marfin

EXECUTIVE SUMMARY
to the
Annual Report

Marine Fisheries Initiative
(MARFIN)
Gulf of Mexico

1 October 1989 to 30 September 1990

National Marine Fisheries Service
Southeast Region

published by
Gulf States Marine Fisheries Commission

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EXECUTIVE SUMMARY
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Annual Report
of the
Marine Fisheries Initiative Program
(MARFIN)

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FY 1990 Program Highlights

- **The Georgia TED and the Supershooter TED not only exclude turtles, but do not significantly reduce the shrimp catch.**
- **Habitat of larval estuarine fish shown to be dominated by proximity to marsh grass, salinity, temperature and turbidity.**
- **The king mackerel stocks appear to be recovering. The Spanish mackerel stocks are stable.**
- **123 ft Shuman trawl standardized for assessing stocks of small pelagics.**
- **Hydroacoustic studies show that small pelagics move away from the bottom at night.**
- **Spanish mackerel followed by king mackerel are the fish most frequently caught by trolling in the Gulf of Mexico. Non-trolling methods mainly catch gray triggerfish and snappers.**
- **The longline catch of yellowfin tuna was significantly greater in 1990 than the 1988-89 catch rate (2.79 vs 1.85 fish per 100 hooks).**
- **Ethical angling (catch and release) brochures were given wide distribution.**
- **Large artificial reefs attract large numbers of yellowtail snapper.**
- **Third annual MARFIN Conference held in Orlando.**

INTRODUCTION

The MARFIN Program was begun in 1986 to develop new fisheries, rejuvenate declining fisheries and to maintain other fisheries requiring research information. Development of new or underutilized resources centered mainly on coastal herrings and butterfish, with some attention paid to deepsea crabs and eels, mullet and tuna.

Declining fishery resources, mostly due to overfishing, required concentration on this MARFIN objective. The hard hit red drum and mackerel resources were selected to receive considerable research funding. For the last two years research on shrimp (including TED technology transfer) and red drum - plus other estuarine fisheries research has declined. Ocean pelagics, menhaden, marine molluscs and endangered species research has increased. The major problem now emerging in the Gulf is the bycatch of finfish in the shrimp trawl fishery. Studies have been initiated to help find solutions.

In the past four years 124 projects have been funded through cooperative agreements. NMFS has completed 39 projects. A total of $13.4M has been made available for these studies and associated contracts.

PROGRAM ORGANIZATION

The Director, NMFS Southeast Regional Office (SERO) utilizes recommendations by individual members of the Program Management Board to direct the MARFIN Program. Program coordination and management is provided by permanently assigned SERO staff. Administrative support for meeting and 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 States' fishery management agencies.
- Director, Florida Sea Grant, representing the four Gulf Sea Grant programs.
- Executive Director, Southeast Fisheries Association, representing commercial 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.

MARFIN operating procedures call for the Board to formulate annual program priorities as close as possible to the beginning of the fiscal year (October). These priorities are then 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 1990, the *Federal Register* notice appeared on March 8. Fifty-three applications were received by the closing date, April 30, 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 June 19-20, the Board met to evaluate the reviews. Board members recommended funding 18 of the proposals judged technically superior. The Regional Director after reviewing the Board's recommendations selected 16 for funding with FY 1990 funds and one with FY 1991 funds. The 17 selected applications were forwarded to the NOAA Grants Management Division for processing.

In addition to the 17 new cooperative agreements, 14 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 1990 projects are shown in Tables 1 and 2.

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 administration and financial progress of all projects.

RESEARCH ACTIVITIES

The third annual MARFIN Conference was held in Orlando, Florida on October 31-November 1, 1990. A summary of this symposium is given below:

Shrimp Fisheries. A major problem in the shrimp trawling industry has been the interaction of turtles with trawls and the development of methods to keep turtles out of trawls. Several turtle excluder devices (TEDs) have been devised to remove turtles from trawls during trawling. These include the NMFS TED, the Georgia TED, the Matagorda TED, the Cameron TED, the Morrison TED, the Parish TED and the Andrews TED. All of these devices exclude turtles. The Morrison TED is constructed of webbing. The others are metal or a combination of metal, plastic and webbing. In some configurations an acceleration funnel may be added. The Anthony Weedless and the Supershooter are modifications of the Georgia TED. Although all of these TEDs exclude turtles, some catch fewer shrimp than others. During 1989-1990, the Georgia TED and its modification, the Supershooter, were tested for shrimp and finfish catch in Texas, Louisiana and off the Carolinas. Ninety-one percent of the Georgia TED testing was done off Louisiana and 65% of the Supershooter studies were performed in the Atlantic. Figure 1 shows the shrimp catch and Figure 2 shows the finfish catch. It should not be inferred that the Supershooter catches more shrimp or more finfish, since the locations and seasons were different. It is important to note, however, that in comparison with standard nets neither TED catches significantly fewer shrimp or finfish.

Table 1. Approved Financial Assistance Awards for FY 90

Recipient	Project	Award ($)
Caribbean Marine Research Center	Spawning Biology of Shallow-Water GOM Groupers	$76,350.00
Florida Department of Natural Resources	Investigations of Inshore and Offshore Population Dynamics of Spanish Sardines in West Florida	$50,906.00
Florida Department of Natural Resources	Spawning Stock and Exploit/Escape of Black Mullet	$57,731.00
Florida Department of Natural Resources	Age Validation of Adult Black Drum in Florida	$4,000.00
Gulf Coast Research Laboratory	Early Life History of Snappers in Coastal and Shelf Waters of the Northcentral Gulf of Mexico	$8,920.00
Gulf and South Atlantic Fisheries Development Foundation	Management of Bycatch in Directed Commercial Fisheries in Gulf of Mexico	$100,000.00
Gulf Shrimp Research and Development Foundation	Finfish Excluding Gear in Shrimp Trawls in Western Gulf of Mexico	$47,135.00
Louisiana Department of Wildlife & Fisheries	Enhancing the Benefits Derived from Shrimp in the Gulf of Mexico Through Optimizing Shrimp Management in Louisiana	$126,000.00
Louisiana Department of Wildlife & Fisheries	Biological and Catch/Effort Sampling from the Domestic Tuna and Shark Fisheries in the Northern Gulf of Mexico	$87,700.00
Louisiana State University	Age, Growth, Diet and Spawning Dates of Yellowfin Tuna, About the Mississippi River Plume	$23,940.00
Louisiana State University	The Variation of Year-Class Strength and Annual Reproduction Output of Red Drum and Black Drum from the Northern Gulf of Mexico	$84,200.00
Louisiana State University	Mackerel and Reef Fish Bioprofile and Catch/Effort Data Collection from the Northern Gulf of Mexico	$38,730.00
Louisiana State University	Age, Growth and Reproduction Biology of Amberjack and Cobia from Coastal Louisiana Waters	$66,800.00
Louisiana State University	Age Structure and Reproduction Potential of Northern Gulf of Mexico Offshore Population of Red Drum	$38,785.00
Louisiana State University	Mortality Rates and Movement of Hook and Line Caught and Released Snapper	$30,568.00
Louisiana State University	Larval Food, Growth and Microhabitat Select: Factors Affecting Recruitment of Estuarine-Dependent Fishes in the Northern Gulf of Mexico	$72,530.00
Louisiana State University	Utilization of Fisheries-Independent Data: Future Management Implications	$79,600.00
Marine Environmental Sciences Consortium	Evaluation of Quahog Abundance and Growth in Inshore Alabama and Northwestern Florida Waters: An Assessment of Favorability for Clam Culture	$61,101.00
Marine Environmental Sciences Consortium	The Relative Value of Vegetated and Unvegetated Habitats to Juvenile Spotted Seatrout and Red Drum: Comparisons of Nursery Habitats and Field Growth Rate Measurement Techniques	$51,900.00
Marine Environmental Sciences Consortium	Recruitment and Habitat Utilization by Blue Crab: Importance of Juvenile Nursery Habitat	$58,287.00
Mote Marine Laboratory	King and Spanish Mackerel Migration and Stock Assessment Study in the Southern Gulf of Mexico	$75,000.00
Mote Marine Laboratory	Cobia, Amberjack and Dolphin Migration and Life History Study off Southwest Florida	$75,000.00

Table 1. Approved Financial Assistance Awards for FY 90 (Continued)

Recipient	Project	Award ($)
Mississippi Department of Wildlife, Fisheries & Parks	Mississippi/NMFS King and Spanish Mackerel Sampling Program	$28,945.00
Southeastern Fisheries Association, Inc.	An International Conference on the Reduction of Bycatch in Shrimp Trawling Operations and Alternative Harvesting Methods for the Shrimp Fishery	$31,650.00
Texas A&M Research Foundation	Genetic Studies to Determine Stock Structure of Reef Fishes in Gulf of Mexico	$54,623.00
Texas A&M Research Foundation	Social and Economic Characterization of Gulf of Mexico Recreational and Commercial Shark Fisheries	$50,000.00
Texas Parks and Wildlife Department	Socioeconomic Impacts of Recreational Reef Fish Fishermen in Texas	$11,535.00
University of Miami	Implementation of a Log Book System for Spotter Pilots and Fleet Captains to Record Observations on Mackerel Schools in South Florida	$25,000.00
University of South Alabama	Investigation of Life History Parameters of Species of Secondarily Targeted Reef Fish and Dolphin (Fish) in the Northern Gulf of Mexico	$42,190.00
University of South Alabama	Species Identification and Management of Amberjacks	$18,893.00
University of Texas at Austin	Dynamics of Estuarine and Offshore Red Drum Stocks	$26,393.00
	Total	$1,604,412.00

Table 2. Approved NMFS Projects for FY 90

Recipient	Project	Award ($)
Galveston Laboratory	Evaluation of the Impacts of TEDs on Shrimp, Catch Rates and Bycatch in Gulf of Mexico	$107,000.00
Galveston Laboratory	Continuation of Improved Sea Turtle Stranding and Salvage Network (STSSN) in Shrimp	$40,000.00
Miami Laboratory	Eastern Gulf Reef Fish Catch and Effort Data	$55,000.00
Panama City Laboratory	Coastal Resources Research in the Southeast	$205,000.00
Pascagoula Laboratory	Latent Resources Research	$460,000.00
Pascagoula Laboratory	TED Technology Transfer	$45,000.00
Pascagoula Laboratory	Shrimp Trawl Bycatch Reduction	$200,000.00
Southeast Regional Office	Economic Data Collection for the Gulf of Mexico Reef Fish Fishery	$100,000.00
Southeast Regional Office	MARFIN Program Management	$75,000.00
Southeast Regional Office	Educational Tools for Marine Recreational Fishermen to Promote Wise Use and Conservation of Gulf Fishery Resources	$16,000.00
	Total	$1,303.000.00

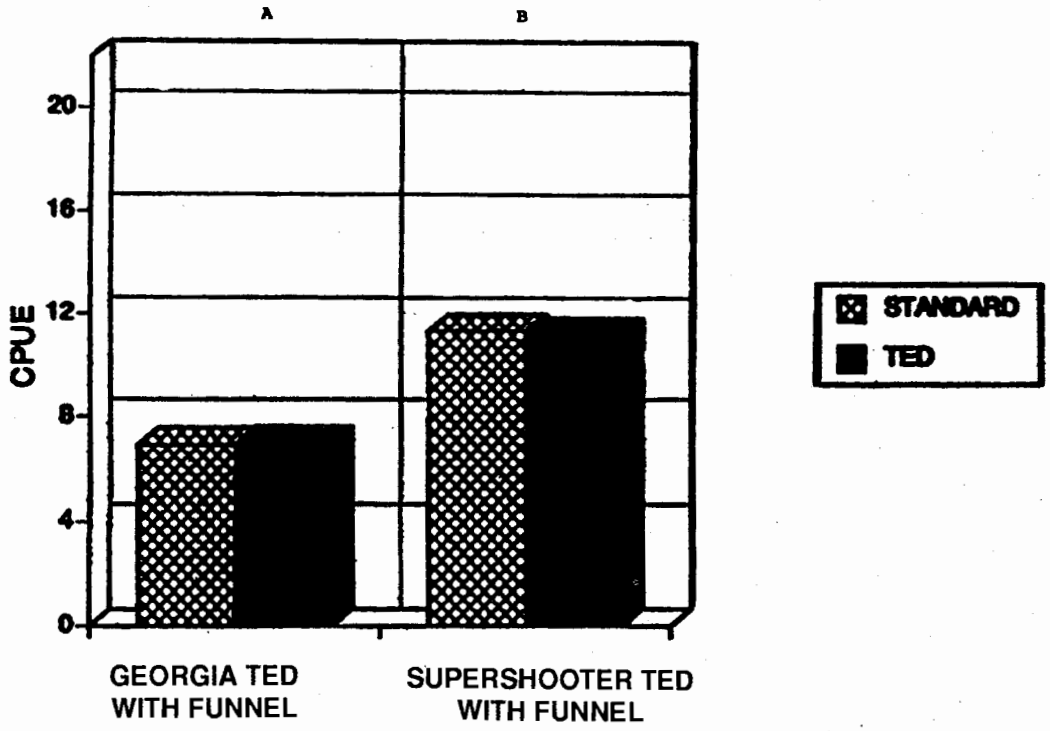

Figure 1. CPUE (lbs/hr) of shrimp in standard and TED-equipped nets. All areas and seasons combined. Standard and TED-equipped nets were not significantly different (P<0.05). Data paired by tows without try nets included (n=425). 1989-1990.

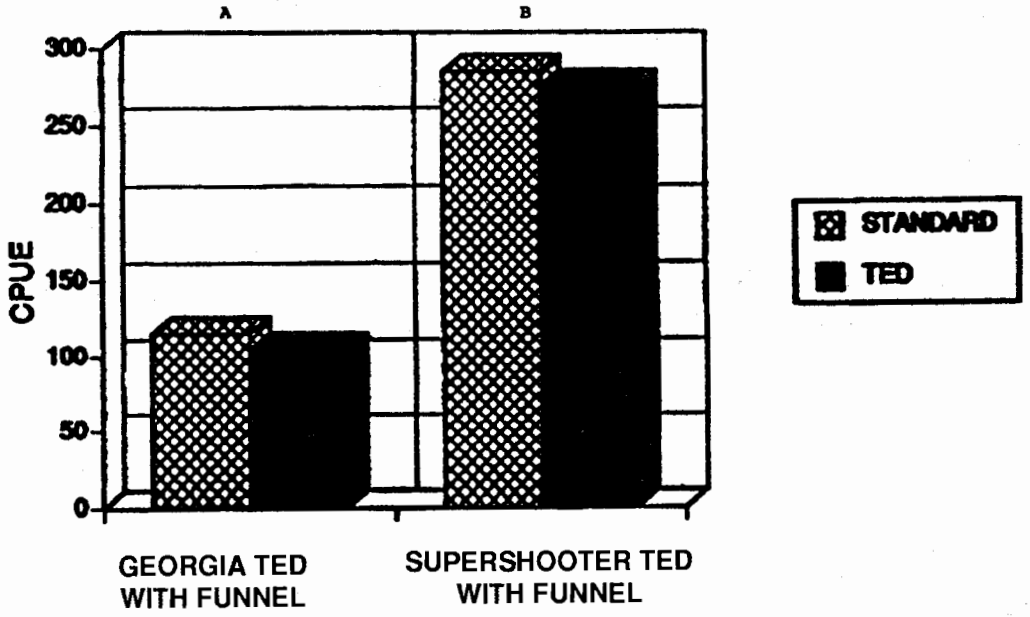

Figure 2. CPUE (lbs/hr) of finfish in standard and TED-equipped nets. All areas and seasons combined. Standard and TED-equipped nets were not significantly different (P<0.05). Data paired by tows without try nets included (n=425). 1989-1990.

Another problem caused by trawlers is that the bycatch of finfish is at least an order of magnitude larger than the shrimp catch. In order to stop the decline of many demersal fisheries, attempts are underway to modify trawls to release finfish during trawling. The goal is a 50% reduction in finfish mortality by 1993. Twelve different approaches have now been consolidated into four full prototypes which show promise. Extensive testing of these prototypes is planned for 1991.

Estuarine Species. Microhabitat used by postlarval spotted seatrout is predominated by proximity to *Spartina alterniflora*. These fish occur most frequently 1-3 m from the marsh edge. Salinity and turbidity are also significantly related to seatrout density. Several microhabitat variables appeared important to the occurrence of postlarval red drum. Water temperature varied between 20.8 and 34.5°C, depths ranged from 3-42 cm and most fish were found less than 2.5 m from the marsh edge.

Juvenile blue crabs (2-18 mm carapace width) are found close to the marsh edge (0-1 m) in the fall in Barataria Bay. In the spring and winter they predominate at 2-4 m from the marsh edge. In the summer they are fairly evenly distributed from 0-4 m. The preferred salinities range from 10-25 ppt. For dissolved oxygen the range was from 4-12 mg/l.

Coastal Pelagics. Initial age, growth and reproductive biology studies of cobia showed that females are slightly larger than males. The sex ratio was strongly skewed towards males for the 1987-1990 test period. The maximum age was 10 with year class composition dominated by 2 to 4 year olds. Spawning off Louisiana takes place mainly during May to July. Amberjacks, like cobia, tend to have larger females and also spawn during the same spring-summer season.

Estimates indicate that the spawning stock biomass of Gulf Spanish mackerel is stable, while Gulf king mackerel spawning stock appears to be recovering. Table 3 compares the allowable catches (ABCs) for both mackerels in the Gulf and in the Atlantic. Table 4 lists king and Spanish mackerel as the species most frequently caught by trolling in the Gulf of Mexico.

Small Pelagics. Spring and fall surveys in the northcentral Gulf of Mexico with large high-opening bottom trawls were successful in locating sizeable concentrations of several species of small pelagics; in providing additional information on distribution and abundance of these latent resources; and in providing additional information concerning distribution by size and abundance in relation to temperature, depth and area in the northern Gulf of Mexico. The cruises were also instrumental in standardizing the 123-ft Shuman trawl for assessing stocks of small pelagics. A fish-shooter device was added to the trawl, increasing its effectiveness and providing a successful modification for the use of smaller trawls in the commercial harvest of these fast-swimming, elusive species.

Hydroacoustic surveys were also conducted in the early spring and late fall to determine the ability of a new hydroacoustic system to differentiate individual targets and to estimate school sizes of the small pelagics. More acoustic targets were noted at night than during the

Table 3. King and Spanish Mackerel Allowable Catch Ranges and Catch Limit Established by Fishery Management Councils

Stock	Fishing year	Million pounds ABC	TAC
Gulf			
King mackerel	Jul. 1, 90-Jun. 30, 91	3.2-5.4	4.25
Spanish mackerel	Apr. 1, 90-Mar. 31, 91	3.9-7.4	5.25
Atlantic			
King mackerel	Apr. 1, 90-Mar. 31, 91	6.5-15.7	8.30
Spanish mackerel	Apr. 1, 90-Mar. 31, 91	4.2-6.6	5.00

Table 4. Most Frequently Caught Fish Species

	Gulf of Mexico		Atlantic	
	Trolling	Non-trolling	Trolling	Non-trolling
1.	Spanish mackerel	Gray triggerfish	Spanish mackerel	Black sea bass
2.	King mackerel	Red snapper	Dolphin	Unident. grunts
3.	Dolphin	Vermilion snapper	King mackerel	Unident. porgies
4.	Little tunny	Unident. porgies	Bluefish	Vermilion snapper
5.	Atlantic bonito	Unident. grunts	Atlantic bonito	Yellowtail snapper

day. At night, two to three target layers formed (Figure 3). In the survey area between the mouth of the Mississippi River and Mobile Bay, and between the 20 and 150-fathom isobaths, Gulf butterfish and Atlantic cutlassfish comprised 70 to 100% by weight of the total catches made with the semipelagic trawl through a target layer located at a depth of 20 to 70 m (upper layer). Target layers were also located near midwater and 2 to 50 m above the bottom. The catches from the deeper layers were more mixed though dominated by butterfish and Atlantic cutlassfish. Other species captured in the midwater and near-bottom layers were small squid, small lizardfish and searobins.

In the Desoto Canyon area located south of the Florida panhandle, the upper target layer was dominated by round herring, with some butterfish, rough scad and chub mackerel. The movement of target species off the bottom was also confirmed with acoustic and trawl data. Round herring were observed with acoustics to rise off the bottom 1-3 hours before sunset and move to a layer that was 20 to 70 m below the surface. The identity of these targets was determined by capture with the bottom and semi-pelagic trawls. The catch composition of bottom trawls during daylight was more varied than noted for the semipelagic trawl. Catches were dominated by round herring, butterfish, rough scad and longspine porgy. Other non-target species included Atlantic cutlassfish, Atlantic croaker, spot, longfin squid, pinfish, broad flounder, vermilion snapper and nurse sharks.

Ocean Pelagics. Longlining for tuna (20 trips) using 68 sets, 34,600 hooks, and 1,429.6 miles of line resulted in a catch of 795 yellowfin tuna, 46 miscellaneous tuna, 87 swordfish, 118 common dolphin (fish), 51 wahoo, 15 miscellaneous sharks, 28 escolar and 14 miscellaneous fish. Discarded fish included 48 blue marlin, 33 white marlin, 21 sailfish, 61 little tunny, 107 yellowfin tuna, 60 sharks, 37 blackfin tuna, 8 longbill spearfish, 23 swordfish, 9 escolar, 39 skipjack tuna, 11 dolphin (fish) and 66 miscellaneous fish. The yellowfin tuna catch rate of 2.79 fish per 100 hooks was significantly greater than the 1988-89 catch rate of 1.85 fish per 100 hooks.

Recreational Fishing. In view of the increased fishing pressure on Gulf of Mexico species, it is imperative that conservation be stressed. In commercial fisheries the pressing need is to reduce or eliminate bycatch of non-target fish. MARFIN has attempted to promote "Ethical angling" by a catch and release program. Figure 4 is an example of information available to all anglers.

Reef Fish. Reef fish population data are in short supply at a time when the various fishes appear to be overfished. Early life history data have been collected for several species with emphasis on red and gray (mangrove) snappers. Prior to this MARFIN study no information was available on larvae smaller than 4 mm. Some of the larvae (7) were red snapper and only one was a gray, while 166 were vermilion snapper.

Large (up to 8 tons and 16 ft high) artificial reefs used to enhance reef fish population off Big Pine Key in Florida attracted large numbers of yellowtail snapper on the high profile of midwater and deep units.

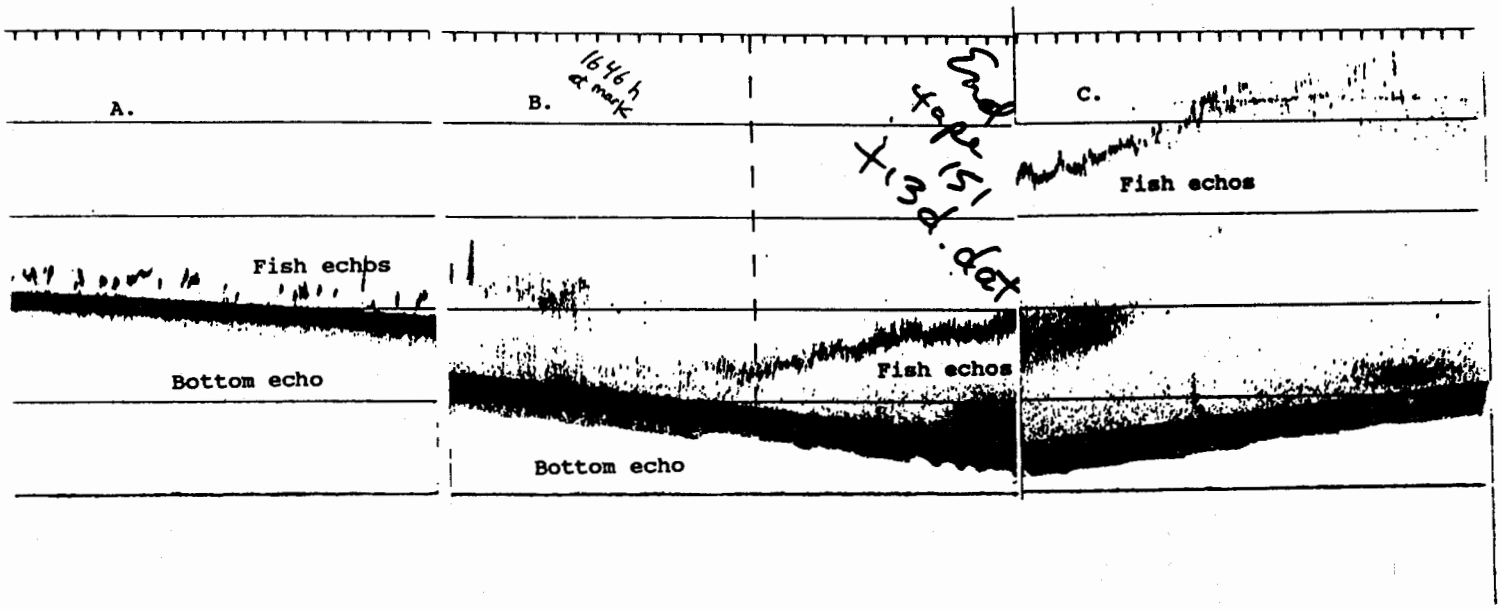

Figure 3. Echograms of round herring made at 120 kHz along the acoustic transect at longitude 86°30" W. during CHAPMAN cruise 90-08. Horizontal grid lines at 50-m intervals. Vertical tick marks every 60 seconds.

A. Time 1400 h, bottom depth 140-155 m.
B. Time 1646 h, sunset at 1801 h, bottom depth 180-220 m.
C. Time 1830 h, bottom depth 220-200 m.

NATIONAL MARINE FISHERIES SERVICE CATCH AND RELEASE QUICK REFERENCE CARD

WHY RELEASE FISH

1. A fish is too valuable a resource to be caught only once.
2. A personal commitment to conservation adds fun to fishing.
3. Size, season, and bag regulations make release mandatory.
4. Stressed fish populations need your help to recover.
5. The future of sportfishing is in your hands. Pass it on!

HOW TO BEGIN

1. Decide to release a fish as soon as it is hooked.
2. Land your quarry quickly; don't play it to exhaustion.
3. Set the hook immediately. Try to prevent a fish from swallowing the bait.
4. Work a fish out of deep water slowly, so it can adjust to the pressure change.
5. Use hooks that are barbless and made from metals that rust quickly.
6. Always keep release tools handy.

HANDLING YOUR CATCH

1. Leave the fish in the water (if possible) and don't handle it. Use a tool to remove the hook or cut the leader.
2. Keep the fish from thrashing.
3. Net your catch **only** if you cannot control it any other way.
4. When you must handle a fish:
   - Use a wet glove or rag to hold it.
   - Turn a fish on its back or cover its eyes with a wet towel to calm it.
   - Don't put your fingers in the eyes or gills of your catch.
   - Larger fish can be kept in the water by holding the leader with a glove or by slipping a release gaff through the lower jaw.
   - Avoid removing mucous or scales.
   - Get the fish back in the water as quickly as possible.
5. Protect against personal injury by handling each species carefully and correctly.

REMOVING THE HOOK

1. Cut the leader close to the mouth if a fish has been hooked deeply or if the hook can't be removed quickly.
2. Back the hook out the opposite way it went in.
3. Use needle-nose pliers, hemostats, or a hookout to work the hook and protect your hands.
4. For a larger fish in the water, slip a gaff around the leader and slide it down to the hook. Lift the gaff upward as the angler pulls downward on the leader.
5. Do not jerk or pop a leader to break it. This damages vital organs and kills the fish.

THE FINAL MOMENTS

1. Place the fish in the water gently, supporting its mid-section and tail until it swims away.
2. Resuscitate an exhausted fish by moving it back and forth or tow it alongside the boat to force water through its gills.
3. Use an ice pick, needle, or hook point to puncture the expanded air bladder on a fish taken from deep water.
4. Watch your quarry to make sure it swims away. If it doesn't, recover the fish and try again.
5. **REMEMBER, A RELEASED FISH HAS AN EXCELLENT CHANCE OF SURVIVAL WHEN HANDLED CAREFULLY AND CORRECTLY.**

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Figure 4. NMFS Catch and Release Quick Reference Card

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