1 menhaden into the fishery the following year. The cold, dry winter is characterized not only by low temperatures and low rainfall but also by low tide levels, low Mississippi River discharge, high salinity, low wind speeds and low incidence of southwest winds.

The 1987 forecast was for an average age-1 year class and an overall below average catch. The 1987 menhaden landings in the Gulf of Mexico were approximately 5% greater than in 1986, but slightly less than the five year average (1982-86). However, the last five years have been above average when compared to historic landings.

Artificial Reefs

The Louisiana Artificial Reef Initiative, comprised of state, federal, university, recreational, commercial fishery and private industry interests was formed in 1985 to promote the "rigs to reefs" (i.e. the use of abandoned offshore oil platforms as artificial reefs) movement in the Gulf of Mexico off the Louisiana coast and to develop an artificial reef program in Louisiana. It has been reported that 350 structures have already been removed from Louisiana's coastline, and estimated that, by the year 2000, 40% (1,625) of the oil and gas structures in the Gulf of Mexico today would have been removed. These structures provide an important habitat for fish and good fishing for Louisiana fishermen. Unfortunately, it is the popular fishing platforms within 25 miles of shore

that have the shortest remaining life expectancy. The Artificial Reef Initiative was designed to convert some of these platforms into artificial reefs.

The Louisiana Artificial Reef Plan was submitted to the Louisiana House and Senate Natural Resources Committees in the spring of 1987. This plan contains the rationale and guidelines for the implementation and maintenance of a state artificial reef plan and provides for eight artificial reef sites off the coast of Louisiana. The program is to be funded through donations from the oil companies on a portion of the savings realized from donating a structure to the state rather than hauling it onshore as presently required by law.

One oil and gas structure has already been donated for use as an artificial reef. This structure, owned by Cities Service, was located in South Marsh Island Block 186, 90 miles south of Marsh Island. This structure was located within one of the artificial reef sites, and was merely toppled over at its present location. A total of \$250,000 (approximately half of the savings realized by Cities Service by not having to transport the structure onshore) was donated to the Louisiana Artificial Reef Development Fund.

Negotiations are now underway with five companies to donate soon-to-be dismantled oil platforms to the artificial reef program.

RESEARCH SUBPROGRAM

Lyle S. St. Amant Marine Laboratory

The primary function of the Lyle S. St. Amant Marine Laboratory is to conduct applied research for the betterment of Louisiana's seafood resources and industries. Problem specific studies as well as extensive monitoring programs are conducted by the research staff who interpret the data and make recommendations concerning management alternatives. Major accomplishments and projects undertaken in 1987 are listed below by topic.

Shrimp. Since 1981, inshore brown shrimp populations in the Barataria Bay system have been sampled intensively before and after the opening day of the inshore season. This intensive sampling scheme is now used on an annual basis in Coastal Study Area III to evaluate the efficiency of the inshore fleet and to determine the success of the opening date with respect to the 100 count/pound criteria. In 1987, approximately 48% of the inshore brown shrimp population was 100 count or larger on opening day (May 25). The efficiency of the fleet was comparable to that observed in previous years with the marketable inshore population decreasing (in weight) by 84% during the first week of the season.

These methods of assessing the season's opening were expanded in 1987 to include all seven Coastal Study Areas (CSAs). The percentage of the inshore brown shrimp population 100 count or larger on opening day ranged from a high of 56% in CSA II to a low of 4% in both CSA VI and CSA VII. The percent decrease in the marketable inshore population during the first week of the season was comparable in all Coastal Study Areas, ranging from 75% to 87%.

In other studies, laboratory researchers have continued to analyze historical data sets generated by the Seafood Division's coastwide shrimp monitoring program. One such analysis involved determining the relationship between juvenile abundance, as measured by the Division's inshore trawl samples during the month of April, and annual NMFS shrimp catch statistics. A strong relationship was found to exist and was used in predicting brown shrimp catch in 1987.

Monitoring of an extensive shrimp farming operation in Lafourche Parish was continued in 1987. The purpose of the monitoring program is to determine the potential for, and the problems associated with, such operations in coastal Louisiana.

Oysters. In 1987, using a predictive model developed at the Laboratory, a forecast was made of seed oyster availability during 1988 on the primary seed grounds east of the river. Over the past five years these forecasts have proven reliable and have served as a basis for management recommendations concerning the seed grounds. Unfortunately, seed production on the primary grounds in 1988 is predicted to be no better than the poor production observed in 1987.

A survey of the Public Oyster Grounds in Atchafalaya and Vermilion Bays was conducted by Marine Lab researchers in June, 1987. From the high oyster densities and the vast reef areas observed, it was projected that full utilization of this resource could partially offset the poor production on the primary grounds east of the river.

Using data provided by the Louisiana Department of Health and Human Resources (DHHR) and the U.S. Army Corps of Engineers, Lab researchers identified relationships between Mississippi River stage and fecal coliform levels in the Sandy Point-Bay Jacques area in Plaquemines Parish; and, between Calcasieu River stage and coliform levels in Calcasieu Lake. These findings have enabled DHHR to conditionally manage these important oyster producing areas.

A survey of oyster mortalities was conducted following a period of prolonged low salinities in June 1987. The mortalities were essentially limited to Little Lake, upper Grand Bayou and Bayou St. Denis.

Finfish. Sampling continued for a fifth year in a study to determine environmental parameters influencing distribution and abundance of young-of-the-year (YOY) spotted seatrout and red drum. Analyses to date indicate that salinity is the prime determining factor of year-class strength for both species. For spotted seatrout, there is a direct relationship between year-class strength and salinity during September and October. A direct relationship also exists between red drum year-class strength and October-November salinities.

In 1987 a king mackerel tagging project continued in conjunction with the National Marine Fisheries Service. A total of 349 mackerel were tagged and 227 tissue samples collected.

Crabs. A study was continued in 1987 to determine the annual variability in blue crab populations in the Barataria Bay system. Historical trawl data and constant recorder information from CSA III is being used in the analyses. An inverse relationship has been found to exist between blue crab catch-per-unit-effort and springtime salinities.

Freshwater Diversion. Marine Laboratory scientists continued to work in close cooperation with the Louisiana Department of Natural Resources and the U.S. Army Corps of Engineers to bring about large-scale controlled freshwater diversion from the Mississippi River into coastal Louisiana.

Since freshwater diversion is perhaps the most effective way to address coastal deterioration and enhance estuarine productivity, facilitating such projects has been given top priority at the Marine Laboratory.

Cooperative Statistics. In 1987, a cooperative study was continued between Marine Laboratory scientists and LSU researchers. Such arrangements are mutually beneficial and allow for more complete utilization of the laboratory's facilities.

The purpose of this ongoing study is to determine the feasibility of, and the problems associated with, pond culture of red drum. The work is being conducted in the research ponds on the Marine Laboratory grounds.

Shrimp Tagging

During 1987 a shrimp mark-recapture study began east of the Mississippi River. During that time 8,000 juvenile shrimp were tagged and released in the Lake Borgne area, and 8,000 were tagged and released in the Oak River-Bay Gardene area. During the study approximately 425 shrimp were returned by fishermen. Most of the returns from shrimp tagged in the Lake Borgne area demonstrated little or no movement; those from the Bay Gardene area generally moved toward the Gulf of Mexico. Data from tag returns is presently being compiled into a completion report on the project.

Shrimp Cage

During July and August, 1987, CSA I personnel conducted several investigations of a Trawl Shrimp Cage. This device is constructed in such a method so as to allow wingnetters to release their bycatch with minimum mortality occurring. The device is mounted at the stern of a boat and the catch from the wingnet is directed into the cage so that the shrimp can be removed by dipping with a small net and immediately releasing all bycatch. Preliminary results of these investigations showed that while the device may work on small boats, its value for larger vessels is questionable.

Sea Turtles

During the summer of 1987 a project proposal was submitted and approved for Marine Fisheries Initiative (MARFIN) funds to conduct a sea turtle stranding study in Louisiana along six study areas west of the Mississippi River and east of the Mermentau River. Each study location was visited twice monthly beginning in October, 1987. During the period from October through December remains of 15 turtles were found; three of the study areas reported finding at least one and three reported no turtle remains. A quarterly report was submitted in January 1988 detailing these findings.

MOSS

A habitat quantification project, using the U.S. Fish and Wildlife Service's MOSS geographic information system was completed early in the year. Results of the project showed a correlation between total annual coastwide brown shrimp harvest and total suitable habitat acreage calculated from recorder data in the Barataria Basin.

ENVIRONMENTAL PROTECTION AND REGULATION SUBPROGRAM

Louisiana continues to lose valuable fish and wildlife habitat to development projects of various agencies of federal, state and local government and to projects of private enterprise. Federal, state and local laws and procedures allow the Louisiana Department of Wildlife and Fisheries to review projects and evaluate the probable effects of the projects on fish and wildlife resources. The Department is charged by the Louisiana Constitution "to protect, conserve and replenish the natural resources of the

state, the wildlife of the state,...," and is, therefore, the appropriate state agency to investigate and assess the fish and wildlife resources of different portions of the state. Our objective is to gather and compile data on the fish and wildlife resources, their potential and their needs in the area of project influence and to provide technical assistance by making information obtained available to project planners and sponsors. Fish and wildlife information is essential to sound planning of land and water management projects and to proper decision making in various government programs.

The 1987 session of the Legislature adopted HCR 139 which established a task force within the Department of Wildlife and Fisheries to review the existing scenic rivers program and develop recommendations for administrative and legislative changes as may be required to improve the Department's scenic rivers management capabilities. The task force is composed of representatives of major user and landowner groups and state agencies which currently have responsibilities for reviewing and evaluating scenic river permit applications. During 1987-88 section personnel participated in regular meetings of the task force and its subcommittees, in task force sponsored activities, including a series of workshops held across the state to provide public input into the management planning process, and in interviews by the various news media. Section personnel are also responsible for preparation of the final task force report to the Legislature.

DOE/CALECO

The Department's participation in the U.S. Department of Energy funded study of pollution loading and environmental characterization of the Calcasieu River/Lake system was completed during this, the fourth year of the project. The Department provided administrative and technical review for the project, while field research was performed by McNeese State University. Additionally, a mathematical model of circulation and dispersion within the Calcasieu system was prepared by researchers from the University of South Carolina.

DOE/West Hackberry Brine Disposal

A U.S. Department of Energy grant was received for environmental assessment at the West Hackberry Strategic Petroleum Reserve (SPR) brine disposal site. The grant is intended to provide monitoring of the SPR brine discharge area in order to protect Louisiana's unique coastal environment from both short-term and long-term damage or harm which may occur due to brine discharge. LDWF will sample benthos, zooplankton, nekton, water and sediment quality and hydrographic parameters. Plans to initiate field work by mid-1987 were delayed due to delays in receipt of equipment from the previous DOE contractor and to the disrepair of much of the equipment. Necessary equipment was ordered and sampling should begin early in 1988.

MISSISSIPPI DEPARTMENT OF WILDLIFE CONSERVATION
BUREAU OF MARINE RESOURCES

The Bureau of Marine Resources (BMR) is a very technical and complex division of the Department of Wildlife Conservation. The BMR's responsibilities include saltwater fisheries management, enforcement of seafood laws, management of coastal wetlands and the all encompassing effort to manage all coastal resources through the Mississippi Coastal Program.

Although the BMR's public image is often viewed to be regulatory, many of its functions are assistance and development oriented. The BMR offers technical assistance to the Department of Natural Resources and the Governor's Office on environmental matters regarding oil and gas exploration off-shore. The BMR provides grant and contractual monies through the Coastal Program for a variety of recreational, public works and developmental programs needed by local units of government, universities and other public institutions. Furthermore, the BMR provides technical assistance to individuals, small businesses and industries in the coastal area concerning aquaculture, pollution abatement, product development, waste utilization and many other functions.

SALTWATER FISHERIES

The Division of Saltwater Fisheries is responsible for the administration of all marine fisheries management-related activities for the State of Mississippi. The division provides technical support to the Commission on Wildlife Conservation, the Gulf of Mexico Fishery Management Council, the Gulf States Marine Fisheries Commission, and the Gulf State-Federal Fisheries Management Board. In addition to participating in regional fisheries monitoring and assessment work, such as the Southeast Area Monitoring and Assessment Program (SEAMAP), division biologists conduct routine surveys of Mississippi's shellfish and finfish resources.

The monitoring and assessment work is intended to provide support data for the management of the state's fisheries resources, to coordinate seasonal openings and closures of the various fisheries in the territorial sea. In addition to these fisheries independent studies, division biologists participate in regional commercial fisheries statistics program in which commercial landings data is collected, processed, and evaluated. The end result of these efforts include: publication of Mississippi Landings, the tri-weekly Market News Report, and other miscellaneous landings-related reports.

The Division's annual program of oyster reef revitalization involved the planting of some 1,000 cubic yards of clamshells in the Bangs Lake and Bayou Heron area of Jackson County. Work was initiated on May 15, 1987 using the "Conservationist" and continued throughout the month. The assistance of private property owners as well as the Jackson County Board of Supervisors, the Bureau's Enforcement Division, and interested oystermen in the county was instrumental in seeing this important project to completion.

Access projects funded under the Sportfish Restoration Act and undertaken by the Division of Saltwater Fisheries included a boat launch and ancillary facilities on the Pearl River near Pearlington, a boat launch and pier at Popp's Ferry, and a recreational fishing pier at Gulf Park Estates. All three projects were scheduled for completion by Fall 1987.

Also in FY 1987, Saltwater Fisheries Division biologists participated in a regional mark/recapture program of red drum populations in the Gulf of Mexico. During the course of the project which began in September 1986, some 20,000 red drum were captured, marked, and released. A recapture phase of the work is scheduled for completion in 1987. In addition, Saltwater Fisheries Division personnel were awarded a grant to tag some 4,000 red drum within state waters.

Beginning in June 1987 division biologists began tagging brown and white shrimp in Mississippi waters. This program, a part of a cooperative mark/recapture effort with the state of Louisiana, is scheduled for completion in the fall of 1987.

Finally, the division is conducting a recreational creel survey in the three coastal counties. Biologists visit access sites on randomly prescribed days to interview fishermen and enumerate their catch. The program is expected to yield valuable information about the state's marine recreational fishery.

Several additions were made to the staff of the division during FY 87 in order to be able to accomplish the above-described work. Mr. Kenneth Hunter, B.S., University of Southern Mississippi, is assigned to red drum and shrimp mark/recapture work. Mr. Winston Denton, B.S., University of South Alabama, is performing creel survey duties; and Ms. Jennifer Davidson is also assigned to creel survey work. Ms. Debbie Ragsdale, B.S., University of California, is the new state port agent, assigned to the collection of Gulf shrimp data in Harrison and Hancock Counties.

DESCRIPTION OF FISHERIES

COMMERCIAL FISHERIES

Landings of commercial marine fish and shellfish during 1986 amounted to 367,814,749 pounds valued at \$41.6 million.

This represents a 15% decline in volume and a 9.5% decline in value over the previous year. This decrease can be attributed to the decline in menhaden landings which constitute the bulk of Mississippi's landings tonnage. In addition, significant declines were also experienced in gulf shrimp landings where a 21% reduction over 1985 landings was evident.

The most noteworthy increases in landings occurred for mullet (up 232% in volume and up 322% in value) and red drum (up 360% in volume and up 563% in value).

The Pascagoula-Moss Point port once again ranked second among U.S. ports in quantity of commercial fisheries landings. Cameron, Louisiana was the leading U.S. port.

Each individual fishery for which data are available and nonconfidential is summarized as follows:

Menhaden

Menhaden landings of 3.536 million pounds in 1986 represent a 14% decrease over the landings in 1985. The total value of 13.2 million dollars was up some 17.8% over last year however. This is largely attributable to a significant 38.3% increase in the unit price from \$.027 to \$.037 per pound.

Menhaden are used primarily for the production of meal, oil and solubles with small quantities being used for bait and canned pet food. Gulf-wide landings of menhaden have been steadily declining since the record-level catches of 1983, 1984 and 1985. This decline was predicted by National Marine Fisheries Service and state fisheries scientists, and this year's continued drop in landings appears to be a continuation of the predicted trend.

Oysters

During the 1986-87 oyster season, some 256,691 pounds of oyster meats were landed in Mississippi. This reflected a marked decline from landings of the previous year which totalled 1.2 million pounds. The 72% drop in oyster landings is attributed largely to an overabundance of oyster drills, a major predator of the marine mollusks, and to poor water quality during much of the oyster season, necessitating closure of many of the reef areas. Although unit cost of oysters increased some 32.5% over last year's price, the total value of the fishery is estimated at only \$461,462, considerably less than the \$1.64 million of 1985.

Blue Crabs

The blue crab harvest in Mississippi again showed a decline in 1986. 1,302,816 pounds of crabs with an average price-per-pound of \$.36 were landed. Although this represents a 21% decrease in poundage landed, the total value of the harvest declined only 12% as a result of a 9% increase in unit price. Interestingly, Gulf-wide landings of all species of crabs increased some 12% during 1986.

Edible Finfish

U.S. per capita consumption of fish and shellfish in 1986 reached a record 14.7 pounds. This total exceeded the 1985 per capita consumption rate by 0.3 pounds. Finfish landings in northern Gulf of Mexico typically undergo dramatic fluctuations from year to year, principally as the result of changing availability and shifting to other target species by fishermen as the result of market demands. This trend was amply demonstrated by Mississippi's 1986 finfish season.

Black drum landings showed a marked 61% decline in landings volume, principally as the result of decreased purse seine pressure on the species. The total dockside value of this species decreased some 49% between 1985 and 1986. Unit prices (price per pound) increased to \$.26, representing a 31.3% increase in that indicator.

Mullet landings, both striped and black, for 1986 totalled some 1,125,496 pounds, representing a 232% increase over landings during the previous reporting period. Average total dockside value increased 322% in 1986, and the price per pound of fresh, whole mullet rose about 36.8% to \$.342.

Red snapper landings in 1986 underwent a fall from 937,336 pounds to 672,658 pounds, a 28% decline. Total dockside value fell 29%, from \$1.27 million in 1985 to \$896,197 in 1986. Average unit prices during 1986 stood at \$1.33, down 1.0% from the previous year.

Changing patterns in finfisheries are evident in both the short term and the long term. In addition to the factors previously mentioned, the demands for frozen fishery products both here and abroad are of particular importance in determining local finfish prices. In addition to black drum and mullet, Spanish mackerel are a significant contributor to the frozen fish market. Landings of Spanish mackerel in Mississippi for

1986 totalled only 42,230 pounds. The total dockside value of these landings was \$13,168, representing a 124% increase in landings and a 92% increase in value for this fishery. The price per pound of Spanish mackerel in 1986 was \$0.31, down 14% from the \$0.36 per pound referenced in 1985.

Landings of premium inshore market species (i.e., spotted seatrout, red drum, and flounder) were as follows:

Red drum landings, still as a result of the popularity of cajun cuisine, showed an increase of 360% in 1986, rising from 2,423 pounds to 126,352 pounds. The total dockside value of red drum landings rose by 563%, the final tally standing at some \$86,696. The average price per pound rose 43.8% to \$0.69, largely as a result of increased demand for this product.

Commercial landings of spotted seatrout during 1986 totalled 38,036 pounds valued at \$38,265. According to most sources, the sportsfishing catch of this species may exceed the commercial catch as much as threefold. If this is the case, then the estimated combined sports and commercial catch can be expected to exceed 152,140 pounds in state waters. One of the higher-priced and consumer-preferred species, spotted seatrout prices averaged about \$1.00 per pound in 1986, representing a 12% decline in price.

Flounder landings, as collected by Saltwater Fisheries Division and National Marine Fisheries Service biologists under a cooperative statistical agreement, include a number of different species. In 1986 the landings volume of flounder totalled 28,133 pounds, representing a 68% decrease over those landed in 1985. The total dockside value of these landings was down 63% from \$41,223 in 1985 to \$15,044 in 1986.

Landings of kingfish, locally known as ground mullet, amounted to 145,538 pounds in 1986, valued at some \$47,522. The average price per pound of kingfish during 1986 was down \$0.33, from the \$0.34 of last year.

Grouper landings, which included spotted, Nassau, and black grouper, totalled 41,791 pounds in 1986, up only marginally from the 41,541 pounds in 1985. Total dockside value of group also rose only marginally during the interval. The price per pound of this species averaged \$1.02 in 1986, down 1% from 1985.

In summary, of the major finfish indicator species, landings gains were shown by the following:

bluefish	mullet	Spanish mackerel
blue runner	pompano	sea catfish
grouper	red drum	white seatrout

Landings declines, on the other hand, were recorded for the following:

black drum	menhaden
croaker	red snapper
flounder	sheepshead
kingfish	spotted seatrout

Shrimp

The Mississippi Commission on Wildlife Conservation opened the 1986 shrimping season on June 4, after Saltwater Fisheries Division biologists had determined that shrimp size would average 68 to the pound at that date.

1986 heads-off landings of Mississippi's three major species of shrimp, white, brown, and pink, were down 21% from last year's catch, totalling 8,155,000 pounds. However, because of a significant increase of 37% in the average price paid per pound, 1986's total harvest was valued at \$24,251,000, representing a 7% increase over the value of the previous year's catch.

The 1986 shrimping season in Mississippi represented a better than average year based upon the 25-year mean landings figure of 4.9 million pounds.

Shrimp imports during 1986 totalled 384.3 million pounds valued at \$1.4 billion, up from the 342.8 million pounds and previous year's value of \$1.2 billion.

RECREATIONAL FISHERIES

Marine recreational fisheries along the Mississippi Gulf Coast followed its usual seasonal trends. During January and February, good catches of black drum were taken from the area's numerous oyster reefs and front beach piers. March and April signalled the start of the annual run of spotted seatrout and an influx of other estuarine dependent species. The First Annual Gorenflo's Cobia Tournament was held in April, and numerous large lemonfish were entered. As usual, some of the earliest catches were reported from the bar off the southwest tip of Horn Island. Throughout the summer, good catches of spotted seatrout, red drum, southern kingfish, croaker, flounder, and other species were taken in the nearshore zone. By late summer, jack crevalle appeared as usual along the front beaches. Unusually, however, some snapper and grouper were taken within the Sound itself, notably near the mouth of the Pascagoula River and around the Ship Island rock jetties. This occurrence is presumable linked to the relatively dry spring and general lack of freshwater throughout much of the summer, resulting in unseasonably high salinities. Offshore fishermen enjoyed good catches of bonito, king mackerel, dolphin, Spanish mackerel and other migratory pelagic species.

Several state saltwater sportfishing records were broken by Mississippi anglers in 1986. These newly established records include a 101 pound cobia caught by Gary C. Pettey; a 9 pound, 15 ounce flounder taken by Roger Sheldon, and a 34 pound red snapper caught by Sherman Broussard, Jr.

Among the saltwater sportfishing regulations implemented in 1986, new size and possession limits for spotted seatrout and red drum were highlighted. Fishermen are permitted to retain no more than twenty-five spotted seatrout and ten red drum daily; and they are further permitted a three-day possession limit. Spotted seatrout and drum smaller than fourteen inches in length now also have to be returned to the water. However, it is permissible to retain up to a maximum of five undersized fish. In addition, fishermen can retain no more than two red drum that exceed 30 inches in length per day.

Preliminary results from a coast-wide survey conducted by division biologists indicate that nearly 57% of the total catch consists of various species within the drum family. Atlantic croaker comprises fully 27.3% of the total catch; spotted seatrout comprise 26.3% of the fish caught; and red drum account for another 3%. Striped and black

mullet, however, would comprise 28.7% of the total catch. Since they are caught using braille or cast nets, this species is not included in the survey results.

Average Catch Composition from Creel Survey

<u>Species</u>	<u>Total Catch</u>	<u>Length</u>	<u>Weight</u>
Atlantic croaker	27.3	8.9	.3
spotted seatrout	26.3	13.5	.9
white trout	24.0	12.0	.4
sea catfish	4.0	12.9	.6
flounder	4.0	13.5	1.0
southern kingfish	3.5	10.5	.5
red drum	3.0	13.5	1.0
other	7.9		

Typically, most fishermen were fishing inshore along the bays and bayous or on the natural or man-made reefs on the front beach.

Reports from the areas numerous low profile fishing reefs indicate that these locations are among the most productive for coastal anglers. Division biologists this year developed five new, additional low profile reefs in the Bay St. Louis and Biloxi Bay and Biloxi Back Bay areas.

OTHER ACTIVITIES

GULF STATES MARINE FISHERIES COMMISSION

The Gulf States Marine Fisheries Commission (GSMFC) is a compact of the Gulf States of Florida, Alabama, Mississippi, Louisiana and Texas. Authorized by Public Law 81-66, this compact was signed by representatives of each of these states with the objective of conservation, development, and full utilization of the fisheries resources of the Gulf region to the full benefit of its residents.

The GSMFC provides a forum for the exchange of information and ideas concerning marine fisheries management, research and development, and other critical fisheries-related issues. The principal species of concern to the Commission are those that clearly migrate across the boundaries of one or more states and therefore are subject to multiple and varying regulatory policies and practices. In addition, the Commission assists in obtaining funding for numerous research and public information programs, projects, symposia and workshops.

Mississippi's three members on the GSMFC in 1986 were Mr. Joe Stone, Executive Director of the Mississippi Department of Wildlife Conservation, Representative Ted Millette, Legislative Commissioner, and Mr. Holton Turnbough, Commissioner-at-large, appointed by the governor.

The Division of Saltwater Fisheries continues an active role in the activities of the Commission with Dr. Fred Deegen, Division Chief, serving as chairman of the Recreational Fisheries Committee and as a member of the Statistical Subcommittee of the Technical Coordinating Committee.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

The Gulf of Mexico Fishery Management Council marked its ninth year of operation under the Magnuson Act. Implementation of the Act by the Council has resulted in the development of a number of fishery management plans and management profiles.

The Magnuson Fishery Conservation and Management Act, Public Law 94-265 as amended, provides for the conservation and management of all fishery resources within the U.S. Exclusive Economic Zone (EEZ) except highly migratory species of tuna. It also provides for fishery management authority over continental shelf resources and anadromous species beyond the EEZ, except when they are within a foreign nation's territorial sea of fishery conservation zone or equivalent, to the extent that such a zone is recognized by the United States. Under this act, the following fishery management plans have been implemented: Swordfish, Gulf and South Atlantic Spiny Lobster, Gulf and South Atlantic Corals, Gulf of Mexico Reef Fish, Gulf of Mexico Shrimp, Gulf of Mexico Stone Crab and Coastal Migratory Pelagics.

Gulf of Mexico Fishery Management Council headquarters are in Tampa, Florida, and bi-monthly meetings are held there as well as in major coastal cities of the other Gulf States. Among the other major fisheries management activities of the Council, continuing negotiations with foreign fishing interests, participation in the MEXUS-Gulf cooperative research program with Mexico, participation in the planning sessions of both the Food and Agriculture Organization (FAD) and the Western Atlantic and Caribbean Development Programs are most noteworthy.

Mississippi's representatives on the Gulf of Mexico Fishery Management Council include Bureau of Marine Resources Director, Dr. Richard Leard and his designee, Dr. Fred Deegen; Mr. George Brumfield of Moss Point, obligatory member; and at-large members, Sherman Muths of Gulfport and Frank Barhonovich of Biloxi.

ENFORCEMENT

During FY 1987 enforcement officers with District Nine (BMR) recorded some 850 arrests, 700 incidences and handled over 85 cases involving the capture and transport of alligators. This level of effort is down considerably from FY 1986 when a record 1,332 charges were made. However, this is only the second year since the inception of the Bureau that arrests have declined.

The first slight reduction occurred in 1983, and as explained last year, this was probably the result of an extremely good oyster season. No firm explanation can be offered for the decline in arrests for FY 1987. Two observations are, however, notable.

First is the deplorable condition of BMR equipment. This condition has resulted primarily from extreme reductions in funding from over \$140,000 being expended in FY 1986 to only \$82,000 in FY 1987. Extreme cutbacks in General Fund appropriations coupled with administrative preclusion of the use of available federal funds caused these reductions in funding.

A second observation regarding the reduction in arrests is the large turnover in personnel during the year. With this turnover, there are fewer experienced officers in the field. It is hoped that arrests will rise in the coming year and that the reduction in arrests this year is not the product of the trend predicted in last year's report.

WETLANDS

Mississippi's coastline is made up of approximately 66,000 acres of tidal marsh and approximately 370,000 acres of submerged waterbottoms. These public trust wetlands serve as a valuable and irreplaceable natural resource of great economic and aesthetic value to the State of Mississippi.

During FY 87, the Bureau of Marine Resources' Wetlands Division processed 319 cases. This case load included the evaluation of several major development projects which may have had certain impacts on the integrity of the coastal resources. Working with the applicants, however, the Wetlands Division was able to incorporate modifications to these proposals to reduce serious environmental impacts.

The rapidly growing coastal region has suffered a loss in total acreage of coastal wetlands. Uncontrolled use and destruction of valuable wetlands areas in the past has resulted in the loss of over 10,000 acres of tidally-influenced wetlands.

Through the efforts of the Wetlands Division, the Bureau of Marine Resources has successfully limited the unnecessary alterations of the coastal wetlands by encouraging projects and activities which are environmentally acceptable.

Wetlands Division personnel are the stewards of the State of Mississippi Public Trust lands. These tidal marshes and shallow waterbottoms serve as a natural habitat and nursery area for approximately two-thirds of the state's commercial and recreational fish and shellfish. Additionally, these areas provide shelter and habitat for numerous species of waterfowl and mammals. Tidal wetlands produce large quantities of plant material annually which serve as a source of organic material which in turn is consumed by finfish and shellfish. Furthermore, these marshes serve as a buffer, protecting the shoreline against erosion and helping to reduce damages resulting from floods. Perhaps more importantly, they protect the public health and welfare by absorbing silt and certain types of pollutants in our estuarine waters. The overall value of wetlands is well documented in the scientific literature and estimated capitalized value for an acre of marsh is \$82,000.

Under the provisions of the Mississippi Coastal Wetlands Protection Law, persons wishing to perform dredge and fill operations in the wetlands or undertake major construction activities in wetlands must first obtain a permit from the Commission on Wildlife Conservation. The Wetlands Division of the Bureau of Marine Resources evaluates all proposed activities in the coastal area and makes reports and recommendations based on their findings to the Commission.

During FY 87, Wetlands personnel revised its video presentation which describes the permitting procedure and highlights some of the most common activities permitted by the BMR. The video has been shown to various civic groups including realtors. We have developed a service for realtors where they provide us with a blank VHS tape, and we will make a copy for their own use. The purpose of this service is to allow the realtors to show potential buyers what can or cannot be permitted on the property in which he is interested in purchasing.

The Wetlands Division has continued to operate the Mississippi Coastal Zone Regional Permit for the Mobile and Vicksburg Districts of the U.S. Army Corps of Engineers.

This program has saved property owners a considerable amount of time, and we believe it has reduced the amount of violations which were occurring prior to the program.

MISSISSIPPI COASTAL PROGRAM

The Mississippi Coastal Program (MCP) is a consolidated statement of state policy. The text, maps and guidelines, included therein, applies to the coastal area of Mississippi and represents a balance of protection with development of the state's coastal and marine resources. The MCP was approved by the Governor, the Commission on Wildlife Conservation and the Office of Ocean and Coastal Resources Management (OCRM) NOAA, Department of Commerce during September 1980. The maintenance and implementation of the MCP is handled by the Coastal Programs Division of BMR; however, the coastal program supports all areas of the Bureau's operation including law enforcement.

In early FY 87, BMR received a grant from OCRM in the amount of \$540,000 for implementation of the MCP for a twelve month period.

The MCP applies to activities that have a direct and significant impact on the state coastal resources. It provides financial support to the Bureau in the form of equipment purchases, certain office expenses and contractual support for research, planning and technical studies.

The Coastal Program also contains the consistency provisions of the Coastal Zone Management Act, P.L. 95-583. These consistency provisions require that all federal activities that may effect land and water resources in the coastal area, including Federal Licenses and Permits, Direct Federal Activities and Development Projects, Outer Continental Shelf (OCS) Exploration, Development and Production Activities and federal funded activities such as housing and highways, be consistent with the guidelines and the Wetlands Use Plan of the Coastal Program.

The ten broad goals on which the Coastal Program was established necessitated a procedure in policy coordination that includes wetlands management, industrial development, waterfront conservation, fisheries management, pollution control, water conservation, archaeological and historical preservation, preservation of natural scenic qualities, protection of national interests, assistance to local governments and the coordinated implementation of public policy. The legislation on which this function was based requires that all state agencies comply with the program and these ten goals. In addition to compliance by state agencies, activities proposed by federal agencies are also required to comply under "federal consistency" provisions of the Coastal Program.

To complement the regulatory provisions of the Coastal Program, Affirmative Management Activities were developed and include efforts in areas such as energy facility planning, shoreline erosion work, designation of preservation/restoration areas, low cost (306A), marine research and public education on marine and coastal resources.

POLICY COORDINATION PROCEDURES

From July 1, 1986 through June 30, 1987, 107 actions were subject to policy coordination procedures and submitted to the Governor's Office of Planning and Policy, the instrument used in state agency reviews for policy coordination activities. This number represents a slight increase over FY 86.

Of these actions, 27 involved activities which required a wetlands permit or were subject to formal wetlands review. These actions were determined to be consistent with the program and received either a wetlands permit or were issued a waiver of permit requirements.

The remaining actions consisted of projects submitted for federal assistance to local and city government through such programs as community development block grants; direct federal actions, such as Outer Continental Shelf (OCS) oil and gas drilling applications submitted by the Minerals Management Service and Corps of Engineers federally authorized channel maintenance dredging. These actions were determined to be consistent with the Mississippi Coastal Program.

SERVICE MANAGEMENT AREA PLANNING

The Coastal Program Division (CPD) began Special Management Area (SMA) planning by providing assistance both financial and technical, to the participating Coastal governors. The advance planning in SMA's insures that development will occur in an orderly manner avoiding the problems of piecemeal decisions.

In 1982, BMR formed a SMA Task Force to develop SMA plans and then retained a consultant to assist and facilitate SMA planning. This Task Force is composed of representatives from the U.S. Army Corps of Engineers, Environmental Protection Agency, National Marine Fisheries Service, Fish and Wildlife Service, Mississippi Bureau of Marine Resources, Mississippi Bureau of Pollution Control, Mississippi Department of Archives and History, as well as representatives from the local entities. Using this process the Port of Pascagoula SMA plan was completed, and the CPD began implementation in 1986.

In FY 1987, CPD continued implementation of the Port of Pascagoula SMA plan by coordination focused SMA planning efforts on the regulatory concerns resulting from the selection of Pascagoula as a U.S. Navy homeport site. As a consequence BMR was instrumental in securing environmental permits and ameliorating impacts to coastal resources occurring as a result of homeporting.

Additional SMA planning efforts began with a Moss Point SMA feasibility study being conducted by the Jackson County Planning Commission. This study will address prerequisite planning necessary for establishing a potential waterfront industrial area in Moss Point.

AFFIRMATIVE MANAGEMENT ACTIVITIES

BMR continued with its affirmative management efforts with the participation in three urban waterfront plant developments, including Harbor Square in Gulfport, Point Cadet in Biloxi and Bay St. Louis. These plans are developed with special emphasis on waterfront property to more efficiently utilize existing space within each are and upgrade existing facilities. The Gulfport and Biloxi waterfront plants are complete and are being implemented with various improvements such as marina and additional boatslips. The Bay St. Louis study will continue into the next year.

The Sand Beach Master Plans for Harrison and Hancock Counties were completed and when implemented by the counties and adjacent cities will reduce shoreline and beach erosion, provide facilities such as restrooms, additional parking spaces and other amenities that will enhance tourist and local use. The plans for both county beach areas were developed by a number of consultants that had expertise in organizational structure, urban design, erosion and geology, plant science and ocean engineering.

Other affirmative management efforts include BMR's continuing participation with the Governor's Office of Planning and Policy to provide funding for the clearinghouse to assist BMR in the notification of activities affecting the coastal area to other applicable state agencies.

Other activities center around BMR's information/educational projects. The publication of the monthly newsletter continues. News releases, public speaking engagements, stories published in Mississippi Outdoors and distribution of DWC educational material were also part of BMR's ongoing public information/education efforts. An extremely popular poster with coastal and upland residents was developed during the year. The poster "Notes...on Important Fish Species of the Mississippi Gulf Coast" delineates and describes 30 commonly caught fish by coastal anglers. Description of the fish including feeding habits as well as culinary qualities. Three thousand copies of the posters were distributed and an additional 3000 copies were printed for further distribution.

Another affirmative management effort of the Coastal Program Division is the low cost construction program generally referred to as the 306A Program of the Federal Coastal Zone Management Act from which funds are derived. This program provides pass through funds to coastal cities and counties for resource protection projects or activities to increase access to coastal waters by providing facilities such as boat ramps, piers, bulkheads, and waterfront parking areas. Projects that were awarded funds or under construction are listed below.

<u>Project</u>	<u>Funding Amount</u>
Popps Ferry Boat Ramp (Biloxi)	\$30,000
Pearlington Boat Launch (Hancock County)	\$30,000
Curtis Johnson Waterfront Park (Hancock County)	\$30,000
Gulf Park Estates Pier (Jackson County)	\$30,000
Courthouse Road Shorefront Access (Gulfport)	\$30,000
Griffin Point Shoreline Stabilization (Moss Point)	\$30,000
Round Island Lighthouse Stabilization (Pascagoula)	\$4,500
West Biloxi Pier	\$30,000
Old Fort Bayou Boat Launch (Jackson County)	\$30,000
Moses Pier Harborwalk (Gulfport)	\$30,000
Marine Enforcement Office Pier Repair (DWC/Biloxi)	\$19,500
Ladner Fishing Pier (Waveland)	\$50,000
Ocean Springs Community Peir	\$30,000
Long Beach Harbor Pier	\$50,000
1987 Oyster Reef Rehabilitation (DWC)	<u>\$100,000</u>
Total	\$524,000

Upon completion these CPD projects will represent an economic impact to the coastal area over one-half million dollars. The 306A Program is a continuing effort of the CPD and additional federal funds are expected in FY 88.

The CPD also coordinated a two phase study to investigate alternate channel dredging techniques and to identify potential dredged material disposal sites in Gulf waters and along the upland portions of the Mississippi Coast. With the completion of this study, BMR will have a tool to help guide dredged material disposal practices in the coastal area.

OTHER MCP RELATED ACTIVITIES

The Coastal Programs Division (CPD) views the MCP as an ever changing program and as such constantly reviews and monitors the effects of the rules, regulations and guidelines of the MCP on the permitting actions and coastal community. In FY 86 numerous changes to

improve the MCP were adopted by the Commission on Wildlife Conservation (CWC) and are as follows:

- Application Processing
- Public Hearing Procedures
- Coastal Wetlands Use Plan Text
- Notification Requirements
- Exclusions
- Oil and Gas Development Guidelines

The CPD is responsible for changes or adjustments in the Coastal Wetlands Use Plan (CWUP) which is used in the wetlands permitting. The CWUP establishes districts where only certain uses may occur. Projects not conforming to the district where the project is located must receive authorization to establish the appropriate district from the CWC.

MARINE OIL AND GAS ACTIVITIES

The Bureau of Marine Resources through its Scientific-Statistical Division continued to address environmental aspects of oil and gas activities proposed for and occurring within the state's coastal waters and the federal Outer Continental Shelf waters. This past year, the staff of the Division continued to provide oil and gas-related guidance and technical support, from an environmental perspective, to the Commission, the Department and state and federal agencies. With respect to oil and gas operations, the Division's efforts through the Bureau are directed toward providing for the protection of the valuable and renewable coastal marine resources while at the same time allowing for the development of the valuable oil and gas resources in an acceptable manner.

MISSISSIPPI COASTAL WATERS: OIL AND GAS RELATED ACTIVITIES

Interest in the potential development of oil/gas resources within Mississippi's coastal waters continued during FY 87. As a result of this interest, the Bureau addressed environmental aspects of oil/gas leasing and operations within the state's coastal marine waters.

In late August 1986, drilling commenced on the first exploratory oil/gas well drilled in Mississippi's coastal waters in many years. Sapphire Exploration and Production, Inc. of Dallas, Texas, initiated the drilling of an exploratory well on submerged lands the company had leased from the state in 1985. These leased lands, consisting of some 20,000 acres, were located south of Ship Island with the specific drilling site being located 4.5 miles south of Ship Island. Drilling of this "wildcat" well was conducted from a semi-submersible rig. The drilling plan called for drilling a shallow well to a depth approximately 6,000 feet in search of oil.

To gain all necessary permit approvals to drill the exploratory well, the company agreed to implement a detailed environmental monitoring program. The program was jointly developed by the staff of the Scientific-Statistical Division, Bureau of Marine Resources and the staff of the Bureau of Pollution Control. Both agencies were involved with the company to assure that well-drilling operations complied with all approved monitoring procedures. Staff personnel of the BMR's Scientific-Statistical Division made several visitations to the drilling rig to observe operations and determine compliance with monitoring programs and environmental specifications. Sapphire was very cooperative in meeting requirements and specifications related to environmental aspects of their drilling operations. The engineering aspects of the operation were managed by the Mississippi Oil and Gas Board. On several occasions, BMR vessels were employed in transporting

Mississippi Department of Natural Resources personnel and State Oil and Gas Board personnel to and from the drilling rig.

In early September 1986, fifteen days after drilling had begun, Sapphire terminated the drilling of their exploratory well south of Ship Island. The desired drilling depth of 5,921 feet had been reached. Sapphire officials announced that the well was a producer of neither oil nor gas, remarking that the well was a longshot, statistically speaking. The over \$1 million drilling operation was closed-down on September 9, 1986. Sapphire has not proposed to drill another exploratory well.

During FY 87, another petroleum company, Chevron, U.S.A., submitted information to the BMR regarding Chevron's proposed drilling of an exploratory oil/gas well in Mississippi's coastal waters. Chevron's proposed drill site is in the Mississippi Sound near Cat Island. Cat Island is the most westerly located offshore barrier island in the Mississippi Sound area. Chevron's information was submitted in the form of an Exploration Evaluation Document (EED), a document format developed by the BMR and one which greatly facilitates the review of proposed oil and gas activities by appropriate state and federal agencies. The Scientific-Statistical Division serves as coordinator of the extensive EED review and comment process. The information submitted to Chevron currently under review by state and federal agencies. At some future time, decisions on Wetlands Compliance, Coastal Program Consistency and state permitting will be rendered. Also, a permitting decision by the U.S. Army Corps of Engineers, Mobile District will be rendered. Chevron proposes to conduct a no-discharge drilling operation.

An oil and gas company, such as Sapphire or Chevron, applies a considerable amount of time in planning the various phases of oil and gas operations in the marine waters of the State of Mississippi. As they plan, companies begin to intensively inquire about environmental regulations, operational regulations, permits and informational requirements pertaining to potential exploratory oil and gas drilling activities on their leased state coastal waterbottoms. Their preparation efforts are considerably benefited if they have access to carefully developed guidelines and regulations which can be utilized in developing their proposed activities. This benefit has been confirmed to the staff of the BMR. Staff members of the Scientific-Statistical Division have applied a considerable amount of their time in developing such guidelines and regulations, which most of these pertaining to the environmental aspects of oil and gas development.

Examples of guidelines and information that have been highly beneficial, as confirmed by the oil and gas companies, are two key documents which were developed for prospective oil and gas lessees. These documents are: "Informational Requirements and Instructions for the Preparation of Evaluation Documents Pertaining to Oil and Gas Operations within State-Owned Coastal Waters of Mississippi" and "Environmental Monitoring Programs Applicable to Oil and Gas Activities in Coastal Waters of the State of Mississippi." In addition to these documents, several other informational papers which pertain to oil and gas operations have been produced by the staff of the Scientific-Statistical Division.

Through FY 87 the staff of the Scientific-Statistical Division met with numerous state and federal agencies, e.g., the Mississippi Department of Natural Resources, U.S. Environmental Protection Agency, U.S. Coast Guard, Army Corps of Engineers, U.S. Fish and Wildlife Services, and the National Marine Fisheries Service, which are involved in oil and gas developments in coastal waters. During FY 87, the Division's staff participated in 17 key technical meetings related to coastal oil and gas activities and developed 15 key responses/comments which pertained to environmental aspects of oil and gas activities within Mississippi coastal waters.

The State, through BMR, began preliminary efforts toward the development of oil spill dispersant-use strategy for Mississippi coastal waters. This information will become part of an on-going Gulf-Wide program undertaken by the Marine Industry Group (MIRG) of the Gulf of Mexico. MIRG has taken the lead in sponsoring the development of the strategy which would be applicable to OCS waters as well as Gulf state's coastal waters. A company specializing in environmental planning has been contracted by MIRG to work with the individual Gulf states and to coordinate the development of dispersant-use strategy. Some of the staff of the Scientific-Statistical Division have met with the company's professional personnel. The purpose of the meetings was to gain an understanding of the objectives of MIRG, to provide detail information on sensitive Mississippi marine resources and to further examine dispersant-use feasibility and limitations, specifically as they pertain to the coastal waters of Mississippi. As the Gulf-wide strategy is formulated, the BMR will continue to contribute professional expertise and participate in a review and comment process.

In 1984, the Scientific-Statistical Division developed a document entitled "A Contingency Guide to the Protection of Mississippi Coastal Environments from Spilled Oil." The oil spill dispersant-use strategy currently being developed through MIRG's lead, with state professional support and review, could be viewed as an expansion of the State's existing planning efforts. These are efforts that focus on protecting Mississippi's coastal environments in the event of an oil spill. State approval of the MIRG-sponsored dispersant-use strategy will depend upon the contents of the final proposed strategy.

OUTER CONTINENTAL SHELF OIL AND GAS ACTIVITIES

The Outer Continental Shelf (OCS) begins at the seaward boundary of the coastal territorial waters of each state and extends seaward to the limit of the federal waters. The development of oil and gas resources in the Gulf of Mexico OCS Region has an influence upon the coastal states in this region. The influences, many of them indirect, affect the socioeconomic and environmental conditions of the states whose coastal areas adjoin the Gulf of Mexico.

The Gulf OCS region is the major U.S. OCS region in oil and gas development, accounting for more than 94% of the oil and gas produced from all U.S. OCS regions. Fifty-four oil and gas lease sales have been held in the Gulf of Mexico since 1953. In that time more than 17 million OCS acres have been leased. Over 22,000 wells have been drilled in the Gulf and over 13,000 miles of pipeline have been installed in support of production efforts. The greater percentage of Gulf OCS activity is located within the Gulf's Central Planning Area, that OCS area which includes the Gulf waters south of the State of Mississippi. During FY 87, there were two Central Gulf sales. As of June 1987, a gas well was drilled by Chevron, U.S.A. on one of the OCS tracts which is located adjacent to Mississippi's offshore territorial boundary. The site drilled is located five miles due south of Mississippi's Petit Bois Island. A large reservoir of gas was found.

The U.S. Mineral Management Service (MMS) is the federal agency responsible for the management of OCS oil and gas exploration, development and production activities, as well as other OCS mineral resource development. For management purposes, OCS oil and gas activities are divided into four categories: (1) oil and gas leasing, (2) post-leasing activities, (3) oil and gas transportation and (4) environmental studies. In addition to the oil and gas program, the MMS manages the Hard Minerals Mining Program. Through the efforts of the personnel of the Scientific-Statistical Division, the BMR provides advice to the MMS regarding environmental aspects of oil and gas activities as well as hard minerals mining on the OCS. This input affords the State of Mississippi the opportunity

to advise on OCS management matters. The Bureau also continued to provide recommendations to the Office of the Governor regarding OCS-related matters. The participation of the state in the federal OCS oil and gas development program provides the opportunity for the state to receive maximum benefits from OCS oil and gas activities which affect it socioeconomically and which have the potential to impact its valuable, renewable coastal resources.

The BMR also represents the state on the Gulf of Mexico Regional Technical Working Group (RTWG). This OCS Working Group, comprised of state, federal, oil industry and private representatives, meets periodically to discuss and formulate technical information pertaining to the overall Gulf OCS Program. The staff of the Scientific-Statistical Division provide professional support work to the RTWG and participates in its meetings.

The BMR continued its involvement with the OCS Environmental Studies Program for the Gulf Region, as administered by the MMS. During FY 87, personnel of the Scientific-Statistical Division participated in the update and development of the MMS Environmental Studies Program for the Gulf Region. The process involved proposing study topics, reviewing new study proposals, providing advice and information regarding previously approved study projects, maintaining an awareness of overall annual Studies Program components and attending studies-related meeting. In particular, BMR has strongly supported for several years an environmental study entitled "Mississippi-Alabama Shelf Marine Ecosystems Study." Funds for this study effort were recently granted by MMS.

During FY 87, numerous reviews and comments were made by the BMR pertaining to environmental aspects of future OCS sales for the Gulf Region, particularly those scheduled for the Central OCS Area. The staff of the Scientific-Statistical Division participated in a total of seven key OCS-related meetings and developed a total of 10 major OCS-related written responses. In addition, the staff reviewed a number of documents to maintain an awareness of OCS oil and gas activities in the Gulf in order to be aware of those activities which may have an influence on Mississippi.

ADDITIONAL NOTES ON OIL AND GAS-RELATED ACTIVITIES

The Scientific-Statistical Division participated in the BMR's Fall Coastal Workshop which took place in Biloxi on November 20, 1986. The Division's Coastal Oil and Gas Activities Panel discussion was well received by guests in the audience. The panel consisted of a State of Mississippi Representative, representatives from the oil/gas industry, Mississippi Department of Natural Resources, U.S. Fish and Wildlife Service, U.S. Mineral Management Service, U.S. Environmental Protection Agency, Corps of Engineers, the Sierra Club and the Gulf Coast Hotel and Motel Association. The Scientific-Statistical Division's chief chaired the panel session. Panel discussions pertained to oil and gas activities which were occurring and projected to occur on the Outer Continental Shelf off Mississippi as well as within Mississippi's coastal waters.

THE GULF INITIATIVE PROGRAM

During FY 87, Dr. Richard Leard attended one of the early meetings sponsored by the U.S. Environmental Protection Agency pertaining to the Gulf Initiative Program. The purpose of the meeting was to discuss the program and outline its objectives. The BMR continued its advisory involvement in the development of the program. The Program will strive to promote a greater awareness about the importance of the Gulf of Mexico, accentuate the special challenges facing the Gulf region and enhance communication between institutions and agencies responsible for monitoring and protecting the Gulf.

The Scientific-Statistical Division developed a document entitled "An Overview of Mississippi's Valuable Coastal Resources: Its Lands, Waters, Fisheries, Industries, Tourism and Other Valuable Assets." This document was developed at the request of E.P.A.'s Region IV office. The information in the document along with information prepared by the Gulf states will be used in support of the Gulf Initiative Program. As requested by E.P.A., the document addresses a general overview of the renewable and non-renewable resources in the coastal area of Mississippi and economic activities associated with the utilization of these resources. The presentation consists of selected topics, accompanying brief narratives and 104 selected photographic slides to illustrate the resources and activities. The information provided will be used by E.P.A. in presentations to various groups to foster support for the "Gulf Initiative Program" and to stress the need for a comprehensive, institutional approach to the management of the Gulf of Mexico.

DEBRIS IN THE MARINE ENVIRONMENT

Debris in the marine environment is a growing problem. Serious attention to the problem is rapidly increasing because of the visual and biological impacts that debris is having on the marine environment. During FY 87, the Staff of the Scientific-Statistical Division continued to procure new debris-related information, to review this information and to add it to the Division's growing debris information file. The file will be maintained to aid in making resource management decisions regarding debris in the marine environment. The Division was involved in several communications and written responses regarding this problem.

Two photographs taken by a staff biologist in the Scientific-Statistical Division illustrate problems experienced by economically important marine fish from encounters with non-biodegradable plastic debris. Neither fish would have expected to survive its respective encounter with the plastic debris.

TECHNOLOGICAL ASSISTANCE TO ENTREPRENEURS, BUSINESSES, & INDUSTRY

The purpose of this activity is to provide technical advice and assistance to industries and individuals involved and interested in the appropriate development and utilization of Mississippi's coastal and marine resource. Technical advice and assistance provided by the personnel of the Scientific-Statistical Division are aimed at enhancing the quality and marketability of seafood (including underutilized species), encouraging intensive culture and production of aquatic organisms in the coastal area to supplement the harvest of food from the natural marine environment, reducing pollution to the coastal marine environment by transforming wastewaters into saleable products, and for Mississippi citizens, enhancing their income and maintaining consistent, profitable income from the sale of products derived directly or indirectly from coastal and marine resources.

Though the demand was very high, technological assistance and advice to entrepreneurs, businesses and industry by personnel of the Scientific-Statistical Division was somewhat curtailed during FY 87. This curtailment occurred because of a heavy workload required to meet the review, information development and field monitoring needs associated with marine oil and gas activities. Also, the inability to expeditiously fill vacant positions in the Division greatly curtailed the providing of technological services as requested and needed by individuals and businesses.

The staff of the Scientific-Statistical Division continues to provide technical assistance to persons involved or interested in becoming involved in aquaculture in the coastal area of Mississippi. Aquaculture is the controlled cultivation and harvest of aquatic animals and plants and thus involves renewable resources.

The Bureau's aquaculture program efforts continue to be mainly aimed at providing an awareness of aquaculture opportunities and developing aquaculture operations which diversify and supplement an existing income base. Highly technical information developed by research organizations has been reviewed and evaluated and has been transformed by the Division's staff into information which can be readily understood and applied by aquaculturists located in the coastal region of Mississippi.

Requests for aquaculture assistance through the Division continues to escalate from year to year. This indicates a growing interest in aquaculture in the coastal area and positive benefits from the educational emphasis of the Bureau's aquaculture program and the contacts made in association with it. During FY 87 the personnel of the Division worked with a number of individuals providing them technical aquacultural information, evaluating their available resources for aquacultural use and advising them on actual culture of organisms in the coastal area, including relatively new species. All aquacultural assistance was rendered by the Bureau with the aim of enhancing job and income opportunities, increasing tax revenues to the state and of offsetting dollars spent importing fish (second only to import of petroleum products), thus improving our trade balance.

The Division's personnel attended selected aquaculture seminars and technical meeting to gain new information which could be transferred in an appropriate format to enhance aquacultural opportunities and activities in the coastal area.

During FY 87, as examples (but not an all inclusive list), specific aquacultural assistance rendered by the personnel of the Scientific-Statistical Division including the following: Met with a young navy man on several occasions to discuss and provide information regarding his interest in developing an intensive commercial redfish production system. The young man desires to produce redfish upon his retirement from the navy in two years. In addition to this individual, discussions occurred and technical information was provided to a number of individuals who had an interest in culturing redfish on a commercial basis; providing bait fish culture information to a young man and his wife. The young man lost his income as a result of the decline in the oil industry and was interested in using his ideally located facilities for producing and marketing baitfish. Also provided this person with information on the potential for utilizing estuarine snails as a gourmet food.

Met with a couple who had an interest in developing an intensive system for the production of tilapia. After providing technical information on tilapia culture and a design for their production, the couple began construction on a small-scale system in FY 87; continued to provide some technical information and advice to the operator of the commercial redfish farm located in western Harrison County; provided technical assistance to several persons involved in the production of soft shell blue crabs.

Aided a man and wife team in the development of a flavor enhancer and a bouillon derived from dried shrimp. Also, began some preliminary technical assistance toward developing an additional income for the couple based upon marketing shrimp waste to be used as fertilizer and pesticide in conjunction with the growth of commercial important plants; designed a recirculating baitfish holding system for a new bait fish dealer in western Hancock County.

Provided to several individuals technical information and assistance pertaining to the production of hard-shell and soft-shell crawfish. Some of these individuals developed both types of production systems; provided to serious softshell crawfish producer information regarding excellent market outlets for their products; provided information

and advice to several persons pertaining to potential new ways of growing oysters both in the natural environment and in man-engineered systems; continued working with the South Mississippi Retardation Center on a project pertaining to the culture of fish in conjunction with its therapeutic benefits to the mentally handicapped. This is a project that the Division implemented with the center four years ago.

During FY 1987, the Scientific-Statistical Division planned and coordinated a segment of the annual workshop of the Bureau of Marine Resources. The particular segment was entitled "Aquaculture in the Coastal Region of Mississippi--Technology, Entrepreneurs and Business Opportunities." The Panel members participated in the workshop and represented persons and businesses involved in aquaculture, persons and businesses interested in becoming involved in aquaculture, aquaculture researchers and information specialists, representatives of state regulatory agencies involved in aquaculture, and a representative of the state legislature. The objective of panel discussion was to focus on aquaculture in terms of existing activities, needs, prospects, business opportunities and problems particularly in the coastal region of the State of Mississippi.

In support of entrepreneurial, business and industry enterprise assistance, the following publications were produced by the personnel of the Scientific-Statistical Division:

Ladner, Cornell M., Richard L. Leard and James S. Franks (November 1986). Oyster depuration in managed off-shore facilities in Mississippi. Some key information on facility specifications, potential economics and operational expenses. Mississippi Bureau of Marine Resources, Long Beach, Mississippi.

The above report is based, in part, on an earlier draft report prepared by the authors. The above report represents a condensation of numerous quantitative production capacity and economic projection figures presented in the draft report. The November 1986 report was basically prepared as a presentation for the Mississippi legislature.

Based upon the information presented in the November 1986 report and other information presented through discussions with legislators in Jackson, the Mississippi legislature passed a bill sponsored by Senator Tommy Gollott. The bill (Senate Bill No. 2759) opens the door for potential on-shore oyster depuration activities in Mississippi. Proof of depuration technology effectiveness is to be shown through a demonstration project before oyster depuration is routinely allowed in Mississippi. The Bureau of Marine Resources was assigned the responsibility for implementing the demonstration project.

Work on several technical publications were begun in FY 87; however, these publications will be completed in the early part of FY 88.

In addition to the assistance previously described, the personnel of the Scientific-Statistical Division provided other professional assistance and respnses. Personnel of the Division reviewed and rated research proposals submitted to the Mississippi Water Resources Research Institute for potential funding by the agency. The Division developed for the Mississippi Department of Economic Development a package of information pertaining to the oyster industry in Mississippi. In addition to the previously mentioned coordination and assistance activities, the Scientific-Statistical Division's personnel conducted several reviews and developed responses as a result of specific requests by various agencies/organizations.

TEXAS PARKS AND WILDLIFE DEPARTMENT

Texas Parks and Wildlife Coastal Fisheries Research Management Programs

The Coastal Fisheries Branch of the Texas Parks and Wildlife Department (TPWD) is responsible for making management recommendations regarding the State's saltwater fishery resources within the bays and estuaries and out to nine nautical miles in the Gulf of Mexico. More than \$400 million is spent annually in Texas' 4 million acres of saltwater by approximately 15,000 commercial and over 1,000,000 recreational fishermen.

The goal of the Coastal Fisheries program is to develop management plans within the concept of optimum yield for selected fisheries that include harvest regulations, resource stock enhancements or habitat enhancements based on monitoring programs and the best scientific information available. The objectives of the Coastal Fisheries Branch are: (1) to recommend management strategies for the aquatic marine resources to the Division Director, the Executive Director, the Parks and Wildlife Commission and the Legislature based on the results of research and monitoring programs and the best scientific information available; (2) to determine the sizes and changes in the sizes of finfish and shellfish populations caused by environmental conditions and fishing; (3) to determine the landings of marine species and the associated social and economic characteristics of the fisheries; (4) to develop mariculture techniques for selected species and make the information available to commercial mariculturists in Texas; (5) to educate the consumer regarding high quality, wholesome seafood products. To achieve these objectives, the Branch is organized into five major functions or programs: Administration, Fisheries Resource Monitoring, Fisheries Harvest Monitoring, Marine Culture and Enhancement, and Seafood Marketing. In FY 87, a total of 35 technical reports, scientific journal articles and magazine articles about various aspects of the Texas coastal fishery resources were completed to aid in meeting the objectives.

Effective management of finfish and shellfish resources must be based on a thorough knowledge of the population dynamics and stability of the resources. Long-term trend data based on routine monitoring are necessary to assess changes in abundance and stability. Landings information from both sport and commercial fishermen is necessary to assess the impacts of user groups on the fisheries and to determine the economic importance of the fisheries to the State.

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

The sport landings and fisherman activity are estimated from samples selected in proportion to the activity at a site (probability sampling); the higher use sites are sampled more frequently. Roving counts are utilized to assess relative pressure at sampling sites to insure that proper sampling probabilities are maintained. The charter fishery is randomly sampled on a continual basis within each of the bay systems of the coast by intercepting boats when trips are completed (party boats) or by accompanying the boat on fishing trips and assessing the landings (headboats). Commercial landings are obtained from commercial seafood dealers through submission of Monthly Marine Products Reports.

The Perry R. Bass Marine Fisheries Research Station at Palacios was established to provide information and techniques necessary for the improvement of Texas fisheries management plans. Research effort is directed toward methods for spawning and rearing marine fish and shellfish.

Once developed, such techniques will be used to provide animals for stocking coastal bays and freshwater reservoirs and information on techniques will be made available to commercial mariculturists in Texas. Coastal fisheries personnel cooperate with other coastal states in marine fisheries enhancement efforts through the transmittal of information and supply of available fishes.

As directed by the Texas Legislature, the Seafood Marketing Program was initiated to increase the utilization and value of seafood products. This charge is aimed at all functional levels within the marketing channel. The Seafood Marketing Program has functioned through an interagency contract with Texas A&M University, the Texas Agricultural Extension Service, the Sea Grant College Program's Marine Advisory Service, and the Texas Department of Agriculture. Several Fisheries Development Foundations nationwide have also supported various work completed by the Seafood Marketing Program.

ACTIVITIES IN FY 87 INCLUDED:

Development of a State red drum management plan was continued as part of the 6-year plan for Coastal Fisheries Programs approved by the Parks and Wildlife Commission. Fishery management plans for shrimp and oysters are in process of development. The Branch also participated in the development, review, and revision of 10 Gulf Council management plans, requiring 2,880 manhours.

Recommended changes in regulations were adopted by the Parks and Wildlife Commission to insure the stability of the resource. These included protection of red snapper by deleting the exception that allows fishermen on headboats to be exempted from red snapper minimum size limits, and protection of striped bass and snook by placing restrictive bag and possession limits and by prohibiting their catch on gear other than rod and reel.

Regulations were modified to protect spawning stocks of red drum impacted by the 1986 red tide by prohibiting the use of fish trawls in the Gulf waters of Aransas, Brazoria, Jefferson, Matagorda and Willacy Counties. Additional regulations established 18 cubic feet as the maximum size of crab traps.

The closure period for Gulf shrimping in state waters was coordinated with the National Marine Fisheries Service for closure of a portion of the Exclusive Economic Zone to increase yield and value for the shrimping industry.

The public oyster reefs in Galveston Bay were closed to harvest from December 9, 1986 through February 19, 1987. All public reefs, except those in San Antonio Bay, were closed from January 13, 1987 through February 19, 1987. Closures were necessary to prevent depletion of the reefs by large numbers of vessels fishing in relatively small areas. The concentration of vessels was caused by Texas Department of Health closure of various areas due to red tide toxins and high bacteriological levels from flooding.

A total of 1,185 survey-days were spent to estimate landings and pressure of sport-boat fishermen. There were 760 gill net samples, 1,080 bag seine samples, 2,760 bay and Gulf trawls samples, and 5,088 oyster dredge samples collected. The total number of routine samples collected is an increase of 216 samples over FY 86. A total of 2,476 fishes were tagged and released. Approximately 8% were returned for rewards. The percent of tags is consistent with prior years.

Gulf of Mexico waters from Alabama to the Rio Grande were sampled to a depth of 300 feet during November 1986 and June-July 1987 with other Gulf States and NMFS. This effort was coordinated by the Gulf States Marine Fisheries Commission and entitled the Southeast Area Monitoring and Assessment Program (SEAMAP). Results of sampling were used to evaluate the closure of Gulf waters to shrimping and determine relative abundance of associated organisms.

King mackerel were tagged in Gulf waters off Texas. This effort was coordinated by TPWD and NMFS. TPWD personnel and volunteer taggers were used. Results of tagging will be used to determine identity and distribution of king mackerel stocks.

Three pilot studies were conducted and used to refine a socioeconomic questionnaire designed to collect data on the motivation, satisfaction and expenses of interviewed fishermen. Routine sport-boat monitoring surveys incorporated these questions coastwide on May 15. An analysis of angler activity and retained fish data justified the early termination of sport-boat monitoring surveys on weekdays at 1600 when no angler interviews had been conducted prior to that time. This procedure increased efficiency of survey personnel with a loss of less than 3% of the coastwide interview and retained fish data.

An inventory of shoreline areas in the saltwater zone was completed and used to initiate an on-site interview sampling program to estimate landings and fishing pressure of commercial vessels in Texas marine waters. Routine collection, editing, summarization and publication of self-reported commercial landings data continued through a formal cooperative statistics agreement with NMFS. TPWD collected commercial landings data continued through a formal cooperative statistics on crabs, oysters and finfish, while NMFS continued to gather landings statistics on shrimp.

Research effort directed toward spawning and rearing marine fish and shellfish was continued at the Perry R. Bass Marine Fisheries Research Station. Induced spawning and pond culture studies of spotted seatrout and common snook are ongoing. Snook were subjected to a temperature-photoperiod regime in combination with hormone (LHRHa) implantation. Pond culture of spotted seatrout, snook, orangemouth corvina, and hybrid orangemouth corvina x spotted seatrout resulted in the production of fry and fingerlings which were stocked into Texas coastal bays or inland reservoirs.

Several laboratory experiments were initiated in 1987. Temperature tolerance, overwinter survival, and growth of red drum fingerlings from Texas and South Carolina were compared. Growth, survival, and tag retention of microtagged red drum were also determined. Primary nutrient concentrations in culture ponds were analyzed in an effort to increase fingerling production. An electrophoretic study of spotted seatrout was initiated to examine sub-population structure along the Texas coast.

Technical information concerning aquaculture and commercial fish hatchery development was provided to other coastal states in a cooperative effort to enhance coastal marine fisheries.

The Seafood Marketing Program developed and distributed educational material, media articles, seafood curriculum newsletters, and Texas seafood recipes through seafood outlets, media efforts, and state agencies. Educational programs and training courses were conducted for groups such as county agents, seafood producers and wholesalers, and home economists. Several seafood cook-offs were coordinated for professional chefs in preparation for nationwide competitions.

GULF STATE-FEDERAL FISHERIES MANAGEMENT BOARD

During the period October 1, 1986 to September 30, 1987, two meetings were held by the Gulf State-Federal Fisheries Management Board (GS-FFMB): New Orleans, Louisiana - October 1986 and Biloxi, Mississippi - March 1987.

The GS-FFMB is comprised of Gulf States Marine Fisheries Commission (GSMFC) Commissioners, two from each of the five Gulf States. The Board members vote as a state with a single vote per state. The Regional Director of the National Marine Fisheries Service (NMFS), or his designee, the Region IV Director of the U.S. Fish and Wildlife Service, or his designee, and the Executive Director of the GSMFC are members of the Board. The GSMFC Executive Director is a non-voting member of the Board. The Board is advised on technical, scientific matters and industry views by the same advisory groups as the Commission. Among these groups are the Technical Coordinating Committee (scientific), the Menhaden Advisory and Management Committee, the Crab Subcommittee, the Anadromous Subcommittee, the Data Management Subcommittee, the Law Enforcement Committee, the Spanish Mackerel Subcommittee, as well as the NMFS.

The GSMFC is the prime contractor for all management plan development and support in the Gulf of Mexico for the Board. This has resulted in coordinated involvement by the Commission in State-Federal management and information in the territorial seas. The activities of the Board and the Commission complement those of the Gulf of Mexico Regional Fishery Management Council, thereby providing an effective system for advising the management of the fisheries throughout the extent of their range.

The major activities and accomplishments of the Board are described in the following summary:

In accordance with provisions included in Cooperative Agreement NA87WC-H-06017 (SFB-1), provided for administration, travel, communication, planning and other activities for the administration and committee support of the Gulf State-Federal Fisheries Management Board (GS-FFMB). This agreement in the amount of \$16,500 provided financial support for the following.

The staff of the Gulf States Marine Fisheries Commission carried out many secretarial duties for the Board and its Committees (Crab Subcommittee, Menhaden Advisory Committee, Data Management Subcommittee, and Anadromous Fish Subcommittee), which included: preparing and distributing minutes of all meetings, preparing and distributing meeting material, arranging and financially supporting all meetings and other duties as required by the Board.

In addition to performing all secretarial duties for the Board and its committees, travel reimbursement was made to Dr. Henry Lazauski, Chairman of the Data Management Subcommittee. Dr. Lazauski attended a United Nations Food and Agriculture Organization meeting in the Port of Spain, Trinidad and Tobago as a representative of the GS-FFMB. While attending, Dr. Lazauski was called onto make a presentation on integrating microcomputer software and hardware for fisheries data entry, storage and analysis.

The Board looks forward to reviewing and supporting efforts funded by the U.S. Fish and Wildlife Service. The GSMFC will be administering these funds to develop management plans, programs, laws and regulations for the effective management of fisheries in the Gulf of Mexico.

During this period Mr. I.B. "Buck" Byrd (NMFS) served as Chairman and Dr. Richard Leard (Mississippi) served as Vice-Chairman. The Board elected Edwin Joyce (Florida) to serve as Chairman and Mr. I.B. "Buck" Byrd to serve as Vice-Chairman in 1987-88.

SOUTHEAST REGIONAL OFFICE (SERO)
AND SOUTHEAST FISHERIES CENTER (SEFC)

NATIONAL MARINE FISHERIES SERVICE (NMFS)

National Oceanic & Atmospheric Administration (NOAA)
U.S. Department of Commerce

FISHERIES MANAGEMENT

The **Fishery Operations Branch** is the focal point for carrying out the mandates of the Magnuson Fishery Conservation and Management Act. The Southeast Region serves three of the eight Fishery Management Councils established by the Magnuson Act.

Noteworthy activities during the year included the implementation of Amendment 1 to the Gulf of Mexico Red Drum Plan. Amendment 1 established annual red drum quotas of zero for the directed commercial fishery, 200,000 pounds as incidental commercial catch in the shrimp fishery, 100,000 pounds as incidental catch in other commercial fisheries, and 325,000 pounds for the recreational fishery to be taken under a bag limit on one fish per person per trip. The catch quotas were limited to the exclusive economic zone off Alabama, Mississippi and Louisiana. Federal waters off Texas and Florida were closed to all harvest of red drum whatsoever. Fish harvested under the quota limitations were subject to state landing laws. Actions currently underway would reduce the allowable catch of red drum in federal waters to zero until recruitment deficiencies to the offshore population (adult brood stock) have been rectified. States have been requested to reduce mortality on juveniles in nearshore waters, and thereby increase escapement to replenish the offshore population.

The Gulf of Mexico Stone Crab Plan was amended to accommodate the occurrence of a new species (Menippe adina) and hybrid in the management area. Two species of stone crabs and their congeneric hybrid now occupy the management area instead of one species, M. mercenaria, as originally believed. The recognition of this new species and hybrid did not require alterations of any of the management measures designed to achieve optimum yield from the fishery.

The Spiny Lobster Plan for the Gulf of Mexico and South Atlantic was amended to: (1) include the Spanish or slipper lobster in the management unit; (2) require the immediate release of egg-bearing spiny and slipper lobsters to the water; (3) prohibit the stripping of eggs from slipper lobsters; and (4) reduce to 100 the number of undersized spiny lobsters that may be carried aboard a vessel for use as attractants in traps. Regulations already prohibit the stripping of eggs from spiny lobsters. Additional changes currently under review would: (1) impose a daily bag limit of six spiny lobsters per person during the two-day, non-trap recreational season; (2) designate the two-day, non-trap recreational season as the first full weekend preceding August 1 of each year; (3) delay the opening of the regular season until August 6 of each year, thereby eliminating harvest over a greater portion of the spawning period; and (4) require that undersized lobsters carried aboard vessels be retained in live wells with circulating sea water. Other actions may be forthcoming, but their adoption is dependent upon the implementation of compatible regulations by Florida.

The Coastal Migratory Pelagics Plan for the Gulf and South Atlantic was amended by establishing bag limits for Spanish mackerel, specifying quotas and allocations for recreational and commercial sectors, and designating the Dade-Monroe County, Florida, line as the fixed boundary between Gulf and Atlantic migratory groups. The amendment also required permits for commercial vessels fishing Spanish mackerel and charter vessels fishing on any species in the coastal pelagics management unit.

A mandatory reporting system was implemented in the reef fish fishery of the Gulf of Mexico through which catch and effort data is obtained from persons fishing with fish traps, other commercial vessel owners and operators, dealers and processors, and headboat owners and operators. In addition, the minimum mesh size requirements for fish traps in the reef fish fishery were modified to more closely align with similar requirements in the Atlantic Ocean snapper-grouper fishery.

Other major activities included transferring the responsibility for tunas (other than bluefin) from the Southwest to the Southeast Region; establishing the shrimp closure boundary off Texas at 9 to 15 nautical miles from shore (the closure lasted 45 days, from June 1 to July 15, 1987); establishing special management zones around 19 artificial reefs off the coasts of Georgia and South Carolina; and advancing the incremental size limits for Nassau grouper and yellowtail snapper in the Caribbean to 14 inches and 10 inches, respectively.

PROTECTED SPECIES

TED - The majority of activities in Protected Species Management in 1987 related to TEDs. The TED rules were implemented by final regulations issued June 29, 1987. They are effective in the Canaveral area of Florida on October 1, 1987, the Southwest Florida area January 1, 1988, and the Gulf area on March 1, 1988.

These rules are controversial and have been strongly supported as well as strongly challenged. The agency is currently in litigation over the rules.

Oil Rigs - Some preliminary evidence suggests that sea turtles may be impacted by the explosive removal of oil rigs in the Gulf of Mexico. Section 7 requirements under the Endangered Species Act require federal agencies, in this case, the Minerals Management Service and the U.S. Army Corps of Engineers to consult with the NMFS to ensure that their activities do not harm sea turtles.

In 1987, oil rig removals with explosives required diver and aerial surveys and NMFS observers to minimize and identify any adverse impacts to sea turtles. No injuries were documented.

Permits - The live capture of bottlenose dolphins for public display was coordinated and monitored. Thirty one takes of an authorized quota of 91 in 1987 occurred.

Other permits for marine mammal and sea turtle research were reviewed and recommendations provided to Washington.

HABITAT CONSERVATION

Our Habitat Conservation Division (HCD) investigates and analyzes proposed environmental alterations and reviews environmental impact analyses, provides technical consultation services to developers, sets forth environmental research requirements, develops criteria and guidelines, and conducts surveillance activities related to

environmental alterations. The HCD also extensively coordinates with Southeast Fisheries Center (SEFC) researchers on habitat-related studies.

Research and management staffs in the southeast have developed an effective and productive coordination process for habitat-related matters. Examples include input by the SEFC on significant water-development projects and projects requested for elevation to higher levels in the Corps of Engineers, collaboration with the HCD on preparation and reviews of scientific papers and research proposals, and continued dialogue on ongoing mitigation studies.

Fishery habitat research conducted by the SEFC during FY 1987 dealt with the relationships between key habitats and important fishery species. The multidisciplinary research program of estuarine-coastal habitats emphasizes a balanced mixture of field and laboratory studies. The research goals of the program are (1) to determine the key functional relationships (i.e., key processes) which regulate fishery production; and (2) to develop the capability to predict and assess man-related impacts (e.g., environmental alterations and contaminant additions) on fishery organisms and their habitats. During FY 1987 research emphasis was on: (1) the distribution and recruitment of larval and juvenile fishes and factors influencing recruitment and survival of larvae; (2) habitat supporting finfish and shellfish, including evaluation of mitigation methodologies and the impact of alterations in environmental parameters; (3) research on feeding habits and predator-prey interactions; and (4) effects of metal contamination on larval fish food webs, mechanisms of metal accumulation and metabolism, and evaluation of metallic and organic contaminants in estuaries.

The HCD and SEFC coordinated extensively with the three fishery management councils in the southeast. Assistance was provided to develop habitat policies, amend council guidelines for involvement in habitat issues, review habitat sections of fishery management plans; and to provide briefing materials and background documentation needed to address activities that potentially impact fishery resources under management by the councils.

The HCD continued its efforts under the Fish and Wildlife Coordination Act. During FY 1987, at least 4,045 proposals to alter wetlands were reviewed. A sub-sample of these proposals indicate that at least 16,512 acres of wetlands were proposed for alteration, the HCD did not oppose the alteration of 8,548 acres, and thereby potentially conserved 7,964 acres. The restoration, generation, and enhancement of about 7,166 acres of wetlands was recommended.

The SEFC and HCD worked under or entered into a number of interagency agreements during FY 1987. Federal agencies involved included the Minerals Management Service, U.S. Fish and Wildlife Service, Corps of Engineers, the Environmental Protection Agency and NASA. The Texas Water Development Board, Texas Parks and Wildlife Department, Brazos River Harbor Navigation District and the Texas Nature Conservancy also joined in interagency agreements with the HCD.

The HCD worked more closely with applicants during FY 1987. More than 230 preapplication meetings were attended. An example of the benefits of this approach are the agreements reached with Louisiana landowners to design management plans for marshes that are deteriorating.

Habitat information was communicated to NMFS' constituents, partners and the public by numerous presentations and scientific papers. Examples of the papers published or submitted for publication this year dealing with habitat issues include: "Modeling the

effects of coastal change on marine resources"; "Habitat development applications: Use of seagrass transplanting for habitats development on dredged material"; "Transplanting of seagrasses, Halodule wrightii, Syringodium filiforme, and Thalassia testudinum for stabilization and habitat development"; "The use of ecological data in the implementation and management of seagrass restorations"; "Preliminary results of the 1984-1985 National Benthic Surveillance Project: Southeast Atlantic and Gulf of Mexico coasts"; "National Marine Fisheries Service habitat conservation efforts in the Southeast Region of the United States from 1981 through 1985"; "Creation of fishery habitat in estuaries"; "The potential impact of ocean thermal energy conversion (OTEC) on fisheries"; "Fish population responses to chronic and acute pollution: The influence of life history strategies"; "The mangrove prop root habitat: A refuge and nursery area for fish"; "Biological effects of trace metals in estuaries"; "National Marine Fisheries Service habitat conservation efforts in the coastal southeastern United States for 1986"; and "Treatment of National Marine Fisheries Service Recommendation by the Corps of Engineers in the Southeast Region of the United States from 1981 through 1985".

RECREATIONAL FISHERIES

The Region implemented a Marine Recreational Fisheries (MRF) Program Development Plan (PDP) in October 1983, which establishes long-term MRF program priorities and created a MRF Steering Committee comprised of key recreational fisheries leaders to obtain program and budgeting guidance. Most objectives and tasks identified in the MRF PDP have been accomplished and efforts will begin in 1988 to revise and update the PDP.

SERO and SEFC personnel continued to work with the states and others to design and implement a cooperative regionwide recreational fisheries statistics program that provides timely accurate information for fisheries management and development efforts. This information is desperately needed for stock assessment and quota monitoring purposes.

In 1987, North Carolina, South Carolina, Georgia and Florida, participated in the National Marine Recreational Fisheries Statistics Survey (MRFSS) by contractually expanding the survey sample size for their respective areas. These same states, except for Florida, are also participating in the 1988 survey. In addition to these enhancements, the Regional Office, working in concert with SEFC and Washington Office personnel, have made a number of additional adjustments and enhancements to improve the accuracy, precision and timeliness of the survey in 1987. For calendar year 1988, SERO is enhancing the MRFSS using \$280,000 of funds obtained under the 1987 MARFIN Program (Marine Fisheries Initiative). Counting ongoing state enhancements (NC, SC and GA), this enhancement will allow NMFS to obtain three to four times the historic sampling effort in all areas of the region and to conduct telephone surveys on a monthly rather than bimonthly basis. Along with some additional sampling for the mackerel fisheries, these enhancements will allow us to obtain more precise and timely estimates. Notably, this pilot study should provide sufficient documentation of the survey's capabilities to encourage greater state participation in future years.

In July 1986, a Technical Review Panel was established to monitor the status of recreational and commercial mackerel fisheries to document and/or predict when various allocations had been or were likely to be achieved and closure actions were necessary. The Panel has developed procedures for using historic and current stock abundance and landing statistics to monitor the mackerel fishery and thus far have enabled managers to effectively close various sectors of the mackerel fishery.

In 1987, an S-K funded regionwide study of charter/headboat fleet provided the means to revise our computerized vessel file through field canvassing. This effort was cooperatively conducted by researchers from Texas A&M University, University of Florida and University of North Carolina. Implementation of a charter/headboat vessel permit

system in 1987 should allow us to discontinue the vessel canvass program in 1988. This canvass provides the basis for our headboat survey and enables us to better understand the nature of the fleet. Historical files on the universe of charter/headboats are being established to assist researchers in studying fleet stability, business turnover and operation.

A contract was awarded in 1987 (using MARFIN funds) to produce a broadcast quality video and brochure on "Catch and Release Techniques for Anglers". Scheduled for completion in the summer of 1988, this video will promote catch and release as a conservation practice and demonstrate proper techniques for southeast recreational target species. Copies of the video and brochure will be made available to southeastern states and Sea Grant Programs.

SERO assisted in organizing and participated in the Florida Artificial Reef Summit and the Fourth International Artificial Reef Symposium. NMFS was a co-sponsor for both of these events which were held in Miami in November 1987.

Technical advice was provided to Congressional staff in drafting H.R. 3474 (the National Fishing Enhancement Act of 1983) and considerable effort has been made to inform recreational constituents of the bill's enactment (11/84). SERO and SEFC participated on a task force to develop the National Artificial Reef Plan called for in the legislation. The plan was completed (10/85), and broadly distributed in 1986. NMFS is assisting Headquarters staff in refining and implementing the plan.

STATE/FEDERAL PROGRAM

A state/federal partnership has been maintained with southeast region states that has yielded significant accomplishments in marine fisheries conservation, habitat protection, research, development and management. The results attained from cooperative state/federal data collections and fisheries management activities in the southeast have contributed to numerous successes and efficiencies of operations. Major emphasis is placed on working with the states to enhance state/federal relationships, to promote state/federal partnerships and accomplish NMFS regional goals and objectives for the conservation and management of marine fisheries resources.

Relationships were developed and maintained with the Gulf States Marine Fisheries Commission and the Atlantic States Marine Fisheries Commission. These marine fisheries commissions have cooperated in developing and implementing interstate and interjurisdictional state/federal planning activities and in administering certain aspects of state/federal data collection and management programs. Federal funds provided to the states for grants and cooperative agreements under PL 99-659, PL 89-304, SEAMAP, Cooperative Fisheries Statistics, MARFIN and other state/federal cooperative programs are utilized for projects that fully support the management of interjurisdictional fisheries. These cooperative programs provide the primary data base used for developing fisheries management plans under MFCMA and PL 99-659. They also provide the major monitoring and assessment activities needed to evaluate the success of federal and state fisheries management regimes.

SERO established working relationships with the states and U.S. Fish and Wildlife Service in screening and selecting Wallop-Breaux projects designed to provide maximum enhancement to recreational fisheries in the southeast.

The state/federal partnerships in the southeast have allowed NMFS, along with the states, marine fisheries councils and marine fisheries commissions to better meet their goals and objectives for fisheries management and conservation with added efficiencies.

TRADE ANALYSIS

The trade analysis staff has completed a survey of the Southeast fishing industry to establish priorities among export fishing products and market countries concerning opportunities for reducing or eliminating trade barriers in market countries. The staff is currently addressing tariff and non-tariff barriers affecting mullet, mullet roe, butterfish and other more traditional species. In recent bilateral negotiations, Taiwan conceded a reduction of 30% in the tariff on mullet roe as a direct result of this effort. Current targets for further reduction are Taiwan, Japan and the Republic of Korea.

SOUTHEAST FISHERIES CENTER 1987 HIGHLIGHTS

Activities of the SEFC during FY 1987 concerned programs focusing on species that support major commercial and recreational fisheries within the region. Most often, these groupings corresponded to those employed by regional fishery management councils in their consideration of management needs. Each of the species-oriented programs were responsible for developing data needed to assess/monitor stock characteristics and condition. Center species programs include: Latent Resources, Mackerels, Menhaden, Molluscan Shellfish, Oceanic Pelagics, Protected Species, Red Drum, Reef Resources and Shrimp. This report covers these species programs and other related activities.

LATENT RESOURCES

A two-year effort to develop and test bottom trawling gear for capturing latent resources on or near bottom was completed. Gear trials resulted in a state-of-the-art, large mesh, high opening bottom trawl commercially produced by Shuman Trawl of Hope Valley, RI. Modifications to the basic trawl design and fishing tactics resulted in a system capable of sampling the fast swimming, elusive semi-pelagic species of the Gulf of Mexico. These modifications, along with an operational tactic called pulsing produced an efficient sampling system for a wide range of latent resources. Use of the system on the CHAPMAN resulted in demonstration of commercial catch rates of butterfish, squid--for the first time in the Gulf--and several other species with commercial potential.

A video tape montage demonstrating trawl gear configurations and fish behavior in trawls was prepared and made available to gear researchers, commercial trawl manufacturers and interested fishermen.

Observer coverage was provided to several New England freezer stern trawlers fishing for butterfish out of Pascagoula from mid-February through May. Over one million pounds of butterfish were landed and the ex-vessel price almost tripled last year's. Rough scad were also landed and marketed overseas.

A trawl evaluation cruise was conducted with the CHAPMAN and OREGON II during October 1986. An exploratory survey by the CHAPMAN during February accessed the distribution of squid off the Florida coast in the eastern Gulf of Mexico and in the Dry Tortugas. The CHAPMAN and the Gulf Coast Research Laboratory research vessel TOMMY MUNRO participated in comparative gear studies during April-May. The CHAPMAN, in cooperation with the Mexican National Institute of Fisheries surveyed the southwestern Gulf to determine the existence and location of latent resources off the Mexican coast. Gulf butterfish trawling data were collected from research cruises in the northern Gulf and analyzed to relate butterfish distributions to environmental factors.

MACKEREL

Stock identification continued to be an important component of the Center's coastal pelagic research, which is principally concerned with king and Spanish mackerel. The collection of vital statistics and biological studies for development of data bases for stock assessment was emphasized. Two new projects were initiated: (1) development of indices of abundance with the use of passive fishing gear and (2) a project concerning the nature of catches in the drift-gill-net fishery for king mackerel off southeast Florida.

Annual stock assessments indicated a continued decline in the spawning stock biomass of the Gulf migratory king mackerel. Some evidence was shown of increased recruitment in stock biomass for Spanish mackerel in recent years, more in Gulf stock than Atlantic stock.

Landings data were collected on the Gulf and Atlantic migratory king mackerel and Spanish mackerel. Sampling for length and sex of both king and Spanish mackerel continued. The data base, now containing about 55,000 lengths and related data, will be combined with similar data from other sources for the 1988 stock assessment of these two species. Otoliths were collected from both species from North Carolina to Texas and are being processed for development of 1987 age-length keys.

King mackerel were tagged off North Carolina, Georgia, southeast Florida, northwest Florida, Louisiana, Texas and Mexico; Spanish mackerel were tagged off North Carolina and northwest Florida. All king mackerel tagged in northwest Florida were tagged with internal anchor tags to provide data on tag loss.

Associations of young mackerel with the plume of the Mississippi River were investigated. Preliminary data from a September 1986 cruise in the plume show that ichthyoplankton were more concentrated by strong physical convergence at the frontal region. Results from a September 1987 cruise are expected to provide additional information.

MENHADEN

Atlantic menhaden otoliths and scales were analyzed to delineate characteristics that permit the identification of geotemporal origins and growth of juveniles and adults in an effort to estimate the prerecruitment year-class strengths of the species. Quantitative forecasts of Atlantic and Gulf menhaden purse-seine landings predicted 1987 Gulf menhaden landings of 853,000 metric tons and Atlantic menhaden landings of 285,500 metric tons. Biostatistical port sampling data and landings records collected from the Gulf menhaden purse-seine fishery between 1974 and 1985 were updated. Two approaches to risk analysis of Gulf menhaden were investigated in cooperation with Pennsylvania State University and Oak Ridge National Laboratory and presented at the 36th Annual AIBS Meeting. An ad hoc review panel of NMFS, state and industry representatives conducted an annual review of the Atlantic Menhaden Fishery Management Plan and of the resource/fishery during August.

Studies concerning the development of fisheries technology to increase the export and direct domestic consumption of menhaden products were conducted. A biomedical test facility for the production of test materials from menhaden oil was completed and distribution of the materials was initiated. A menhaden surimi demonstration plant was constructed by Zapata Haynie Corporation at Reedville, Virginia under NMFS contract to determine the commercial feasibility of producing surimi from menhaden and to supply mince and surimi for product research and development. The work is being monitored by the Charleston Laboratory. An econometric model of the U.S. fish meal industry is being estimated.

MOLLUSCAN SHELLFISH

A workshop to assess the state-of-the-art in shellfish depuration and to recommend draft regulations for depuration was conducted. Four literature reviews were distributed concerning: occurrence and persistence of pathogenic viruses in the estuarine environment; depuration of pathogens by shellfish; factors affecting wholesomeness and quality of molluscan shellfish during all stages of commerce and methods for measuring microbiological indicator organisms in shellfish.

The feasibility of using poliovirus as an indicator of virus pollution in shellfish was studied. Research results on the frozen storage stability of filtered and non-filtered poliovirus were presented at the annual meeting of the American Society of Microbiology. Virus binding to specific filters was evaluated in an effort to define conditions under which attenuated poliovirus may be stored and processed more efficiently. Efforts to develop a cell culture assay system for the Norwalk virus are underway.

Laboratory scale systems have been developed to evaluate the uptake, tissue distribution and depuration of viruses. Recent successes allow us to trace the fate of very low levels of viruses during tissue uptake and excretion, and during conventional sample processing. A grant to the University of North Carolina was monitored for a study concerning optimal conditions for removal of hepatitis A virus from eastern oysters and hardshell clams.

Oysters, clams and mussels from the Charleston area were assayed to provide data on the quality of molluscan shellfish in the retail sector. A protocol for a nationwide survey on the quality of molluscan shellfish at the retail market level was prepared. A grant to the Shellfish Institute of North America to measure the amount of free-liquor in fresh packs of oysters processed along the Atlantic and Gulf coasts was monitored.

OCEANIC PELAGICS

Annual indices of abundance of blue and white marlin were estimated from catch and effort data collected throughout the southeast and Caribbean at billfish tournaments and docks over the past 15 years. Estimated changes from year to year are being evaluated.

The status of Atlantic bluefin tuna stocks were examined during an annual meeting of the International Commission for Conservation of Atlantic Tunas (ICCAT) Standing Committee on Research and Statistics. Estimated abundances indicated that the number of adults in 1987 was 25% of their abundance in 1972, and that recruitment had been low in recent years. The virtual population analysis tuning method, developed at the SEFC and used by ICCAT, was investigated to determine its sensitivity to variation in the catch at age, abundance indices and partial recruitment patterns. Abundance indices were updated and a new index based on catch rates in the U.S. recreational fishery for medium and large bluefin tuna in the Gulf of Maine was developed. Preliminary identifications of bluefin larvae from the Gulf of Mexico larval surveys and associated statistics were reviewed and finalized. In addition to the regular survey for larval bluefin tuna in the Gulf of Mexico, several transects were made across loop current fronts to learn more about the distribution of bluefin larvae with respect to environmental features.

A pilot study is being conducted in the Gulf of Mexico to determine the feasibility of improving recreational landings data for billfish. Billfish research emphasized development of marlin data bases and contracted studies to continue age and growth work. Working documents on swordfish age and growth, indices of abundance for blue and white marlin, and a program plan and progress report for the ICCAT Enhanced Research Program for

Billfish were prepared for the 1987 Standing Committee on Research and Statistics meeting. U.S. landing estimates, catch at size estimates, sex ratio data, mark-recapture data and hardpart aging data were compiled for the ICCAT Swordfish Workshop. Working documents were prepared in the areas of stock structure, indices of abundance, age and growth and a historical review of the U.S. swordfish fishery.

Life history information on mako sharks are being compiled along with sources and locations of catch and size. These data are being pooled with the Northeast Fisheries Center (NEFC) to obtain a data base for analysis and information.

PROTECTED SPECIES

Sea Turtles. In April 1,621 multiple-tagged head-started Kemp's ridley sea turtles were released into the Gulf of Mexico. A group of 100 of the largest of the 1986 year-class were held back for "super head starting." By August 532 (4.3%) of head-started Kemp's ridleys released since 1979 had been recovered. Primary recovery locations include Texas, Louisiana and Florida.

In June the Sea Turtle Stranding and Salvage Network reported 1,094 turtle strandings for 1987. Seventy-one percent of these turtles were reported during May and June.

Captures of sea turtles at sea for ascertaining the distribution and relative abundance of sea turtles in coastal waters continued. The importance of the Cape Canaveral, Florida area as a sea turtle habitat was confirmed by continuing high capture rates. Captures on the west coast of Florida resulted in tagging 127 juveniles.

The Western Atlantic Turtle Symposium (WATS) II was held in Mayaguez, Puerto Rico in October with 32 countries presenting national reports. All data were included with WATS I data at the Miami Laboratory.

A new soft Turtle Excluder Device (TED) was tested in the Cape Canaveral, Florida area and proved to be successful in excluding the size class of turtles found in the area. Results led to limited certification of the device under current TED regulations. A TED demonstration was held in Tampico, Mexico during July and Panama has requested demonstrations.

Marine Mammals. The SEFC participated in an investigation to determine the cause and impact of the sudden die-off of bottlenose dolphins (400 from early July through September) along the mid-Atlantic coast. Surveys to determine the effects of the die-off on population levels are planned.

Two contracts were awarded for low-level monitoring of bottlenose dolphin populations. The three-year study is designed to detect a halving or doubling of the population size in the Tampa-Sarasota Bays and Indian-Banana River complex.

Analysis of the regional sampling surveys (1983-86) for bottlenose dolphins in the Gulf is underway. A paper based on this work was presented at the December meeting of the Society for Marine Mammology.

In a cooperative effort with the NEFC and the Right Whale Consortium a computerized image analysis is being developed for identifying individual whales. The Center also participated in two aerial surveys for right whales off Georgia and northern Florida and off Nova Scotia.

RED DRUM

A pilot aerial survey designed to evaluate aerial surveying techniques for determining the distribution of surface schooling red drum in the Gulf of Mexico, assessing the relative abundance of these fish, and estimating their density and biomass was completed in May. The study was successful in providing a 35 million pound estimate of minimum biomass for adult red drum in the northern Gulf. A spring aerial survey was flown and a survey to replicate the pilot study was initiated in August. Analytical reports from these surveys will be available in the spring of 1988.

An experiment to estimate the size of the red drum spawning stock in the northern Gulf began in the fall of 1986. Approximately 16,000 fish were marked with single and double tags from a chartered purse seiner operating in conjunction with a spotter aircraft. The tagging area was from Mobile, Alabama, to Galveston, Texas. Marking was completed in late spring 1987 and recovery operations were begun in July. As of October 1987, approximately 25,000 adult fish had been examined for tags with about 60 tags being found; close to 100 additional recaptures had been reported by commercial and recreational fishermen. A pond study was conducted jointly with the Alabama Department of Conservation and Natural Resources to determine tag induced mortalities and to provide an initial estimate of tag loss.

A tagging center was established in Miami as part of the Cooperative Red Drum Program. A data management system allows cooperating scientists to retrieve tagging data with personal computer terminals.

Emphasis in 1988 will shift to cooperative work with the states in estimating escapement. An experimental protocol, based on inshore mark/recapture studies coupled with studies to estimate tag reporting biases, was developed and will be implemented by state fishery management agencies. Other cooperative studies designed to increase understandings of red drum biology, age and growth, reproduction, stock identification and spawning stock biomass will also be supported.

REEF FISH

Commercial reef fish landings from the Gulf of Mexico were summarized on a regional basis in quarterly Automated Landings Assessment for Responsive Management reports showing seasonal and yearly trends since 1979. Species routinely covered included groupers and snappers.

Research was initiated on the effects of mesh size on the catch and size of reef fishes. Preliminary results showed a total of 59 species and 521 individuals representing 234 kg were caught in 131 trap hauls. Total weight per trap haul showed no significant trends with mesh size.

This was the fifteenth year of sampling and estimating headboat catches for the U.S. south Atlantic, and the second year for the Gulf of Mexico. In calendar year 1986, samplers measured 37,000 fish in the south Atlantic region and 22,000 in the Gulf. In 1987, the number measured in the south Atlantic was about the same as in 1986, while the number in the Gulf increased slightly.

The annual spiny lobster stock assessment update was completed in July. A workshop was held in Miami during August to address research needed to evaluate growth, mortality, and migration of lobsters.

Reef fish cruises, directed toward developing techniques for stock assessment of adult fish, were conducted in the eastern Gulf in January and in the western Gulf in September. A brief portion of another cruise in March was also used to investigate a possible sampling strategy.

Center reef fish work in the south Atlantic was carried out under contract with the S.C. MARMAP organization. Several years have been devoted to examining sampling techniques and strategies.

SHRIMP

Predictive models were used to forecast annual landings for the Texas and Louisiana offshore brown shrimp fisheries. In Texas each of the three shrimp abundance indices for 1987 were lower than the corresponding indices for 1986. Lower than average numbers of postlarval shrimp entered the bays during March and April. Smaller shrimp were caught in the bays in May as compared to May of 1986, so the shrimp were expected to be small at the opening of the Texas offshore season in mid-July. In the Louisiana forecast prospects for the brown shrimp harvests were similar to the Texas forecast. Indices for waters west of the Mississippi River suggested that catches could be 32.9 million pounds for the 1987-1988 season, which is above the 27.0 million pound average annual yield for the area.

The Gulf of Mexico Fishery Management Council (GMFMC) requested a predictive model for the Tortugas pink shrimp fishery, similar to the ones used to forecast the offshore brown shrimp catches for Texas and Louisiana. This forecast was based on data collected by the Everglades National Park and the National Weather Service. These data have been collected through 1986, and arrangements made to receive future data as they become available. Preliminary regression analysis indicated that June-September water levels in Everglades National Park and fall air temperatures may be important shrimp catch predictors.

Commercial landing and effort data, as well as scientific investigations, were used to evaluate the effect of the Texas Closure on the Gulf brown shrimp fishery. An annual assessment was also made on the effects of the closure of the Tortugas pink shrimp fishery.

At the request of the GMFMC, an inshore economic survey was conducted of shrimp fishermen in the Galveston Bay, Texas and in the Lake Calcasieu, Louisiana areas. The survey was designed to determine variable costs and revenues per trip by vessel size and gear type. A report will be available in February 1988.

Cooperative mark-recapture experiments with Mexico were conducted in the western Gulf during May-August 1986 to examine the flux of brown and pink shrimp across the EEZ boundary between Texas and Tamaulipas, Mexico. Data from these experiments were incorporated into a yield-per-recruit model to contrast numerical loss rates of migrating shrimp and biomass gains estimated by having the Texas Closure in effect for 1978-80 and 1985-86. Although there were instances of southward movement into Tamaulipas waters, the model predicted that losses were neither strong enough nor rapid enough to offset the biomass gains derived from a prohibition of shrimping.

ECONOMIC AND STATISTICS

The general economic conditions in the mackerel, reef fish and spiny lobster fisheries were reviewed. Total annual catches of king mackerel along the Atlantic coast decreased from a peak of 6 million pounds in 1982 to 3.6 million pounds in 1985. Catches

in the Gulf were down 43% in 1985 from the peak in 1981 of 3.07 million pounds. A quota of 870 thousand pounds reduced total catches of king mackerel in the Gulf by about 2.5 million pounds during the July 1986 through June 1987 fishing year. Catches of all reef fish species in the south Atlantic region peaked at 15.2 million pounds in 1982 and decreased to 9.5 million pounds in 1985. Catches also peaked in 1982 in the Gulf at 19.7 million pounds, but the decrease in catches in the Gulf was only 7% to 18.4 million pounds in 1985. The revitalization of the grouper fishery, due largely to the recent growth of bottom longline fishing, maintained the commercial reef fish catches in the Gulf. Like mackerels and reef fishes, the recent landings of spiny lobsters have never exceeded their peak in 1974. Catches in the Florida Keys and the west coast of Florida have remained fairly stable since 1970 with an average of about 5.5 million pounds per year. The estimated number of traps increased about 150% since 1970; however, the estimated number of fishing craft has increased only about 20%.

Analyses of the effects of ciguatera poisoning in snapper and grouper show that when the public is aware of the risk of this poisoning, significant avoidance costs occur in the ex-vessel market. Estimates of these costs are in the range of 5 to 8% decrease in ex-vessel prices respectively for grouper and snapper in Hawaii.

Fishery statistics were collected with emphasis on the collection of size frequency and effort information through the Trip Interview Program. Sampling targets were for mackerels, reef fishes, oceanic pelagics and spiny lobsters.

Port agents provided information on turtle excluder devices to shrimp vessel owners and fishermen, answered questions about new fishery regulations, and supplied information for Market News reports. Surveys were conducted of shrimp fishermen to determine their response to the Texas Closure regulation and of king mackerel fishermen to determine the economic impact of regulations on the fishery.

Data on king mackerel catches, submitted by charterboat captains who were required to submit logbook records, were evaluated. Records were compared to estimates of king mackerel catches made using the survey design of the marine recreational fishery statistical survey. Complete reporting by logbook was not attained and serious discrepancies were discovered in the accuracy of some reports.

Systems support was provided for design and implementation of (1) a charterboat logbook tracking and reporting system, (2) a swordfish logbook system, (3) microcomputer data entry and editing systems for the Trip Interview Program and for Gulf shrimp schedules, (4) a Florida Trip Ticket file for the mainframe computer, (5) the programming for a Cooperative Tagging System and (6) a vessel code book system used for integrating the shrimp code book system used for integrating the shrimp code book and vessel operating file.

FISHERY HABITAT

The adverse impact of turbidity (due to boat traffic) on seagrass distribution, abundance and growth was studied in Hobe Sound, Florida. In Florida Bay, SEFC examined how the production, standing crop, and density of temperate and tropical seagrasses are limited by nutrients and therefore impacted by reduction of nutrient input by reduced freshwater inflow or increased nutrients through eutrophication. A study continued to evaluate habitat creation techniques to determine whether artificially propagated seagrass beds and salt marshes provide fishery habitat values equivalent to the habitats they are to replace. Studies are underway to determine the actual fishery contribution of (1) substituting transplanted seagrass beds for natural beds and (2) substituting one seagrass species for another. A study continued at two salt marsh mitigation sites in

North Carolina to determine how these sites compare with natural marshes as habitat for fishery organism production. Research is being conducted in Texas to determine whether the construction of access channels in transplanted marshes will increase utilization of the inner marsh surface by fishery organisms. In North Carolina, three recontoured dredge material islands were studied to ascertain whether faunal abundances, faunal composition and trophic dynamics compare with natural counterparts of these systems.

Data are being compiled on the life history, distribution and abundance of 35 selected fish and invertebrate species in each of 13 estuaries from Florida Bay to Mobile Bay. The completed data base will be part of the National Estuarine Inventory. Acreages of coastal wetland habitats are being estimated for National Wetland Inventory habitat maps and submerged aquatic vegetation are being mapped in North Carolina sounds from Cape Lookout to the northern tip of Currituck Sound.

Studies continued concerning the predation and survival of postlarval and juvenile penaeid shrimp in estuarine nurseries to determine causes of natural fluctuations in populations.

As part of the NMFS Marine Entanglement Research Program, research was initiated to evaluate samples taken in the northern Gulf of Mexico for the presence of small plastic particles that could be ingested by larval or juvenile fish.

A cooperative program with the NMFS, Sandy Hook Laboratory is continuing to examine hypoxia and nutrient enrichment in New Jersey coastal waters. The abundance of bacteria in sediments impacted by sludge dumping and variability in the water column is being emphasized.

Trace metal studies focused on determining total dissolved and ionic copper and zinc in estuarine waters, bioassay of trace metal pollution in estuaries, monitoring levels of contaminants in 17 estuaries in the southeast (a part of NOAA's National Status and Trends Program), and determining mechanisms of metal regulation in shellfish.

PRODUCT QUALITY AND SAFETY

A biomedical test material facility was completed in March at the Charleston Laboratory. Test materials of defined quality are being produced under a memorandum of understanding with the National Institute of Health and provided at no charge to investigators whose research proposals have undergone stringent peer review. Test materials in production include refined menhaden oil and concentrates of omega-3 polyunsaturated fatty acid ethyl esters. Research is underway to determine the feasibility of dispensing test materials from aerosol cans as microcapsules having a starch or starch-gelatin matrix.

Development of methods for examining volatile oxidation products and for quality assurance of deuterated fatty acids produced by contract began in late fall with the installation of a recently purchased gas chromatograph/mass selective detector. A 12-month storage study of soft-gel encapsulated refined menhaden oil was initiated and storage studies to determine stability of micro-encapsulated refined menhaden oil and ethyl ester concentrates will be initiated in the near future. A computerized data base containing analytical data originating from quality assurance/quality control analyses of test materials and materials from storage stability studies was developed.

Experimental frankfurters containing 15% minced fish were prepared and shipped to the USDA in a cooperative study on the potential nitrosamines problem. The NMFS nutritional

data base was compressed and stored on a personal computer with five or more megabytes of memory under a Clemson University Sea Grant project. An iced and frozen storage study was conducted on hybrid striped bass from the South Carolina Waddell Mariculture Center. Sensory and chemical tests were also conducted every two months on vacuum packaged or glazed and boxed skinless fillets and headed and gutted fish stored at -20C. Good storage stability is indicated for these products. Sensory evaluations, proximate compositions and fatty acid profiles were also determined for cultured red drum from the South Carolina Waddel Center.

A six month storage stability study on frozen menhaden surimi prepared from both Gulf and Atlantic menhaden was completed. The surimi, prepared in the experimental processing laboratory, exhibited good flavor stability while a frozen washed mince which was not stabilized with cryoprotectants developed a relatively strong "characteristic protein flavor."

Efforts focusing on methods for alleviating the threat of ciguatera poisoning involved: (1) increasing the production of maitotoxin, (2) attempting to purify maitotoxin, (3) collaborative efforts to develop both immunological and cell rector site mechanisms for field detection of cigua-maitotoxin and (4) estimating the economic impact of ciguatera incidence on selected commercial fisheries.

A model seafood surveillance program, administered by NMFS Headquarters, is being designed for the certification and surveillance of fishery products to protect the consuming public in areas of safety, quality and economic fraud. Key aspects of the program include hazard analyses at critical control points during the handling of products and methods to assure equitability in surveillance of imported and domestically produced products.

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

ACTIVITIES DURING 1987

BILLFISH

During the latter part of 1987, the five Councils, charged with preparation of an FMP for billfish, reached general agreement on the provisions of a plan. The Council held eight public hearings on a draft FMP prepared by the South Atlantic Council. After reviewing public comment, the Council took final action on the FMP and submitted it to the South Atlantic Council for submission to the Secretary of Commerce. Principal management measures are as follows:

- o Prohibition on sale of billfish
- o Prohibition on possession of billfish on board longline and net vessels
- o Size limits which reduce recreational landings of marlin by 50 percent and sailfish by 30 percent
- o Rod and reel only allowable gear in directed fishery
- o Prohibition on imports of billfish taken from North Atlantic stocks

GROUND FISH

The Council reviewed analyses on trawl bycatch of groundfish prepared by NMFS.

COASTAL PELAGICS (MACKERELS)

The Council completed Amendment 2 to the FMP which was submitted to the Secretary in January and became effective in July. Based on a NMFS stock assessment prepared in March, the Councils set TAC and allocations for king and Spanish mackerel for 1987-1988. The changes in TAC for Spanish mackerel resulted in a reduction in commercial allocations and a Gulf-wide bag limit of three fish for the recreational sector. During the period October through December, all of the allocations for Gulf group king and Spanish mackerel were reached and these fisheries in the EEZ were closed for the remainder of the fishing year (until June 30, 1988). The Council reviewed electrophoretic information collected by NMFS which suggests the Gulf group king mackerel could be divided into east and west components.

RED DRUM

The Council completed and submitted to the Secretary Amendment 1 to the Secretarial FMP. This amendment, which became effective in October, continued the FMP prohibition on a directed fishery, prohibited harvest from the EEZ off Florida and Texas, provided for a commercial bycatch allocation of 300,000 pounds and a recreational bag limit of one fish per person per trip under a total recreational allocation of 325,000 pounds.

In October, the Council received the NMFS stock assessment of the resource. Based on the stock assessment, the Council's stock assessment group recommended that ABC for the

EEZ be set at zero and that the Council recommend to the states that the escapement rate for juvenile fish be set at 30 percent. The Council instructed its staff to initiate development of Amendment 2 to the FMP to set TAC equal to zero in the EEZ and recommend the Regional Director close the EEZ to harvest by emergency rule.

REEF FISH

The Council continued development of Amendment 1 to the FMP. The stock assessment prepared by NMFS and provided to the Council had some technical errors and the Council suspended action on addressing the amendment while NMFS revised the stock assessment and prepared an economic analysis for the fishery.

SHRIMP

The Council completed draft Amendment 4 to the FMP, held public hearings and submitted the final Amendment to the Secretary for implementation. Amendment 4 would set a 100-count limit for white shrimp in the EEZ and modify the criteria used in setting the cooperative Texas closure and Tortugas Sanctuary closure.

After review of the NMFS analyses, the Council set the extent of the cooperative Texas closure for 1987-1988 at 15 nautical miles. Based on similar analyses, the Council continued the Tortugas Sanctuary closure with no charges.

SPINY LOBSTER

The Council completed Amendment 1 to the FMP which was implemented in July. The Regional Director (RD), NMFS, reserved implementation of several provisions pending adoption of similar rules by the Florida Marine Fisheries Commission. The study on limited entry systems for the fishery was completed and reviews held with the state and fishing industry. Council and state action on the study provisions was deferred to 1988.

SWORDFISH

The Council's swordfish committee participated in technical discussions with the South Atlantic Council on revision of the measures of the FMP disapproved by the Secretary.

OTHER ACTIVITIES

HABITAT PROTECTION

The Council adopted a motion to budget for two meetings of each of the Habitat Advisory Subpanels and one meeting of the full panel each year. The current year, the Council budget could support at least one or more of these suggested meetings. The Council endorsed the Gulf Initiative sponsored by EPA. The Gulf Initiative is designed to provide coordination among the environmental interests in the Gulf of Mexico, and establish a more effective force for environmental conservation.

The Council convened separately its Mississippi/Louisiana Habitat Advisory Panels and its Texas Habitat Advisory Panel which resulted in the following action:

- o The Council took the position that all marsh management plans and their implementing projects in Louisiana including mariculture schemes should be held in (abeyance) unless it has been shown that such plans have no net adverse impact on natural populations of fish and wildlife resources. This position was communicated to the Environmental Protection Agency, the U.S. Army Corps of Engineers (COE), the U.S. Soil Conservation Service, and the Louisiana Department of Natural Resources, urging these agencies to use their permitting or assistance authorities to implement this policy. The Council further urged these agencies to work together to develop a programmatic Environmental Impact Statement (EIS) for marsh management plans in Louisiana's coastal zone that would provide the information necessary for identifying the trade-offs among competing natural resource population uses that are necessary in determining "no net adverse impacts."
- o The Council expressed concern to the COE that the Galveston Bay Area Navigation Study (GBANS) recommended projects would have adverse impacts on fishery resources and that these impacts would be exacerbated by a number of other planned or authorized federal projects that would impact the Galveston Bay system. The Council urged development of a comprehensive EIS to assess the overall impact of all these projects. Finally, the Council determined it would be necessary to develop an agenda and hold a public hearing for the purpose of determining if the Final EIS for the GBANS had, in the opinion of state and federal agencies and individuals, satisfactorily addressed concerns about the project. The Council proposed holding the hearing in Clear Lake, Texas, in February 1988.

1988 SEAMAP-GULF OF MEXICO MARINE DIRECTORY

Fishery-Independent Survey Activities

SOUTHEAST AREA MONITORING AND ASSESSMENT PROGRAM

Walter M. Tatum, Chairman

GULF STATES MARINE FISHERIES COMMISSION

Post Office Box 726

Ocean Springs, Mississippi 39564

INTRODUCTION

The Southeast Area Monitoring and Assessment Program (SEAMAP) is a cooperative State/Federal/university program for the collection, management and dissemination of fishery-independent data (data collected without direct reliance on any commercial or recreational fishery) and information in the southeast region. Presently operational are the SEAMAP-Gulf and SEAMAP-South Atlantic components; with the newly-formed SEAMAP-Caribbean in the Strategic Planning stage.

This Marine Directory, incorporated into the Thirty-eighth Annual Report of the Gulf States Marine Fisheries Commission, updates information contained in the 1983, 1984, 1985, 1986 and 1987 SEAMAP Marine Directories, and describes survey activities (ongoing programs, vessel schedules, etc.) throughout the Gulf of Mexico. The SEAMAP Program is managed through the office of the Gulf States Marine Fisheries Commission.

Agencies responding to the 1988 Directory were contacted in March 1988 and requested to provide current information or projected changes in their survey programs. Tables 1, 2 and 3 are condensed summaries of information submitted by responding agencies and organizations, indicated as either Federal, State or university activities.

Representatives of agencies contributing information to past directories are listed alphabetically in Appendix A by organizational category. The SEAMAP Subcommittee would like to express its appreciation to all organizations responding to the request for information. Other organizations conducting fishery-independent marine or estuarine surveys are encouraged to contact the SEAMAP Program for inclusion in future listings. The Directory will be updated each year, with copies supplied to participating organizations.

Appendix B lists published documents which have been produced by the SEAMAP Program and are available through the Gulf States Marine Fisheries Commission. Questions and requests for detailed information concerning the Directory or the SEAMAP Program should be referred to:

Tom Van Devender
SEAMAP-Gulf Coordinator
Gulf States Marine Fisheries Commission
Post Office Box 726
Ocean Springs, Mississippi 39564
(601) 875-5912

TABLE 1. SUMMARY OF INFORMATION PROVIDED BY FEDERAL AGENCIES

AGENCY	TARGET SPECIES	LIFE STAGES SAMPLED	TYPES OF FISHERY-INDEPENDENT SAMPLING		ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR		SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPENDENT ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE	
			AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING				PLANKTON
NOAA NMFS/SEFC Mississippi Labs, Pascagoula (MS)	Groundfish (shrimp, spot, croaker, catfish, trout)	Subadults-adults	Gulf of Mexico South Atlantic	Territorial; open ocean (EEZ)	172' OREGON II	107/yr toward target species; 102/yr total sea days	600/yr trawl stations, 180 plankton/yr 180 neuston/yr	Standard 40' semibel-ton trawl; High-opening fish trawl	Bongo array with .333-mm mesh nets; 1 x 2-m neuston net with .947mm mesh	Random (stratified) 5-60 fm	None	None
	Reef fish (snapper, grouper, tilefish)	Adults	Gulf of Mexico; South Atlantic; Caribbean	Territorial; open ocean (EEZ)	OREGON II; 127' CHAPMAN	87/yr toward target species	150 longline sets/yr	Longline; traps; gill nets	Varies	None	None	
	Latent resources (coastal herring, squid, butterfish)	Subadults-adults	Gulf of Mexico	Territorial; open ocean (EEZ)	CHAPMAN	145/yr toward target species 160/yr total sea days	400/yr trawl stations	High-opening & mid-water bottom trawls	Transects	Expansion	None	
NOAA NMFS/SEFC Miami Lab (FL)	All recreationally & commercially important species; reef fish	Larvae; juvenile; adult	Gulf of Mexico; SW FL; SE FL	Territorial; open ocean (EEZ); internal	OREGON II; CHAPMAN; various small boats	120/yr	3500/yr	Fish traps	Bongo nets 60 & 20 cm with .333-mm mesh; neuston 1 x 2-m with .947-mm mesh	Systematic, grid basis; long-term station selection; estuary entrances; reefs	Continuation of SEAMAP; continuation of SE & SW FL monitoring	Billfishes; tunas.
NOAA NMFS/SEFC Beaufort Lab (NC)	Atlantic croaker; spot	Subadults-adults	Charlotte Harbor; Tampa, Apalachicola, Escambia, Mobile, Barataria, Corpus Christi, Galveston, San Antonio Bays; MS Sound; MS Delta; Laguna Madre	Territorial	133' FERREL	70/yr	130 fish per sampling site	30' otter trawl	None	Samples representative of general contaminant levels at each sampling site (NOAA Status & Trends Program; National Benthic Surveillance Project; organic contaminants, trace metals, histopathology)	Project funded on yearly basis	None
NOAA NMFS/SEFC Galveston Lab (TX)	Peneaid shrimp; bottomfish; estuarine dependent spp.	Postlarvae-adults	Gulf of Mexico	Internal; EEZ	OREGON II (Texas Closure); small boats	257/yr	1996/yr	Other trawls 10'-40'; beam trawl; drop sampler		Random stratified for Texas Closure; long-term studies for estuarine ecology	None	None
	Sea turtles	Juveniles	Gulf of Mexico	Internal; EEZ-oil and gas platforms	Bay boats; helicopters; crew boats; zodiac	12/yr 45/yr	96 Various	Otter trawls 60'-80' None	None None	Random Random	None None	None None
	Kemp's ridley sea turtles	Hatchlings-yearlings	Gulf of Mexico (release of tagged turtles)	Territorial EEZ (Texas)	U.S. Coast Guard Cutter; Univ. Texas R/V LONGHORN	2	1-2 releases per year	None	None	None	None	None
	Sea turtles	Stranded juveniles-adults	SW LA; TX	Coastline beaches	All terrain vehicles; dirt bikes; outboard boats	50	Variable	None	None	Twice-monthly stratified random sampling by beach strata	None	None
NOAA NMFS/SEFC Panama City Lab (FL)	King & Spanish mackerel	Subadults-adults; larvae	Gulf of Mexico; South Atlantic	Territorial; open ocean (EEZ)	OREGON II; CHAPMAN; small boats	50/yr	Various	Trawls	Bongo nets 60 & 20 cm with .333-mm mesh; neuston 1 x 2-m with .947-mm mesh	Systematic, grid basis; long-term station selection; oceanic discontinuities	Continuation of SEAMAP;	None

TABLE 1. (CONTINUED)

AGENCY	TARGET SPECIES	LIFE STAGES SAMPLED	TYPES OF FISHERY-INDEPENDENT SAMPLING		TYPES OF PLATFORMS	ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR		SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPEND. ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
			AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE		NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON			
U.S. Dept. of Interior, Fish & Wildlife, LSU, Baton Rouge, LA	All economically important estuarine-dependent fishes & crustaceans	Larvae-juveniles	SW LA; south central LA	Estuarine	35-hp outboard	Varies	Once every two weeks	Custom-designed shallow marsh trawl; traps;	None	Systematic, long-term station selection; short-term special studies	Depending on funding, will remain the same	None
U.S. Army Corps of Engineers, Mobile, AL	All commercially & recreationally important species	All stages	Mobile Bay; MS Sound; Gulf of Mexico to the 20-fm contour	Internal; territorial	Charter research vessel; small boats	Varies with project	Varies with project	Varies	None	Systematic, random, short-term special studies	None	None
USDI MMS/GOM OCS Region New Orleans, LA	Projects are as follows:											
MS/AL Shelf Study	All invertebrates, fishes	All	Whole MS/AL shelf	Shelf to 200 m	R/Y TOMMY MURRO	10/yr for 3 yr	24	24	Trawl; grab	Winter & summer, 9 stations	Study program ends in 1989	None
FL Bay Seagrass Mapping	Seagrasses	All	FL Bay	Shelf to 30 m	R/Y BELLOWS	7	9	9	Diver; photo	One cruise	Study ends in 1988	None
Physical Oceanography	None	None	Gulf-wide	Shelf & slope	R/Y PELICAN; drift buoys; ships-of-oppor.	100's	--	--	Hydrographic records	Moorings; X-sects	Study ends in 1988	None
Sea Turtle Study	All turtles	Adult; Juvenile	LA	Shelf to 100 m	Aerial over flights	84	--	--	Photos; videos	Stratified X-sects	Sea turtle study conducted under Interagency Agreement with NMFS	None

TABLE 2. SUMMARY OF INFORMATION PROVIDED BY STATE AGENCIES

AGENCY	TARGET SPECIES	LIFE STAGES SAMPLED	TYPES OF FISHERY-INDEPENDENT SAMPLING			ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GFAR		SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPENDENT ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
			AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON			
Alabama Dept. of Conservation & Nat. Resources	All penaeid shrimp; southern flounder; Gulf menhaden; spot; croaker; red drum; seatrout; blue crab	Larvae-adults	AL marshes to territorial sea	Internal; territorial; EEZ	22' Tiara, (2) 90-hp; 23' Seacraft, (2) 150-hp; 32' Laffitte	110/yr	450/yr	50' bag seine; 16' otter trawl	6' beam plankton trawl; neuston	Long-term station selection, effort varies according to spawning season of target species	Increase effort to determine year-class strength of target species and determine habitat preference of juvenile target fish species	Increase level of sampling in AL territorial sea
Florida Dept. of Natural Resources	Red drum; spotted trout; snook; king mackerel; mullets; gag grouper; tarpon; stone crab; blue crab; spiny lobster; oysters; hard clam	All stages, larvae-adults	FL waters & offshore	Internal; territorial; EEZ	37' BONNIE "E"; 24' T-craft inboard; 3 small out-boards used for inshore sampling; 5 mullet skiffs; 34' Allmand; 24' tunnel boat; 19' Monark; 2-17' Boston Whalers; 85' HERNAN CORTEZ II; 20' Boston Whaler; 25' Boston Whaler; 3-20' HAKO; 18' Monarch; 20' mullet skiff; 16' skiff	Varies	Varies with project Weekly intervals (annually)	35' trawl 100' bag seine; benthic sled with net; 600' x 8' trammel net; lobster & crab traps	bongo array	Systematic, random (stratified), grid basis; long-term station selection, short-term special studies	As per Florida Marine Fisheries Commission	Mainly applies to implementation of research phases on current species or topics with additional personnel and increased funding
Louisiana Dept. of Wildlife & Fisheries	All penaeid shrimp; finfish; oysters	Larvae-adults	LA inshore waters; territorial seas; EEZ	Internal; territorial	13-17' out-boards for 6' trawl; 30' in-boards for 16' trawls; 85' vessel (LOOP) for 50' trawl Leased vessel 40' trawl	167/yr state 92/yr LOOP 16/yr	Plankton, 528/yr; Benthos, 56/yr; Trawls: 800/yr 1288/yr 494/yr 72/yr 12/yr 96/yr 250/yr 1500/yr 100/yr 576/yr 135/yr 144/yr	1/2-m surface ring nets (.153-mm & .363-mm) 1-m surface ring (.363-mm) 60-cm bongo nets (.333-.363-mm) neuston (.948-mm) Otter Trawls: 6' (inshore) 16' (inshore) 16' (offshore) 50' (offshore) 50' (inshore) 40' (offshore)	Long-term station selection, LOOP monitoring, and stratified random sampling for SEANAP (40' trawls and plankton)	Increase territorial sea sampling; increase emphasis on commercial finfish	Adult pelagic finfish in open Gulf waters	
Mississippi Bureau of Marine Resources	All penaeid shrimp; speckled trout; redfish; mullet; black drum; flounder; snapper; grouper; white trout; so. kingfish; menhaden; blue crab; cobia; Spanish mackerel; king mackerel	Juveniles-adults	MS territorial sea	Internal; territorial; (EEZ)	32' Laffitte; 19' Proline; 65' oyster dredge boat; 24' Boston Whaler; 18' Boston Whaler	50/yr; 10/yr; 50-60/yr 50/yr	Varies; oyster 6/mo; shrimp 10-15/mo	16' trawl; oyster tongs and dredge; gill nets	None	Long-term station selection, varies with opening and closing of areas	Increase tagging activities	

TABLE 2. (CONTINUED)

			TYPES OF FISHERY-INDEPENDENT SAMPLING		ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR					
AGENCY	TARGET SPECIES	LIFE STAGES SAMPLED	AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON	SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPEND. ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
Texas Parks & Wildlife Dept.	All penaeid shrimp; all other species	Juveniles-adults	TX internal coastal waters; territorial sea	Internal; territorial	30'-45' inboards; 18' outboard; skiffs	365/yr	1584/yr 1680/yr 960/yr 756/yr 5232/yr 504/yr	16' bag seines (shoreline); 20' trawl (bay, open water); 20' trawl (Gulf waters); gill nets for adult finfish (along shore); oyster dredge; beach seine	None	Random, grid basis	None	Adult finfish in open Gulf waters

TABLE 3. SUMMARY OF INFORMATION PROVIDED BY UNIVERSITIES

			TYPES OF FISHERY-INDEPENDENT SAMPLING			ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR				
UNIVERSITY	TARGET SPECIES	LIFE STAGES SAMPLED	AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON	SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPENDENT ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
FLORIDA												
Florida State Tallahassee	Benthic in-fauna; epibenthic fishes & invertebrates	Larvae-adults	NE Gulf of Mexico	Internal; territorial	(3) 55-hp 25' skiffs; outboard	48/yr	Monthly samples, both trawl & environ.	Standard 5-m otter trawl	80-um plankton net	Systematic, random long-term station selection; short-term special studies	More environmental experimentation	Areas: Apalachicola Bay system & Apalachee Bay; species: all species in those areas
Univ. West Florida Pensacola	Demersal vertebrates & invertebrates	Subadults-adults	NE Gulf of Mexico	Estuarine	18' skiff	7/yr trawl; 14/yr plankton neuston	50/yr; 140/yr	16' otter trawl	2 (1-m) bongos 3 (1-m) neustons	Systematic, random (stratified)	More environmental assessment	None
Florida Sea Grant Gainesville	Oysters; spiny lobster; swordfish; tilefish; snowy grouper; shark; clams; shrimp; scallops; golden crabs; snook	All stages	FL waters	Estuarine; offshore	Industry, NMFS and F.I.O. contract vessels	Varies with project	Varies with project			Varies with project	None	None
Florida Institute of Oceanography St. Petersburg	All species	All stages	Gulf; Caribbean; South Atlantic	Internal, territorial	SUNCOASTER; BELLOMS	20-30/project	Varies	40' otter trawl; Tucker trawl; shellfish dredge	Various plankton nets	Random, long-term station selection; short-term special studies	To continue with SEAMAP; Expanded environmental sampling	None
University of Florida Gainesville	Offshore: deep-water crabs & lobsters; nearshore: stone crabs	Offshore: adults; juveniles; nearshore: adults, sub-adults	Offshore & nearshore, eastern Gulf of Mexico	Offshore: continental slope nearshore: internal, territorial	Offshore: SEWARD JOHNSON; OREGON II; industry vessel; submersible; nearshore: 24' inboard-outboard	Offshore: 7/yr; nearshore: 30*/yr	Offshore: 96 transects 2 trawl tows 5 trap lines nearshore: 5 transects/day	Otter trawl; various traps; scuba and 250-m transect line		Offshore & nearshore: intensive sampling during mating season	None	None
ALABAMA												
Marine Environmental Sciences Consortium (Dauphin Is. Sea Lab & U. Alabama)	Spotted sea-trout; white sand trout; croaker; red drum	All stages	MS Sound; Mobile Bay; Perdido Bay	Estuarine	40' DEBORAH "B"; 14' skiff; 23' outboard	At least monthly	Monthly at 4 sites & supplemental	Fyke net; drop net; bag seine	.505-mm mesh beam trawl	Target areas: grass beds	None	None
Mississippi-Alabama Sea Grant Consortium Ocean Springs (MS)	Red drum; blue crabs; stone crabs; oysters	Vertebrates: larvae; invertebrate: all stages	Northern Gulf of Mexico; MS Sound; Mobile Bay	Territorial; EEZ; estuarine; coastal	96' TOMMY MUMRO; skiffs; industry	Varies with project	Varies with project	Various types of crab pots; tonging for oysters; closed, recirculating sea-water system for crabs; opening/closing plankton trawl	Tucker trawl (.202-mm and .333-mm mesh nets); 60-cm bongo net	Varies with project	None	None

TABLE 3. (CONTINUED)

			TYPES OF FISHERY-INDEPENDENT SAMPLING		ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR					
UNIVERSITY	TARGET SPECIES	LIFE STAGES SAMPLED	AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON	SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPEND. ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
MISSISSIPPI												
Univ. So. Mississippi Hattiesburg	Freshwater prawn; all estuarine finfish; centrarchids	All stages	MS estuarine; northern Gulf; Biloxi Bay	Estuarine; territorial	Various small skiffs (outboard)	Varies	Biweekly to monthly	Standard basic equipment	Standard basic equipment	Short-term special studies	Increase development of a marine science program	None
Gulf Coast Research Laboratory Ocean Springs	All penaeid shrimp; blue crab; croaker; spot; seatrout; catfish; Gulf menhaden; sea mullet; Atlan. bumper; butterfly; cutlassfish; red drum; squid; golden Gulf crabs	Larvae-adults	MS territorial sea; offshore to 300 fm	Internal; territorial; (EEZ)	96' TOMMY MUMRO; (5) 20' skiffs; 35' HERMES; 40' NEREUS;	Semi-monthly and monthly	216 trawl stations/yr	50' bag seine; 36' otter trawl; 16' otter trawl; 6' Renfro beam trawl; variable mesh gill net sampler; 40' shrimp trawl; 80' high-rise net; crab traps	Tucker trawl; neuston; bongo	Long-term station selection; stratified-random	Fishery Division anticipates its program of monitoring & assessment over the long term, with appropriate increases in intensity & scope if funds become available; longline for pelagic fishes; bottom longline; deepwater traps for crabs	None
Mississippi-Alabama Sea Grant Consortium Ocean Springs	Red drum; blue crabs; stone crabs; oysters	Vertebrates larvae; invertebrates: all stages	Northern Gulf of Mexico; MS Sound; Mobile Bay	Territorial; EEZ; estuarine; coastal	96' TOMMY MUMRO; skiffs; industry	Varies with project	Varies with project	Various types of crab pots; tonging for oysters; closed, recirculating seawater system for crabs; opening/closing ichthy. trawl	Tucker trawl (.202-mm and .333-mm mesh nets); 60-cm bongo net	Varies with project	None	None
LOUISIANA												
Univ. New Orleans New Orleans	Blue crab; oysters; marine commercial finfish	All stages	Lake Pontchartrain; Lake Borgne	Estuarine		Varies				Short-term special studies	Analyze commercial fish populations by use of electrophoresis; studies of oyster nutrition and parasitology	None
McNeese St. University Lake Charles	No sampling at this time							15-m balloon otter trawl,	3-l Van Dorn bottle; 67-cc bongo array; .333-mm & .505-mm mesh nitex nets; Ring net 1.0 m with .353 mesh	Short-term special studies	None	None
Nicholls St. University Thibodaux	Oysters	All stages	Terrebonne Bay; Barataria Bay	Estuarine	21' skiff; 30' oyster dredge boat	48/yr	144/yr	Oyster dredge		Random, long-term station selection	2 more years with oyster project before it ends	None

TABLE 3. (CONTINUED)

			TYPES OF FISHERY- INDEPENDENT SAMPLING			ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR				
UNIVERSITY	TARGET SPECIES	LIFE STAGES SAMPLED	AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON	SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPEND. ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
LOUISIANA												
Louisiana St. University Baton Rouge	Red drum	Juveniles	Saltwater impound- ment near Grand Isle	Estuarine	None	10	more than 200/yr	Hook-and- line	None	Short-term, random at fixed station	Short-term special study to be applied to long- term tagging studies	None
	Red drum	Adults	Nearshore Gulf of Mexico off eastern LA	Coastal	Varies	Varies	Varies	Varies	Bongo nets	Sample in areas of historic fishing activity	Two additional years	None
	King mackerel; Spanish mackerel; black drum; tunas; snapper; grouper; red drum; striped mullet	Juveniles; adults	Louisiana	Estuarine; coastal	Varies	Varies	Varies	Varies	None	Areas of commer- cial and recrea- tional activity	On-going	None
	Drums; seatrouts; croaker; spot	Eggs; larvae	Western LA continental shelf	Coastal	Ocean-going SEAMAP vessels	150	185	None	Modified bongo net	Stratified, short- term station selection	Short-term special study	None
	Red drum; caramids; clupeids; scomberids	Larvae	Gulf of Mexico	Gulf-wide	Ocean-going SEAMAP vessels	Varies	Varies	None	Bongo array	Partially randomized stations Gulf-wide	Next want to look at MS River Delta plume effects on lar- va recruitment and transport	None
	Southern flounder; cobia; tarpon; black drum; greater amberjack	Juveniles; adults	Louisiana	Estuarine; coastal	Varies	40-60	50-1000	Hook & line	None	Sample fish landed in rodeos	Beginning of a long-term program	Other species are being considered
Louisiana Universities Marine Consortium Cocodrie	Zooplankton; benthos; bottomfish	All stages	Terrebonne and Tim- balier Bays; Inner Cont. Shelf	Internal; territorial	110' PELICAN; 58' R/V ACADIANA; small out- boards; 19-m, 32-m vessels	Varies	Varies	5-m otter trawl	.333-mm & .505-mm mesh bongo nets	Fixed station transects	None	None
TEXAS												
Univ. of TX, Austin Marine Science Institute, Port Aransas	Shelf & bay species	All stages	Internal; territorial waters	Internal; territorial; (EEZ)	105' LONGHORN 57' KATY	100/yr	Varies with project	42' semi- balloon shrimp trawl; 40' semi- balloon otter trawl	12' x 24" plankton net	Short-term special studies	Institute ex- pansion on all present programs	None
Texas A & I Kingsville	All inshore bay species	All stages	Corpus Christi to Brownsville	Internal; coastal		24/yr	150/yr			Short-term special studies	None	None

TABLE 3. (CONTINUED)

			TYPES OF FISHERY-INDEPENDENT SAMPLING			ANNUAL EFFORT DEVOTED TO FISHERY-INDEPENDENT SAMPLING BY ACTIVITY IN:		TYPES OF GEAR				
UNIVERSITY	TARGET SPECIES	LIFE STAGES SAMPLED	AREA SAMPLED	GEOGRAPHIC AREAS OF IMPORTANCE	TYPES OF PLATFORMS	NUMBER OF DAYS	NUMBER OF SAMPLES	FISHING, TRAWLING	PLANKTON	SAMPLE STRATEGY FOR DATA COLLECTION	ANTICIPATED CHANGES IN DIRECTION OF FISHERY-INDEPEND. ACTIVITIES OVER NEXT 5 YEARS	HIGH PRIORITY SPECIES PRESENTLY UNABLE TO SAMPLE
TEXAS												
Texas A & M College Station and Galveston	All macro-crustaceans and finfish	All stages	NW Gulf off LA & TX	Internal; territorial; (EEZ)	71' EXCELLENCE II; 47' ROAMIN EMPIRE	Varies	Varies with project	34' & 50' semi-balloon trawls	Bongo net with .333-mm & .505-mm mesh	Short-term special studies	None	None
Pan American University, Coastal Studies Lab, So. Padre Island	All finfish of Laguna Madre, benthic macrofauna of Laguna Madre	All stages	Corpus Christi to Brownsville	Laguna Madre; Gulf near-shore	Shallow-draft bay boats	48/yr	Biweekly and monthly depending on project	Otter trawls & bag seines	Plankton tows	Long-term baseline studies	Intensive studies of individual species	None

APPENDIX A

MARINE AGENCY CONTACTS

FEDERAL AGENCIES

U.S. DEPARTMENT OF COMMERCE
NOAA/NATIONAL MARINE FISHERIES SERVICE
Southeast Fisheries Center

Dr. Brad Brown, Acting Director
75 Virginia Beach Drive
Miami, Florida 33149
(305) 361-4284

Miami Laboratory
Dr. Walter Nelson
75 Virginia Beach Dr.
Miami, FL 33149
(305) 361-4225

Galveston Laboratory
Dr. Edward Klima
4700 Avenue "U"
Galveston, TX 77550
(713) 766-3500

Mississippi Laboratories
Dr. Andrew J. Kemmerer
Pascagoula Facility
P.O. Drawer 1207
Pascagoula, MS 39568
(601) 762-4591

Panama City Laboratory
Mr. Eugene Nakamura
3500 Delwood Beach Rd.
Panama City, FL 32407
(904) 234-6541

National Space Technology
Laboratories
NSTL Station, MS 39529
(601) 688-3650

Beaufort Laboratory
Dr. Ford Cross
Beaufort, NC 28516
(919) 728-4595

Economic and Statistics Office
Dr. Albert Jones
75 Virginia Beach Dr.
Miami, FL 33149
(305) 361-4259

FEDERAL AGENCIES

U.S. DEPARTMENT OF INTERIOR

Minerals Management Service
Mr. H.P. Sieverding
1201 Elmwood Park Blvd.
New Orleans, LA 70123-2394
(504) 736-2755

Dr. Robert M. Avent
Continental Slope Study
Florida Shelf Ecosystems Study
(504) 736-2899

Dr. Murray Brown
Circulation Modelling Program
Field Measurements Program
(504) 736-2901

U.S. Fish and Wildlife Service

Dr. Roy Perez
c/o Corpus Christi State University
P.O. Box 338
6300 Ocean Drive
Corpus Christi, TX 78412
(512) 888-3346

Mr. Barton Rogers
Louisiana Cooperative Fishery
Research Unit
Louisiana State University
Baton Rouge, LA 70803
(504) 385-0380

Dr. Susan Rees, PD-EC
U.S. Army Corps of Engineers
P.O. Box 2288
Mobile, AL 36628
(205) 690-2511

GULF AND SOUTH ATLANTIC FISHERIES DEVELOPMENT FOUNDATION, INC.

Mr. Tom Murray, Executive Director
5401 W. Kennedy Blvd.
Suite 571
Tampa, FL 33609
(813) 870-3390

STATE AGENCIES

ALABAMA DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES

Mr. Walter M. Tatum
Drawer 458
Gulf Shores, AL 36542
(205) 968-7576

FLORIDA DEPARTMENT OF NATURAL RESOURCES

Mr. J. Alan Huff
100 8th Avenue, S.E.
St. Petersburg, FL 33701
(813) 896-8626

LOUISIANA DEPARTMENT OF WILDLIFE AND FISHERIES

Mr. Barney Barrett
P.O. Box 15570
Baton Rouge, LA 70895
(504) 765-2372

MISSISSIPPI DEPARTMENT OF WILDLIFE CONSERVATION

Bureau of Marine Resources
Dr. Frederick Deegen
P.O. Drawer 959
Long Beach, MS 39560
(601) 864-4602

TEXAS PARKS AND WILDLIFE DEPARTMENT

Dr. Gary Matlock
4200 Smith School Road
Austin, TX 78744
(512) 389-4863

UNIVERSITIES

SEA GRANT PROGRAMS

Florida Sea Grant Office
Dr. James Cato, Director
Dr. Bill Seaman, Assoc. Director
Building 803
University of Florida
Gainesville, FL 32611
(904) 392-5870

Mississippi-Alabama Sea
Grant Consortium
Dr. James Jones
P.O. Box 7000
Ocean Springs, MS 39564-7000
(601) 875-9341

Louisiana Sea Grant Office
Dr. Jack Van Lopik, Director
Mr. Ronald Becker, Assoc. Director
Center for Wetland Resources
Louisiana State University
Baton Rouge, LA 70803
(504) 388-1558

Texas Sea Grant Office
Mr. Tom Bright, Director
Texas A & M University
College Station, TX 77843
(409) 845-3854

ALABAMA UNIVERSITY PROGRAMS

Alabama Marine Environmental
Sciences Consortium
Dauphin Island Sea Lab
Dr. George F. Crozier
P.O. Box 369-370
Dauphin Island, AL 36528
(205) 861-2141

Talladega College
Dr. Arthur Bacon
Biology Department
Talladega, AL 35160
(205) 362-0206

University of South Alabama
Dr. Robert Shipp
Department of Biological Sciences
Mobile, AL 36683
(205) 460-6101

FLORIDA UNIVERSITY PROGRAMS

Florida Institute of Oceanography
Mr. Dean Milliken
830 First St., South
St. Petersburg, FL 33701
(813) 893-9100

Florida State University
Dr. Robert Livingston
Department of Biological Sciences
Tallahassee, FL 32306
(904) 644-1466

UNIVERSITIES

FLORIDA UNIVERSITY PROGRAMS (CONTINUED)

University of Florida
Dr. Ron Labisky
School of Forest Resources
and Conservation
Gainesville, FL 32611
(904) 392-4851

University of Miami
Dr. Frank Williams
Rosensteil School of Marine
and Atmospheric Sciences
4600 Rickenbacker Causeway
Miami, FL 33149
(305) 284-2211

University of South Florida
Dr. John Briggs
Department of Marine Science
140 Seventh Avenue, South
St. Petersburg, FL 33701
(810) 893-9130

University of West Florida
Dr. Steve Bortone
Department of Biology
Pensacola, FL 32514
(904) 474-2000

LOUISIANA UNIVERSITY PROGRAMS

Louisiana State University
Dr. Mike Wascom
Coastal Fisheries Institute
Center for Wetland Resources
Baton Rouge, LA 70803
(504) 388-6513

Louisiana Universities
Marine Consortium (LUMCON)
Dr. Donald Boesch
Chauvin, LA 70344
(504) 851-2800

McNeese State University
Dr. Robert Maples
Department of Biological Sciences
4100 Ryan St.
Lake Charles, LA 70609
(318) 437-5663

Nicholls State University
Dr. John Green
Department of Biological Sciences
Thibodeaux, LA 70301
(504) 446-8111

University of New Orleans
Dr. Thomas M. Sniat
Department of Biological Sciences
New Orleans, LA 70148
(504) 286-6307

University of Southwestern
Louisiana
Dr. William Reese
Department of Biological Sciences
Box 42451
Lafayette, LA 70504
(318) 231-6748

MISSISSIPPI UNIVERSITY PROGRAMS

Gulf Coast Research Laboratory
Dr. Thomas McIlwain
P.O. Box 7000
Ocean Springs, MS 39564
(601) 875-2244

University of Southern Mississippi
Dr. Steve Ross
Department of Biological Sciences
Hattiesburg, MS 29401
(601) 266-4928

UNIVERSITIES

TEXAS UNIVERSITY PROGRAMS

Pan American University
Dr. Frank W. Judd
Coastal Studies Laboratory
P.O. Box 2591
South Padre Island, TX 78597
(512) 761-2644

Texas A & I University
Dr. Allan H. Chaney
Department of Biology
Campus Box 158
Kingsville, TX 78363
(512) 595-3803

Texas A & M University
Dr. Andre M. Landry
Department of Marine Biology
Mitchell Campus
P.O. Box 1675
Galveston, TX 77553
(409) 740-4400

University of Houston
Dr. Al Loedlich
c/o NOAA/NMFS
4700 Avenue "U"
Galveston, TX 77550
(409) 766-3500

The University of Texas at Austin
Dr. Robert S. Jones
Marine Science Institute
P.O. Box 1267
Port Aransas, TX 78373
(512) 749-6730

APPENDIX B

SEAMAP DOCUMENTS

SEAMAP DOCUMENTS LIST, 1982 - CURRENT

- 9) Proceedings: SEAMAP Shrimp and Bottomfish Sampling Gear Workshop, August 1985. A summary of seven technical papers and a panel discussion on shrimp/groundfish sampling gear, presented at the 33rd Annual Spring Meeting of the Gulf States Marine Fisheries Commission. Included are recommendations for standardizing and calibrating bottom trawl survey activities and for satisfying future research requirements.

- 10) Annual Report of the Southeast Area Monitoring and Assessment Program,
October 1, 1984 - September 30, 1985, October 1985;
October 1, 1985 - September 30, 1986, October 1986;
October 1, 1986 - September 30, 1987, December 1987.
Summaries of activities and proposed events for the SEAMAP-Gulf and SEAMAP-South Atlantic components.

- 11) Data Management System Requirements Document for Gulf and South Atlantic, November 1986.

- 12) Data Management System Design Study for Gulf and South Atlantic, March 1987. A result of the system design study, this documents describes the high level design of the proposed system and presents a five year implementation plan.

- 13) SEAMAP Operations Manual for Collection of Data, May 1987. A manual presenting the procedures to be followed by all vessels that participate in SEAMAP surveys.

Biological and environmental data, and ichthyoplankton specimens sorted to the family level from SEAMAP surveys in the Gulf of Mexico, are available to researchers upon request to the SEAMAP Coordinator, Gulf States Marine Fisheries Commission (601/875-5912).

SEAMAP DOCUMENTS LIST, 1982 - CURRENT

- 1) SEAMAP Strategic Plan, January 1981. The initial planning document describing the intent to develop the SEAMAP Program and outlining the preliminary goals and objectives, assessment requirements and priorities, research strategies, and funding requirements.
- 2) SEAMAP Quick-Reports (Data Summaries): six summaries, June-July 1981; seven summaries, June-July 1983; seven summaries, June-July 1984; five summaries, June-July 1985; five summaries, June-July 1986; six summaries, June-July 1987; five summaries, June-July 1988. Summaries of catch rate information from the SEAMAP Summer Shrimp/Groundfish surveys (Squid/Butterfish Survey, 1985 only) in the northern Gulf of Mexico, indicating stations sampled, catch rates, assessment of shrimp and finfish yields, and synopses of hypoxic conditions in the survey areas.
- 3) 1983, 1984, 1985, 1986, 1987 SEAMAP Marine Directories: May 1983, March 1984, March 1985, March 1986, and September 1987. Inventories of marine agency contacts (State, Federal and university) concerned with fishery research in the Gulf, and summaries of information provided by these organizations: target species, types of fishery-independent sampling gear and platforms, annual sampling effort and other material.
- 4) SEAMAP Information System Manual, Fall 1983. A description of the data management program supporting SEAMAP surveys and collecting activities, detailing the data processing and quick-report subsystems and presenting data formats for SEAMAP surveys and sample documentation and transmittal forms.
- 5) SEAMAP-Gulf Operations Plan, October 1983. A description of the SEAMAP Program, its goals and objectives, program accomplishments, survey and information systems operations, survey plans and schedules, program management, and funding requirements. Includes figures and tables detailing system functions, platform and funding needs, and information utilization.
- 6) SEAMAP-Gulf Operations Plan Executive Summary, March 1984. A summary of the features of the Operations Plan.
- 7) SEAMAP Environmental and Biological Atlases of the Gulf of Mexico, 1982, 1983, 1984, 1985, January 1985; February 1986; October 1986; June 1988. Compilations of information obtained from the 1982, 1983, 1984 and 1985 SEAMAP surveys. Included are dominant finfish and invertebrate catches from the shrimp/groundfish surveys, results of the plankton surveys, environmental data taken during both surveys, and methodology used in SEAMAP surveys.
- 8) SEAMAP 1982, 1983 Ichthyoplankton Atlases. NOAA Technical Memoranda NMFS-SEFC-144 (1985) and NMFS-SEFC (1986) summarizing in plots the larval distribution and abundance of the families Engraulidae, Carangidae, Clupeidae, Lutjanidae, Serranidae, Coryphaenidae, Xiphiidae, and Scombridae taken on SEAMAP surveys in 1982 and 1983.

Boutwell and Company, Limited

Certified Public Accountants

1126 JACKSON AVENUE — POST OFFICE BOX 295
PASCAGOULA, MISSISSIPPI 39567

MEMBER

AMERICAN INSTITUTE OF
CERTIFIED PUBLIC ACCOUNTANTS
MISSISSIPPI SOCIETY OF
CERTIFIED PUBLIC ACCOUNTANTS

MILLETTE BUILDING
SUITE 402
TELEPHONE 762-5181

May 10, 1988

To The Commissioners
Gulf States Marine Fisheries Commission
c/o Mr. Larry B. Simpson, Executive Director
P. O. Box 726
Ocean Springs, Mississippi 39564

Gentlemen:

We have examined the balance sheet of Gulf States Marine Fisheries Commission as of September 30, 1987, and the related statement of revenues, expenses and changes in fund balances for the fiscal year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion the accompanying financial statements present fairly the financial position of Gulf States Marine Fisheries Commission at September 30, 1987, and the results of its operations and changes in fund balances for the twelve months then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

A separate management letter containing our observations pertaining to the internal administration of the Commission's financial affairs will be furnished in a separate letter.

Respectfully submitted,

Boutwell and Company, Limited

BOUTWELL AND COMPANY, LIMITED
Certified Public Accountants

GULF STATES MARINE FISHERIES COMMISSION
Balance Sheet
September 30, 1987

ASSETS

Cash		\$ 28,304
Furniture, Fixtures and Equipment	\$ 41,201	
Automotive Equipment	13,661	
Total	\$ 54,862	
Less: Accumulated Depreciation	(27,874)	26,988
 Total		 \$ 55,292

LIABILITIES

Payroll Taxes Withheld and Accrued		\$ 4,902
------------------------------------	--	----------

FUND BALANCES

Operating Fund	\$ 86,536	
State-Federal Management Funds	17,864	
State-Federal Administrative Programmatic Funds	(4,304)	
State-Federal SEAMAP Funds	(13,844)	
State-Federal Council Funds	5,721	
Marine Fisheries Initiative Funds	(12,412)	
MarFin-Red Drum	(2,325)	
D-J Support	(25,134)	
Stripped Bass	(1,712)	50,390
 Total		 \$ 55,292

The accompanying notes are an integral part of these financial statements.

GULF STATES MARINE FISHERIES COMMISSION
Statement of Revenues, Expenses and Changes in Fund Balances
Fiscal Year Ended September 30, 1987

	<u>Operating Fund</u>	<u>State-Federal Management Funds</u>	<u>State-Federal Administrative Programmatic Funds</u>
<u>REVENUES:</u>			
Member States Appropriations			
Alabama	\$ 11,250		
Florida	22,500		
Louisiana	22,500		
Mississippi	-0-		
Texas	-0-		
Grants - Previous Year			\$ 18,344
Grants - Current Year			13,477
Interest Earned	2,870		
Total Revenues	<u>\$ 59,120</u>	<u>\$ -0-</u>	<u>\$ 31,821</u>
<u>EXPENSES:</u>			
Salaries	\$ 25,991		\$ 9,000
Contract Labor	6,500		1,296
Insurance - Hospital	3,160		-0-
Retirement Plan	1,463		-0-
Taxes - Payroll	5,998		-0-
Office Rental	-0-		250
Office Supplies	611		1,124
Postage	734		820
Professional Fees	1,590		-0-
Travel and Entertainment	3,899		6,320
Telephone	1,673		975
Equipment Rental	350		149
Printing	-0-		5,115
Meetings	9,456		2,986
Dues and Subscriptions	687		-0-
Auto Expense	227		-0-
Insurance - Auto and Bond	1,728		-0-
Maintenance and Repairs	1,734		-0-
Courtesies	352		-0-
Depreciation	6,054		-0-
Miscellaneous and Fringes	339		-0-
Office Equipment	-0-		-0-
Total Expenses	<u>\$ 72,546</u>	<u>\$ -0-</u>	<u>\$ 28,035</u>
Excess of Revenues Over (Under) Expenses	\$ (13,426)	\$ -0-	\$ 3,786
Fund Balances, October 1, 1986	<u>99,962</u>	<u>17,864</u>	<u>(8,090)</u>
Fund Balances, September 30, 1987	<u>\$ 86,536</u>	<u>\$ 17,864</u>	<u>\$ (4,304)</u>

1

1. To receive \$3,023 in next fiscal year on \$16,500 contract.
 2. To receive \$60,624 in next fiscal year on \$98,500 contract.
 3. To receive \$6,250 in next fiscal year on \$25,000 contract.
- The accompanying notes are an integral part of these financial statements.

State-Federal SEAMAP Funds	State-Federal Council Funds	Marine Fisheries Initiative Funds	MarFin- Red Drum	D-J Support	Stripped Bass	Combined Funds
						\$ 11,250
						22,500
						22,500
						-0-
						-0-
\$ 53,407	\$ 6,250	\$ 44,100	\$ -0-	\$ -0-	\$ -0-	122,101
37,876	18,750	8,711	4,675	31,974	1,804	117,267
						2,870
<u>\$ 91,283</u>	<u>\$ 25,000</u>	<u>\$ 52,811</u>	<u>\$ 4,675</u>	<u>\$ 31,974</u>	<u>\$ 1,804</u>	<u>\$ 298,488</u>
\$ 37,083	\$ 19,079	\$ 19,759		\$ 30,901	\$ 1,859	\$ 143,672
4,734		395				12,925
						3,160
1,035		1,413		737		4,648
1,302				1,150		8,450
450	1,250	1,800				3,750
675	741	1,955	60	751	59	5,976
1,672	642	1,249	1,370	125	230	6,842
	300	580				2,470
22,365	1,172	10,289	3,300	9,659	632	57,636
3,760	565	1,370		450	50	8,843
3,264	432	4,576		561	549	9,881
3,070			2,270			10,455
2,488		1,495		1,564	137	18,126
						687
	585					812
						1,728
		347				2,081
						352
	221					6,275
1,966	1,045	4,671		1,367		9,388
		1,265		9,843		11,108
<u>\$ 83,864</u>	<u>\$ 26,032</u>	<u>\$ 51,164</u>	<u>\$ 7,000</u>	<u>\$ 57,108</u>	<u>\$ 3,516</u>	<u>\$ 329,265</u>
\$ 7,419	\$ (1,032)	\$ 1,647	\$ (2,325)	\$ (25,134)	\$ (1,712)	\$ (30,777)
(21,263)	6,753	(14,059)	-0-	-0-	-0-	81,167
<u>\$ (13,844)</u>	<u>\$ 5,721</u>	<u>\$ (12,412)</u>	<u>\$ (2,325)</u>	<u>\$ (25,134)</u>	<u>\$ (1,712)</u>	<u>\$ 50,390</u>

- 2
3
4
5
6
7
4. To receive \$43,634 in next fiscal year on \$52,344 contract.
 5. To receive \$2,325 in next fiscal year on \$7,000 contract.
 6. To receive \$46,499 in next fiscal year on \$78,473 contract.
 7. To receive \$13,196 in next fiscal year on \$15,000 contract.

GULF STATES MARINE FISHERIES COMMISSION
Notes to Financial Statements
September 30, 1987

NOTE 1: SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES:

(A) The accounting and reporting practices of the Commission conform to generally accepted accounting principles applicable to governmental units applied on a consistent basis between periods. The accrued basis of accounting is followed with these modifications:

(1) Revenues from members states' appropriations are recorded when received in cash.

(B) Depreciation of furniture, fixtures, equipment and the commission vehicle is calculated using the straight-line method.

NOTE 2: ORGANIZATION:

Gulf States Marine Fisheries Commission was created with the consent of the 81st Congress of the United States, granted by Public Law 66, approved May 19, 1949, authorizing an interstate compact relating to the better utilization of the fisheries of the Gulf of Mexico. Parties to the agreement are the states of Alabama, Florida, Louisiana, Mississippi and Texas.

NOTE 3: STATE-FEDERAL FISHERIES MANAGEMENT PROGRAM:

Effective August 15, 1975, the Commission entered into a contract with the U. S. Department of Commerce to provide administrative support of the State-Federal Fisheries Management Program in the Gulf of Mexico coastal states.

NOTE 4: STATE-FEDERAL FISHERIES ADMINISTRATIVE SUPPORT PROGRAM:

Effective in April, 1978, the Commission entered into contracts with the U. S. Department of Commerce to provide programmatic funds to support the State-Federal Fisheries Planning and Administrative Program in the Gulf of Mexico coastal states.

NOTE 5: STATE-FEDERAL FISHERIES COUNCIL SUPPORT PROGRAM:

Effective in October, 1977, the Commission entered into contracts with the U. S. Department of Commerce to provide administrative support of the State-Federal Fisheries Council in the Gulf of Mexico coastal states.

