

marfin

**EXECUTIVE SUMMARY
to the
Annual Report**

**Marine Fisheries Initiative
(MARFIN)
Gulf of Mexico**

1 October 1990 to 30 September 1991



**National Marine Fisheries Service
Southeast Region**

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EXECUTIVE SUMMARY

to the Annual Report of the Marine Fisheries Initiative Program (MARFIN)

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FY 1991 Program Highlights

- New finfish excluders in shrimp trawls reduce amount of fish caught with no loss in shrimp catch.
- Turtle Excluder Device (TED) technology transfer workshops have been held in all of the Southeastern states and also foreign countries such as Mexico, Panama and Honduras.
- Development of a standardized midwater trawl was completed.
- A satellite receiving station was acquired to obtain oceanographic data for fish-environment studies.
- The Experimental Seafood Processing Laboratory (ESPL) in Pascagoula (cooperative effort among the Agriculture and Forestry Experiment Station, the Cooperative Extension Service of Mississippi State University and NMFS) was completed and is now fully functional.
- Genetic studies confirm that red drum stocks in the northern Gulf of Mexico differ from southeastern Atlantic coast stocks.
- Gaps in the reef fish information base are being filled. Life history, fecundity and genetic studies on snappers and groupers will allow better management regimes.
- Recreational reef fish anglers rated nonconsumptive aspects of their fishing trips as more important than either catching or keeping fish.
- Fourth annual MARFIN Conference held in San Antonio.

INTRODUCTION

MARFIN promotes and endorses programs which seek to optimize economic and social benefits from marine fishery resources through cooperative efforts which coordinate and evoke the best research and management talents of the Southeast Region. Preference is given to cooperative planning efforts with 3- to 5-year time horizons. The intent is to focus projects funded by MARFIN in such a way, and within an appropriate time frame, that clear answers to fishery questions covered by the NMFS Strategic Plan¹, particularly goals 1, 2 and 4 are forthcoming. For example, a geographically restricted age and growth study of a local

fishery resource is of limited value unless it is coordinated with or verified by similar studies which span the range of the resource. Furthermore, the value of such studies is also relatively limited unless the results can be combined with results from other studies to provide a regional assessment of the resource. MARFIN provides this programmatic integration. MARFIN is designed mainly to supplement and enhance existing research and management efforts in the region. Many high-priority issues are already being addressed in one way or another by state, federal, university and/or industry efforts. MARFIN recognizes that these efforts can have limited effectiveness, however, because of funding constraints which limit scope,

¹NMFS Strategic Plan Goals

1. Rebuild overfished marine fisheries.
2. Maintain currently productive fisheries.
3. Advance fishery forecasts and ecosystem models.
4. Integrate conservation of protected species and fisheries management.

5. Improve seafood safety.
6. Protect living marine resource habitat.
7. Improve the effectiveness of international fisheries relationships.
8. Reduce impediments to U.S. aquaculture.

precision and accuracy of sampling and analytical efforts.

PROGRAM ORGANIZATION

The Director, NMFS Southeast Regional Office (SERO), utilizes recommendations by individual members of the Program Management Board and the NOAA Assistant Administrator for Fisheries to direct the MARFIN Program. Program coordination and management are provided by permanently assigned SERO staff. Administrative support for meetings, travel arrangements and preparation of meeting minutes is provided by a contract to the Gulf States Marine Fisheries Commission.

Current Board members providing recommendations to the Regional Director are:

- Executive Director, Gulf and South Atlantic Fisheries Development Foundation, Inc.
- Executive Director, Gulf of Mexico Fishery Management Council
- Executive Director, Gulf States Marine Fisheries Commission
- NMFS representative
- Administrator, Seafood Division, Louisiana Department of Wildlife and Fisheries, representing the five gulf state fishery management agencies
- Director, Florida Sea Grant, representing the four gulf Sea Grant programs
- Executive Director, Southeast Fisheries Association, representing commercial fisheries interests
- Director, Coastal Research and Development Institute, University of South Alabama, representing recreational fisheries interests

Alternate representatives have also been designated and serve as necessary. The Board Chairman and Vice Chairman are each elected for a two-year term with individual Board members appointed by member organizations for staggered three-year terms.

Each year, as close as possible to the beginning of the fiscal year (October), the MARFIN Board

members recommend program priorities. Following concurrence by the Regional Director and the NOAA Administrator for Fisheries, these priorities are incorporated by the Program Office into the Notice of Availability of Financial Assistance and published in accordance with established Department of Commerce procedures. Announcement of funds available through financial assistance is made through the *Federal Register*.

Project Planning and Funding

In FY 1991, the *Federal Register* notice appeared on January 28. Fifty-eight applications were received by the closing date, March 14, and were reviewed for technical merit by academic, state agency and federal scientists. These reviews were then summarized by NMFS for presentation to the MARFIN Board. On May 29-30, the Board met to evaluate the reviews. Board members recommended funding 18 (plus six alternates) of the proposals judged technically superior. After reviewing the Board's recommendations, the Regional Director with concurrence of the NOAA Assistant Administrator for Fisheries, selected 16 for funding which were forwarded to the NOAA Grants Management Division for processing.

In addition to the 16 new cooperative agreements, nine multi-year awards (continued from previous years), ten NMFS research projects and a contract to the Gulf States Marine Fisheries Commission for the MARFIN Board support were funded. Approved 1991 projects are shown in Tables 1, 2 and 3.

SERO provided the program officer who used technical monitors throughout the Southeast Region to ensure that recipients complied with program technical objectives. The NOAA Grants Management Division provides the Grants Officer who monitors the administrative and financial progress of all projects.

RESEARCH ACTIVITIES

The fourth annual MARFIN Conference was held in San Antonio, Texas, on September 10-11, 1991. A summary of this symposium is given below:

Shrimp Fisheries. Shrimp trawl bycatch is now

Table 1. 1991 NMFS Southeast Region Financial Assistance Projects (New Projects)

Recipient	Project	Award (\$)
Louisiana State University	Patterns in Distribution and Abundance of Fishes and Macroinvertebrates in Louisiana	\$32,162.00
Gulf Shrimp Research and Development Foundation	Finfish Excluding Gear in Shrimp Trawls in Western Gulf of Mexico Study-Bycatch	\$95,000.00
Louisiana State University	Evaluation of Shrimp Trawls Designed to Reduce Bycatch in Inshore Waters of Louisiana	\$46,917.00
Louisiana State University	Shrimp Closures and Their Impact on Gulf Region Processing and Wholesaling	\$64,838.00
University of Florida	Economic Analysis of U.S. Demand for Swordfish and Effect Reduction Measures	\$43,287.00
Mote Marine Lab	Bycatch and Catch-Related Mortality of Sharks in Gulf Coast Nursery off Florida	\$32,143.00
University of West Florida	Identification of Stock Structure and Recruitment Patterns for Red Snapper in Gulf of Mexico	\$89,918.00
Continental Shelf Associates, Inc.	Compilation of Existing Data on Location and Areal Extent of Reef Fish Habitat on Mississippi/Alabama/Florida Continental Shelf - Eastern Gulf of Mexico	\$20,924.00
Alabama Department of Conservation and Natural Resources	Analysis of Red Snapper Catches from Alabama Charter Boat Fleet	\$30,000.00
Gulf Coast Research Laboratory	Spawning and Early Life History of Snappers in Northcentral Gulf of Mexico	\$96,140.00
Louisiana State University	Life History Gaps in Red Snapper, Swordfish, Red Drum in Northern Gulf of Mexico	\$40,000.00
University of Miami	Biological Data from Commercial Landings of Spanish Mackerel in Southwest Florida Fishery	\$68,545.00
Texas A&M Research Foundation	Population Genetic Studies of King Mackerel in Gulf of Mexico	\$59,703.00
Mote Marine Lab	King and Spanish Mackerel, Red Grouper and Red Snapper Stock Assessment Southern Gulf of Mexico	\$103,000.00
University of South Florida	In-Situ and Lab Studies of Survivorship of Bycatch in Red Grouper Fishery	\$71,157.00
Louisiana State University	Finfish Processing Sector Changes in Gulf of Mexico Fisheries Under Management/Regulation	\$51,484.00

**Table 2. NMFS Southeast Region Financial Assistance Projects
(Multi-Year Projects)**

Recipient	Project (Year/Total Years)	1991 Award (\$)
Southeast Fisheries Association	Conference on Reduction of Bycatch Shrimp Trawling Operations and Alternative Harvesting (2/2)	\$99,650.00
Caribbean Marine Research Center	Spawning Biology of Shallow-Water Gulf of Mexico Groupers (2/2)	\$83,539.00
Marine Environmental Science Consortium	Recruitment and Habitat Utilization by Blue Crab: Importance of Juvenile Nursery Habitat (2/2)	\$59,861.00
Louisiana State University	Mortality Rates and Movement of Hook and Line Caught and Released Red Snapper (2/2)	\$47,655.00
Louisiana State University	Variation of Year-Class Strength and Annual Reproduction Output of Red and Black Drum Northern Gulf of Mexico (3/3)	\$84,200.00
Louisiana Department of Wildlife and Fisheries	Biological and Catch/Effort Sampling from Tuna and Shark Fisheries in Northern Gulf of Mexico (3/3)	\$87,700.00
Louisiana State University	Utilization of Fisheries-Independent Data: Future Management Implications (3/3)	\$79,600.00
Louisiana State University	Mackerel and Reef Fish Bioprofile and Catch/Effort Data Collection from Northern Gulf of Mexico (3/3)	\$38,730.00
Florida Department of Natural Resources	Age Validation of Adult Black Drum in Florida (3/3)	\$4,000.00

Table 3. Approved NMFS Projects for 1991

Recipient	Project	Award (\$)
Southeast Regional Office	MARFIN Program Management	\$75,000.00
Southeast Regional Office	Educational Tools for Marine Recreational Fishermen in the Gulf of Mexico	\$29,000.00
Southeast Regional Office	Economic Assessment of the Gulf of Mexico Commercial Reef Fish Fishery	\$65,160.00
Southeast Regional Office	Economic Analysis of Finfish Bycatch in the Gulf of Mexico Shrimp Fishery	\$22,000.00
Galveston Laboratory	Evaluation of the Impacts of Bycatch Excluder Devices (BEDs) on Finfish and Shrimp Catch Rates in the Gulf of Mexico	\$115,000.00
Panama City Laboratory	Reproductive Biology of Reeffish	\$75,000.00
Miami Laboratory	Data Collection for Sharks	\$55,000.00
Pascagoula Laboratory	Small Pelagics Resource Surveys	\$460,000.00
Pascagoula Laboratory	Gear Development for Bycatch Reduction	\$357,000.00
Pascagoula Laboratory	TED Technology Transfer	\$50,000.00

recognized as the major problem facing the shrimp industry in the Southeast. Consequently, considerable research is now directed to solving this problem.

More than 50 finfish excluder combinations were evaluated by divers. Seven design combinations underwent comparative fishing tests. Catch results from the comparative tests showed combined day and night finfish reduction rates of 20 to 58 percent (Table 4). The best reduction rates were achieved with a mini-super shooter TED, a Florida fish excluder equipped with a cone webbing water deflector and a hummer wire deflector. A mini-super shooter TED with a large mesh excluder section, a Florida fish excluder with a cone webbing water deflector and a hummer wire deflector combination exhibited the best snapper exclusion with a reduction rate of approximately 52 percent. Shrimp loss was apparent with the excluder designs incorporating a Florida fish excluder with a water deflector (cone and double webbing).

Although no longer the major problem, TED technology transfer continues to receive attention. TED technology transfer activities in FY 1991 have included: direct assistance to shrimp fishermen in choosing and installing TEDs, assistance to law enforcement, TED manufacturers and Sea Grant agents in determining legal requirements and definitions of TEDs, technical assistance to fishermen, net shops and TED manufacturers in determining if various TED designs meet legal requirements, assistance in construction and installation techniques, assistance to TED designers in developing new TED designs, providing certification tests for new TED designs and dissemination of TED informational literature and videos. Twelve TED workshops have been held to date, including three in North Carolina, three in Louisiana, two in Georgia and one each in Florida, Alabama, Mississippi and Texas. Technical assistance was provided to the North Carolina Division of Marine Fisheries in providing and testing modified TED designs for use in the winter flounder trawl fishery in North Carolina.

Estuarine Species. The nuclear and mtDNA data obtained to date indicate that red drum are genetically subdivided, with distinct subpopulations or stocks occurring in the northern Gulf of Mexico and along the southeastern Atlantic Coast. This suggests that a biological or geographical barrier separates or perhaps historically separated red drum in

the gulf from those in the Atlantic. The relative magnitude of genetic differentiation between gulf and Atlantic red drum, however, is not large, and there is evidence that considerable gene flow (migration) occurs between the two subpopulations. Red drum in the northern Gulf of Mexico do not appear to be genetically subdivided either spatially or temporally. This suggests that (1) gene flow among gulf red drum is extensive and (2) the effective size of the red drum subpopulation in the northern gulf is very likely large. Levels of genetic variability in the gulf red drum are comparatively high, suggesting that the perceived decline in the gulf red drum abundance has not affected the genetic variability base of the gulf subpopulation.

Coastal Pelagics. Studies to fill in some of the gaps in the early life histories of commercially and recreationally important fishes revealed that cobia eggs hatch in about 24 hours at 29°C. Eggs are usually collected in the upper meter of water and larvae in surface towed nets. Larvae hatch at about 2.5 mm SL and are recognized by the large supraorbital ridge with a single spine, 'swollen' pterotics, heavy body pigmentation, minute epithelial prickles and a pair of moderate to large, simple spines at the angle of the posterior margin of the preopercle. Fewer than 50 larvae <20 mm SL have been collected in the Gulf of Mexico and most occurred between June and September. Evidence suggests that cobia spawn in both estuarine and shelf waters during the day. Most larval cobia in the Gulf of Mexico have been collected at surface water temperatures of 25°C or greater and salinities >27 ppt.

Migration and stock assessment research with king and Spanish mackerel in the southern Gulf of Mexico is now in its sixth consecutive year. Figure 1 A-G depicts tagging and tag return areas.

Small Pelagics. Species of small pelagics are distributed according to different bathymetric provinces and their depth-related occurrences vary seasonally. These seasonal changes are related to temperature, food and reproductive cycle. Research trawl surveys conducted on the West Florida Shelf and Slope by the NMFS since 1986 have provided information on distribution from which general provinces for the species can be described. The following array shows the general distribution of the species off Florida.

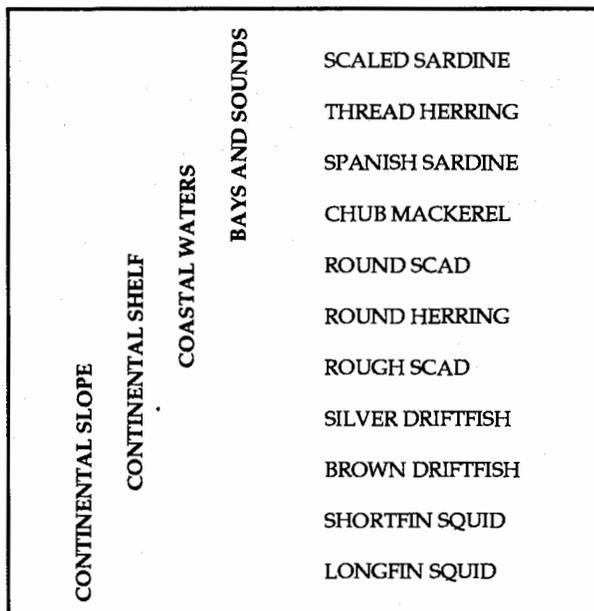
The reproductive phase shifts farther offshore

Table 4. Reduction rates for finfish, shrimp and red snappers in seven TED-equipped trawls with finfish excluder designs as compared to the standard-equipped TED trawl

<u>Description</u>	<u>Percent Reduction</u>		
	<u>Finfish (wt.)</u>	<u>Shrimp (wt.)</u>	<u>Snapper (no.)</u>
Super shooter TED w/Florida Excluder (double webbing water deflector, and lead panel) and hummer wire deflector.	54	22	48
Super shooter TED w/Florida Excluder (double webbing water deflector) and hummer wire deflector.	50	15ns	15
Mini-super shooter TED w/large mesh excluder (A) and Florida Excluder (cone webbing water deflector) and hummer wire deflector.	54	8	52
Mini-super shooter TED w/Florida Excluder (cone webbing water deflector) and hummer wire deflector.	58	50	46
Mini-super shooter TED w/extended funnel excluder and hummer wire deflector.	44	0	22
Mini-super shooter TED w/extended funnel excluder and chain deflector.	22ns	0	20ns
Mini-super shooter TED w/Florida Excluder and hummer wire deflector	20ns	0	+10ns

ns - not statistically significant

into the open gulf from nearshore to offshore and beyond the outer continental shelf. The array during the reproductive phase holds the same relative order.



A satellite receiving station was acquired. The receiver will support MARFIN activities involving remote sensing data. Satellite imagery was collected and processed into sea surface temperature and water turbidity data to detect and delineate the Mississippi River Plume. Satellite imagery is periodically processed throughout the year for use in Panama City Laboratory MARFIN and other projects. An upgrade of the underwater Remote Operating Vehicle (ROV) was completed. This upgrade allows precise navigation of the vehicle for trawl evaluation work.

The Experimental Seafood Processing Laboratory (ESPL) in Pascagoula was completed and is fully functional. The seafood laboratory is a cooperative effort between the Agriculture and Forestry Experiment Station, the Cooperative Extension Service of Mississippi State University and the National Marine Fisheries Service. Processing equipment has been installed and is fully operational. Laboratory personnel have initiated preliminary studies focusing on obtaining information on composition, uses, handling methods, processing re-

FIGURE 1

Figure 1.A. Number of mackerel tagged off Mexican Gulf Coast States (1986-1991).

Figure 1.B. Significant long distance tag returns between the U.S. and Mexico (1986-1991).

Figure 1.C. Significant tag returns within Mexico and from Veracruz, Mexico, to the U.S. (1986-1991).

Figure 1.D. Important tag returns from Texas to Mexico (1986-1991).

Figure 1.A.

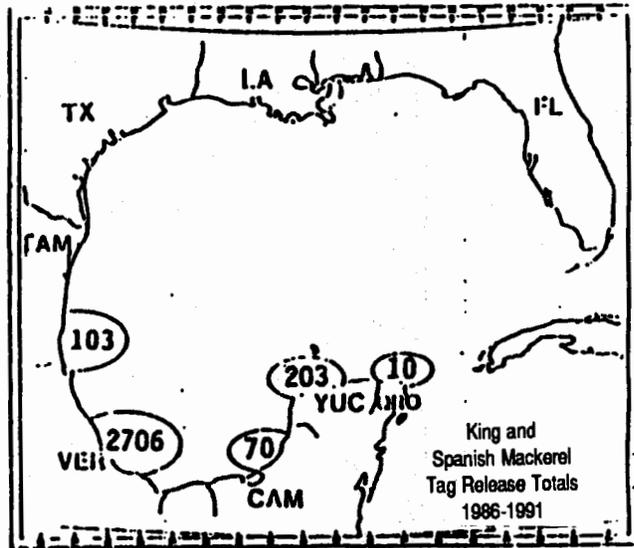


Figure 1.B.

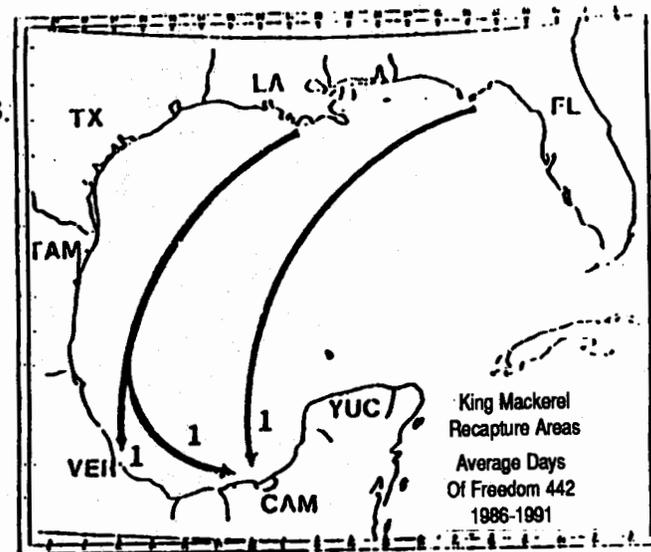


Figure 1.C.

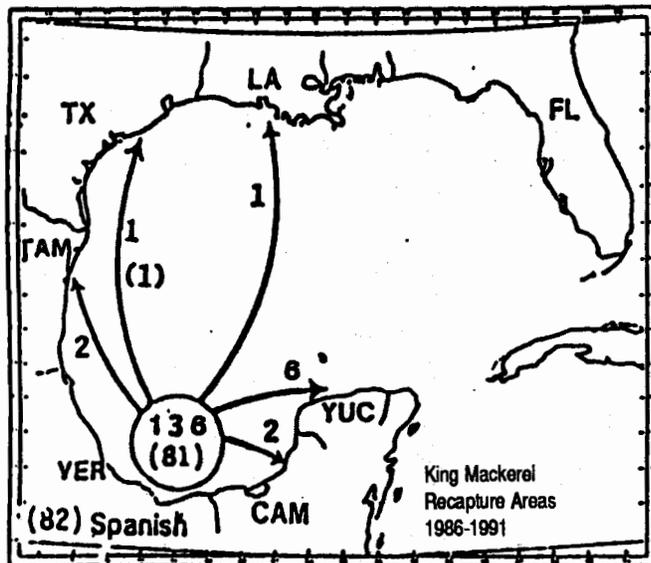


Figure 1.D.

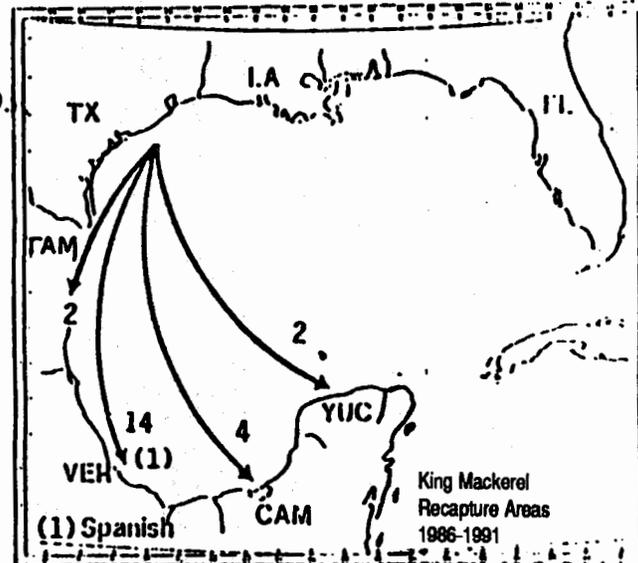
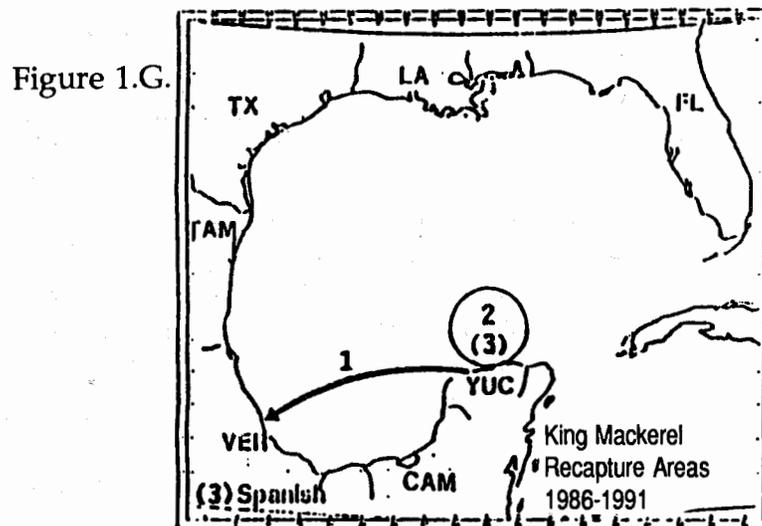
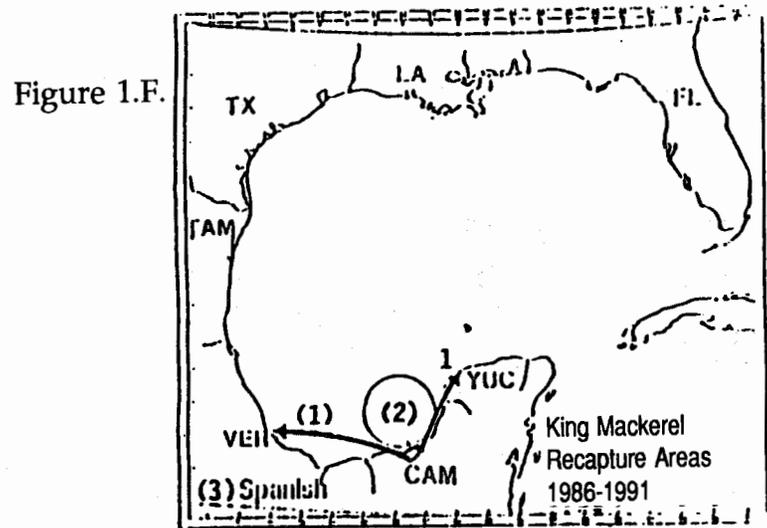
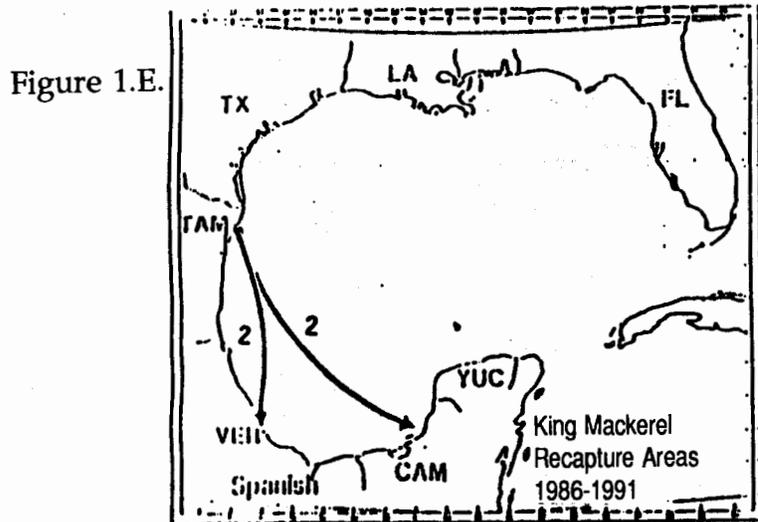


FIGURE 1 (Continued)

Figure 1.E. Significant tag returns from Tamaulipas to other Mexican states (1986-1991).

Figure 1.F. Significant long distance tag returns from Campeche to other Mexican states (1986-1991).

Figure 1.G. Important long distance tag returns from Yucatan to Veracruz (1986-1991).



quirements, yields and quality retention of Gulf of Mexico species. Several samples of butterfish, rough scad, round herring, Spanish sardines and chub mackerel were collected for fatty acid and proximate composition studies. Preliminary evaluations on the sensory characteristics of chub mackerel held in ice or refrigerated seawater have also been completed.

Reef Fish. Genetic studies with snappers, groupers and jacks suggest that red snapper may not be genetically subdivided in the northern Gulf of Mexico. Red grouper mitochondrial DNA research with 12 haplotypes showed a low nucleon diversity which indicated that all 12 haplotypes were derived fairly recently from one another. Preliminary heterogeneity tests of mtDNA haplotype frequencies suggest that the two samples of the greater amberjack from Florida are not differentiated genetically.

Age and growth studies of 715 cobia and 822 greater amberjack have enhanced population assessment research of these species. Peak spawning of these fish takes place during May and June off the Louisiana coast. Differentiation of amberjack species remains a problem among fishermen, but research comparing lesser and greater amberjack showed a yellow second dorsal fin in the lesser amberjack that differed from a gray colored second dorsal fin in the greater amberjack.

Fecundity research to determine the spawning potential ratio (SPR) was conducted with 13 species of reef fish. Most of the samples were obtained from three species of grouper (gag, red and scamp) and two species of snapper (red and vermillion).

Recreational reef fish anglers rated nonconsumptive aspects of their fishing trips as more important than either catching or keeping fish. These fishermen spent an average of \$102 per trip and averaged 22 trips per year.

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