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AMENDMENT NUMBER 9

TO

FISHERY MANAGEMENT PLAN FOR THE SHRIMP FISHERY

OF THE GULF OF MEXICO, U.S. WATERS

WITH

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

REGULATORY IMPACT REVIEW

INITIAL REGULATORY FLEXIBILITY ANALYSIS

AND SOCIAL IMPACT ASSESSMENT

FEBRUARY 1997

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COVER SHEET

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Abstract: The Gulf of Mexico Fishery Management Council proposes an amendment to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters, to reduce unwanted bycatch of juvenile red snapper with ancillary benefits to other finfish species. The requirement of bycatch reduction devices in shrimp trawls is proposed to allow rebuilding of the overfished stock of red snapper.

ABBREVIATIONS AND ACRONYMS USED IN THIS DOCUMENT

AP	Shrimp Advisory Panel
BO	Biological Opinion
BRD	Bycatch Reduction Device
CPUE	Catch Per Unit of Effort
DOC	Department of Commerce
SEIS	Supplemental Environmental Impact Statement
ESA	Endangered Species Act
EEZ	Exclusive Economic Zone
FEIS	Final Environmental Impact Statement
F	Fishing Mortality
FMP	Fishery Management Plan
GMFMC	Gulf of Mexico Fishery Management Council
GSAFDF	Gulf and South Atlantic Fishery Development Foundation
IRFA	Initial Regulatory Flexibility Analysis
ITQ	Individual Transferrable Quota
LTPY	Long-Term Potential Yield
M	Natural Mortality
MMS	Minerals Management Service (DOI)
MRFSS	Marine Recreational Fishery Statistics Survey
MSY	Maximum Sustainable Yield
NAS	National Academy of Sciences
NMFS	National Marine Fisheries Service
NMFS-SEFSC	National Marine Fisheries Service, Southeast Fisheries Science Center
NOAA	National Oceanic and Atmospheric Administration
OY	Optimum Yield
RFSAP	Reef Fish Stock Assessment Panel
RA	Regional Administrator of NMFS
RIR	Regulatory Impact Review
SEP	Socioeconomic Assessment Panel
SIA	Social Impact Assessment

SEFSC	Southeast Fisheries Science Center
SLF	Shrimp Landings File
SPR	Spawning Potential Ratio
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TALFF	Total Allowable Level of Foreign Fishing
TED	Turtle Excluder Device
TL	Total Length
TAMU	Texas A & M University
TPWD	Texas Parks and Wildlife Department
TSA	Texas Shrimp Association
USCG	United States Coast Guard
VOUF	Vessel Operating Units File
YPR	Yield Per Recruit

SUMMARY

The Gulf of Mexico Fishery Management Council (GMFMC) prepared a Fishery Management Plan for Shrimp in the Gulf of Mexico, U. S. Waters that was implemented in 1981. Its principal effect is to monitor for overfishing while enhancing yield by deferring harvest of small shrimp. In recent years, the exvessel value of annual Gulf shrimp landings has exceeded $400 million (see Table R-1).

During the 1970s, 1980s, and early 1990s studies of the bycatch of fish in shrimp trawls found substantial levels of mortality among both regulated and unregulated species of commercial and recreational value. In particular, the rebuilding program for the overfished stock of red snapper was being impeded by the high levels of juvenile mortality from bycatch of shrimp trawls.

In 1990, the GMFMC considered measures to reduce shrimp trawl bycatch and committed to a 50 percent reduction of juvenile red snapper mortality in 1993. The Congressional reauthorization of the Magnuson Fishery Conservation and Management Act in 1990 established a 3-year moratorium on implementation of bycatch reduction regulations and authorized a study program on bycatch reduction (NMFS, 1995). The moratorium was later extended for an additional year. The actions proposed herein are based on the results of this study program and the GMFMC's commitment to reduce bycatch mortality of red snapper. Alternatives considered include: status quo; requiring use of Bycatch Reduction Devices (BRDs) in specific areas; establishment of a bycatch reduction criterion and certification of various BRDs; seasonal closures; area closures; and a framework procedure for modifying the bycatch reduction criterion, establishing certification procedures, and certifying additional BRDs.

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FISHERY IMPACT STATEMENT (FIS)

This integrated document contains all elements of the Plan Amendment, Supplemental Environmental Impact Statement (SEIS), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). These sections also include the fishery impacts of the proposed management measures. This table of contents and summary are provided separately to aid the reader in reviewing fishery impacts by referencing corresponding sections of the amendment that are inclusive of the FIS.

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SUMMARY

The FIS indicates that initially there may be a reduction in shrimp biomass as a result of the requirement of BRDs; however, it is not known whether such a reduction (about 5.9 to 8.2 percent) would reduce catch because there has been approximately a 12 percent variability in landings over the past five years. Additionally, one scenario evaluated by Martinez et al. (1996) indicates that there could be as much as a 4.7 percent increase in shrimp biomass as shrimp predators become larger and target larger prey. Consequently, any effect of changes in shrimp biomass or landings on participants or fishing communities is unknown.

The RIR notes that requiring the use of either the Fisheye 30 mesh BRD or the Andrews TED could reduce the total surplus for the industry by about $116 million and $1.13 billion, respectively over a very long period when the fishery reaches equilibrium in terms of minimal changes in total surplus. Annual impacts would range from about $10 million to $40 million for the fisheye 30 BRD and from about $10 to $100 million for Andrews TED. These estimates assume shrimp reductions of 3 and 16 percent, respectively for these gears. Other BRDs have demonstrated a zero percent shrimp loss, and it is possible that future development and refinement of BRDs could eliminate shrimp loss and still meet bycatch reduction requirements. It is also likely that the requirement of BRDs will reduce culling, and thereby shrimping operations will be less labor-intensive and perhaps safer.

The RIR also concludes that there will probably be a reduction in the shrimp fleet over time with the implementation of the requirement for BRDs in trawls. The amendment also notes that there has already been a reduction in effort by about 10 percent, which may be due in part to a reduction in the number of vessels. This reduction has occurred prior to any requirement for the use of BRDs.

The effects of requiring BRDs in shrimp trawls of the Gulf of Mexico EEZ on fishing participants and communities will depend on how the shrimping industry reacts. As noted in the SIA, participants currently believe that impacts will be negative; however, as indicated by economic and biological data, there is the potential for positive benefits not only to finfish stocks (and fisheries for these stocks) but also to the shrimp industry if shrimp loss can be minimized. To the extent that bycatch reduction is achieved for migratory stocks of fish, e.g., mackerels and cobia, there should be positive effects to recruitment of these stocks in portions of the South Atlantic and possibly the Mid-Atlantic Councils' areas of jurisdiction.

SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT

This integrated document contains all elements of the Plan Amendment, Supplemental Environmental Impact Statement (SEIS), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the SEIS is provided separately to aid the reviewer in referencing corresponding sections of the amendment.

( ) Draft (X) Final

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SUMMARY

This SEIS addresses the issue that shrimp trawls have a significant bycatch of nontarget species of finfish; most of which are discarded dead. Consequently, fisheries directed at the discarded species and other fauna may be adversely affected and ecosystem diversity may be reduced. Red snapper is one species documented to be overfished and unable to recover because of the unacceptably high mortality of juveniles taken incidentally in shrimp trawls. Alternatives are presented that will reduce bycatch. The proposed measures address Problem number 4 of the FMP concerning conflicts with the Gulf's reef fish fishery and Management Objective number 5 to minimize the incidental capture of finfish by shrimpers, when appropriate. Because BRDs are not 100 percent effective, some reduced level of incidental take will continue to occur. A reduction or loss of shrimp through the BRD also may occur. The amount of shrimp loss is dependent on the type of BRD used and the operation of the trawl and vessel. In areas not directly affected by this action (i.e., state controlled waters), the fishery may continue to take incidental catch. Ecological modeling suggests that use of the three most effective BRDs will result in a decline in shrimp biomass ranging from 5.9 to 8.2 percent (Martinez et al. 1996) as a result of an increase in the population of bottom fish

predators and a reduction in available nutrients for recycling. Subsequent modeling of changes in finfish size on shrimp predation could result in a 4.7 percent increase in shrimp biomass or a decrease of 16.7 percent. The subsequent effect on shrimp landings in unknown and would be difficult to measure because over the past five years natural variability in landings has averaged about 12 percent.

REGULATORY IMPACT REVIEW

This integrated document contains all elements of the Plan Amendment, Supplemental Environmental Impact Statement (SEIS), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the SIA is provided separately to aid the reviewer in referencing corresponding sections of the amendment.

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SUMMARY

The regulatory impact review consists of the following major features: 1) economic profile of the shrimp and selected finfish industries, 2) analysis of impacts, 3) determination of a significant regulatory action, and 4) initial regulatory flexibility analysis.

Economic profiling of the various fishing industries is undertaken by presenting historical and current information such as landings, number of vessels, ex-vessel values, processing products and values for the shrimp processing industry, and cost and returns for the shrimp harvest sector.

The analyses of impacts focuses on the determination of costs and benefits to the various fishing industries. A table on the next page summarizes these impacts. In quantifying the effects of various management measures, specifically the various BRD designs, a dynamic bioeconomic model was developed consisting of several components identifying the various economic relationships. The basic result of this modeling is that total surplus to the shrimp industry would be reduced by $116 million with the adoption of the th fisheye 30 BRD and $1.1 billion with the adoption of Andrews TED as BRD. This result is arrived at by running the model over a very long period. Over the short-run total surplus reductions would range from $10 million to $40 million for fisheye 30 BRD and from $10 million to $100 million for Andrews TED, with the upper limits occurring in the first year of BRD implementation. Mainly a qualitative discussion is conducted for determining the economic impacts on red snapper and other finfish fisheries. This analysis shows that benefits can arise in the finfish fisheries to the extent that some effort control program is implemented in these fisheries. In the particular case of the commercial red snapper fishery, adoption of BRDs would at least allow maintenance of a higher TAC and quota. If current TAC of 9.12 million pounds is maintained throughout the stock's recovery period, the commercial red snapper fishery is expected to gain about $118 million in net benefits for the period 1996-2020. No benefit determination is done for the recreational fishery.

The RIR has determined that this amendment would not result in a significant regulatory action. However, it would result in a significant economic impact on a substantial number of small business entities.

Summary of Costs and Benefits (Million Dollars)					
Alternative	**Shrimp[1]**	**Red Snapper[2]**	**Other Finfish**	**Gov't Cost[3]**	**Net Change[4]**
Fisheye 30	-117	≤ 118	Unknown	0.243	Positive or negative
Fisheye 45	-795	≤ 118	Unknown	0.243	Likely negative
Extended Funnel	316	≤ 118	Unknown	0.243	Likely positive
Andrews TED	-1,130	≤ 118	Unknown	0.243	Very likely negative
Season Closures	-35 to -55	≤ 118	Unknown	0.243	Positive or negative
Area Closures	Considered impractical; economic outcomes not estimated				
Florida and Greater Than 100 Fathom Exemption	Status quo for these areas; no change in economic outcomes				

[1]Net benefits (loss) for BRDs are estimated over a very long period while those for closures are done over a period of 10 years.

[2]The $118 million impact is estimated over a 25-year period and assumes an ITQ management program for the red snapper fishery. Without an ITQ management program, the expected change is small (see text).

[3]First year cost only. A one-time cost of up to $10 million has been expended for research, development and testing of various BRD designs. Annual cost following the first year is small.

[4]Net change is determined as the sum of net impacts for shrimp and finfish fisheries less government cost. The outcome denoted depends on the type of management adopted for the red snapper and other finfish fisheries (see text).

SOCIAL IMPACT ASSESSMENT

This integrated document contains all elements of the Plan Amendment, Supplemental Environmental Impact Statement (SEIS), Regulatory Impact Review (RIR), and Social Impact Assessment (SIA). The table of contents for the SIA is provided separately to aid the reviewer in referencing corresponding sections of the amendment.

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SUMMARY

A sociological assessment of shrimp vessel captains in the Gulf was conducted by Thomas et al. (1995). Some 577 captains were interviewed between Key West, Florida and Brownsville, Texas with selection based on a two-year average of landings in key ports. Thomas et al. (1987) previously surveyed 113 Alabama-based shrimp captains, and those data allowed for comparisons of demographic, economic, and occupational characteristics of the Alabama group between 1987 and 1994, as well as their social problems. Based on these limited comparisons, this section describes the social characteristics of Gulf shrimp fishermen and their perceptions about how bycatch regulations may affect them. Included are basic demographic characteristics of fishermen, economic characteristics, occupational features,

physiological and psychological indicators of health, and perceptions fishermen have of the future. This analysis is also compared and contrasted with similar studies of shrimp fishermen in the south Atlantic area (See Section 5.0 for details of each of these findings).

This assessment also includes similar comparisons of commercial red snapper fishermen developed by Thomas et al. (1993) as included in Amendment 8 to the Reef Fish Management for Reef Fish Resources of the Gulf of Mexico. Adequate social impact data on other commercial finfish fishermen and recreational fishermen that may be affected by the alternatives in this amendment are not available. Conclusions are presented where possible.

1.0 INTRODUCTION

HISTORY OF MANAGEMENT

A fishery management plan (FMP) for the shrimp fishery in the Gulf of Mexico was prepared by the Gulf of Mexico Fishery Management Council (GMFMC) and implemented as federal regulation on May 15, 1981. The principal thrust of the plan was to enhance yield in volume and value by deferring harvest of small shrimp to provide for growth. Principle action included: (1) establishing a cooperative Tortugas Shrimp Sanctuary with the state of Florida to close a shrimp trawling area where small pink shrimp comprise the majority of the population most of the time; (2) a cooperative 45-day seasonal closure with the state of Texas to protect small brown shrimp emigrating from bay nursery areas; and (3) seasonal zoning of an area of Florida Bay for either shrimp or stone crab fishing to avoid gear conflict.

Amendment 1, approved later that year, provided the Regional Administrator (RA) of the National Marine Fisheries Service (NMFS) with the authority (after conferring with the GMFMC) to adjust by regulatory amendment the size of the Tortugas Sanctuary or the extent of the Texas closure, or to eliminate either closure for one year.

Amendment 2 (1983) updated catch and economic data in the FMP, and Amendment 3 (1984) resolved another shrimp-stone crab gear conflict on the west-central Florida coast.

Amendment 4, partially approved in 1988 and finalized in 1989, identified problems that developed in the fishery and revised the objectives of the FMP accordingly. The annual review process for the Tortugas Sanctuary was simplified, and the GMFMC's and RA's review for the Texas closure was extended to February 1st. Disapproved was a provision that white shrimp taken in the EEZ be landed in accordance with a state's size/possession regulations to provide consistency and facilitate enforcement with the state of Louisiana. This latter action was to have been implemented at such time when Louisiana provided for an incidental catch of undersized white shrimp in the fishery for seabobs. This proposed action was disapproved by the NMFS with the recommendation that it be resubmitted under the expedited 60-day Secretarial review schedule after Louisiana provided for a bycatch of undersized white shrimp in the directed fishery for seabobs. This resubmission was made in February of 1990 and applied to white shrimp taken in the exclusive economic zone (EEZ) and landed in Louisiana. It was approved and implemented in May of 1990.

In July 1989, the NMFS published revised guidelines for FMPs that interpretatively addressed the Magnuson Act National Standards (50 CFR Part 602). These guidelines require each FMP to include a scientifically measurable definition of overfishing and an action plan to arrest overfishing should it occur.

In 1990, Texas revised the period of its seasonal closure in Gulf waters from June 1 to July 15 to May 15 to July 15. The FMP did not have enough flexibility to adjust the cooperative closure of federal waters to accommodate this change, thus an amendment was required.

Amendment 5, approved in 1991, defined overfishing for Gulf brown, pink, and royal red shrimp and provided for measures to restore overfished stocks if overfishing should occur. Action on the definition of overfishing for white shrimp was deferred, and seabobs and rock shrimp were deleted from the management unit. The duration of the seasonal closure to shrimping off Texas was adjusted to conform with the changes in state regulations.

Amendment 6 (1993) eliminated the annual reports and reviews of the Tortugas Shrimp Sanctuary in favor of monitoring and an annual stock assessment. Three seasonally opened areas within the sanctuary continued to open seasonally, without need for annual action. A proposed definition of overfishing of white shrimp was rejected by the NMFS as not being based on the best available data.

Amendment 7, finalized in 1994, defined overfishing for white shrimp and provided for future updating of overfishing indices for brown, white, and pink shrimp as new data become available. A total allowable level of foreign fishing (TALFF) for royal red shrimp was eliminated; however, a redefinition of overfishing for this species was disapproved.

Amendment 8, submitted in 1995 and implemented in early 1996, addressed management of royal red shrimp. It established a procedure that allows total allowable catch (TAC) for royal red shrimp to be set up to 30 percent above Maximum Sustainable Yield (MSY) for no more than two consecutive years so that a better estimate of MSY can be determined.

The present draft amendment, Amendment 9, addresses the issue of reducing the bycatch of juvenile red snapper in the shrimp trawl fishery

PURPOSE AND NEED

The purpose of amendment 9 is to provide additional management of the shrimp fishery to reduce the unwanted bycatch of juvenile red snapper, and to the extent practicable, not adversely affect the shrimp fishery valued at $400 million at the ex-vessel level (see Table R-1), or $2.95 billion in sales (Kearney-Centaur, 1989). The red snapper stock in the Gulf of Mexico is considered to be overfished, and even if the directed fisheries for adult red snapper were closed to all harvest, the stock is not predicted to recover from overfishing (i.e. rebuild to the target SPR of 20 percent) because of the excessive loss through bycatch of juveniles in shrimp trawls. NMFS (1990) estimated that a reduction in bycatch of red snapper of about 60 percent was needed in order to allow a directed harvest of only one million pounds. Afterwards, the red snapper recovery plan and 1995 stock assessment were predicated on achieving a 50 percent reduction in bycatch. Thus, the major goal of Shrimp Amendment 9 is to achieve a 50 percent reduction in juvenile red snapper bycatch mortality (age 0 and age 1 fish) in shrimp trawls from the average level of mortality on those age groups during the years 1984-1989 (prior to the requirement of TEDs). This base period was recommended by the Reef Fish Stock Assessment Panel (RFSAP, 1995). Ancillary benefits to other finfish species are also expected.

Shrimp trawl mortality on these age groups was estimated to be F=1.75 when calculated using the red snapper natural mortality rate (M) assumption of M=0.2 prior to 1995 (Goodyear 1995 - Table 108). Subsequently, the RFSAP (1995) specified M=0.1, and this action changed the estimate of juvenile bycatch mortality expressed as fishing mortality (F), on these age groups for the base years to F=2.12 (Goodyear 1995 - Table 98) (see Figure 1). This F was distributed by age for each year class on average (Goodyear 1995 - Table 98 on the vertical) as follows: 18 percent for age 0 (F=.370) and 82 percent for age 1 (F=1.693). In modeling stock restoration scenarios, Goodyear (1995) concluded that a 50 percent reduction in the cumulative instantaneous fishing mortality for age 0 and age 1 juveniles would be sufficient to restore the stock within the GMFMC's specified recovery period (2019) provided: (1) it was initiated in 1997, (2) recruitment does not decline, and (3) the directed harvest does not exceed 10 million pounds. The estimate of F was later revised to 2.06; thus a 50 percent reduction in the cumulative fishing mortality rate from the base period results in a F=1.03, which is equivalent to a conditional survival probability of 36 percent (the percentage change in survivors with and without the bycatch mortality).

Because of this substantial fishing mortality on juvenile red snapper and the need to rebuild this overfished stock, the development and utilization of bycatch reducing gear or other management techniques in the shrimp fishery are needed to restore this stock. Because the use of turtle excluder devices (TEDs) became mandatory in 1989 and 1990, any reduction in bycatch resulting from the use of TEDs contributes to the 50 percent reduction goal.

Overview

The FMP for the Shrimp Fishery of the Gulf of Mexico cites conflicts with other fisheries such as the groundfish fishery of the north central Gulf and the Gulf's reef fish fishery as problems in the fishery. It accordingly lists the minimization of incidental capture of finfish by shrimpers, when appropriate, as a specific management objective. The FMP for Gulf Reef Fish lists the establishment of a certain survival rate of biomass into the spawning stock to achieve at least 20 percent spawning potential ratio (SPR) as a primary objective.

Although the purpose of this amendment is to reduce the bycatch mortality on juvenile red snapper, other juvenile fish stocks are also being caught as bycatch. This bycatch of juvenile fishes, predominantly in year classes 0 and 1, is discarded as an unwanted nuisance by the shrimp trawlers. It causes a time-consuming sorting of shrimp from the catch, and excessive amounts of bycatch may reduce the quality of the shrimp caught. A large portion of the fish bycatch, though returned to the water, does not survive. Catch rates and distribution of bycatch are shown in Figure 2.

The NMFS, the Gulf and South Atlantic Fisheries Development Foundation (GSAFDF), and Texas Shrimp Association (TSA) have conducted studies to evaluate the overall bycatch of shrimp trawl vessels in the southeast. Data used have come from both the characterization of catch research programs involving commercial vessels and from the control nets in the bycatch reduction device (BRD) evaluation research. Five hundred forty-four trips were completed during the period February 1992 through October 1995. Three hundred fifty-five of the 544 trips were along the eastern coast of the

United States, while the other 189 trips were in the Gulf of Mexico. Data from 5,045 tows have been recorded in NMFS databases (1,726 characterization and 2,071 BRD/TED evaluation). One thousand two hundred seventy-one tows were along the eastern coast of the United States, while the other 3,326 tows were in the Gulf of Mexico. A total of 3,653 sea days were used to collect the data (1,359 NMFS and 2,294 GSAFDF/TSA). Of the 2,879 sea days in the Gulf of Mexico, 686 were off Florida, 160 were off Alabama/Mississippi, 943 were off Louisiana, and 1,090 were off Texas (NMFS-SEFC). (See Appendix A for most recent status report [NMFS 1996]).

Table 1. Ratio of finfish poundage to each pound of shrimp caught in shrimp trawls from the Gulf of Mexico, 1992-1994. Note: These figures are based on more recent data than those illustrated in Figure 2.

By Area		By Season	
Gulf-Wide	4.2	Gulf-Wide:	
Florida			
Nearshore[1]	2.9		
Offshore[2]	3.1	January/April	4.9
Alabama/Mississippi			
Nearshore	3.2		
Offshore	3.6	May/August	3.3
Louisiana			
Nearshore	3.3		
Offshore	6.9	September/December	5.1
Texas			
Nearshore	3.5		
Offshore	3.3		

[1] Inside 10 fathoms
[2] Outside 10 fathoms
Source: Data provided by NMFS, Galveston.

The GMFMC's 1981 draft Groundfish FMP included a calculated, average total weight of fish discards for the years 1973 through 1976 in a "Primary Area" between Perdido Bay, Florida and Point Au Fer, Louisiana of 231,980 metric tons (from a minimum of 64,691 to a maximum of 320,536 metric tons). Included in the average were 33,900 metric tons (14.6 percent) from inshore (estuarine) waters from commercial boats and 48,000 sport trawls. Shrimp trawlers took an estimated 1.63 billion croakers from offshore waters. The data on finfish bycatch for the Groundfish FMP were based on sampling the catch of commercial shrimp vessels during 1973 through 1977. Data were collected from 300 trips during that period (GMFMC, 1981). From standard trawls, finfish to shrimp ratios by weight averaged 4.2 and 13.7 for inshore and offshore areas, respectively.

In the Gulf offshore shrimp fishery, the finfish to shrimp ratio has declined from about 10:1 in the 1970s to about 4:1 in 1994 (NMFS 1995). Recent ratios by area and season are shown in Table 1. The decline was attributed to changes in gear, fishing technology, and reduced abundance of some species (Nichols 1994). Beginning in 1989, TEDs were required on trawls which probably excluded large fish and contributed to the reduction in the finfish to shrimp ratios based on weight caught in offshore waters.

Bycatch by number in 1989 is shown in Table 2 for selected species. Bycatch remains a major source of fishing mortality on mackerels (Figure 3). Nichols (1994) estimated the 1993 bycatch of juvenile king and Spanish mackerel in the Gulf shrimp fishery to be approximately 650,000 and 5,000,000 fish, respectively. The average annual catch for the last five years (1991 through 1995) was 911,000 king mackerel and 3.9 million Spanish mackerel (S. Nichols, personal communication).

It should be noted that the aforementioned numbers, weights, and ratios relate primarily to species other than red snapper. Caution should be used with estimates of discards and ratios of fish to shrimp catch because they are relevant only to stock size at the time of sampling, and they can be misinterpreted (NMFS 1995).

The 1993 estimate of total number of red snapper discarded as shrimp bycatch was 34,000,000. There were 134,000 days fished in waters 5 fathoms and greater by the Gulf shrimp fleet in statistical areas 9 through 21 (Destin, Florida, through Port Isabel, Texas) where the bulk of juvenile red snapper are found (Figure 4) (Goodyear, 1994). Offshore shrimping effort has remained high but declined by 5.8 percent in 1993 and 10.0 percent in 1994 (Figure 1) (Goodyear 1995); and offshore catch of brown shrimp declined in 1992 and 1993 (Figure 5).

Table 2. Estimate of 1989 Gulf Offshore Shrimp Fleet Bycatch.

Species	Millions of Fish
Atlantic Croaker	5600
Sea Trouts	1300
Longspine Porgy	1300
Spot	680
Gulf Butterfish	400
Atlantic Cutlassfish	130
Hardhead Catfish	112
Atlantic Bumper	110
Red Snapper	20
Spanish Mackerel	3.2
King Mackerel	1.3
Vermilion Snapper	0.9
Red Drum	0.2
Sharks	(5.6 m lbs)

Source: Nichols, et al. (1990)

In reviewing the Draft Groundfish FMP, the GMFMC deferred further action on the plan until such time as BRDs or other techniques may be developed. A preferred option of the draft plan stated:

> The GMFMC will establish gear restrictions for the Primary Area (Perdido Bay, Florida to Point Au Fer, Louisiana) to reduce the discarded bycatch of groundfish by shrimpers, contingent upon successful development and testing of promising new gear (excluder panel, Belgian beam trawl, or others).
>
> A. A gear will be considered successful if the following three criteria are met.
>
> 1. It reduces the fish/shrimp ratio by approximately 50 percent in direct comparison to standard trawls on commercial vessels.

2. It does not reduce the shrimp catch by more than 3 percent in direct comparison to standard trawls on commercial vessels.

3. It does not increase the overall cost of gear by more than 10 percent.

B. The GMFMC will determine when development and testing of a gear has been successful and will initiate restrictions governing the use of such gear by area by season.

With pledges of assistance from the shrimp industry, the GMFMC in 1990 expressed its intent to reduce bycatch mortality of juvenile red snapper by 50 percent by 1993. The 3-year delay was provided to develop methodology in cooperative studies with the industry. A subsequent Amendment to the Magnuson Act in 1990 established a four-year moratorium on implementation of bycatch reducing criteria.

In a 1991, Regulatory Amendment to the Reef Fish FMP, the GMFMC adopted a proposal to effect a 50 percent reduction of red snapper shrimp trawl bycatch in 1994. This reduction was to occur through the mandatory use of finfish excluder devices, reductions in shrimp fishery effort, area or season closures, or a combination of actions. Evaluation of the red snapper stocks has determined that without a 50 percent reduction in red snapper mortality from shrimp trawl bycatch, the red snapper resource cannot recover to a 20 percent SPR even with a total closure of the directed fishery (GMFMC, 1991).

In summary, the GMFMC's intent in Amendment 9 is to help resolve Problem 4 and meet Objective 5 of the FMP for the shrimp fishery of the Gulf of Mexico, as listed below:

<u>Problems in the Fishery</u>

The following are specific problems defined in the existing FMP as amended.

1. Conflict among user groups as to area and size at which shrimp are to be harvested.
2. Discard of shrimp through the wasteful practice of culling.
3. The continuing decline in the quality and quantity of estuarine and associated inland habitats.
4. Conflicts with other fisheries such as gear conflict with the stone crab fishery in southern Florida, the groundfish fishery of the north central Gulf, and the Gulf's reef fish fishery.
5. Incidental capture of sea turtles.
6. Loss of gear and trawling grounds due to man-made obstacles.
7. Partial lack of basic data needed for management.
8. Increasing catch of small shrimp in inshore waters.
9. Pulse fishing resulting from seasonal closures.
10. Loss of access to productive shrimp fishing grounds off Mexico.
11. Possible loss of shrimp to Mexico through transboundary migration.
12. Competition in shrimp sizes targeted by management with prevalent sizes produced by foreign mariculture operations.
13. Inconsistency in some state and federal regulations.

14. Excessive fishing effort employed in the fishery.
15. Limited enforcement capabilities.

Specific Management Objectives

The following are the specific management objectives of the existing FMP as amended.

1. Optimize the yield from shrimp recruited to the fishery.
2. Encourage habitat protection measures to prevent undue loss of shrimp habitat.
3. Coordinate the development of shrimp management measures by the Gulf of Mexico Fishery Management GMFMC with the shrimp management programs of the several states, where feasible.
4. Promote consistency with the Endangered Species Act and the Marine Mammal Protection Act.
5. Minimize the incidental capture of finfish by shrimpers, when appropriate.
6. Minimize conflicts between shrimp and stone crab fishermen.
7. Minimize adverse effects of obstructions to shrimp trawling.
8. Provide for a statistical reporting system.

Impractical and/or Previously Rejected Bycatch Reduction Options

In reviewing potential ways to accomplish its objectives with regard to bycatch reduction, the following options were determined to be impractical, or the GMFMC had already rejected them.

Area Closures

Hendrickson and Griffin (1993) found that area and seasonal closures to trawling to reduce bycatch are both ineffective and costly; while BRDs generated fewer discards and at a lower cost. Data and analyses of area closures for this amendment addressed them as permanent closures, not seasonal, because juvenile red snapper are associated with the shrimping grounds for 14 months or longer (see discussions under Alternatives A and D. Permanently closed areas would only be effective if they were large (for enforceability and to effectively address the broad distribution of red snapper in the northern and western Gulf) and included areas of high juvenile red snapper abundance. Such areas would also include areas of high shrimp abundance; consequently, permanent closures would have a similar, if not greater, negative impact on the shrimp industry as seasonal closures, i.e., they would result in a significantly larger reduction in shrimp catch and rents from the fishery than that resulting from the use of BRDs. Because the available scientific information indicates that area closures that would be effective in reducing the bycatch of juvenile red snapper would have an unacceptable impact on the shrimp industry, and because the use of BRDs to fish these areas would have a lesser impact; area closures are not considered to be a feasible alternative to meet the goal of this amendment.

Limited Access Considerations

In 1991, the Council developed "An Options Paper for a Limited Access System for the Shrimp Fishery of the Gulf of Mexico." This paper reviewed two major systems: a license limitation system and an individual transferable quota (ITQ) system. Under a license limitation system, permits would be required for shrimp vessels in the EEZ, and the issuance of new permits would be restricted or eliminated. Furthermore, the number of permits would be reduced over time by providing incentives to leave the fishery, attrition, or some other method. The reduction in permits would reduce effort and increase profitability in a fishery that is considered to have an excessive amount of vessels to harvest the available resource (Section 4.0 - Optimal Yield).

The ITQ system would provide each fishing entity (vessel, person, or other) with a share of the available resource. This entity could then harvest his share or transfer it to another entity. A total allowable catch (TAC) would have to be determined in order to specify shares. Entities could sell out their shares to others; thus decreasing the total number of participants and increasing profits. Because shrimp are basically an annual crop, this TAC would probably vary from year-to-year. If this system established a fixed TAC based on historical average catches or some other method, optimum yield from the fishery may not be realized during years of above average abundance. Additionally, in years of below average abundance, TAC may be too high to allow for adequate escapement and overfishing could occur. If the ITQ system uses a variable TAC, this level would have to be determined on an annual basis through predictive modeling. Past predictions by the states and the NMFS have only been minimally accurate for brown shrimp, with the exception of brown shrimp predictions in Louisiana. Consequently, TAC levels could again be set too high or too low causing loss of a potentially significant portion of the resource or overfishing.

Under any limited access system, permits would be required. The requirement of permits for shrimp vessels in the EEZ has been rejected by the Council and its SSC particularly because of uncertainties regarding revocations and administrative fees. In October of 1991, the Shrimp AP, rejected an ITQ system as being unworkable for a number of reasons. A major consideration was that catches in state and federal waters could not be differentiated. The AP also rejected other limited entry systems in the EEZ because it would probably shift more effort to inshore waters. The AP recommended that the Council work with the states to study using limited entry in both state and EEZ waters. The Council subsequently deffered action on limited entry until the industry, the Shrimp AP, or some other appropriate entity requests it, or at some future date when the Council determines that it is appropriate to address the issue.

Future consideration of limited access systems could be accomplished through a plan amendment. The Council and the Shrimp AP have discussed holding workshops in the future to gain insight from the industry and others regarding the need and desire for limited entry. The Council has determined that prior to holding such workshops the states should formally state their intentions regarding adoption and implementation of limited access strategies in state waters. Both the AP and the Council have noted that limited entry strategies are not workable unless they are implemented concurrently in state and federal waters.

DESCRIPTION OF THE FISHERY

The FEIS for the original-FMP and the FMP as revised in 1981 contain a description of the Gulf shrimp fishery. In its appendix, the FEIS of February 1981 includes the Habits, Distribution, and Incidental Capture of Sea Turtles. This material is incorporated by reference and is not repeated here in detail. (Also see Section 10 discussion of sea turtles.)

As an overview, the management unit of this FMP consists of brown, white, pink, and royal red shrimp. Seabobs and rock shrimp occur as incidental catch in the fishery.

Brown shrimp is the most important species in the U.S. Gulf fishery with principal catches made from June through October. Annual commercial landings in recent years range from 70 to 100 million pounds of tails depending on environmental factors that influence natural mortality. The fishery extends offshore to about 40 fathoms.

White shrimp, second in value, are found in nearshore waters to about 20 fathoms from Texas through Alabama. There is a small spring and summer fishery for overwintering individuals, but the majority are taken from August through December. Recent annual commercial landings are about 50 million pounds of tails.

Pink shrimp are found off all Gulf states but are most abundant off Florida's west coast and particularly in the Tortugas grounds off the Florida Keys. Most landings are made from October through May with annual commercial landings of about 10 million pounds. In the western Gulf states, pink shrimp are landed mixed with browns. Most catches are made within 30 fathoms.

The commercial fishery for royal red shrimp has expanded in recent years with the development of local markets. This deep-water species is most abundant on the continental shelf from about 140 to 275 fathoms east of the Mississippi River. Thus far, landings have not reached the maximum sustainable yield (MSY), optimum yield (OY), and TAC estimate of 392,000 pounds of tails in any year.

The three principal species (penaeids) are short-lived and provide annual crops; however, royal red shrimp live longer, and several year classes may occur on the grounds at one time. The condition of each shrimp stock is monitored annually, and none has been classified as being overfished.

Brown, white, and pink shrimp are subjected to fishing from inland waters and estuaries, through the state-regulated territorial seas, and into federal waters of the EEZ. Royal red shrimp occur only in the EEZ. Management measures implemented under the Magnuson Act apply only to federal waters in the EEZ. Cooperative management occurs when state and federal regulations are consistent. Examples are the seasonal closure off Texas, the Tortugas Shrimp Sanctuary, and the shrimp/stone crab zones off Florida.

The NMFS has classified commercial shrimp vessels comprising the nearshore and offshore fleet into size categories from under 25 feet to over 85 feet. More than half fall into a size range from 56 to 75 feet.

Federal permits for shrimp vessels are not required, and state license requirements vary. Many vessels maintain licenses in several states because of their migratory fishing strategy. The number of vessels in the fishery at any one time varies due to economic factors such as the price and availability of shrimp and cost of fuel. The NMFS maintains two types of vessel files, both of which are largely dependent on port agent records. One is for vessels that are recorded as landing shrimp; the other is the vessel operating units file (VOUF) that lists vessels observed at ports. The number of commercial vessels participating in the Gulf shrimp fishery is not known but is believed to be between 3,700 and 4,442 (Figure 6).

The NMFS estimates fishing effort independently from the number of vessels fishing. The NMFS uses the number of hours actually spent fishing from interview data with vessel captains to develop reports as 24-hour days fished (Figure 2). These estimates have been controversial and not well understood because the effort reported does not necessarily reflect the number of active vessels in the fleet (Figure 6).

A recreational shrimp trawl fishery occurs seasonally and almost entirely in the inside waters of the states. There are about 8,000 small boats participating using trawls up to 16 feet in width. About half the boats are licensed in Louisiana. Florida proposes to prohibit recreational shrimp trawling by 1996. The original FMP reported an estimate of the 1979 and 1980 recreational catches in the Gulf states exclusive of Florida to be 10.5 and 6 million pounds respectively (Brown, 1981).

Bait landings of juvenile brown, pink, and white shrimp, occur in all states and are not included in the NMFS statistics. Estimates from the original FMP suggest landings of about 5 million pounds (whole weight) in 1980.

Various types of gear are used to capture shrimp including but not limited to cast nets, haul seines, stationary butterfly nets, traps, and beam trawls. The otter trawl with various modifications, is the dominant gear used in offshore waters. A basic otter trawl consists of a heavy mesh bag with wings on each side designed to funnel the shrimp into the codend or tail. A pair of otter boards or trawl doors positioned at the end of each wing hold the mouth of the net open by exerting a downward and outward force at towing speed.

The two basic otter-trawl designs used by the Gulf shrimp fleet are the flat and the semi-balloon trawls (Klima and Ford 1970). The mouth of the flat trawl is rectangular in shape, whereas the mouth of the semi-balloon design forms a pronounced arch when in operation.

Try nets are small otter trawls about 12 to 16 feet in width that are used to test areas for shrimp concentrations. These nets are towed during regular trawling operations and lifted periodically to allow the fishermen to assess the amount of shrimp and other fish and shellfish being caught. These amounts in turn determine the length of time the large trawls will remain set.

Until the late 1950s, most shrimp vessels pulled single otter trawls ranging from 80 to 100 feet in width (Idyll, 1963). Double-rig trawling was introduced into the shrimp fleet during the late 1950s. The single large trawl was replaced by two smaller trawls, each 40 to 50 feet in width, towed simultaneously from stoutly constructed outriggers located on the port and starboard sides of the vessels. The port trawl was towed about 150 feet in back of the starboard trawl to prevent fouling. The advantages of double-rig trawling include: (1) increased catch per unit of effort, (2) fewer handling problems with the smaller nets, (3) lower initial gear costs, (4) a reduction in costs associated with damage or loss of the nets, and (5) greater crew safety (Idyll, 1963).

In 1972, the quad rig was introduced in the shrimp fishery, and by 1976 it became widely used in the western Gulf. The quad rig consists of a twin trawl pulled from each outrigger. One twin trawl typically consists of two 36-foot trawls connected to a center sled and spread by two outside trawl doors. Thus, the quad rig with two twin trawls has a total spread of 144 feet versus the total spread of 110 feet in the old double rig of two 55-foot trawls. The quad rig has less drag and is more fuel efficient. For some designs, a lower opening reduces fish bycatch (David Harrington, personal communication).

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTIONS

A. GEAR REQUIREMENTS

Rejected Alternative A.1.: **Status Quo - No change to regulate shrimp trawling to reduce bycatch.**

Biological Impacts: If the shrimp trawl fishery continues in the EEZ without regulation to reduce bycatch, the overfished stock of red snapper will not recover above the overfished level by the year 2019. The 50 percent reduction in the mortality rate of juveniles from bycatch is required in order to effect the recovery to 20 percent SPR (overfished level) by the target date. If this is not achieved it could result in the Secretary of Commerce taking unilateral action by plan amendment to reduce juvenile mortality in bycatch (see Senate Magnuson Act amendments). Additionally, the Secretary could require closure of the directed fishery for red snapper. A TAC for red snapper is presently allowed only because the GMFMC has established a program for stock recovery in accordance with the 602 Guidelines. Status quo would negate this recovery program and thus conceivably force the Secretary to conclude that any allowance of a directed fishery would amount to overfishing in violation of the Magnuson Act.

Populations of other trawl-caught species of fish (Table 2) also would continue to be affected; however, the extent to which bycatch mortality affects the status of most of these stocks is presently unknown. It is known, however, that for many of these species recovery to MSY will be precluded without reductions in bycatch mortality. Knowledge of the total shrimp trawl bycatch for a given species is important; however, it is meaningful only when considered in conjunction with data on that species' overall stock size, its bycatch by age class, and the magnitude of its bycatch relative to other sources of directed or nondirected fishing mortality (NMFS 1995). Again, the parameters are not well understood for most species taken as bycatch in shrimp trawls.

At their January 1996 meeting, the Shrimp Advisory Panel (AP) reviewed a preliminary draft of this amendment. By unanimous vote, they recommended that the GMFMC not implement further restrictions to regulate trawling in order to reduce bycatch, i.e., they supported this Alternative A.1 - status quo. In recommending this alternative they reasoned that adequate bycatch reduction had been accomplished through closed seasons, closed areas, untrawlable bottoms, reduction of offshore shrimp vessels (5,500 to 3,500), and exclusion by TEDs of essentially all red snapper of one pound or larger. They were also concerned that information evaluating the effects of BRDs was preliminary and not complete. Additionally, they felt that economic harm to the industry would occur as a result of increased predation on shrimp by fish ejected by the BRDs, as predicted by the ecological model (see Appendix B and subsequent section), and that elimination of the longline fishery for red snapper had contributed significantly to restoration of that stock. The Shrimp AP reiterated these concerns at their May 1996 and October 1996 meetings. The GMFMC concurred that these issues should be addressed, and they have been discussed below and in other sections of this amendment.

Effect of Seasonal Closures, such as the Cooperative Texas Closure

Although NMFS (1990) estimated a net benefit in juvenile red snapper escapement from the Texas closure (estimated at 6 percent for 200-mile closure), subsequent analyses (Nichols 1990) presented to the GMFMC in September 1990 suggested that this may not occur because juvenile red snapper (ages 0 and 1) are closely associated with the brown shrimp fishing grounds for the first 14 months of age. Nichols (1990) also postulated that the 45 to 60 day closure likely would simply defer incidental harvest to a later time and no net benefit would occur unless overall effort was reduced by a seasonal closure. Using more recent information, Nichols et al. (1995) reiterated this conclusion; however, they pointed out that reduction in shrimping effort as a result of a 200-mile closure (as opposed to a 15-mile closure) was less than 3 percent. Hendrickson and Griffin (1993) simulated seasonal and areal closures in the Gulf, and concluded that they were less effective than BRDs and more costly to fishermen.

The data used by Nichols (1990) in assessing the relationship of juvenile snapper abundance to shrimping effort in areas by statistical grid and water depth within statistical grid was from an earlier set of bycatch studies conducted by the NMFS in 1972 through 1982. The more recent characterization data collected by the Gulf and South Atlantic Fishery Development Foundation (GSAFDF), Texas Shrimp Association (TSA), and the NMFS yield essentially the same trends (Nichols 1996a).

The Texas Parks and Wildlife Department (TPWD) has annually monitored the abundance of juvenile red snapper (age 0) off Texas (from August through November) following the Texas closure. They found a significantly greater number of juveniles (80 to 100 mm TL) during years of 200-mile closures as compared to years of 15-mile closures, i.e., catch per trawl hour was 3.99 (N=2805) and 0.61 (N=952), respectively (H. Osburn, personal communication). These observations represented a six-fold increase of age 0 fish and should create some net benefit; however, the greater portion of F occurs on the age 1 fish (Nichols et al. 1995), and a greater potential for bycatch reductions applies to that year class (See discussion under Purpose and Need section). Furthermore, the closure occurs at a time when age 1 juveniles are predominant in the catches (SEAMAP, reports, various years). If these fish migrate to hard-substrate areas before or during the Texas offshore fishery, a net benefit in escapement may occur; however, information to assess this possibility is not currently available. The Texas closure of federal waters has occurred since 1981; however, any benefits of the closure to the red snapper stock have only been evaluated through annual or biennial assessments of the stock by the SEFSC since 1988.

Effect of Closed Areas and Untrawlable Bottoms

The oil and gas industry through its offshore production facilities, collection and distribution pipelines, and discarded debris have created large areas where trawling is not possible. The states, through artificial reef programs, have created other such areas. Sea Grant, working with the shrimp industry, has documented thousands of potential "hangs" and has published their locations. These offshore obstructions have created a large area where trawling is not possible, thereby potentially increasing escapement of juvenile red snapper; however, there is insufficient information to assess its effect. Factors that would assist this evaluation include knowledge of migratory characteristics of the juveniles as they age and the areal extent of each untrawlable area, particularly in statistical grids 9 - 21. Additionally, the total amount of closed or untrawlable bottom should be constant or change very slowly in order to be accurately addressed in SEFSC stock assessments. These data are not available.

In the last decade, areas obstructed by oil and gas platforms and pipelines have declined in abundance due to MMS rules for nonproductive rig removal; however, in the last several years, these obsolete rigs have been donated to states for redeployment as artificial reefs. Some states have also expanded their artificial reef programs, thereby halting the declining trend in the amount of untrawlable bottom as a result of rig removal.

Effect of Fish Exclusion by TEDs

The requirement that TEDs be used in shrimp trawls fished in offshore waters was first initiated in 1989; however, TEDs were voluntarily used by some fishermen prior to that time. In a May 1990 workshop, the NMFS data on catch by TED-equipped nets versus nets without TEDs was evaluated (NMFS, 1990). Overall, losses of shrimp and finfish (by weight) were estimated at 10 and 13 percent, respectively. The catch rate of snapper (all species combined) in nets equipped with TEDs was 2.5 percent lower by weight and 17.5 percent higher by number than nets without TEDs, but neither value was significantly different from zero. Workshop participants concluded that the effect of current TED regulations on red snapper bycatch was negligible.

Nichols et al. (1995) examined more recent information of exclusion of finfish from TEDs and modeled bycatch levels of red snapper using five data sets from old and new data. Overall, the model estimates were similar, and they concluded that reduction due to TEDs, if any, was insufficient to over-ride other factors. They also reported that soft TEDs had greater reductions of both finfish and shrimp than TEDs with grids. Initial reductions of snappers by the Georgia jumper were much less when the TED was "tuned" to reduce shrimp loss. The overall reduction in fish biomass using the Georgia jumper TED (N=188 tows) was 9 percent, and the Super Shooter TED (N=237) was 4 percent.

Most large fish, e.g., red drum and salable size red snapper, are probably excluded by TEDs. Texas A&M University (TAMU) Sea Grant agents under a GSAFDF project completed recent bycatch studies utilizing the Andrews 5-inch TED versus a net with no TED. Three trips were made yielding rates of reduction of red snapper (by number) of 71 percent (N=8); 78 percent (N=16); and 88 percent (N=10); or a weighted average of 77 percent for the 34 trawl tows. Shrimp loss (by weight) averaged 16 percent for the 34 tows. Table 3 presents data on reduction of shrimp and various bycatch species by this TED from the GSAFDF study.

Table 3. Percent Reduction by Andrews 5" TED vs. No TEDs				
	Trips			Total
	(n=8)	(n=16)	(n=10)	(n=34)
Total Biomass (kg/hr)	48	46	49	48
Total Finfish (kg/hr)	54	58	60	57
Shrimp (kg/hr)	**18**	**14**	**16**	**16**
Crustacea (kg/hr)	25	+17	32	12
Other Inverts (kg/hr)	70	84	39	66*
Red Snapper (kg/hr)	**68**	**80**	**81**	**79***
Red Snapper (no/hr)	**71**	**78**	**88**	**77***
Lane Snapper (no/hr)	60	66	65	61*
Vermilion Snapper	--	73	82	78*
King Mackerel (no/hr)	--	75	67	71
Croaker (no/hr)	75	71	65	72*
Spot (no/hr)	65	58	68	63*
Lngsp. Porgy (no/hr)	49	48	61	51*
Cynoscion spp. (no/hr)	75	55	69	61*
Catfish	53	76	76	63
Bumper (no/hr)	70	31	76	46
Butterfish (no/hr)	83	73	84	81*
Misc. Fish (kg/hr)	36	50	52	46*

* $P<0.05$

\+ Denotes an increase rather than reduction.

Source: (GSAFDF)

The Andrews TED is principally used off Florida and southwest Texas. The NMFS estimates that about 20 percent of Gulf vessels are using the Andrew's TED at least part of the year (Oravetz, personal communication). The percentage fishing off Texas and percentage of Florida vessels changing to other TEDs when fishing other areas are unknown. Because of its effectiveness in finfish reduction, this TED could be considered a BRD, and its use particularly in statistical grids 9 - 21 should contribute significantly to red snapper escapement.

The 1995 the NMFS Emergency Response Plan for turtles prohibited use of soft TEDs in certain locations and times off Texas and Louisiana (Appendix C). Additionally, the NMFS would not allow the use of nets without TEDs in the bycatch characterization studies conducted since 1991. Allowance for these usages would have provided a better data base on bycatch reduction by the current TED designs.

The model for annual (or biennial) stock assessments by SEFSC should adjust for escapement from TEDs. The magnitude of this reduction is most important when considering strategies to further reduce bycatch.

Effect of Reduction in Effort and Offshore Shrimp Vessels

Over the past five years, fishermen and dealers have consistently pointed out that the number of large offshore vessels has declined. Nichols et al. (1995) noted that registered vessels declined by 19 percent from the peak year of 1987 to 1993 with a similar reduction in hours fished; however, these reductions in vessels and effort, as measured from the 1982 to 1987 mean, were -3 percent and +1 percent, respectively. The task of determining the number of vessels at a given time is complicated by the fact that some states have no vessel license (Florida and Louisiana), and vessels may register in more than one state. The NMFS keeps two types of vessel files; both are largely dependent on port agent records. One is for vessels that are recorded as landing shrimp; the other is the vessel operating units file (VOUF) that lists all vessels observed at ports. Figure 6 shows a general decline in the number of vessels in both files since 1987; however, there has been a slight increase in vessels from the shrimp landings file (SLF) from 1992 to 1995. Additionally, there is a significant difference in the number of vessels in each file.

Until just recently, total shrimping effort measured by the NMFS in 24-hour days was essentially stable. Recent data showed a 5.8 percent decline in this measure of effort for 1993 as measured against the 1984 to 1990 mean, and a 10 percent difference in 1994 (Figure 1). In modeling this effect of effort reduction on red snapper recovery, the Reef Fish Stock Assessment Panel (RFSAP 1995) assumed that a 10 percent reduction in effort would continue in 1995, and the model was adjusted accordingly.

Effect of Prohibition on Red Snapper Longline Fishery

Amendment 1 to the Reef Fish FMP prohibited the use of longlines and buoy gear to target reef fish inshore of the 50-fathom contour in 1990, primarily to protect the larger spawning fish. In part, the rationale for the prohibition initially was that these large fish were sparsely distributed over bottoms with little vertical relief, and local abundance levels were so low that a directed fishery by bandit rigs was unprofitable. Furthermore, they were not targeted by bandit rigs and made up a pool of spawners that typically were not harvested until longlines were used. It was felt that this action would have a significant effect in improving the condition of the stock. Scientists have recently (February 1996 GMFMC minutes) indicated that in rebuilding the stock, it is usually beneficial to allow the harvest of larger fish because under the restriction of quotas and allocations based on weight, fewer fish are harvested; consequently, more fish are left to spawn.

Most of these actions have had, or will have, positive benefits on stabilizing and restoring the red snapper stock. Data are not available to develop reliable estimates of the contribution to bycatch removal by many of these measures; however, in measuring the status of the stock annually or biennially most of the effects that eventually result in increased year-class strength of fish in the directed fishery are adjusted for by the SEFSC stock assessment model. Reductions in shrimping effort are directly applied to the model as they are measured, e.g., 5.8 percent in 1993 and 10 percent in 1994 and 1995. Overall, the effects appear to be less than that required to restore the red snapper stock (see Purpose and Need section); however, use of the Andrews TED in statistical grids 9-21 (Figure 4) could contribute significantly to escapement of juvenile red snapper.

Economic Impacts: This alternative would have no additional negative economic effects on participants of the shrimp industry. On the other hand, it would probably adversely impact the red snapper industry to the extent that the TAC in that fishery may not be increased over time even with the current restrictive regulations on that industry. In fact, TAC would probably have to be decreased, perhaps to zero, in order to facilitate recovery of the stock. This option may also have a long-term adverse effect on other finfish industries, i.e., the industry dependent on the king and Spanish mackerel.

While the status quo measure has no economic impacts on participants of the shrimp industry, there are potential forgone benefits from maintaining status quo for this fishery. The RIR explores certain scenarios illustrating such a situation.

Social Impacts: This alternative (i.e., status quo) could help relieve the various psychological stresses and related social disorders of shrimpers associated with their anticipation of regulatory requirements for the use of BRDs (Thomas et al. 1995). While much of shrimp fishermen's current distress undoubtedly results from the mandated use of TEDs, which they believe have had a significantly adverse effect on their fishing operations and income (Moberg and Dyer 1994), the majority have a very negative outlook on their future if bycatch regulations are imposed on them (Thomas et al. 1995). For example, only three fifths believe they will be able to survive the first year of bycatch regulations; only two fifths believe they would be able to survive the following two to three years; half believe they would seek work on shore; and only 30 percent would move to another fishery (Section 5.0).

Proposed Alternative A.2.: **BRD Requirement - Require the installation of NMFS-certified BRDs that meet or exceed the bycatch reduction criteria established by the Council in each net used aboard vessels trawling for shrimp in specified areas of the Gulf of Mexico EEZ. Exempted are vessels trawling for royal red shrimp beyond the 100-fathom contour and vessels trawling for groundfish or butterfish. A single try net with a headrope length of 16 feet or less per vessel and no more than two rigid-frame roller trawls limited to 16 feet or less, such as those used in the Big Bend area of Florida are also exempted.**

For the purpose of this action, a shrimp trawler is any vessel that is equipped with one or more trawl nets and is capable of fishing for shrimp, or whose on-board or landed catch of shrimp is more than one percent by weight of all fish comprising its on-board or landed catch. Any shrimp trawler in the designated areas in the Gulf EEZ must have an approved BRD installed in each net that is shackled, tied or otherwise connected to any trawl door or board, or to any tow rope or cable, either on board or attached in any manner to such trawler.

Excluded from the BRD requirement are butterfish and groundfish trawlers and shrimp trawlers fishing for or possessing royal red shrimp, provided that at least 90 percent (by weight) of all shrimp either found on board, or off-loaded from, such trawler are royal red shrimp. (NOTE: There is no red snapper bycatch in the royal red shrimp fishery).

Also excluded from the BRD requirement is a single test net (try net) aboard a shrimp trawler with a headrope length of 16 feet (4.9 m) or less, provided that it is either pulled immediately in front of another net or is not connected to another net in any way. Only one test net may be used. (NOTE: The definitions used here for shrimp trawler and royal red shrimp trawler are consistent with the definitions used in the TED regulations).

No more than two ridged-frame roller trawls that do not exceed 16 feet each and that are of a design similar to that of such trawls that have typically been used in the Big Bend area of Florida are also exempt from the requirement of having a certified BRD.

Biological Impacts: Young-of-the-year red snapper begin to occur in shrimp trawl bycatch in June and July and become the dominant part of the red snapper bycatch by August (Figure 7). Age 1 red snapper (4.8+ inches TL) constitute an important part of the bycatch each month (Goodyear, 1994), and seasonal changes in the amount of this bycatch are the result of changes in shrimping effort.

There are approximately 3,400 shrimp trawlers capable of operating continuously in the Gulf EEZ (GMFMC, 1994). Vessels fishing only in state waters (to 3 nautical miles or 9 nautical miles off Florida and Texas) are not required by this amendment to have BRDs, and there are few juvenile red snapper within 5 fathoms. Juvenile croaker and Spanish mackerel, however, occur in state waters, and these stocks would benefit from use of BRDs in nearshore waters.

GSAFDF (1994) provided the following observations on the ecological benefits of BRDs:

> From an ecological perspective, with a programmatic goal of reducing finfish bycatch by 50 percent, the successful development of BRDs for the shrimp fishing fleet will have a significant measurable positive ecological impact on the faunal community that inhabits areas where shrimp are abundant. Considering that much of this catch is unwanted by shrimp fishermen, use of BRDs have the indirect benefit of developing a more ecologically favorable fishery, thus ameliorating a negative perception about "waste" in this fishery.
>
> More importantly, reduction in juvenile finfish mortality is anticipated to increase available stocks of fishes for other commercial and recreational fisheries. This will be especially important for those species, such as red snapper, which are highly prized and targeted by an intense directed recreational and commercial effort. Finally, successful completion of a bycatch reduction program will, in turn, provide fisheries management agencies with alternative strategies to enhance stocks of impacted finfish, and potentially alleviate user-group conflicts stemming from current management restrictions.

Preliminary analyses of red snapper bycatch reduction rates using selected BRDs indicate that attainment of a 50 percent reduction in red snapper bycatch mortality is possible for age 1 fish (RFSAP, 1994). As such, it appears that technology exists that would allow the GMFMC to reach its goal of recovery of the red snapper stock to an SPR of 20 percent by the proposed target year of 2019.

Ninety-two BRD designs have been evaluated under the Regional Bycatch Program since 1990. Designs tested include BRDs developed by commercial fishermen, net shops, gear technicians, and fishery engineers. Of those evaluated, the extended funnel design and the top position fisheye appear to have the best potential for reduction in bycatch mortality for juvenile red snapper while maintaining acceptable shrimp catching efficiency (NMFS, 1994). At the present time, however, only the fisheye 30 mesh position and the Andrews TED have been shown to meet the 50 percent criterion. Details of the extended funnel and fisheye BRDs are contained in Appendix A.

Length frequency data from the NMFS' BRD development research indicated reduction rates between 40 and 60 percent for red snapper over 130 mm TL (5.1 inches) (age 1) for the extended funnel BRD and between 40 and 80 percent for red snapper over 130 mm TL for the fisheye BRD when compared with nets without BRDs. These data indicate that the extended funnel and the fisheye BRD designs are capable of reducing juvenile snapper (age 1) fishing mortality from shrimp trawls by 50 to 60 percent (NMFS, 1994). These gears are not effective in reducing bycatch of small (age 0) red snapper less than 122 mm (4.8 inches) TL (Figure 4); however, since M for age 0 is estimated at 0.5 (39 percent of total annual mortality), it is more important to the restoration of the red snapper stocks to reduce bycatch mortality on age 1 juveniles for which M is estimated at 0.3 (26 percent total annual mortality). Reducing the age 1 bycatch mortality rate by these gears should accomplish restoration goals for the red snapper stock within the target period, i.e., by 2019.

Shrimp retention rates were updated in the spring of 1995, for the recommended BRDs were: (1) mid-size fisheye (5 inches by 12 inches), front codend position, 97 percent shrimp retention; (2) mid-size fisheye (5 inches by 12 inches), middle codend position, 93 percent shrimp retention; and (3) extended funnel (3 mesh design) 105 percent shrimp retention. Overall, snapper reduction has increased slightly for both BRD designs (J. Watson, personal communication, 1995).

The most recent estimates of the cumulative reduction in fishing mortality of juvenile red snapper (age 0 and age 1) by these BRDs are as follows: (1) mid-size fisheye, front codend (30 meshes) position 58-61 percent; (2) fisheye, middle codend (45 meshes) position, 33 percent; and (3) extended funnel 32 percent (Goodyear, personal communication, 1996).

Ecological Impacts: Although the requirement for using BRD's is expected to have positive biological impacts of increasing the biomass of numerous finfish species, their ecological effects may have a negative impact on shrimp biomass. The following is a summary of these ecological effects. Appendix B provides a more detailed discussion.

The SEFSC examined the food habits of 161 species of bottomfish, reef fish, and pelagic fish. Of these, only 14 species were identified as predators on shrimp at some time in their life. Table 1 of Appendix B lists these in order of their importance as predators. The top three were sand seatrout, spotted seatrout, and Atlantic croaker.

Mandating the use of BRDs could have a negative effect on the shrimp population based on results of the NMFS ecological modeling of bycatch reduction. Martinez, et al. (1996) projected that the effect of requiring BRDs could be a reduction in the biomass of shrimp by as much as 11 percent, but more likely between 5.9 and 8.2 percent. These estimates are based on increased predation that could result from an increase in abundance of bottomfish predators and decreased recycling of nutrients if finfish bycatch biomass is reduced by 50 percent (see Appendix B). Their model examined the effects of predation and recycling of organic nitrogen resulting from the reduction of bycatch. Four types of scenarios were examined. The first of these was the general effect of various levels of reduction in biomass of bottomfish (principally groundfish) on the biomass of shrimp from increased predation and reduced organic nitrogen. This scenario provided a standard by which probable effects could be evaluated depending on the reduction of bottomfish biomass achieved by various BRD designs that might be certified in the future. The model predicted that a 10 percent reduction in bycatch of finfish would result in a 0.8 percent decline in shrimp stock biomass, and declines of 5.5 percent and 10.7 percent were predicted for reductions in bycatch of 25 and 50 percent, respectively. The predicted reduction in shrimp stock biomass resulted from predation as the bottomfish nitrogen pool increased due to bycatch reduction. With the current BRD designs being considered, the reduction of bycatch biomass would be approximately 25 percent with a resultant reduction in shrimp stock biomass of 5.8 percent (see following discussion on BRDs). The scenario, however, assumed all finfish were released at equivalent rates.

The second scenario examined the reduction in bycatch by the aforementioned three BRD models and used data on the selective release of finfishes by each model recognizing the fact that BRDs do not release all finfish at equivalent rates. (Some finfish are released at higher rates, and some are not released at all). The reductions in CPUE (by weight of all fish excluded) averaged 30.6 percent for the 30 mesh position fisheye BRD, 29.6 percent for the 45 mesh position fisheye BRD, and 34 percent for the extended funnel BRD (see Appendix A for description of these BRD designs). The model estimated these BRDs would reduce the shrimp stock biomass by 6.7, 5.9, and 8.2 percent, respectively. Factors that would affect these estimates include the areas where BRDs are used (Alternatives B) and seasonal closures (Alternatives D). This scenario is probably more accurate because finfish are probably not excluded at an equivalent rate for all species.

The two other scenarios examined (Appendix B) assumed that as finfish biomass increased through the use of BRDs, the size and age structure of these excluded stocks could also change. Additionally, as these fish attain a larger size, and predation rates and prey may change for species that feed on shrimp. These scenarios examined assumptions that: (1) Larger fish would consume more shrimp, and some fish that are currently too small to prey on shrimp might grow large enough to utilize shrimp; and (2) Larger fish would target prey larger than shrimp (e.g., other fish), and predation rates on shrimp may decline. There is currently insufficient data available to predict the effects on predation through growth in size of fish for the populations of predator species through use of the model. A sensitivity analysis, however, showed that the shrimp stock could be reduced by as much as 16.7 percent from an increase in predation by 50 percent. A reduction in predation had smaller effects on the shrimp stock biomass; however, a 50 percent reduction showed an increase in shrimp stock biomass of 4.7 percent. Figure 7 of Appendix B presents these relationships in terms of predation rates and increases or decreases in shrimp biomass (expressed as organic nitrogen).

Sufficient information to utilize the model to examine effects of bycatch reduction on other predators, such as birds and marine mammals is not available. Large numbers of birds prey on the discarded bycatch while it floats on the surface, and there is some conjecture that they may have developed a dependence on this source of food. Earlier versions of a trophic ecological model (Browder 1983 and Sheridan et al. 1984, Appendix B) indicated that if 50 percent bycatch was removed from the ocean (e.g., landed and utilized on shore) the shrimp biomass would decline by 25 percent. If birds were harvesting a significant percentage of the bycatch biomass, a similar effect should have occurred, but it would be smaller in magnitude because bird guano and the tissues of dead birds would be recycled and contribute to the organic nitrogen pool. Whether bycatch reduction will have an adverse impact on bird populations is unknown (see discussion under section 6).

Martinez, et al., (1996) (Appendix B) pointed out that the model predicted the effects on the shrimp stock biomass and not yield from the fishery. Information to assess the relation between the model results and catch by fishermen is not available, and any negative effects of increased predation could be "masked" by annual fluctuations in recruitment and landings.

In summary, restoration of the red snapper stock in the Gulf will produce a long-term potential yield (LTPY) from the fishery of 33 million pounds, and LTPY from groundfish stocks responding to bycatch reduction will approach 150 million pounds (NOAA 1995). It is emphasized that these will be long-term effects or benefits because even with the proposed 50 percent reduction in shrimp trawl bycatch for red snapper, it is projected that the stock will be recovered only above the overfishing threshold by 2019. Recovery to a LTPY level would require many more years and also be dependent on maximizing yield per recruit (YPR).

In contrast, any reduction in shrimp stock biomass from the use of BRDs would occur in the first year of implementation and could occur in subsequent years unless and until the stock rebounds. Any relationship between a reduction in biomass and a reduction in harvest is not currently known; however, the cumulative reduction in shrimp stock biomass over the red snapper stock-restoration period could result in substantial reductions in shrimp harvest.

Economic Impacts The use of BRDs would affect both the costs and revenues of shrimp vessels (see section 4.0). BRDs cost to install and use, although it appears that this cost may not be substantial, especially for larger fishing operations. The more important effect would be on the revenue side. BRDs, probably with the exception of the extended funnel, are expected to reduce shrimp catch. Even a relatively small percentage reduction in the amount of catch, and eventually gross revenues can translate into relatively large reductions in profits. In addition, the results from a NMFS ecological modeling study indicate that in the first year of BRD implementation shrimp biomass would decline with reductions in bycatch. Consequently, future catches could fall or costs may increase to some substantial level. Although the requirement of BRDs may negatively affect certain fishing vessels, it is possible to conceive of a situation that economic benefits to the entire industry may increase. This condition would happen if cost increases and revenue reductions force many vessels out of the fishery to the point that mainly efficient vessels or fishing operations remain in the fishery.

With the use of BRDs, finfish industries, like the red snapper industry, may economically benefit from an increase in biomass for finfish stocks through an increase in benefits from a larger catch or decrease in cost from shorter fishing time due to an increase in fish abundance. This could eventually translate to an increase in revenues. It may be noted, however, that an increase in benefits due to increased abundance could be temporary if such increase in benefits merely invites more participants into an open access fishery. The GMFMC has, however, approved measures to restrict and even reduce commercial access to the red snapper fishery.

Social Impacts: This alternative (i.e., mandated use of BRDs) is likely to result in the various psychological stresses and related social disorders of shrimpers described by Thomas et al. (1995) as being associated with anticipation of regulatory requirements for the use of BRDs. While much of the shrimp fishermen's distress undoubtedly results from the mandated use of TEDs, which they believe have had a significantly adverse effect on their fishing operations and income (Moberg and Dyer 1994), the majority have a very negative outlook on their future if bycatch regulations are imposed on them. For example, only three fifths believe they will be able to survive the first year of bycatch regulations; only two fifths believe they would be able to survive the following two to three years; half believe they would seek work on shore; and only 30 percent would move to another fishery (Thomas et al. 1995) (see Section 5.0).

While the required use of BRDs is likely to result in adverse social impacts to shrimp fishermen, the social effects are likely to be positive for fishermen (recreational and commercial) who target finfish populations (e.g., red snapper) that are likely to increase from the use of BRDs. Sociological data are lacking to quantify these impacts.

Thomas, et al. (1995) recommend that shrimp fishermen be included early in the decision making process and be given a range of technological options (BRDs) from which to choose. By providing as much information as possible and incorporating the fishermen into the process, the GMFMC is more likely to reduce the uncertainty and most likely enhance implementation in that the fishermen's attitude would be more positive. Choosing the geographic area, the criteria, and a protocol for BRD use that are amenable to the industry will certainly encourage shrimpers' acceptance of subsequent regulations.

B. AREAS SPECIFIED FOR BRD USE

Rejected Alternative B.1.: **Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour.**

Biological Impacts: Shrimp trawling with its associated bycatch occurs throughout the coastal areas of the Gulf of Mexico. In 1991, about 1 billion pounds of finfish bycatch was taken in offshore waters including about 3 billion individual Atlantic croakers (Nichols and Pellegrin, 1992). Other bycatch estimates from 1993 included approximately 5 million Spanish mackerel, 0.65 million king mackerel (Nichols, 1994), and 34 million juvenile red snapper (Goodyear, 1994). While most red snapper bycatch occurs at depths greater than 10 fathoms (Nance 1993, 1994), Spanish and king mackerel are taken as bycatch in greater numbers within 10 fathoms. (Nichols 1990, 1996a).

The current distribution of red snapper is mostly in the northern and western Gulf, but waters off Florida's west coast once supported a substantial fishery. Relic populations of red snapper are still found off Florida's west coast, and BRD use in these areas possibly would benefit their recovery . Other bycatch species such as other snappers, groupers, sea trout, butterfish, and sardines would benefit from use of BRDs in these areas as well.

For example, total finfish reductions in proof of concept studies were 70 and 41 percent for fisheye and extended funnel BRDs, respectively (NMFS, 1994).

This alternative would provide the greatest reduction in finfish bycatch from area restrictions, because it encompasses virtually the entire geographic area where shrimping occurs in the EEZ for brown, white, and pink shrimp. With regard to the goal of reducing the bycatch of red snapper, it may be excessive (compared with Proposed Alternative B.2 and Rejected Alternatives B.3 and B.4 below) given our current knowledge of the distribution of juvenile red snapper.

It should be noted that the percentage reductions or increase in shrimp stock biomass as estimated by Martinez et al. (1996) (see discussion under Proposed Alternative A.2.) were calculated using biomass estimates for only the area encompassed by shrimp statistical grids 11-21 (Alabama through Texas); therefore, increased declines in the shrimp biomass would occur under Rejected Alternative B.1., i.e., a Gulf-wide BRD requirement. The increase, however, would not be substantial because most of the shrimp biomass is located within grids 11-21 (Figure 4).

Economic Impacts: The effects of this alternative are similar to those discussed under Proposed Alternative A.2, requiring the use of BRDs.

Social Impacts: Because this alternative covers the widest geographic area of the Alternatives B, it would probably have the greatest impact in terms of negative social effects on the shrimp industry as described in Proposed Alternative A.2. Shrimp fishermen are likely to perceive a BRD requirement throughout this entire area as being excessive given that the primary goal of this amendment is to reduce the bycatch of juvenile red snapper, that are primarily found in a much smaller geographic area of the Gulf (see Proposed Alternative B.2 and Rejected Alternatives B.3 and B.4 below). Conversely, those fishermen involved in the directed fisheries for other finfish species whose populations may be strengthened as a result of BRD use would probably incur positive social impacts from the more extensive area of coverage viewing it as necessary for the likelihood and timing of the recovery.

Proposed Alternative B.2.: **Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida.**

Biological Impacts: Limiting the geographical scope of BRD use to the northern and western Gulf would result in a reduced savings of overall finfish bycatch when compared to a Gulf-wide requirement (i.e., Rejected Alternative B.1). Nevertheless, this alternative addresses the primary goal of this amendment, i.e., a bycatch reduction target for red snapper juveniles. Most juvenile red snapper appear in bycatch taken west of Destin, Florida, and the bulk of the commercial catch of red snapper is from the northern Gulf of Mexico between Panama City, Florida and Galveston, Texas (Goodyear, 1994). The use of BRDs along Florida's southwest coast would have minimal benefit for red snapper because of a lack of abundance in that area. Cape San Blas, Florida is suggested as an eastern boundary because most red snapper bycatch occurs west of that area.

As discussed in Rejected Alternative B.1 above, relic populations of red snapper are found off Florida's west coast, and BRD use in that area possibly would benefit their recovery. Additionally, other finfish species would benefit from use of BRDs in those areas as well. Recent bycatch characterization studies (Nance, 1994) indicated insignificant bycatch of red snapper and king and Spanish mackerels off Florida (Figures 8, 9, and 10). Nichols (1990, 1996a, 1996b) found most of the red snapper and king and Spanish mackerel in trawl bycatch west of Statistical Area 11, Alabama.

It should also be noted that the area in which trawls can be used off the west Florida shelf declines significantly due to the rough bottom of exposed marl bedrock on the shelf (e.g., Florida Middle Ground). Off southwest Florida less than 10 percent of the bottom is trawlable in the nearshore waters (Stone Crab FMP, GMFMC 1979). Also, the abundance of shrimp is greatly reduced (Shrimp FMP, GMFMC 1981); therefore, shrimping activity is reduced as well as impacts on finfish.

Economic Impacts: This alternative has similar effects as Rejected Alternative B.1; however, the magnitude of impacts would be less.

Social Impacts: Given that this alternative is aimed at the geographic area where most red snapper occur and includes a smaller geographic area than Rejected Alternative B.1, the negative social impacts on the shrimp fishery are likely to be less than those caused by Rejected Alternative B.1. Shrimpers are more likely to view it as being more objective and more directed at the primary goal of this amendment while minimizing the negative impacts to the shrimp fishery. Conversely, fishermen who target other finfish species whose populations may be strengthened by the use of BRDs may view this alternative as not restrictive enough.

Rejected Alternative B.3.: **Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico between the 10- and 100-fathom contours.**

Biological Impacts: Nichols (1990) noted that few red snapper are caught in the 0- to 5-fathom zone despite heavy fishing effort. He also noted that a more significant portion of the bycatch probably occurs between 5 and 10 fathoms during the summer off Louisiana, and this area incurred a substantial increase in fishing effort in the mid 1980s. Although juvenile red snapper are encountered inside of 10 fathoms, approximately 80 to 83 percent of the total juvenile red snapper bycatch comes from depths greater than 10 fathoms, and the majority occurs at depths between about 15 and 25 fathoms (S. Nichols, personal communication; Nichols 1996b).

Nichols (1990) reported that Spanish and king mackerels are taken in bycatch in greater numbers within 10 fathoms. During warm weather, most Atlantic croakers in the northern Gulf are also found within 10 fathoms but may be found in depths from 10 to 30 fathoms in winter concentrations (GMFMC, 1991). Distributions of bycatch by area, season, and depth for red snapper, king mackerel, and Spanish mackerel are illustrated in Figures 8, 9, and 10 (Nance 1994). The number of samples by season, area, and depth are shown in Figure 11. As with Proposed Alternative B.2, this alternative would increase bycatch over Rejected Alternative B.1 because species other than red snapper would be caught if BRDs are not used inside of 10 fathoms. Nevertheless, this alternative is reasonable in that the purpose of this amendment is a bycatch reduction target for juvenile red snapper.

Economic Impacts: This alternative has similar effects as Rejected Alternative B.1 and Proposed Alternative B.2; however, the magnitude of impacts to the shrimp industry would be less. Conversely, this alternative would provide a lower degree of protection for finfish species; consequently, the potential economic impacts to these fisheries would be greater (see Section 4.0).

Social Impacts: As discussed under Proposed Alternative B.2, this alternative would probably be more acceptable to shrimp fishermen in terms of reduced negative social impacts from required BRD use because it would not require the use of BRDs in a very large portion of the traditional shrimping grounds. Requiring the use of BRDs in a smaller geographic area to achieve the goal of reducing bycatch of juvenile red snapper would significantly reduce the social and economic impacts on the shrimp fishery. Thus, shrimpers would be more likely to accept the requirements and comply with the regulations. Conversely, fishermen who target other finfish species whose populations may be strengthened by the use of BRDs may view this alternative as not restrictive enough.

Rejected Alternative B.4.: **Require the use of NMFS certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico between 10-and 100-fathom contours and west of Cape San Blas, Florida.**

Biological Impacts: Nance (1993,1994) and Nichols (1990, 1996b) found that most red snapper bycatch occurred west of Statistical Area 11 and in depths greater than 10 fathoms (Figure 11). This Alternative would provide the most direct focus of the amendment on the reduction of juvenile red snapper bycatch because it would require BRD usage in the areas where most red snapper and shrimp trawling interaction occur (Nance 1993, 1994). Conversely, it would provide the least amount of protection for many other finfish species that occur in the excluded areas. The biological impacts of this alternative would not be appreciably different from Rejected Alternative B.3 because over 80 percent of the red snapper bycatch occurs at depths greater than 10 fathoms. It would, however, invoke the same biological consequences in Florida as discussed in Proposed Alternative B.2.

Economic Impacts: This alternative would have the least economic impacts on the shrimp industry because it would require the use of BRDs in the smallest geographic area of all alternatives being considered. Conversely, it would have the greatest impact on the economics of various finfish industries because it would afford the least amount of protection from bycatch mortality (Section 4.0).

Social Impacts: This alternative would provide the least disruption to traditional shrimping practices of all the alternatives. It would still cause many of the social problems outlined in Proposed Alternative B.2 and Section 5.0; however, these impacts would be minimized; thus compliance by shrimpers should be maximized. Conversely, potential social impacts to finfish users would be greatest especially if this action negatively impacts the continued recovery of some stocks. e.g., red drum and king and Spanish mackerel stocks, or if other stocks decline.

C. CRITERIA FOR BRDs, INCLUDING CERTIFICATION OF BRDs THAT HAVE BEEN TESTED AND DETERMINED TO MEET THE ESTABLISHED BYCATCH REDUCTION CRITERION:

Proposed Alternative C.1.: It must reduce the bycatch mortality of juvenile red snapper (age 0 and age 1) by a minimum of 44 percent from the average level of mortality on those age groups during the years 1984-1989. Any bycatch reduction contributed by a TED within the net is included as a part of an overall BRD reduction in the bycatch.

Based on the criterion above, the following gear will be considered as two NMFS certified BRDs on implementation of this amendment:

- **fisheye 30 mesh position or an equivalent distance from the top of a 120-mesh cod end bag of 1 5/8-inch mesh (as described in footnote below)[1]**
- **5-inch Andrews TED (if not prohibited from use by other applicable federal law or regulation.)**

Biological Impacts: Juvenile red snapper are one of the most difficult of the bycatch species to eliminate from shrimp trawls because of their attraction ~~to~~ objects and their comparable size to shrimp. In order to maintain the present ABC ranges for the directed red snapper fishery, a reduction in the shrimp-trawl bycatch reduction rate by 44 percent beginning in 1997 is necessary to attain the GMFMC's 20 percent SPR goal by the target year of 2019 (RFSAP 1995). This bycatch reduction criterion considers the fact that a 10 percent reduction in fishing mortality through reductions in effort has occurred; consequently, to achieve the Council's goal, only an additional 44 percent is needed. Setting the bycatch reduction criterion at the minimum level necessary to restore the red snapper stock will give gear developers greater latitude in developing additional BRDs for certification (see Proposed Alternative E.2), e.g., the Andrews soft TED is effective in excluding small red snapper (see discussion under Rejected Alternative A.1). Additionally, the RIR shows that effort is not likely to increase with the requirement of BRDs; however, if effort subsequently increases, the framework procedure (Proposed Alternative E.2) would allow the criterion to be increased. Currently, only the fisheye 30 mesh position and the Andrews TED are capable of reducing bycatch by the required amount; however, the framework procedure (Proposed Alternative E.2) would allow other BRDs to be

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[1]

Fisheye Description

Approved fisheyes are cone shaped rigid frames constructed from aluminum or steel which are inserted into the top center of the codend to form an escape opening.

Minimum Construction and Installation Requirements

Fisheyes should be constructed of aluminum or steel rod of at least 1/4 inch diameter with a minimum opening dimension of 5 inches and a minimum total opening area of 36 square inches. Fisheyes must be installed in the top center of the codend of the trawl to create an opening in the trawl facing in the direction of the mouth of the trawl no further forward than 70 percent of the distance between the codend drawstring (tie off rings) and the beginning of the codend (excluding any extension) or 11 feet, whichever is the shorter distance.

certified (Table 4). The GMFMC's goal of 50 percent bycatch reduction of juvenile red snapper will likely result in a greater amount of bycatch reduction in other species of fish, e.g., more than 50 percent of croaker and spot are excluded by both BRDs (GSAFDF, 1994).

Table 4 lists gear that have been considered as potentially certifiable BRDs on implementation of this amendment, and the estimated reduction characteristics of each.

Table 4. Current Estimates of Bycatch and Shrimp Reduction

Gear	Red Snapper (by number) Age 1	Red Snapper (by number) Age 0 & Age 1	Shrimp (by weight)	Finfish (by weight)
Fisheye (30 mesh)[1]	66	58	3	31
Fisheye (45 mesh)[1]	41	33	7	30
Extended Funnel[1]	36	32	0	34
Andrews TED[2]	77	-	16	57

[1] Expressed as percent reduction when compared with nets containing only a TED.
[2] Expressed as percent reduction when compared to naked nets without TEDs or BRDs.

The above values represent all the available evaluation information through March 1996. It should be noted that earlier datasets indicated that all three BRD designs (Appendix A) would reduce age 1 red snapper bycatch (by number) by approximately 50 percent. The more recent weighted data in Table 4 indicate that two BRD designs are below the 50 percent criterion. These variations are probably indicative that the designs differ in their capability of reducing bycatch by area and time of year.

Economic Impacts: The economic impacts of mandated use of BRDs have previously been discussed. Additional impacts would occur based on the types of BRDs certified and their resultant loss of shrimp as well as the cost of the gear itself.

Social Impacts: The social effects associated with the mandated use of BRDs are summarized in Proposed Alternative A.2 above and more fully described in Section 5.0. Information is not available to discern the relative social impacts associated with various levels of percentage reductions in red snapper bycatch; however, negative social impacts to shrimp fishermen would be proportional to the percentage of the bycatch reduction mandated and the size of the geographic area to which the reductions apply. Maximum involvement of the shrimpers in assisting the GMFMC in making these decisions is essential to maximize the industry's acceptance of the requirements and subsequent compliance with the implementing regulations.

Proposed Alternative C.2.: Its shrimp retention rate when compared with seemingly identical nets containing only an approved TED:

Rejected Option a. ...must be at least 90 percent, or
Rejected Option b. ...must at least 95 percent, or
Rejected Option c. ...must be at least 97 percent, or
Proposed Option d ...is unspecified, i.e., fishermen may use any design that meets the criterion under Proposed Alternative C.1.

Biological Impacts: The biological impacts for each option should be essentially the same provided that the required reduction in juvenile red snapper is met. Additionally, there should be no negative biological impacts associated with shrimp loss because shrimp are basically an annual crop. Shrimp that are excluded will either be caught in subsequent tows or escape to the spawning stock. The primary differences in impacts of the above options are regarding shrimp retention which is a major concern to shrimp fishermen. The more efficient the device is in retaining the shrimp catch, the more likely it will be accepted.

Option a, b, or c would be met with the fisheye 30 mesh position ~~and~~ extended funnel BRDs as both devices were found to achieve at least a 97 percent retention of shrimp in the NMFS testing. A major advantage of the fisheye BRD is the simplicity of design and its low cost. They are also easily sewn into existing nets.

Option d may be the most acceptable to shrimp fishermen. Although some fisheyes and other BRD designs may not meet the shrimp-retention criteria of options a, b, or c under testing carried out by the NMFS, they are being used by part of the industry and are meeting the criteria under Proposed Alternative C.1 of reducing bycatch mortality on age 0 and age 1 red snapper. As long as these BRDs meet the primary goal of red snapper bycatch reduction, there should be no negative biological impacts resulting from their use, and they should be considered to be consistent with the intent of this amendment. Thus, if the fishermen choose to use this gear (and some have done so voluntarily for years), they should be allowed to do so; however, they should be advised of the relative economic impacts of the various BRDs (see following Economic Impact discussion).

Economic Impacts: The principal economic impacts associated with requiring BRDs are associated with shrimp loss, rather than gear cost. Fisheye and extended funnel BRDs can reduce bycatch mortality of age 1 red snapper by 50 percent. Both devices, depending on size and location on the trawl, have also been shown to achieve the 97 percent shrimp retention rate criteria in the NMFS testing.

GSAFDF (1994) reported observations of vessel operations by the GSAFDF Gear Review Panel that show the effects of other factors on shrimp retention. Subsequent to this report, these factors have been confirmed by NMFS divers, video, and other means to contribute to shrimp loss while using the fisheye BRD designs. Since these factors may have an effect on overall profits from shrimping, changes in fishing methods could help minimize these losses.

> Although no documentation has yet been made, it has been speculated by the Gear Review Panel that some shrimp loss may come from "belching" of the catch during haul-back on the gear during rough weather or from "wash-

down" at the end of the tow. The former phenomenon occurs when a wave surges the boat and nets forward and up, and as the boat returns to the wave trough, the nets sink back more rapidly than the catch. Thus, the catch remains nearer the mouth, the TED, and the BRD; any of which could then be used for escape by the catch, including shrimp. The NMFS Pascagoula personnel intend to dive on the nets during 1994 to examine this possibility. "Wash-down" is practiced by many captains; when the nets are at the surface, the vessel runs forward at high speed; this pushes the catch to the tail of the net, and eliminates a substantial portion of mud collected in the nets. The turbulence created in the bag during "wash-down" may actually eject part of the catch (including shrimp) from the bag through the BRD opening(s).

In contrast to the adverse economic effects of shrimp loss, there are probably some positive but unquantified economic benefits to the industry. The GSAFDF reported:

> Reduction of finfish bycatch in the shrimp fishery is ecologically and economically beneficial to the industry through reduced cost to harvest and process the catch, as well as in providing a higher quality product. There will be a measurable positive impact to shrimp fishermen because of decreased workload in culling the unwanted bycatch, and a concurrent reduction in the time that valuable shrimp must remain on deck during the culling process. This will, in turn, provide for a higher quality product through two means: (1) less damage to shrimp during towing and haul-back because of a reduced amount of total catch (weight) in the net, and (2) more rapid processing of shrimp off the deck and into a cold storage system, lessening the chance of spoilage. Additionally, as the weight load in the nets increases during towing, the otter doors are pulled closer together, reducing the total area swept by the net. With a reduction in weight load in the net, this reaction of the doors will be reduced, and the area swept may increase, thus potentially increasing catch per tow.

Social Impacts: Thomas, et al. (1995) described the negative social effects on shrimpers resulting from their anticipation of mandated use of BRDs. These impacts are summarized in Proposed Alternative A.2, and they are further described in Section 5.0. Shrimp retention is obviously a major concern to shrimp fishermen, and the more efficient the device is in retaining the shrimp catch, the more likely it will be accepted. Nevertheless, Option d is likely to cause the least, negative, social impact because it allows shrimpers the most flexibility. Some fisheyes and other BRD designs may not meet shrimp retention criteria of Options a, b, or c under testing by NMFS, but they are being used by part of the industry and are meeting the criteria under Proposed Alternative C.1 of reducing bycatch mortality on age 0 and age 1 red snapper. As long as these BRDs meet this primary goal (Proposed Alternative C.1), there should be no negative biological impacts from their use. If fishermen choose to use this gear (and some have done so voluntarily for years), they should be allowed to do so; otherwise, they may experience additional social problems by being forced to purchase and use an unfamiliar gear. They should, however, be made aware of the potential economic impacts of the various BRDs (see Economic Impact discussion above).

D. SEASONAL CLOSURES

Proposed Alternative D.1.: **Status Quo - No change in seasonal closures.**

Biological Impacts: Juvenile red snappers are generally found in the north and western Gulf waters beyond 10 fathoms throughout the year. King and Spanish mackerels and croaker are taken as bycatch mostly within 10 fathoms in the warmer months. The existing seasonal closure, the Texas Closure, is discussed under Alternative A.1. Nichols (1996a) noted that seasonality of bycatch is primarily indicative of seasonality of shrimping effort. Hendrickson and Griffin (1993) simulated the effect of seasonal closures for five periods and found them all to be ineffective in reducing juvenile snapper bycatch; consequently, existing closures would not meet the goal of reducing bycatch of juvenile red snapper by 50 percent.

Economic Impacts: No additional economic impacts are expected from a status quo option.

Social Impacts: As noted by Hendrickson and Griffin (1993), the use of closures as a means of reducing bycatch is ineffective and costly compared with BRDs. Status quo in terms of seasonal closures is not likely to cause any net change in social impacts.

Rejected Alternative D.2.: **Invoke seasonal closures to trawling in the Gulf EEZ to reduce bycatch.**

Biological Impacts: Juvenile red snapper, age 0 and age 1, are vulnerable to shrimp trawls for 14 months or more; and because they are distributed throughout the same area as the offshore brown shrimp fishery, any seasonality of their bycatch is primarily a reflection of shrimping effort. Hendrickson and Griffin (1993) simulated seasonal and area closures to shrimp trawling and compared them with the use of BRDs. They found that both closures were less effective than BRDs at reducing bycatch and more costly to the fishermen (see discussion of Economic Impacts). The greatest reduction in red snapper bycatch (15 percent) was achieved by a seasonal trawling closure from December 16 through April 30. Nichols (1990) also noted that closures would probably redirect effort to other seasons when snapper were still vulnerable. As such, seasonal closures would result in an insufficient net reduction in juvenile bycatch. (See discussion under Rejected Alternative A.1.).

Economic Impacts: Using a bioeconomic model, Hendrickson and Griffin (1993) conducted simulations on closing the shrimp fishery at certain times of the year to reduce bycatch. Various closure scenarios were tried, such as May 1-July 15, May 1-July 31, January 1-March 31, January 1-April 30, and December 16-April 30. These simulations resulted in reductions in rents to the vessel owners and crews ranging from $35 million to $54.6 million.

Social Impacts: Given the findings of Hendrickson and Griffin (1993) that seasonal closures are ineffective in reducing bycatch while causing increased costs to fishermen, this option is likely to result in substantial negative social impacts as a result of the economic impacts.

E. FRAMEWORK PROCEDURES FOR MODIFYING THE BYCATCH REDUCTION CRITERION, ESTABLISHING AND MODIFYING BRD CERTIFICATION CRITERIA, AND ESTABLISHING A BRD TESTING PROTOCOL FOR CERTIFYING ADDITIONAL BRDS

Rejected Alternative E.1.: Status Quo - Do not establish framework procedures for modifying the bycatch reduction criterion or establishing and modifying criteria or certifying additional BRDs.

By not providing a framework for modifying the bycatch reduction criterion, the criterion for a 44 percent reduction in bycatch mortality of juvenile red snapper from the 1984-1989 average would remain in effect until an additional plan amendment could be developed and implemented. Also, only the BRDs certified with the implementation of this amendment could be used without a plan amendment.

Proposed Alternative E.2.: Establish the following framework procedures for modifying the bycatch reduction criterion, establishing and modifying BRD certification criteria, and establishing a BRD testing protocol for certifying additional BRDs: The purpose of the framework procedures is to provide a flexible management system to ~~mimimize~~ minimize regulatory delays while maintaining substantial Council and public input into management decisions. With these procedures in place, management can rapidly adapt to changes in the abundance of red snapper, new scientific information, and changes in fishing practices, i.e., seasonal patterns, areas, effort, etc.

Alternative E.2.a: Framework Procedure for Modifying the Bycatch Reduction Criterion - The Council will evaluate the need for changes to the bycatch reduction criterion for red snapper as needed and recommend such changes to the RA. Changes to the bycatch reduction criterion will be accomplished through regulatory amendments. If the Council determines that bycatch reduction criteria are needed for other finfish species, those criteria will be established by FMP amendments.

The Council will establish a Special BRD Advisory Panel (SBAP) made up of scientists, engineers, fishermen, environmentalists, or others with knowledge of BRDs and their ability to reduce bycatch of juvenile red snapper. The SBAP will advise the Council regarding the need for and recommendations regarding modifications to the bycatch reduction criterion. Prior to making recommendations for changes in the bycatch reduction criterion, the Council will also consult the Shrimp AP, the Standing SSC and Special Shrimp and Reef Fish SSC, and the RFSAP. In addressing changes to bycatch reduction criterion for juvenile red snapper, the Council will consider the present status of red snapper stocks as reflected in stock assessments, the impacts of shrimp trawl bycatch, and the impacts of the directed fishery for red snapper on the stock. The Council will also consider factors related to the shrimp fishery such as changes in fishing effort (i.e., increases or decreases), the effects of state and federal management efforts that may affect bycatch, changes in TED gear or rules that may effect bycatch, closed areas, closed seasons and/or seasonal usage of BRDs, and limitations on the types and sizes of trawl gear. The Council will consider environmental and ecological effects; social and economic factors in the commercial and recreational fisheries for both red snapper and shrimp; and other relevant data. Modifications to the bycatch reduction criterion will be based on the best available scientific information and realistic expectations that the reduction levels that can be achieved with available, or soon to be available, technology. Public comments will be received prior to changes, and public testimony will be allowed in the meeting at which the GMFMC considers changing the criteria.

The bycatch reduction criterion will be specified in terms of a percentage reduction in bycatch mortality of juvenile red snapper (age 0 and age 1) from the average level of mortality on those age groups during the years 1984-1989. The criterion may be further qualified according to seasons and geographic areas.

If changes are needed to the bycatch reduction criterion for juvenile red snapper, the Council will send a regulatory amendment to the RA that details its recommendations along with any relevant reports and public comments. The RA will review the Council's recommendations; all scientific reports; comments of the Special BRD Advisory Panel, the Shrimp AP, the SSC, and the RFSAP. If it is determined that the recommendations are consistent with the objectives of the FMP, the provisions of the Magnuson Act, and other applicable law, the RA will draft proposed regulations implementing the changes to the bycatch reduction criterion and publish them as a proposed rule in the Federal Register After a comment period of not less that 15 days, the RA will publish the final rule in the Federal Register.

If the RA rejects the recommended changes of the Council, the RA shall notify the Council and provide written reasons for rejection along with recommendations for revisions. In the event of rejection, the existing criterion for bycatch reduction of red snapper shall remain in effect until the rejection is resolved and changes are implemented.

Alternative E.2.b: Framework Measure Establishing and Modifying BRD Certification and Decertification Criteria and Establishing a BRD Testing Protocol

General Guidelines:

The Council desires to have a rapid and efficient process to certify and decertify BRDs as a part of this amendment that affords a flexible and workable mechanism for industry to use in designing and developing new or modified BRDs. The NMFS is responsible for review and certification of BRDs for use in the EEZ.

BRD Certification Criterion:

The BRD certification criterion is the demonstration that a BRD can consistently meet or exceed the established bycatch reduction criterion of 44 percent as demonstrated through the testing protocol established by the RA. This BRD certification criterion will be modified through implementation of a regulatory amendment concurrent and consistent with changes to the bycatch reduction criterion.

The Council has not established criteria for shrimp loss from BRDs; however, shrimp loss data should accompany any BRD application for certification to allow evaluation of which BRDs minimize shrimp loss while satisfying bycatch reduction requirements. Additionally, the applicant should provide information on cost and operational considerations (e.g., ease of handling and any special operating tactics such as hauling back while towing away from high seas to minimize shrimp loss).

BRD Testing Protocol:

The BRD testing protocol will include the testing parameters and statistical guidelines to be followed in evaluating the effectiveness of BRD designs in meeting the established bycatch reduction criterion. The basic testing procedure includes an accurate and detailed written description and diagram of the gear used, including the types of trawls, rigging of BRDs, and TEDs (type, rigging, etc.). Also, the BRD must be rotated between outside and inside nets from side to side to reduce net bias. If the gear is modified during the testing, it constitutes the beginning of a new test.

All testing shall be done under the supervision of qualified scientists or other technical personnel approved by the RA in order to insure that the protocol is followed and to help prevent the need for additional evaluation. Testing shall be accomplished with at least the minimum number of tows of a net with an experimental BRD and certified TED compared to a net with only the same type of TED. Testing shall also be done in areas where juvenile red snapper are present.

The RA will develop the testing protocol for certifying new BRDs. This testing protocol will include specifications and guidelines regarding various testing parameters. Prior to implementation of the testing protocol, the RA shall provide copies of the protocol to the Council and provide a reasonable period for the Council's review and comment. In reviewing the testing protocol, the Council may consult its SSC and other appropriate advisory panels for recommendations. The Council will advise the RA in writing of any recommendations regarding the testing protocol, including its guidelines and parameters, and provide any relevant reports and comments. The RA will review the Council's recommendations along with other comments and reports. The BRD testing protocol will be implemented by proposed and final rules published in the Federal Register.

The following is a list of specifications and guidelines that will be included in the testing protocol. This list is demonstrative and may not be exhaustive of all testing data that would be required, or parameters examined in evaluating BRD testing performance. The RA will determine if the researcher has complied with these and other testing parameters as specified in the testing protocol.

- evaluation and oversight personnel,
- sample size,
- experimental design,
- season and area of testing,
- time of day,
- required measurements,
- length of tows,
- description of devices in nets,
- shrimp loss,
- and any other relevant parameters

For each new BRD proposed for certification, the applicant must submit an application to the RA along with a complete report on the BRD testing. This report must contain a comprehensive description of the tests, including a summary of all data collected, together with copies or listings of all data collected during the certification trials, and analyses of the data that demonstrate compliance with the testing protocol and the ability of the BRD to meet or exceed the bycatch reduction criterion. An applicant will provide photographs, drawings, and similar material describing the BRDs. In addition, any unique or special circumstances of the tests should be described.

The RA will determine if a BRD meets, or exceeds, the bycatch reduction criterion and whether the required reports and supporting materials are complete. The RA will also determine whether the testing protocol was followed. If the applicant complies with the testing protocol and the BRD meets or exceeds the current bycatch reduction criterion, the RA will certify the BRD (with any appropriate conditions as indicated by test results) and announce the certification in the Federal Register, amending the list of certified BRDs.

BRDs not Certified and Re-submission Procedures:

The RA will advise the applicant, in writing, if a BRD is not certified. This notification will explain why the BRD was not certified and what the applicant may do to either modify the BRD or the testing procedures to improve the chances of having the BRD certified in the future. If certification is denied because of insufficient information, the applicant will have 60 days from receipt of such notification to provide the additional information; afterwards, the applicant would have to re-apply. If the RA subsequently certifies the BRD, the RA will announce the certification in the Federal Register, amending the list of certified BRDs.

Decertification of BRDs:

The RA will decertify a BRD whenever it is determined that the BRD does not satisfy the bycatch reduction criterion. Before any proposed action is taken to decertify a BRD, the Council and public will be advised and provided an opportunity to comment on the advisability of the proposed decertification. The RA will consider any comments from the Council, and if the RA elects to decertify the BRD, it that be accomplished through publication of proposed and final rules in the Federal Register with a comment period of not less than 15 days.

Modification of BRD Testing Protocol:

The RA may modify the BRD testing protocol to more appropriately compare and evaluate these requirements with the bycatch reduction criterion established by the Council. If the RA determines that changes to the testing protocol are needed, the RA will advise the Council in writing of the proposed changes and provide an adequate period for the Council's review. In reviewing the proposed modifications to the testing protocol, the Council may consult with its SSC and other appropriate advisory panels for recommendations with regard to the proposed changes. The Council will advise the RA in writing of any suggested changes to the proposed modification of the testing protocol. The RA will review the Council's comments and recommendations and implement modifications to the testing protocol through publication of proposed and final rules in the Federal Register with a comment period of not less than 15 days.

Biological Impacts: The no action alternative (Rejected Alternative E.1.) would not provide a mechanism for modifying the bycatch reduction criterion in a timely manner. As additional data are collected and stock assessments are completed, the status of the red snapper stock may change. This status may also change as a result of recovery of the stock through management measures adopted pursuant to this amendment. Without a framework procedure to effect changes through a regulatory amendment, a plan amendment would be required, and the more lengthy amendment process could cause a reduction in optimum yield during the development and implementation period. Additionally, the status quo option would not provide a mechanism by which additional BRDs could be certified. Consequently, only the BRDs approved with this amendment would be allowed unless another plan amendment was developed. This alternative would not provide adequate flexibility with regard to modifying regulations to meet fishery management needs.

Conversely, Proposed Alternative E.2. provides a mechanism to implement changes to the bycatch reduction criterion in response to changes in the status of red snapper stocks and changes in, or needs of, the shrimp fishery. It also provides for the orderly and efficient testing and certification of BRDs to meet the established criterion of the GMFMC (initially a 44 percent reduction in the bycatch of juvenile red snapper). The establishment of this framework procedure will allow changes to be made as needed, and in a timely manner, to ameliorate unnecessary, negative impacts to the shrimp fishery. The biological impacts of BRD use are more fully discussed in the Alternatives A, B, and C above.

Economic Impacts: The economic impacts of having a procedure for modifying the bycatch reduction criterion and a procedure for establishing and modifying the certification criterion and testing protocol versus no such procedures or protocol are unknown. Reductions in the minimum criteria if warranted in the future could, however, benefit fishermen through relaxation of regulations. If these changes are implemented in a timely manner, fishermen would have a better chance of achieving their economic goals. Additionally, fishermen are innovative entrepreneurs, and they could potentially design less costly and more shrimp retentive BRDs using an approval process versus a BRD developed by scientists or others. Both the fisheye and Andrews TED were developed by fishermen.

Social Impacts: The no action alternative (Rejected Alternative E.1.) would probably have a negative impact on fishermen because there would seemingly be less hope for relaxation of the bycatch reduction criterion because of the necessity for a FMP amendment. Furthermore it would dissuade fishermen from initiating innovations in gear which might benefit the industry. It might also produce stresses by forcing shrimpers to use unfamiliar and unacceptable BRD gear types. Fishermen are innovative and continually experiment with new gear configurations in an attempt to become more efficient. The BRD certification criterion and testing protocol that would be established under Proposed Alternative E.2. would allow that innovation to continue, giving fishermen the flexibility and opportunity to expand the number of certified BRDs from which they can choose. Acceptance and compliance with BRD requirements thus would be enhanced.

3.0 AFFECTED ENVIRONMENT

BIOLOGICAL ENVIRONMENT

The biological environment of Gulf shrimp was described in the FMP as revised in 1981 and its FEIS. It is incorporated by reference and not repeated in detail in this amendment. In brief, shrimp are distributed throughout three characteristic water areas of the Gulf: (1)

inland waters (including major bays), (2) state territorial seas, and (3) the EEZ. Their annual abundance is highly dependent on the quality and quantity of habitat, particularly in estuarine and nearshore waters of the states. These habitats are in turn affected by various environmental conditions, particularly salinity and temperature.

Throughout their life cycle, shrimp interact with a wide variety of other species (as predator, prey, or other), and many of these other species are under management by the states, the GMFMC, or various federal agencies. This amendment addresses the interactions of shrimp with other species in the EEZ, particularly juvenile red snapper. Although shrimp are not a major prey species of red snapper, adult shrimp and juvenile snapper often occur in the same area. Other species of finfish in the area may be predators of shrimp.

This amendment to the FMP is directed at reducing the bycatch mortality of juvenile red snapper in the shrimp trawl fishery. It may also have varying effects on stocks of other species. These effects have been discussed earlier in Section 1.0 and Section 2.0, especially under Proposed Alternative A.2. Biological implications of this amendment will accrue in both the EEZ and state waters, particularly if states adopt similar regulations for state waters or fishermen voluntarily use BRDs in all areas.

PHYSICAL ENVIRONMENT

As described in the FMP, as revised in 1981, the Gulf shrimp fishery in the EEZ operates on various bottom types of three general regions extending to the 200-meter isobath. One occurs from the Texas/Mexico border to just west of the Texas/Louisiana border and consists mainly of sand and finer grain sediments with occasional pockets of sand and shell. The second region extends eastward to a point about even with Pascagoula Bay, Mississippi. This area is a complex of fine grain sediments with occasional deposits of sand and shell, but it is dominated by mud deposited by the Mississippi River. The third region is the remaining area off Alabama and Florida. It is almost exclusively comprised of sand, shell, and coral, with coral becoming more prevalent off central and southern Florida.

The first two regions are primarily associated with brown and white shrimp, while the third is primarily associated with pink shrimp. Trawl fisheries for these species have occurred for decades in these three regions of the EEZ, as well as in the nearshore and inshore waters under state jurisdiction. None of the alternatives being considered in this amendment should have any appreciable effect on the physical habitat in the EEZ, unless for some unforeseen reason they should result in the cessation of trawling on these traditional shrimping grounds that have been subjected to repeated physical effects of trawling (physical contact with benthic habitat by trawl doors, tickler chain, foot rope, and chafing gear resulting in resuspension of bottom sediments into the water column) for decades.

4.0 REGULATORY IMPACT REVIEW

INTRODUCTION

Executive Order (EO) 12866 "Regulatory Planning and Review" was signed on September 30, 1993 and established guidelines for promulgating new regulations and reviewing existing regulations. While the EO covers a variety of regulatory policy considerations, the costs and benefits of regulatory actions are a prominent concern. Section 1 of the EO is repeated in its entirety:

Section 1. *Statement of Regulatory Philosophy and Principles.*

(a) The Regulatory Philosophy. Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling public need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people. In deciding whether and how to regulate, agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating. Costs and benefits shall be understood to include both quantifiable measures (to the fullest extent that these can be usefully estimated) and qualitative measures of costs and benefits that are difficult to quantify, but nevertheless essential to consider. Further, in choosing among alternative regulatory approaches, agencies should select those approaches that maximize net benefits (including potential economic, environmental, public health and safety, and other advantages; distributive impacts; and equity), unless a statute requires another regulatory approach.

(b) The Principles of Regulation. To ensure that the agencies' regulatory programs are consistent with the philosophy set forth above, agencies should adhere to the following principles, to the extent permitted by law and where applicable:

(1) Each agency shall identify the problem that it intends to address (including, where applicable, the failures of private markets or public institutions that warrant new agency action) as well as assess the significance of that problem.

(2) Each agency shall examine whether existing regulations (or other law) have created, or contributed to the problem that a new regulation is intended to correct and whether regulations (or other law) should be modified to achieve the intended goal of regulation more effectively.

(3) Each agency shall identify and assess available alternatives to direct regulation, including providing economic incentives to encourage the desired behavior, such as user fees or marketable permits, or providing information upon which choices can be made by the public.

(4) In setting regulatory priorities, each agency shall consider, to the extent reasonable, the degree and nature of the risks posed by various substances or activities within its jurisdiction.

(5) *When an agency determines that a regulation is the best available method of achieving the regulatory objective, it shall design its regulations in the most cost-effective manner to achieve the regulatory objective. In doing so, each agency shall consider incentives for innovation, consistency, predictability, the costs of enforcement and compliance (to the government, regulated entities, and the public), flexibility, distributive impacts, and equity.*

(6) *Each agency shall assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.*

(7) *Each agency shall base its decisions on the best reasonably obtainable scientific, technical, economic, and other information concerning the need for and consequences of the intended regulation.*

(8) *Each agency shall identify and assess alternative forms of regulation and shall, to the extent feasible, specify performance objectives, rather than specifying the behavior or manner of compliance that regulated entities must adopt.*

(9) *Wherever feasible, agencies shall seek views of appropriate State, local, and tribal officials before imposing regulatory requirements that might significantly or uniquely affect those governmental entities. Each agency shall assess the effects of Federal regulations on State, local, and tribal governments, including specifically the availability of resources to carry out those mandates, and seek to minimize those burdens that uniquely or significantly affect such governmental entities, consistent with achieving regulatory objective. In addition, as appropriate, agencies shall seek to harmonize Federal regulatory actions with related State, local and tribal regulatory and other governmental functions.*

(10) *Each agency shall avoid regulations that are inconsistent, incompatible, or duplicative with its other regulations or those of other Federal agencies.*

(11) *Each agency shall tailor its regulations to impose the least burden on society, including individuals, businesses of differing sizes, and other entities (including small communities and governmental entities), consistent with obtaining the regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations.*

(12) *Each agency shall draft its regulations to be simple and easy to understand, with the goal of minimizing the potential for uncertainty and litigation arising from such uncertainty.*

In compliance with this EO, the Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA) require the preparation of a Regulatory Impact Review (RIR) for all regulatory actions which either implement a new Fishery Management Plan (FMP) or significantly amend an existing plan, or may be significant in that they reflect important DOC/NOAA policy concerns and are of public interest.

The RIR is part of the process of preparing and reviewing fishery management plans and provides a comprehensive review of the changes in net economic benefits to society associated with proposed regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

Additionally, the RIR serves as the basis for determining whether any proposed regulation is a "significant regulatory action." A regulatory action is considered significant if it is likely to result in a rule that, among others, may have an annual effect on the economy of $100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities.

The Regulatory Flexibility Act (P.L. 96-353) has the purpose of relieving small businesses, small organizations, and small governmental entities from burdensome regulations and record keeping requirements. The Small Business Administration (SBA) defines a small business in the commercial fishing activity, as a firm with receipts up to $3.0 million annually. Additionally, the SBA defines a small business in the charter boat activity to be a firm with receipts up to $5.0 million per year.

To meet the basic objective of the Regulatory Flexibility Act, federal agencies are required to determine if proposed regulations will have a significant economic impact on a substantial number of small business entities. The main source of information for this determination is the RIR, but the determination may require additional information not contained in the RIR. If it is determined that the proposed regulation(s) will have a significant impact on a substantial number of small business entities, then an Initial Regulatory Flexibility Analysis (IRFA) must be prepared and, as in the case of making the original determination, the RIR serves as the source of most of the information for the IRFA. However, certain information required for completing the IRFA is not necessarily available in the RIR. For example, if the RIR does not contain an estimate of the number of small businesses affected, a description of the small businesses affected or a discussion of the nature and size of impacts, then it would be necessary to expand on the information shown in the RIR.

PROBLEMS IN THE FISHERY

The general problems in the fishery are described in the FMP, as amended. The specific problems addressed in this amendment are discussed in Purpose and Need section of this document.

MANAGEMENT OBJECTIVES OF THE FMP

The Purpose and Need section of this document enumerates the management objectives of the FMP, as amended.

ECONOMIC CHARACTERISTICS OF THE SHRIMP INDUSTRY

Introduction

The shrimp fishery in the Gulf of Mexico is considered to be one of the most important fishery resources in the United States and is the most important resource in the Gulf of Mexico. One measure of the importance of this resource is the large number of analyses preformed on the shrimp fishery over time with one of the earliest economic analysis dating from 1954 (De Sylva, 1954). An annotated bibliography can be found in Appendix E of the 1994 update of the Stock Assessment and Fishery Evaluation (SAFE) Report for the Gulf of Mexico Shrimp Fishery (Ward and Nance, 1994).

Another measure of the importance of the shrimp fishery is the size and impact of landings that have occurred over time relative to other fisheries. Domestic shrimp landings in the Gulf of Mexico have ranged from 134 to 304 million pounds live weight between 1950 and 1994. Landings have gradually increased from an annual average of 196 million pounds between 1950 and 1960 to an average of 240 million pounds between 1984 and 1994. In 1994, shrimp landings constituted 14 percent of total finfish and shellfish landings, but 64 percent of its total value (Vondruska, 1995a).

Ex-vessel price is a third measure of the importance of a resource. Real ex-vessel shrimp prices in the Gulf of Mexico have increased from $1.48 in 1950 to $3.44 in 1994; a 132 percent increase. However, ex-vessel prices have been below the 1979 peak of $4.30, primarily as a result of an increase in imports of 1,470 percent (Vondruska, 1995a)[2].

Economic impacts on a region or state from harvesting and processing shrimp can also be used to determine the importance of this resource. Griffin and Jones (1975), for example, found that the shrimp fishery contributed over $63 million to the Texas economy and supported over 6,000 jobs in 1971. Kearney/Centaur, under contract with the National Fisheries Education and Research Foundation, Inc. (1989), estimated that the Gulf shrimp industry generated direct impacts amounting to $2.95 billion in sales, resulting in $1.41 billion in income. It also supported 162,520 jobs. When both direct and indirect effects are taken into account, economic activities were estimated to be $5.21 billion in sales, $2.05 billion in income, and 189,653 jobs.

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[2]Imports have increased from approximately fifty percent to seventy-five percent of the total domestic shrimp supply in the U.S. (personal communication, John Vondruska, NOAA, NMFS, SERO, St. Petersburg, FL).

The shrimp fishery as an industry group has faced and is facing a unique set of problems. The common property nature of the fishery has led to a decline in vessel productivity that was first documented by Osterbind and Pantier (1965) for the late 1950's. Marine turtle and finfish bycatch may also be affected by the common property nature of the fishery. Turtle excluder devices (TED's) were developed to comply with the requirements of the endangered species act. Griffin and Oliver (1991) estimated the economic impacts of the TEDs requirement. Bycatch reduction devices (BRD's) are a proposed method to reduce the incidence of finfish bycatch in shrimp trawls (Ward and Macinko, 1993). However, these two similar management measures have distinctly different impacts on the stocks they are designed to conserve. In addition, the development and adoption of fishery management plans for shrimp (Texas Closure) and other species since 1980 have resulted in the reallocation of fishing effort between fisheries and between fishing grounds (Fonyo et al. 1983). Lastly, the closure of the Mexican shrimp fishing grounds due to the adoption of a 200-mile limit has increased competition for the limited domestic supplies of shrimp (Griffin and Beattie, 1978).

External economic influences have also impacted the shrimp fishery. Ex-vessel prices have been declining since the late 1970's, and input costs have been on the increase. Fuel price increases in the early 1970's had a significant impact on shrimp vessels (Griffin and Nichols, 1976). The extension by Mexico of its jurisdiction to 200 miles eliminated access to shrimp fishing grounds that had been heavily utilized by U.S. fishermen prior to 1980 (Blomo et al. 1978). Lastly, the expansion in shrimp aquaculture and imports of shrimp into the U.S. have depressed ex-vessel prices shrimp fishermen receive for their catch (Vondruska, 1992) and led to the development of a shrimp futures market.

Harvest Sector

a. Landings and Values

Brown, white, and pink shrimp comprise the major species in the Gulf shrimp fishery, whereas, royal red, rock, and seabob shrimp contribute a minor share to the fishery. Rock shrimp and seabob have been dropped from the management unit but are retained in the Shrimp FMP for purposes of data collection and fishery monitoring. Table R-1 shows the landings and values of shrimp landed in Gulf ports since 1973, averaged over three-year periods, except 1994.

Table R-1. Pounds, values and price per pound of shrimp landed in Gulf ports, heads-on weight.

Period	Landings (Mil. lbs.)	Current Value (Mil. $)	Real Value (Mil. $)	Ex-vessel Price (1990 $)
1973-75 avg.	179.50	162.74	366.46	2.04
1976-78 avg.	241.22	297.50	529.68	2.20
1979-81 avg.	227.68	360.37	475.21	2.09
1982-84 avg.	220.88	427.46	488.98	2.21
1985-87 avg.	274.70	477.01	544.58	1.98
1988-90 avg.	234.54	395.70	412.40	1.76
1991-93 avg.	219.12	378.31	374.63	1.71
1994	206.22	462.71	446.58	2.17

Source of basic data: Vondruska (1995a).

For the period considered, landings peaked at 274.7 million pounds (MP) around 1985-87 and declined thereafter to 206.22 MP in 1994. The current and real values tracked the movement in landings with a peak in 1985-87 of $477.01 million (current). Although landings fell from 1985-87 through 1994, the values advanced in 1994 to $462.71 million due to the increase in price per pound.

b. Vessel Characteristics

The fishing fleet is comprised of boats (less than 5 net tons) as well as vessels (greater than 5 net tons). The commercial offshore fleet competes for shrimp with a commercial inshore fleet and a bait fishery that operates in the bays and estuaries (Waters and Nance, 1990). It also competes with a recreational fishery consisting of a sizable number of participants who land a relatively small amount of shrimp (Brown, 1981 and Swingle et al., 1976).

Determination of the number of vessels in the shrimp fishery is not an easy exercise. In the absence of federal permitting for shrimp vessels, the number of vessels has been estimated from so-called Vessel Operating Units File (VOUF) and Shrimp Landings Files (SLF). The VOUF contains information about individual vessel characteristics indexed by the United States Coast Guard (USCG) vessel documentation or identification number. This data set contains information about vessels that operate in the fisheries of the southeastern region of the United States. The SLF contains information on the pounds, value, and to a limited extent fishing effort for vessels that harvest shrimp in the Gulf of Mexico by USCG vessel documentation number. There is no doubt that estimation of the number of vessels from these sources is not straightforward. Table R-2 presents estimates of the number of vessels from these sources.

Table R-2. Number of vessels in the Gulf of Mexico shrimp fishery.

Year	Number of Vessels in the VOUF	Number of Vessels in the SLF	Matches Between SLF and VOUF	Number of Full Time Vessels	Number of Entering Vessels	Number of Entering & Exiting Vessels	Number of Exiting Vessels
1973	4,093	3,451	3,335	3,010	331	97	376
1974	3786	3,246	3,190	2,965	362	83	217
1975	3,693	2,625	2,542	3,110	302	64	222
1976	4,178	.	.	3,190	657	109	242
1977	4,357	282	254	3,605	410	100	203
1978	4,609	.	.	3,812	553	41	462
1979	5,053	.	0	3,903	604	84	316
1980	5,131	1,421	1,284	4,507	624	72	392
1981	5,193	4,327	3,585	4,351	337	113	187
1982	5,244	4,275	3,706	4,501	466	90	210
1983	5,359	4,146	3,527	4,757	334	58	
1984	5,636	4,519	3,738	4,953	493	52	138
1985	5,670	4,940	3,987	5,169	179	45	277
1986	5,633	4,743	3,801	5,051	210	75	297
1987	5,725	5,168	4,081	5,077	392	72	184
1988	5,897	4,824	3,919	5,187	322	106	282
1989	6,250	4,780	3,904	4,862	584	157	647
1990	5,828	4,671	3,854	5,104	234	216	274
1991	5,791	4,394	3,712	4,233	245	208	1,105

Notes:

1. Full time vessels are reported by the VOUF as using shrimp fishing gear for three consecutive years. That is, for a vessel to be considered full time in 1980, it would have to use a shrimp fishing gear in 1979, 1980, and 1981.
2. Vessels entering the fishery would have had to use shrimp fishing gear in the base year and a subsequent year, but not in the previous year.
3. Vessels entering and exiting the fishery would have used shrimp fishing gear in the base year, but not in a previous or subsequent year.
4. Vessels exiting the fishery would have had to use shrimp fishing gear in the base year and a previous year, but not the subsequent year.

Source: Ward and Nance (1994).

The number of vessels recorded in the VOUF is higher than that in the SLF. Vessels in the VOUF that are considered to be shrimp vessels in the above table are those that reportedly used shrimp fishing gear, including shrimp otter trawls (gear code 215), shrimp beam trawls (gear code 192), butterfly nets (gear code 189), and chopstick beam trawls (gear code 194). The vessels in the SLF may be regarded as those that actually landed shrimp for that particular year. The column "Matches Between the SLF and VOUF" counts only vessels that are identified in both data sets. This column shows that the number of vessels fluctuated in the early 1980s, rose slightly in the middle 1980s, and peaked at 4,081 in 1987. Since then, the number of vessels had been declined to 3,712 in 1991.

One important aspect regarding vessels is the number of full-time vessels and the number of those entering and exiting the fishery. While we may observe that the number of full time vessels fluctuated throughout the period, an upward trend in entries and exits is noticeable since the early 1980s. In more recent times, the largest number of entering vessels occurred in 1989 with 584 vessels. This number is slightly less than the 1976 number of 657 vessels. The largest number of exiting vessels occurred in 1991 at 1,105 vessels. Noticeable in the table is the relatively high number of vessels entering and exiting the fishery from 1988 through 1991.

The following table (Table R-3) below summarizes the major characteristics of the shrimp fleet based on information from the VOUF.

Table R-3. Shrimp vessel characteristics.

Year	Age (yrs.)	Horsepower	Length (ft.)	Tonnage	Crew Size
1973	10.59	208.98	53.63	45.15	2.52
1974	10.05	215.78	53.56	45.43	2.51
1975	10.70	214.67	53.12	44.21	2.50
1976	11.65	211.64	52.05	41.59	2.47
1977	12.13	217.21	52.73	43.42	2.43
1978	10.02	225.74	53.09	44.84	2.52
1979	9.69	231.25	52.91	44.83	2.52
1980	10.11	231.51	52.31	43.42	2.50
1981	10.74	235.18	52.55	43.65	2.51
1982	11.31	235.57	52.02	43.05	2.51
1983	12.41	234.85	51.79	42.27	2.51
1984	12.88	233.20	51.27	40.99	2.49
1985	14.10	235.11	51.52	41.56	2.49
1986	14.57	235.69	51.74	41.99	2.49
1987	14.37	237.68	52.69	44.17	2.54
1988	14.69	237.24	52.91	44.53	2.54
1989	22.28	217.62	51.38	39.56	2.54
1990	15.60	239.56	52.77	43.97	2.58
1991	16.55	241.40	52.98	44.42	2.59
1992	16.68	247.10	53.28	45.29	2.64

Source: NMFS (1994).

Vessel age is a time dynamic component of the fishing fleet. During periods of fleet expansion, average vessel age should decline reflecting the construction of new vessels. During time periods when the fleet is contracting, average vessel age should increase as fewer new vessels enter the fishery. Also, older vessels tend to have lower fixed costs, due in part to cheaper construction loans, and would be less likely to exit the fishery. The table above shows that average vessel age began to increase after 1979 and exceeded 15 years after 1988. The highest age was recorded in 1989 with 22.28 years.

A steady increase in average vessel horsepower occurred over the period considered. The highest average vessel horse power occurred in 1992 and the lowest in 1973. Average vessel length decreased from 1973 to 1984, and since then had trended upward to reach 53.28 feet in 1992. Thomas et al. (1995) recorded a relatively higher average length for vessels in 1994 of 59.6 feet. Gross tonnage changed in practically the same way as vessel length, that is declining from 1973 to 1984 and trending upward thereafter.

While crew size may vary over the short run more than vessel characteristics such as gross tonnage, length, and horsepower; it is constrained by the capital-labor ratio. That is, only a certain number of crew will fit on a vessel; and as crew size increases, they spend more time avoiding each other than doing productive work. Crew size remained at approximately 2.5 crew per vessel from 1973 to 1990. After 1990, average crew size increased to 2.6 per vessel. Thomas et al. (1995) reported a much lower average crew size of 1.6 per vessel for 1994. Both sources exclude captain from the counting of crew members.

c. Vessel Costs and Returns

Since cost and revenue data for the Gulf shrimp fishery are not routinely collected, many specialized data-collection efforts have been undertaken. The most recent of these was conducted by Resource Economics Consultants (1994). Ward et al. (1995) assembled and integrated these survey data to develop costs and revenues information for shrimp vessels in the Gulf of Mexico.

Table R-4 presents costs and revenues for all types of vessels in the Gulf shrimp fishery. Costs and revenues are averages for the shrimp fishery throughout the Gulf from 1969 through 1992, with 1977 as the base year. Plus one and minus one standard deviation from the averages are presented to depict the range of values.

Observable from the table is the wide disparity in the distribution of revenues and costs. While the average total revenue for the period is about $42,000, the range is a little over $200,000. Average net revenue in the fishery is relatively low at $6,564.15 and ranges from $2,249.33 to $41,881.18.

Table R-4. Average cost and returns in the Gulf of Mexico shrimp fishery, 1969-92.

Cost/Revenue Categories	Average Real Dollars	Plus One Standard Deviation	Minus One Standard Deviation
Shrimp revenue	42,864.83	220,210.44	8,343.81
Other revenue	1,933.73	10,765.37	347.35
Total revenue	43,001.86	220,412.33	8,389.55
Fuel cost	8,106.57	43,188.36	1,521.62
Supplies	3,811.64	23,353.95	622.10
Maintenance	7,860.61	53,523.07	1,154.44
Overhead	1,498.82	8,036.47	279.53
Interest	5,007.91	19,802.05	1,266.49
Depreciation	2,024.83	12,337.96	332.30
Insurance	7,110.18	15,072.51	3,354.10
Total overhead	3,297.91	26,427.23	411.55
Crew shares	3,536.57	199,094.60	62.82
Total cost	36,437.71	216,231.16	6,140.22
Net revenue	6,564.15	41,881.18	2,249.33

Note: Figures have been converted to 1977 dollars.

Source: Ward et al. (1995).

Table R-5 below depicts average cost and returns by vessel size categories. On average, the most profitable vessel-size category is the largest one. Average net revenue ranges from $828.93 for small vessels to $4,382.19 for large vessels.

Table R-5. Average cost and returns in the Gulf of Mexico shrimp fishery, 1969-92.

Cost/Revenue Categories	Less Than 25 Feet (Small)	Between 25 and 50 Feet (Medium)	Greater Than 50 Feet (Large)
Shrimp revenue	2,008.42	11,924.62	102,839.08
Other revenue	379.27	1,906.04	3,015.99
Total revenue	2,011.57	12,160.52	102,873.81
Fuel cost	370.22	1,851.02	20,316.86
Supplies	143.98	989.84	9,838.62
Maintenance	143.03	1,775.65	18,676.62
Overhead	139.37	278.44	3,885.74
Interest	334.31	1,032.54	6,577.51
Depreciation	402.41	1,623.56	7,505.12
Insurance	434.06	1,788.92	7,611.82
Total overhead	301.51	432.87	7,846.88
Crew shares	2.44	106.99	29,315.56
Total cost	1,182.64	8,041.35	98,491.62
Net revenue	828.93	4,119.17	4,382.19

Note: Figures have been converted to 1977 dollars.

Source: Ward et al. (1995).

An examination of the components of total revenues and costs reveal some patterns not obvious from a mere examination of net revenue.

Gross revenues increase with vessel size. In addition, the share of total revenue that the crew receives increases with the size of the vessel. Crew share is 0.12 percent for small vessels, 0.88 percent for medium vessels, and 28.5 percent for large vessels. The importance of other sources of revenue to fishing firms declines with vessel size. As a percentage of total revenue, other revenue is 18.85 percent for small vessels, 15.67 percent for medium vessels, and 2.93 percent for large vessels. This result implies that firms become more specialized in the production of shrimp as vessel size increases.

While total cost increases as firms increase in size, the composition of total operating cost changes. Fuel cost, for example, increases from $370 for small vessels to $1,851 for medium vessels and $20,316 for large vessels. However, as a percent of total cost, fuel costs decline as vessels increase in size. Fuel costs as a percent to total costs are 31.3 percent for small vessels, 23 percent for medium vessels, and 20.6 percent for large vessels. Crew shares, however, increase in both absolute and percentage terms. As a percentage of total costs, crew shares are 0.2 percent for small vessels, 1.3 percent for medium vessels, and 29.8 percent for large vessels.

<u>Processing Sector</u>

Shrimp represents the primary component of the Southeast seafood processing industry, generally contributing more than 80 percent of the total edible production activities by value. Table R-6 below shows some of the major features of the shrimp processing industry.

Table R-6. Selected statistics of the shrimp processing industry in the southeast region, 1973-1990.

Year	No. of Firms	Product Weight (1,000 lbs.)	Current Value (1,000 dollars)	Deflated Value (1,000 dollars)	Current Price	Deflated Price
1973	181	213,253	397,928	1,170,377	1.87	5.49
1974	179	187,429	315,293	834,108	1.68	4.45
1975	164	168,697	337,435	819,016	2.00	4.85
Average	175	189,793	350,219	941,167	1.85	4.96
1976	166	206,291	534,480	1,225,871	2.59	5.94
1977	171	233,261	608,862	1,312,203	2.61	5.63
1978	171	249,681	691,262	1,385,295	2.77	5.55
Average	169	229,745	611,535	1,307,790	2.66	5.69
1979	172	224,025	809,089	1,457,817	3.61	6.51
1980	170	197,106	690,095	1,093,653	3.50	5.55
1981	167	225,444	809,400	1,164,605	3.59	5.17
Average	170	215,525	769,528	1,238,691	3.57	5.75
1982	168	221,561	920,645	1,247,486	4.16	5.63
1983	171	221,999	939,807	1,233,343	4.23	5.56
1984	154	252,543	969,422	1,219,399	3.84	4.83
Average	164	232,034	943,291	1,233,409	4.07	5.32
1985	145	256,342	935,176	1,134,922	3.65	4.43
1986	152	291,732	1,106,224	1,318,503	3.79	4.52
1987	151	264,259	1,014,845	1,167,831	3.84	4.42
Average	149	270,778	1,018,748	1,207,085	3.76	4.46
1988	153	275,540	931,503	1,029,285	3.38	3.74
1989	149	288,988	1,054,464	1,111,132	3.65	3.84
1990	143	309,012	1,049,801	1,049,801	3.40	3.40
Average	148	291,180	1,011,923	1,063,406	3.48	3.65

Note: Base year is 1990.

Source: Keithly et al. (1993).

While the number of processing firms fluctuated from year to year, the trend appears to be a declining one. The average number of firms fell from 175 in 1973-75 to 148 in 1988-90, or by 15 percent. In contrast, pounds of shrimp processed in the Southeast generally increased throughout the period (except for a moderate decline in the 1979-81 average) from 190 million pounds in 1973-75 to 291 million pounds in 1988-90, or by about 53 percent. The increase has been particularly pronounced since the mid 1980s and, to an extent, most likely reflects the sharp increase in the U.S. imports of shrimp, particularly from the Asian Region. Roberts et al. (1992) noted much of these imports were subsequently utilized in Southeast processing activities.

The current value of processed shrimp matched the increase in pounds processed. This value advanced from a little over $350 million in 1973-75 to more than $1.0 billion in 1988-90, or by 188 percent. The mentioned increase in pounds processed partly accounted for this increase in current value. A good part of this increase was also due to inflation that occurred in the 1970s and early 1980s.

Deflated value rose from $941 million in 1973-75 to $1.3 billion in 1976-78, but declined since then to $1.0 billion in 1988-90. The observed deflated processed price of $3.65 per pound in 1988-90 reflects more than a 45 percent decline when compared to the 1979-81 price of $5.75 per pound and about a 25 percent decline compared to the deflated price of $4.96 per pound in 1973-75. This decline likely reflects three factors: 1) increased domestic production of processed shrimp, 2) competition from imported processed shrimp, and 3) declining input costs of the raw, unprocessed product.

Table R-7 below shows the distribution of shrimp processing firms in the Southeast by sales volume. Approximately one-third of the processors generally reported annual sales of less than $250 thousand, when examined in three-year intervals. Another 10 to 20 percent reported annual sales in the $250 thousand to $1 million range. From about 30 to 40 percent reported annual sales in the $1 to $10 million range, and the remaining 15 to 20 percent reported sales of $10 million or more. The table appears to indicate that taken in three-year intervals, the size distribution of processing firms by total sales remained stable throughout the period considered. It is noted, however, that more firms are in the $1 to $10 million category than in other categories.

Table R-7. Percentage distribution of shrimp processing firms in the southeast, by total sales.

Year	Less Than $250,000 (percent)	$250,000 - $1 Million (percent)	$1 Million - $10 Million (percent)	$10 Million or More (percent)	Total Number of Firms
1973	31	18	32	18	181
1974	35	16	37	12	179
1975	29	23	35	13	164
Average	32	19	35	15	175
1976	28	17	34	20	166
1977	32	12	33	23	171
1978	35	13	30	22	171
Average	32	14	32	22	169
1979	33	15	31	20	172
1980	36	14	34	16	170
1981	32	16	34	19	167
Average	34	15	33	18	170
1982	35	13	34	19	168
1983	35	9	36	19	171
1984	34	11	35	19	154
Average	35	11	35	19	164
1985	32	13	35	20	145
1986	28	10	42	20	152
1987	24	15	40	21	151
Average	28	13	39	21	149
1988	27	12	39	22	153
1989	28	19	34	20	149
1990	30	14	34	22	143
Average	28	15	36	21	148

Source: Keithly et al. (1993).

One other characteristic of the shrimp processing sector that is examined is the degree of specialization in their processing activities which refers to the proportion of the firm's production activities devoted to processing shrimp. Table R-8 below illustrates this feature.

The table indicates that, by and large, most processors rely on shrimp processing in most of their seafood processing activities. Historically, about two-thirds of the processors have relied upon shrimp processing for 95 percent or more of their total processed seafood sales, and this percentage has increased to 70 percent in more recent years. Another 15 to 20 percent of the processors have relied upon shrimp processing activities for between 50 and 95 percent of their total processed seafood sales, with the low end of the range occurring in more recent intervals of analysis. About 15 to 20 percent of the processors have relied on shrimp processing for less than 50 percent of their total processed seafood sales, although the percentage of firms belonging to this category has fallen over time, especially after the mid-1980s. The information indicates that increased specialization in the Southeast shrimp processing industry has occurred after the mid-1980s.

Table R-8. Processed shrimp sales as a percentage of total processed seafood sales, 1973-90.

Year	Less Than 50% of Sales (percent)	50% to 95% of Sales (percent)	95% or More of Sales (percent)	Total Number of Firms
1973	23	17	60	181
1974	18	18	64	179
1975	21	19	60	164
Average	21	18	61	175
1976	17	19	64	166
1977	16	20	64	171
1978	22	17	61	171
Average	19	19	63	169
1979	20	17	63	172
1980	19	17	64	170
1981	19	17	64	167
Average	19	17	64	170
1982	20	17	63	168
1983	20	18	63	171
1984	19	16	65	154
Average	20	17	63	164
1985	19	14	67	145
1986	20	14	66	152
1987	13	13	74	151
Average	17	14	69	149
1988	14	16	71	153
1989	14	15	70	149
1990	12	14	74	143
Average	13	15	72	148

Source: Keithly et al. (1993).

Considering the general move towards specialization in the shrimp processing industry to production of shrimp, it may be instructive to delve further into the various shrimp processing activities of these firms. Table R-9 contains the various shrimp processing activities and corresponding levels.

Virtually all of the increase in Southeast shrimp processing activities during the period considered was based on peeling activities. Production of peeled shrimp, expressed on a product weight, advanced from 24 million pounds annually in 1973-75 to more than 80 million pounds in 1988-90, and the increase was consistent throughout the period. The number of firms engaged in peeling activities also increased steadily during the period. The deflated value of peeling activities, after increasing from an average of $136 million annually in 1973-75 to $290 million annually in 1985-87, declined somewhat to $267 million annually during the most recent interval due to a sharp decline in the deflated price per pound.

Interval variation in the production of raw headless shrimp, to a large degree, reflects changes in reported Southeast shrimp landings. Such a finding is expected given the fact that imports already arrive in raw headless or more processed form. Between 55 and 60 percent of the reported Southeast shrimp landings were consistently used to produce a raw headless product when evaluated in three-year intervals, except in 1973-75 when the share was marginally lower. The deflated value of Southeast raw headless shrimp processing activities fell sharply after 1976-78, reflecting a declining deflated price for the product.

While the reported number of Southeast shrimp breading establishments declined during the study period, the processed poundage remained relatively stable when examined in three-year intervals with the exception of a notable increase in 1988-90. Although the processed-breaded poundage increased substantially during the most recent interval of analysis, the deflated value of Southeast breading activities declined due to a fall in the deflated per pound price.

The number of Southeast shrimp processing establishments producing specialty products fell sharply during the study period as did the processed poundage and deflated value. Much of the reduction was in canning activities, and it was largely in response to the substantial increase in the amount of canned imports.

Table R-9. Shrimp processing activities in the Southeast, 1973-90.

Time Period	Number of Firms	Product Weight (1,000 pounds)	Deflated Value (1,000 dollars)
Raw Headless			
1973-75	106	66,850	359,484
1976-78	108	103,610	664,573
1979-81	118	89,457	568,845
1982-84	126	92,656	539,753
1985-87	113	105,481	516,542
1988-90	111	100,563	451,926
Peeled			
1973-75	43	24,300	135,851
1976-78	52	34,287	188,693
1979-81	56	43,800	259,242
1982-84	61	53,833	261,354
1985-87	64	72,301	290,285
1988-90	66	80,527	267,498
Breaded			
1973-75	46	85,489	360,955
1976-78	38	79,032	365,938
1979-81	30	72,557	335,576
1982-84	26	78,273	380,221
1985-87	26	87,108	367,775
1988-90	26	104,051	315,076
Specialty Products			
1973-75	39	13,154	84,877
1976-78	34	12,816	88,586
1979-81	29	9,712	75,028
1982-84	25	7,272	52,081
1985-87	23	5,888	32,513
1988-90	21	6,040	28,907

Source: Keithly et al. (1993).

The information presented in this document relative to the shrimp processing sector can be used to draw some tentative inferences regarding the relationship between Southeast shrimp processing activities and landings/imports. Some of these inferences are briefly discussed below.

First, a comparison of pounds processed expressed on a headless, shell-on weight basis (Table 4) with pounds landed (Table 1) indicates a reduction in the long-run, domestic, raw- material supply that has increased through time, particularly after 1982-84. For example, the ratio of processed poundage to pounds landed equaled 1.47 in 1973-75 versus 1.51 in 1982-84. By 1985-87, it had increased to 1.62, and it increased again to 1.75 in 1988-90. The increased processed poundage and ratio was associated with a rapid increase in U.S. shrimp imports from Asia and; as documented by Roberts et al. (1992), these imports have been used extensively in Southeast shrimp processing activities.

Second, the deflated value of Southeast shrimp processing activities has declined in recent years despite substantially higher processed poundage. The decline reflects a lower deflated processed price. The price decline reflects the increased imports since the early 1980's that have resulted in both a lower domestic dockside shrimp price and a lower import price. Lower dockside and import prices not only translate into lower raw material input prices to the Southeast shrimp processor, but also into a lower output price.

Third, increased import usage among Southeast shrimp processors appears to have increased productivity and increased specialization. These two factors are, to an extent, interrelated. The increased availability and supply of imported raw material suggest that shrimp processing activities can increasingly be conducted year round rather than on a seasonal basis that coincides with the seasonal nature of the domestic shrimp fishery. The ability to process shrimp throughout the year would naturally lead to increased shrimp production per firm and worker. It would also increase the ability to specialize among firms in the industry; however, the increased import availability has apparently not influenced industry concentration nor the size distribution among firms.

Finally, the peeling component of the Southeast shrimp processing industry has been the primary benefactor of increased imports. As noted, imports cannot be used in the production of raw headless shrimp and increased imports of canned shrimp have largely displaced the domestic canning industry. The increased breading activities during the most recent interval of analysis indicate that this component of the Southeast shrimp processing industry may also be increasingly using new sources of imported shrimp, i.e., Asian, to meet increased raw material needs.

<u>National Market</u>[3]

The aggregate supply of shrimp in the U.S. generally comes from three sources: domestic landings, imports, and inventories (holdings). Table R-10 below shows that the 1994 supply from these three sources amounted to 981 million pounds (heads-off equivalent basis). Landings accounted for 175 million pounds, imports for 750 million pounds, and

[3]The major source for data and discussion on this section is Vondruska (1995a).

inventories for 56 million pounds. Highly noticeable is the major role played by imports since the early 1960s.

The decline in landings in 1994 has been attributed to a landings decline in the Pacific region. Landings in the South Atlantic and New England rose in 1994. Gulf landings remained about the same albeit at the lower end of the range for recent years. The Southeast is the major source of shrimp landings.

While landings fell in recent years, imports rose to more than compensate for the decline in landings. In 1994, the leading suppliers of imported shrimp were Thailand, Ecuador, China, Mexico, and India. Shell-on shrimp, notably raw headless shrimp, represents the leading product form. Imports of this product form have been on a downward trend dropping from 373 to 335 million pounds from 1989 to 1994. On the other hand, imports of what are thought to be mostly peeled, raw shrimp have been on a strong upward trend, increasing from 109 to 256 million pounds from 1989 to 1994. On a comparable heads-off, equivalent-weight basis, U.S. imports of peeled raw shrimp were about 327 million pounds in 1994. Imports of peeled raw shrimp were valued at $942 million, while those for shell-on were valued at $1.5 billion.

U.S. consumption of shrimp in 1994 was 861 million pounds. This is a record amount, and it was about 5.1 percent above that of a year earlier. Roughly 53 percent of shrimp is consumed away from home, while two-thirds of all occasions where shrimp is eaten occur away from home (Vondruska, 1985).

Consumption of shrimp is determined by a number of factors including price of shrimp, income, population, price of competing goods, consumer preferences, etc. Various studies reported that demand for shrimp is price inelastic. Earlier estimates reported shrimp demand to be income elastic, but subsequent studies showed that income elasticity could very well range from being inelastic to elastic (U.S. ITC, 1985). Keithly et. al. (1991) estimated shrimp import demand. He found that a 10 percent increase in the real import price of shrimp would effect a 7.79 percent decrease in the quantity of shrimp import demanded. He also found import demand to be highly elastic with respect to real disposable income.

Table R-10. United States supply and use of shrimp.
(Thousand pounds and pounds per person, heads-off weight)

	Initial holdings	Landings	Imports	Exports	Ending holdings	Consumption, total	Consumption, per capita
1950	16,469	120,715	44,218	5,088	25,652	150,661	1.00
1951	25,652	141,421	46,006	7,039	27,552	178,488	1.18
1952	27,552	143,292	42,318	6,950	15,390	190,822	1.24
1953	15,390	164,246	47,410	5,748	26,390	194,908	1.24
1954	26,390	169,307	45,671	7,745	32,184	201,438	1.26
1955	32,184	154,310	59,585	9,036	22,665	214,377	1.32
1956	22,665	140,927	75,480	7,318	23,389	208,365	1.25
1957	23,389	128,827	76,705	7,290	31,225	190,406	1.13
1958	31,225	133,450	93,933	7,144	41,684	209,780	1.22
1959	41,684	149,855	117,211	9,683	48,438	250,628	1.43
1960	48,438	156,167	124,760	11,999	54,354	263,012	1.48
1961	54,354	108,541	138,896	17,614	28,295	255,882	1.41
1962	28,295	118,830	155,301	11,489	39,744	251,194	1.37
1963	39,744	149,973	170,082	22,203	59,116	278,479	1.49
1964	59,116	132,314	171,576	24,829	48,516	289,662	1.53
1965	48,516	151,927	180,570	25,252	41,461	314,300	1.64
1966	41,461	148,093	195,330	26,342	46,685	311,857	1.61
1967	46,685	189,972	203,943	36,125	83,058	321,416	1.65
1968	83,058	344,065	211,806	31,721	60,566	386,642	1.96
1969	60,566	195,002	221,923	51,847	68,607	357,037	1.79
1970	68,607	224,271	249,066	61,990	78,690	401,264	1.99
1971	78,690	238,073	216,443	62,713	73,036	397,457	1.94
1972	73,036	235,852	255,096	57,385	98,090	408,509	1.97
1973	98,090	228,643	232,338	74,587	82,711	401,773	1.92
1974	82,711	225,529	270,517	53,100	82,482	443,176	2.09
1975	82,482	209,151	231,521	52,299	54,336	416,519	1.95
1976	54,336	245,597	271,895	52,502	71,697	447,629	2.07
1977	71,697	288,295	271,811	57,919	93,950	479,933	2.20
1978	93,950	256,882	240,414	66,607	64,555	460,083	2.09
1979	64,555	205,588	269,240	51,079	88,496	399,809	1.79
1980	88,496	207,868	258,070	41,059	77,587	435,788	1.93
1981	77,587	218,900	259,112	43,723	64,638	447,237	1.96
1982	64,638	175,614	319,596	37,198	58,176	464,475	2.02
1983	58,176	155,592	421,179	35,936	71,482	527,528	2.27
1984	71,482	188,132	422,340	26,590	61,207	594,157	2.54
1985	61,207	207,239	452,232	26,940	61,694	632,044	2.68
1986	61,694	244,409	492,030	30,450	59,275	708,407	2.97
1987	59,275	223,514	583,030	33,813	66,704	765,302	3.18
1988	66,704	203,350	598,208	34,783	58,502	774,977	3.19
1989	58,502	215,825	563,596	48,103	56,713	733,107	2.99
1990	56,713	213,899	579,425	69,332	59,675	721,030	2.91
1991	59,675	198,115	632,779	88,341	56,364	745,863	2.98
1992	56,364	207,086	694,249	81,558	53,771	822,370	3.24
1993	53,771	180,687	708,684	48,870	55,996	838,276	3.27
1993	53,771	180,687	708,692	68,309	55,996	818,844	3.19
1994	55,996	174,969	750,001	67,512	52,756	860,697	3.332

Landings data for 1978 onward from NMFS, Fisheries of the United States is subject to to revision. Holdings from NMFS (formerly BCF), Fishery Statistics of the United States and Frozen Fishery Products, Annual Summary for various years. See following tables on trade data. Population data from NMFS, Fisheries of the United States; revised for 1980-93. (Source of this table: Vondruska (1995a).

ECONOMIC CHARACTERISTICS OF SELECTED FINFISH INDUSTRIES

Introduction

Reduction in shrimp-trawl bycatch of finfish may be expected to improve the status of many finfish stocks and help accomplish the recovery of some managed species within their scheduled rebuilding period. The three major groups that may be directly affected by the bycatch-reduction program are reef fish (particularly red snapper), mackerels, and the groundfish complex. Improvement of these stocks has a bearing on the benefits derived by the various participants of these fisheries.

Reef Fish (Red Snapper)

The fishery for red snapper is composed of a shrimp-trawl bycatch of age-0 and age-1 fish, a commercial fishery managed by quota since 1990, a for-hire recreational fishery and private recreational anglers. Since the advent of TAC and allocations in the fishery, its history can be described as one of attenuated seasons and depressed prices for the food-commercial sector and overruns of allocation by the recreational sectors. The reaction by the Council has been the implementation of an effort-management system for the food-commercial sector, the establishment of a permit system for the for-hire recreational fishery, and the accelerated implementation of increased minimum sizes on red snapper for anglers.

The statutory allocation of TAC is 51 percent commercial and 49 percent recreational, but the actual landing percentages in the directed fishery over the last three years averaged at 41 percent commercial and 59 percent recreational.

a. Recreational and For-Hire Sectors

Recreational landings have been identified from three survey sources: Texas Parks and Wildlife, NMFS-Headboat, and NMFS-MRFSS. All three surveys reflect an increasing trend in landings over the years. Figure R-1 displays the relative contribution to recreational catch by state using these sources. Another perspective is to view the landings on a state-by-state basis. Even during this short time frame, the shift in state shares of the recreational landings, notably the recovery of landings by Florida and the growth of landings in Louisiana and Alabama, is evident.

Figure R-1. Gulf of Mexico red snapper landings, by state, 1986-1994 (MRFSS/HEADBOAT/TPWD)

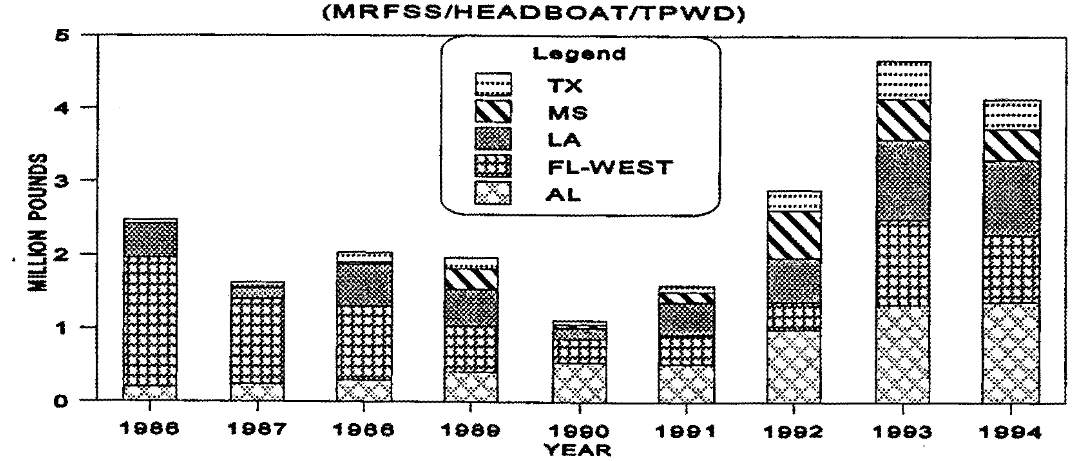
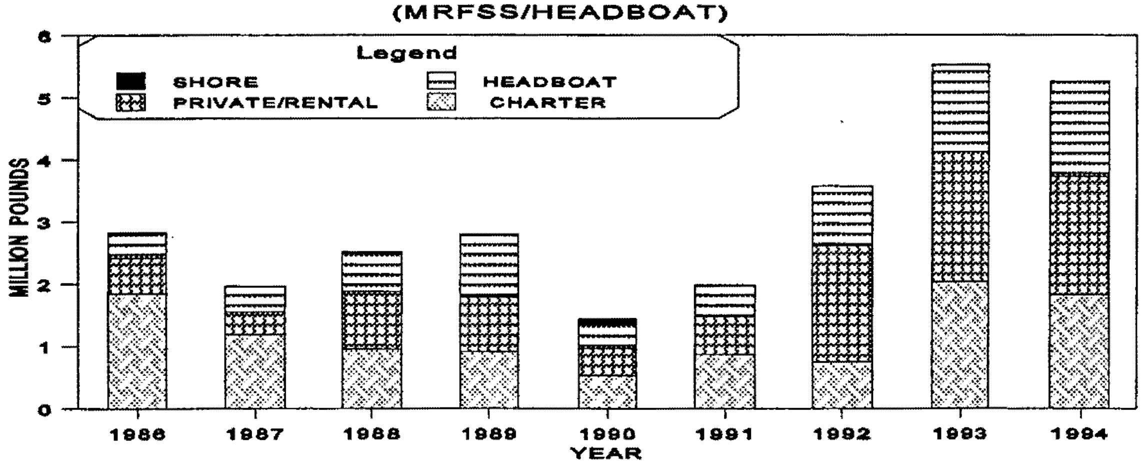


Figure R-2 shows landings by mode for the period 1986 to 1994. The landings in the charter mode have a bimodal distribution with highs during 1986 and 1993; the private boat and headboat modes suggest a trend of growing catches. Noticeable here is the relative share of the charterboat fleet and of the for-hire sector, generally. The estimation of landings for the mode is controversial because of the re-analysis of the 1993 and 1994 data. NMFS-MRFSS staff concluded that those years were correct estimates, while 1990-92 were possibly underestimates. The figure reflects a 5.7 MP catch in 1994, for example. The approach taken by the stock assessment was to average those years and therefore to de-trend the 1993 and 1994 data for a 1994 estimate of 4.7 MP. It should also be noted that preliminary partial-year landings data received by the Council indicated that 1995 landings from MRFSS were 24 percent lower than those in 1994 and 1995 headboat landings and 16 to 32 percent lower than those in 1994 (SEP, 1995).

Estimation of recreational overruns is further complicated by the increased minimum size limit that went into effect during 1995 and the lack of 1995 data to evaluate the accuracy of the earlier reduction estimates. Some public testimony to the Council suggested that landings were down as a result of the size limit and bad weather.

Figure R-2. Gulf of Mexico recreational landings, by mode, 1986-1994 (MRFSS/HEADBOAT)



Based only on MRFSS records, the number of recreational anglers in the Gulf of Mexico averaged 1.87 million annually for the period 1990-1994. These anglers took 16.9 million trips annually for the same period. Figures 12 through 15 present some information on angler trips in which red snapper was targeted (target trips) or caught (catch trips). Figure R-3 notes the following trends in red snapper targeted trips by state between 1988 and 1994: 1) there was little perceptible effect on target trips after the implementation of Amendment 1 to the reef fish FMP; 2) Louisiana anglers increased trips by roughly 20 percent when the last two years are compared to the previous five years; 3) Alabama anglers experienced a doubling of trips between 1991 and 1992 that has persisted and increased; and 4) Mississippi anglers mimicked the trend in Alabama.

Figure R-4 displays angler trips in which red snapper was caught, whether or not red snapper was targeted. The catch trips correlated well with the target trips, although not so much in terms of magnitudes of changes. In Alabama, for example, the catch trips increased and decreased in the same direction as the target trips; however, the doubling of target trips between 1991 and 1992 was accompanied by only a slight increase in catch trips. Catch trips in this state nonetheless picked up in later years. Florida's proportion of catch trips is larger than the state's proportion in target trips, while the opposite seems to be the case for Mississippi.

Figure R-3. Red snapper recreational target trips, by state, 1988-1994 (MRFSS)

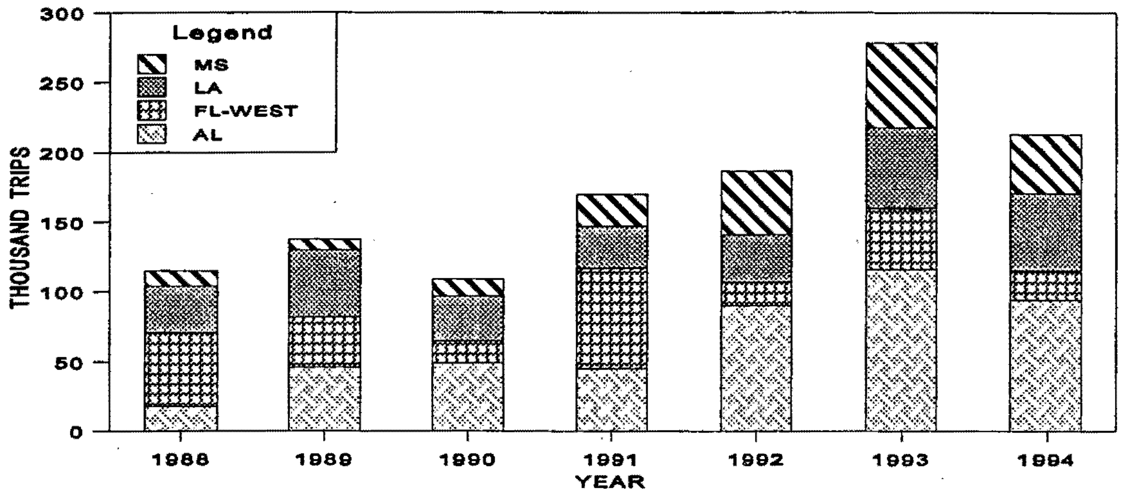
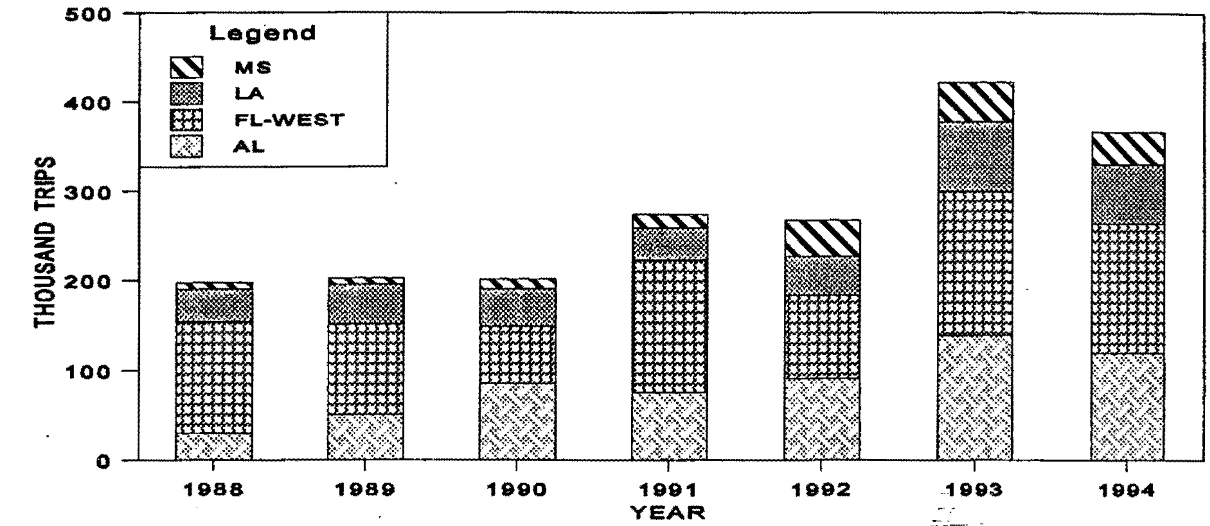


Figure R-4. Red snapper recreational catch trips, by state, 1986-1994 (MRFSS)



Figures R-5 and R-6 break down the recreational target trips and catch trips into shore, charter, and private boat modes. The shore mode comprises a minimal portion of both total target and catch trips. The charterboat mode indicates a steady increasing trend in both target trips (Figure R-5) and catch trips (Figure R-6). The private mode has dominated the target trips. The same can be said of the catch trips, except in 1993 and 1994 when the charterboat mode had a higher proportional share of total catch trips. Figure R-6 appears to bear out the growing importance of the charterboat mode in accounting for recreational catches of red snapper.

Figure R-5. Red snapper recreational target trips, by mode, 1986-1994 (MRFSS)

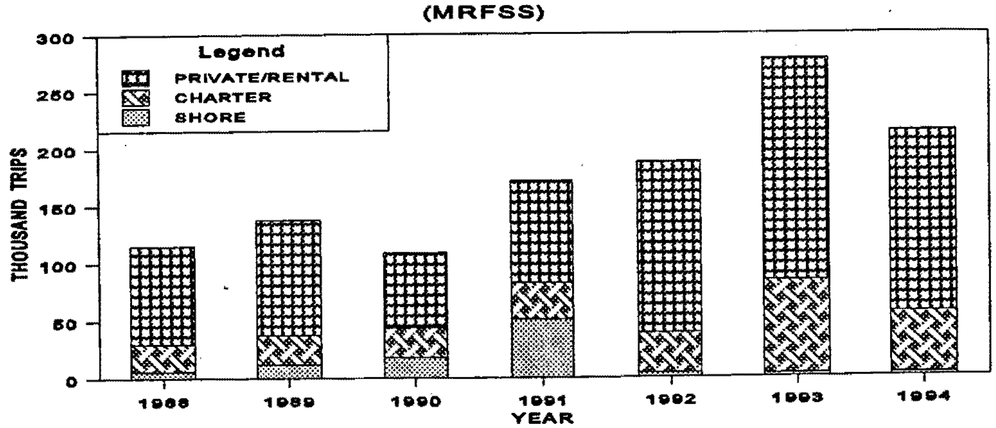
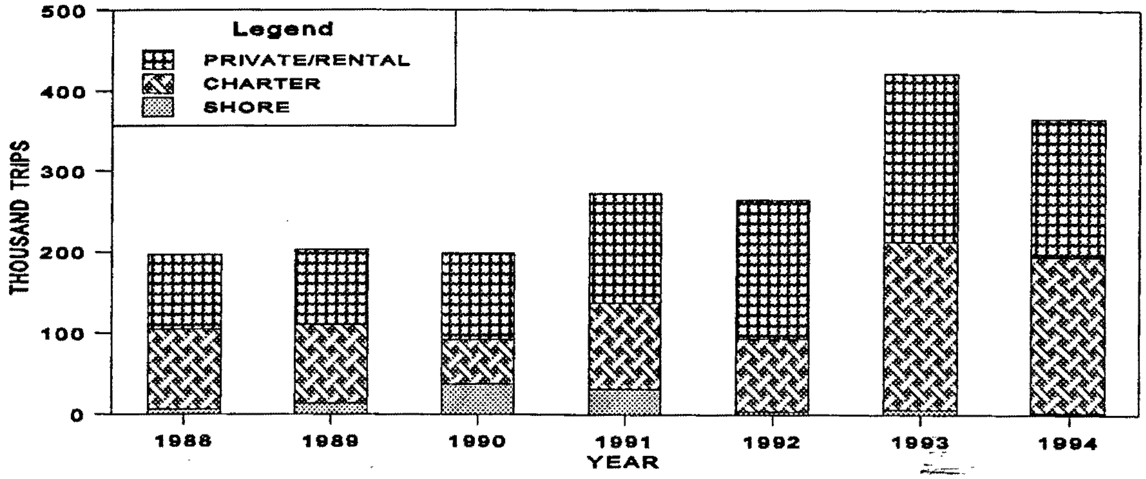


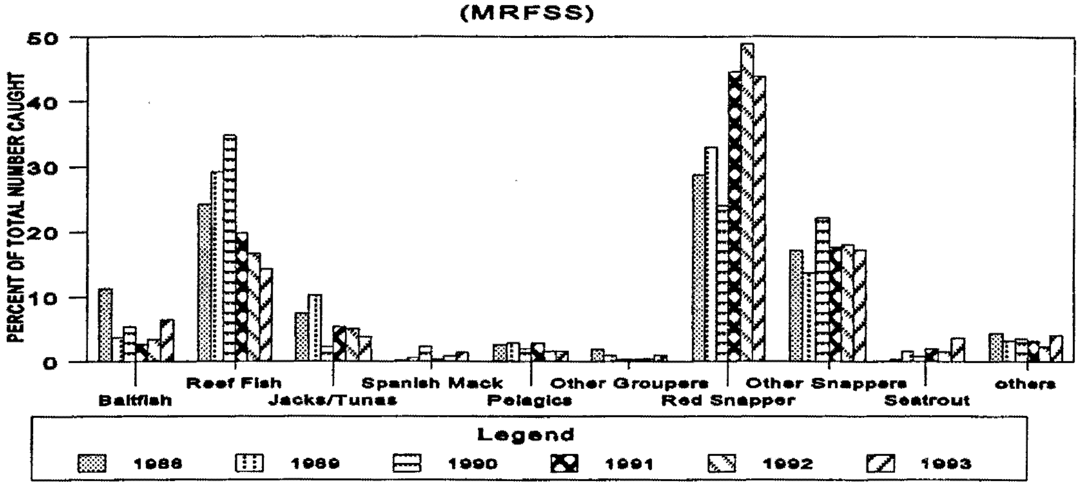
Figure R-6. Red snapper recreational catch trips, by mode, 1988-1994 (MRFSS)



While target trips and catch trips can give some information about future catch, catch composition may suggest effects of further regulation of anglers and the for-hire sector on different species. Figure R-7 illustrates the catch composition of red snapper catch trips, i.e., trips catching red snapper whether or not red snapper was targeted. This figure appears to imply that the composition of species caught together with red snapper has remained relatively stable. Among the various species caught, there also appears to be no trend as to which species are caught as regulations are changed on the red snapper fishery.

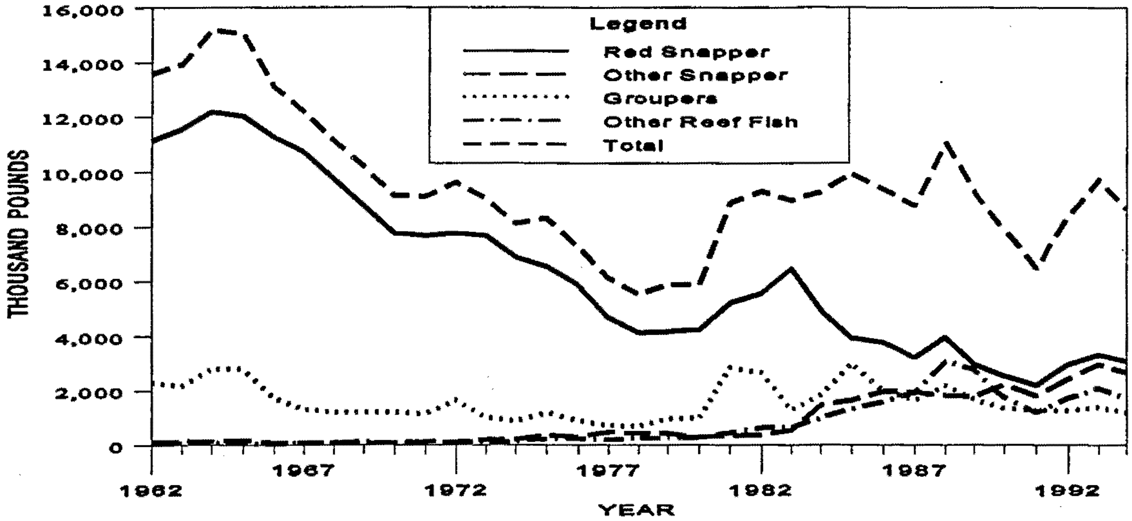
b. Commercial Sector

Figure R-7. Catch composition of red snapper catch trips, 1988-1993 (MRFSS)



Red snappers are mainly caught and landed in the northern and western Gulf (mostly off Louisiana and Texas, but extending eastward to about Bay County, Florida). Commercial landings of reef fishes in this area declined from over 15 million pounds in 1964 (a good portion of which was from Mexican waters) to a low of 5.5 million pounds in 1978. Landings recovered during the late 1970s and averaged 9.0 million pounds (whole weight) per year between 1981 and 1994 with a range of 6.5 million pounds (in 1991) to 11.0 million pounds (in 1988) (Figure R-8). However, the species composition of the catch changed markedly. Landings of red snapper declined from approximately 12.2 million pounds in 1964 to 2.2 million pounds in 1991, the first year of management with quotas. Red snapper now compose the vast majority of the catch on red snapper trips. Red snapper represented 35 percent of the total commercial catch of reef fishes in 1994 compared with 72 percent of the catch in 1980 and 85 percent in 1970.

Figure R-8. Commercial landings of reef fishes along the northern and western Gulf



Ex-vessel value received by commercial reef fishermen in the northern and western Gulf of Mexico increased from $2.9 million in 1962 to $18.6 million in 1988. It declined to $11.9 million in 1991, and then increased to $15.5 million in 1994 (Figure R-9). Much of the increase prior to 1988 was due to inflation as measured by the consumer price index for all items and all urban consumers (CPI-U, with a 1982-1984 base period). After adjusting for inflation, total ex-vessel value tended to mirror the trend in landings (compare Figures 17 and 19). Real ex-vessel value remained relatively constant from 1981 through 1987, peaked in 1988, and then declined. The real ex-vessel revenues received in 1991 and 1992 were the lowest since 1980 (Figure R-10).

Figure R-9. Exvessel value of reef fishes landed along the northern and western Gulf

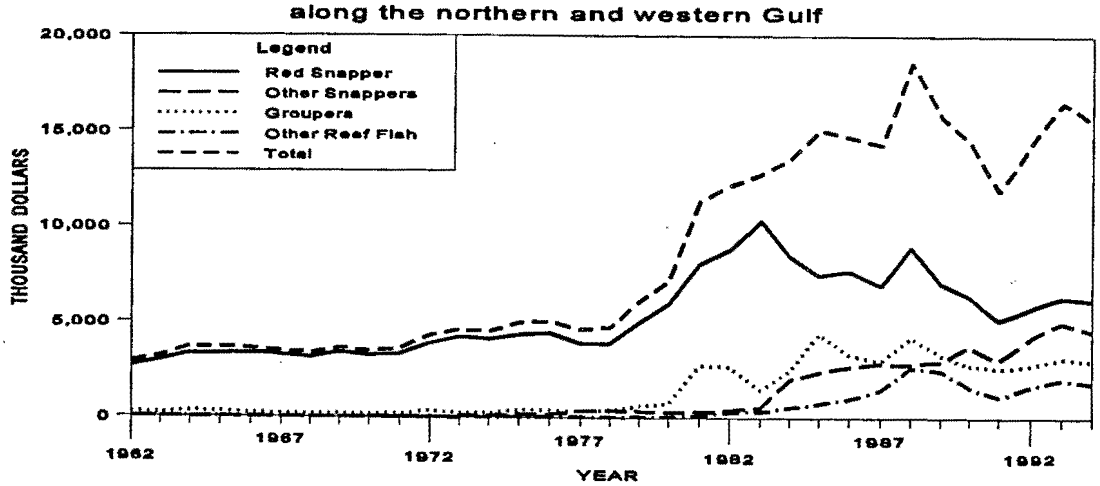
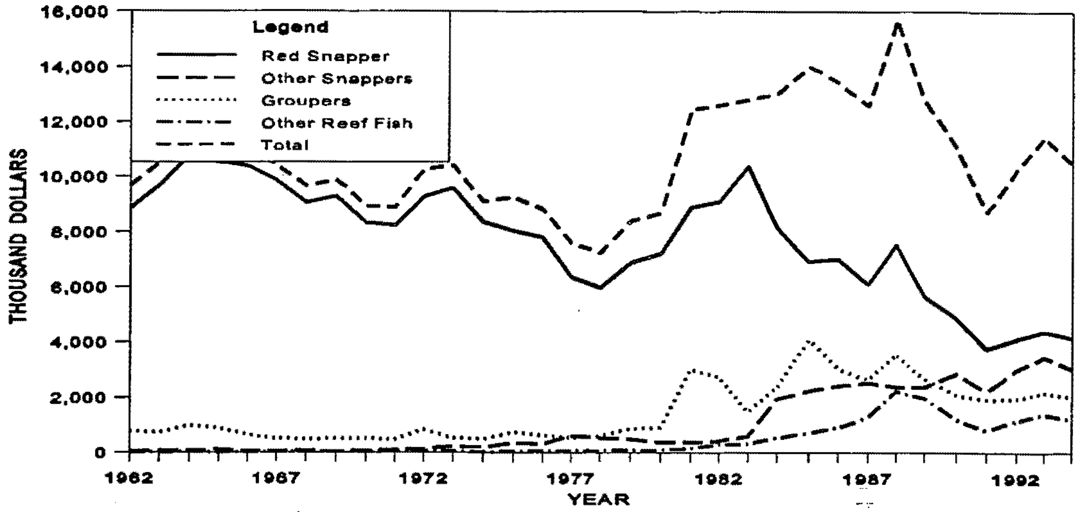


Figure R-10. Real exvessel value of reef fish landed along the northern and western Gulf



Commercial fishermen in the northern and western Gulf received $6.2 million from red snapper in 1994. Historically, red snapper has been the most valuable species in the reef fish fishery, but its relative importance has declined (Figures 17 and 19). In 1994, red snapper contributed 40 percent to overall value received; whereas it contributed 83 percent in 1980 and 93 percent in 1970. Red snapper prices generally rose more quickly than the general price level prior to the derby fishery. Since then, however, red snapper prices have declined markedly and monthly price fluctuations are large.

c. Reef Fish Commercial Permits

The permit data file identifies vessels with permits to fish for reef fishes in Federal waters of the Gulf of Mexico. The data indicate a decline from approximately 2,000 in January, 1993, to about 1,532 in July, 1995. The reason for the decline is unknown, but it is presumed that vessels which were only marginally active or not active at all in the reef fish fishery have not chosen or have not been able to have the permits renewed. When the red snapper endorsement system took effect in 1993, 131 vessels qualified for the endorsement that allowed them to harvest up to 2,000 pounds per day trip. The rest of red snapper fishermen were allowed a 200 pound limit per day trip.

An economic survey was conducted in the fall of 1994 and spring of 1995 by interviewers in face-to-face meetings with owners or operators of randomly selected vessels. The questionnaire primarily asked fishermen about their fishing histories; their capital investments in vessel and equipment; and their average catches, revenues, and costs per trip for their two most important fishing activities for reef fishes during the 1993 calendar year.

Standard statistical procedures were used to estimate the total number of trips for red snapper, as well as landings, revenues, and trip costs. It was estimated that a total of nearly 3.7 million pounds of red snapper worth $7.4 million were landed on 4,328 trips. Fishermen on high-volume boats with vertical hook-and-line gear accounted for nearly 62 percent of total landings and ex-vessel revenues of red snapper. Fishermen spent nearly $2.2 million for routine trip costs such as fuel, ice, bait, food, and minor gear replacement and repair. These estimated costs exclude fixed costs and payments to owner, captain, and crew.

Mackerel

The mackerel fishery is similar to the red snapper fishery in the sense that there is shrimp-trawl bycatch, a commercial fishery managed by quota since 1985, a for-hire recreational fishery, and private/recreational anglers managed currently by bag limits and size limits. Restrictive management of this fishery began in the mid-1980s, and regulations have contributed to the rebuilding of the overfished stocks of Gulf king and Spanish mackerel.

a. Recreational and For-Hire Sectors

Table R-11 gives an estimate of the number of recreational anglers in the Gulf of Mexico. It is noted that not all of them target or catch mackerel, and this information is taken from the MRFSS only. In the last four years, the number of anglers appears to have leveled off at around 1.9 million individuals.

TABLE R-11. GULF OF MEXICO RECREATIONAL FISHERY PARTICIPANTS, MRFSS DATA ONLY (THOUSANDS OF ANGLERS).

	ALABAMA	FLORIDA	LOUISIANA	MISSISSIPPI	TEXAS	TOTAL
1981	113	836	345	124	987	2,403
1982	295	700	406	112	946	2,458
1983	335	1,434	574	164	755	3,263
1984	129	1,609	436	140	661	2,975
1985	154	1,241	608	91	1,024	3,120
1986	174	1,355	653	130		2,314
1987	131	1,148	608	133		2,020
1988	285	1,350	502	146		2,283
1989	147	1,036	393	112		1,688
1990	172	1,009	413	103		1,697
1991	131	1,152	471	145		1,897
1992	154	1,162	418	193		1,928
1993	182	1,053	442	199		1,876
1994	187	1,173	391	179		1,930

Source: Holiman (1996).

Table R-12 pertains only to Gulf king mackerel and shows the distribution of catches by fishing modes; namely, shore, charter, and private/rental fishing modes. Observable from the table is the steady increase in catches by the charterboat mode, while other modes experience slight declines in the more recent years. Similar information for Spanish mackerel is portrayed in Table R-13.

TABLE R-12. GULF OF MEXICO KING MACKEREL RECREATIONAL LANDINGS (NUMBERS OF FISH) BY MODE, MRFSS DATA ONLY.

	MODE					
	SHORE		CHARTER		PRIVATE\RENTAL	
	NUMBER OF FISH	POUNDS	NUMBER OF FISH	POUNDS	NUMBER OF FISH	POUNDS
	SUM	SUM	SUM	SUM	SUM	SUM
YEAR						
1982	23,103	231,892	58,989	742,675	651,892	4,620,754
1983	32,061	277,037	45,808	493,402	184,552	1,321,888
1984	.	.	37,492	401,183	265,842	2,731,590
1985	0	.	60,757	523,943	79,379	581,825
1986	5,863	66,129	37,795	371,982	118,503	1,284,841
1987	42,824	317,026	108,446	684,467	259,997	1,860,439
1988	23,839	200,537	103,427	1,000,467	195,735	1,717,857
1989	9,820	98,394	73,647	870,622	179,754	1,661,301
1990	96,490	989,857	99,688	686,402	176,331	1,491,472
1991	125,524	647,159	164,650	1,092,732	306,147	2,585,170
1992	52,976	500,629	133,327	1,190,575	163,372	1,443,743
1993	61,879	520,607	230,469	2,236,602	154,481	1,361,707
1994	66,830	466,085	319,977	2,547,663	151,695	1,619,955
1995*	14,950	104,898	365,170	3,605,108	133,126	1,117,994

*Preliminary.

Source: Holiman (1996).

Table R-13 below shows the significant declines in recreational catch of Gulf Spanish mackerel in the last few years, particularly from anglers fishing on private or rental boats.

TABLE R-13. GULF OF MEXICO SPANISH MACKEREL RECREATIONAL LANDINGS (NUMBERS OF FISH) BY MODE, MRFSS DATA ONLY.

	MODE					
	SHORE		CHARTER		PRIVATE\RENTAL	
	NUMBER OF FISH	POUNDS	NUMBER OF FISH	POUNDS	NUMBER OF FISH	POUNDS
	SUM	SUM	SUM	SUM	SUM	SUM
YEAR						
1982	283,874	321,946	754,648	798,244	1,576,510	1,120,460
1983	614,142	787,235	296,383	420,704	1,222,084	1,441,069
1984	272,610	386,747	222,949	283,134	272,316	395,704
1985	246,748	284,814	210,303	293,757	534,283	629,077
1986	3,498,704	3,703,844	337,739	495,315	2,536,448	2,589,462
1987	608,050	734,333	351,078	585,668	824,869	1,494,689
1988	258,849	346,936	86,680	149,055	1,070,955	1,555,579
1989	236,696	210,014	164,182	243,873	694,372	1,106,134
1990	678,748	860,668	142,030	264,958	703,798	1,241,030
1991	576,463	734,542	72,473	192,842	1,043,554	1,592,582
1992	1,296,872	1,737,945	58,800	96,858	988,084	1,588,095
1993	1,050,065	1,098,372	85,589	145,976	356,467	696,197
1994	817,555	974,521	117,111	162,671	424,917	624,734
1995*	375,481	469,073	445,410	674,914	294,518	666,225

*Preliminary.

Source: Holiman (1996).

Table R-14 depicts the movement of effort expended by anglers on Gulf king and Spanish mackerels. The table shows the number of trips taken that targeted Gulf king or Spanish mackerel and the number of trips taken that caught Gulf king or Spanish mackerel. In more recent years, the peak for number of trips that targeted or caught king mackerel occurred in 1991, while the peak for Spanish mackerel occurred in 1992.

Table R-14. King and Spanish mackerel angler effort (trips), MRFSS data only.

GULF KING MACKEREL		
YEAR	TARGET	CATCH
1986	285,405	119,736
1987	792,844	380,345
1988	615,009	225,453
1989	407,097	206,669
1990	464,987	258,463
1991	759,819	425,816
1992	533,625	251,084
1993	564,520	311,729
1994	726,707	365,379
GULF SPANISH MACKEREL		
1986	1,255,075	1,577,807
1987	732,125	803,295
1988	753,221	682,688
1989	493,688	532,673
1990	654,294	749,142
1991	752,263	922,714
1992	1,178,535	1,273,167
1993	739,563	662,984
1994	856,328	728,570

Source: Holiman (1996).

A permitting requirement has been instituted for possession of coastal migratory pelagics for charter and head boats in order to identify participants in this fishery. Lately, however, there have been reports that many operators have not been aware of this requirement. Table R-15 below shows the number of permitted charter vessels.

Table R-15. Vessels permitted under coastal migratory pelagic fishery for charter.

Fishing Year	NC	SC	GA	FLEC	FLWC	AL	MS	LA	TX	OTHER	TOTAL
1987/88	136	54	6	99	223	26	34	15	48	28	669
1988/89	202	69	11	231	396	48	39	30	63	55	1144
1989/90	275	77	29	310	524	57	38	46	91	72	1519
1990/91	287	86	43	309	574	69	35	47	110	82	1642
1991/92	264	79	39	284	529	63	32	43	101	75	1509
1992/93	279	77	41	380	483	60	27	29	90	68	1534
1993/94	243	86	26	344	436	62	25	39	75	97	1433

Source: Pat Howell (unpublished data)

b. Commercial Sector

A permit is currently required for commercially fishing for king and Spanish mackerel. Unlike the charterboat permits, an income requirement is also provided for securing mackerel commercial permits. Table R-16 shows the distribution of commercially permitted vessels by state of registration.

Table R-16. Number of vessels (by state of registration) permitted for commercial king and Spanish mackerel as of 2/14/95.

Fishing Year	NC	SC	GA	FLE	FLW	AL	MS	LA	TX	OTHER	TOTAL
1987/88	325	40	2	580	237	4	7	58	9	18	1,280
1988/89	462	44	6	629	290	3	72	86	15	27	1,634
1989/90	533	56	7	645	340	5	12	161	14	51	1,824
1990/91	590	74	13	767	558	14	13	195	32	52	2,308
1991/92	481	69	11	717	580	15	13	172	27	46	2,131
1992/93	488	112	37	819	891	64	38	178	98	61	2,786
1993/94	412	79	10	846	808	20	21	238	56	98	2,588

Source: Pat Howell (unpublished data).

ANALYTICAL APPROACH

Introduction

The measures in this amendment are specifically designed to help meet the FMP objective of minimizing the incidental capture of finfish by shrimpers. These measures, which affect the shrimp and various finfish industries, will be looked at separately to determine whether or not they contribute to the realization of a net positive economic benefit to the nation. The underlying analytical approach involves a contrast of changes in net benefits or losses to the shrimp industry with changes in net benefits or losses to the finfish industries. The short- and long-term horizons will be considered in the analysis.

Net economic benefits include the sum of: (1) expected changes in producer surplus and consumer surplus for landings from the commercial shrimp and finfish fisheries, (2) potential changes in consumer surplus derived from the recreational finfish industry, and (3) management costs (plan preparation and review, enforcement, additional data collection, and public burden in terms of reporting costs).

The analysis used in this draft of the RIR will involve a combination of qualitative and quantitative approaches. In other words, the RIR analysis will attempt to discover how the proposed management measures affect net societal benefits; however, in some cases, there will be no attempt to place estimated dollar values on the gains or losses that are discussed. The first and major reason is that in some cases the data on the biology and economics of the fisheries are insufficient even though the biological and economic decline of the fisheries may be well established. The second reason is that it may be more important at this stage to see if there are plausible benefits at all versus trying to place exact dollar values on benefits when such an approach is not possible.

The ensuing discussions describe the various techniques used to measure the impacts of various management measures considered in this amendment. The quantitative focus is on the measurement of impacts on the shrimp industry. Determination of impacts on the finfish industries proceeds along a more qualitative line due to the paucity of data.

Conceptual Model: Static and Dynamic Implications of BRDs[4]

Ward and Macinko (1996) developed static and dynamic bioeconomic models to determine the magnitude and direction of change in the affected fisheries from proposed management regulations to reduce the level of discarded bycatch. One basic assumption of these models is that bycatch is caused by excessive levels of fishing effort directed at a fish species by the fishing fleet as a result of the common property nature of that fish. These models help to demonstrate the problems inherent in dealing with common property resources.

Figures R-11 to R-14 feature the static equilibrium relationships defining solutions to the model that incorporate the bycatch problem. The stylized fisheries model involves two species, X and Y. Both X and Y have directed fisheries, and Y is also a bycatch in the X fishery. Fishery Y has both commercial and recreational user groups. We may consider fishery X as the shrimp fishery and fishery Y as the red snapper fishery.

For the multispecies fishery in Figure R-11, an equilibrium harvest (H) and bycatch (H_y) occur in quadrant I corresponding to ex-vessel price (P) for species (X) and the effort level (E) in quadrant IV. Since bycatch species (Y) is assumed to have no market value, it is discarded and does not affect the fishing effort level in the multispecies fishery (quadrant IV). However, the equilibrium stock size of the bycatch species (Y) is reduced by the level of discarded bycatch in quadrant III.

In Figure R-12, a bycatch reduction device is installed in the fishing gear of the multispecies fishery that results in a sixty percent reduction in fishing mortality for the bycatch species

[4]This section is based on a paper by Ward and Macinko (1996).

FIGURE R-11
Multispecies Fishery Before Gear Modification

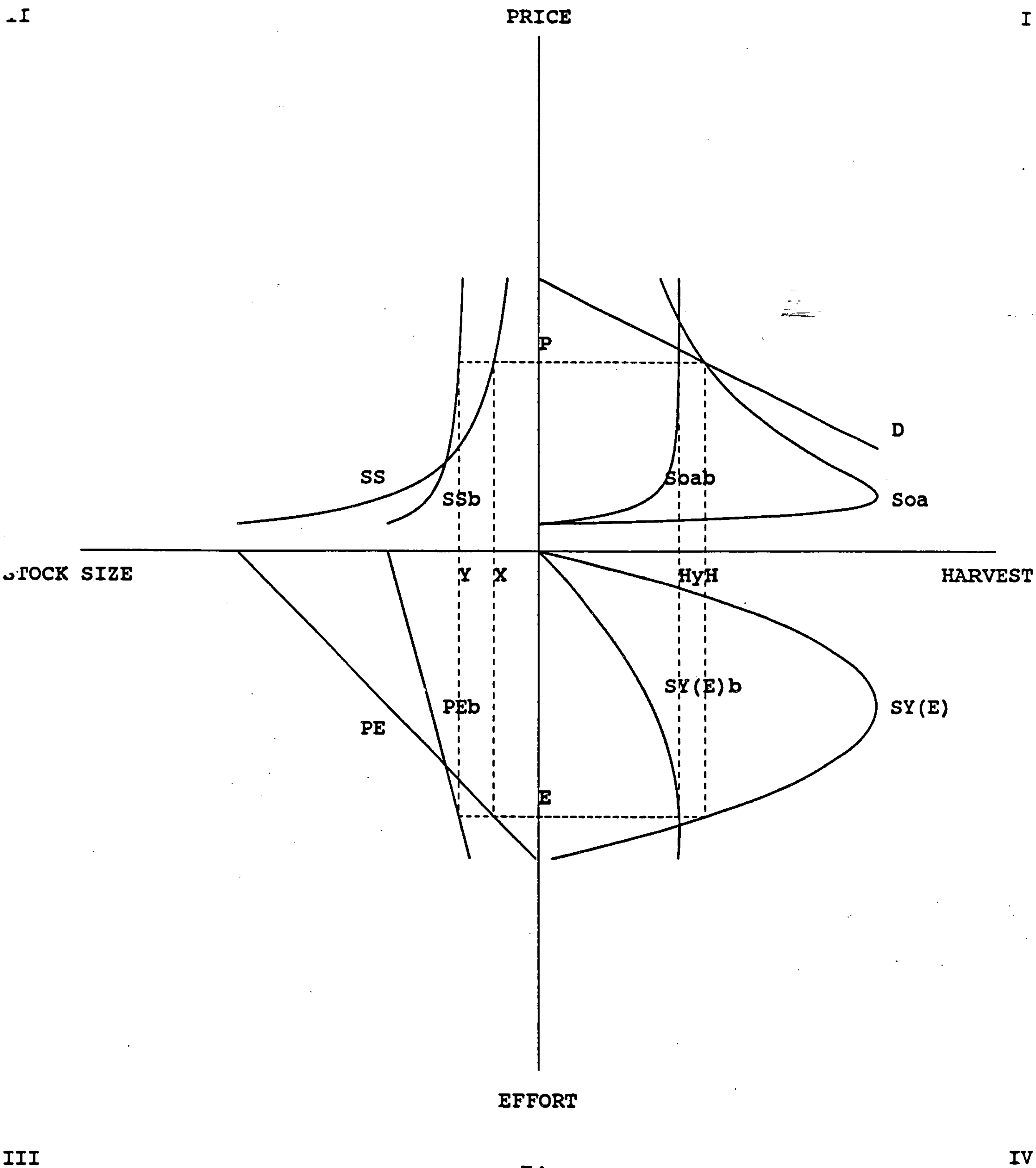
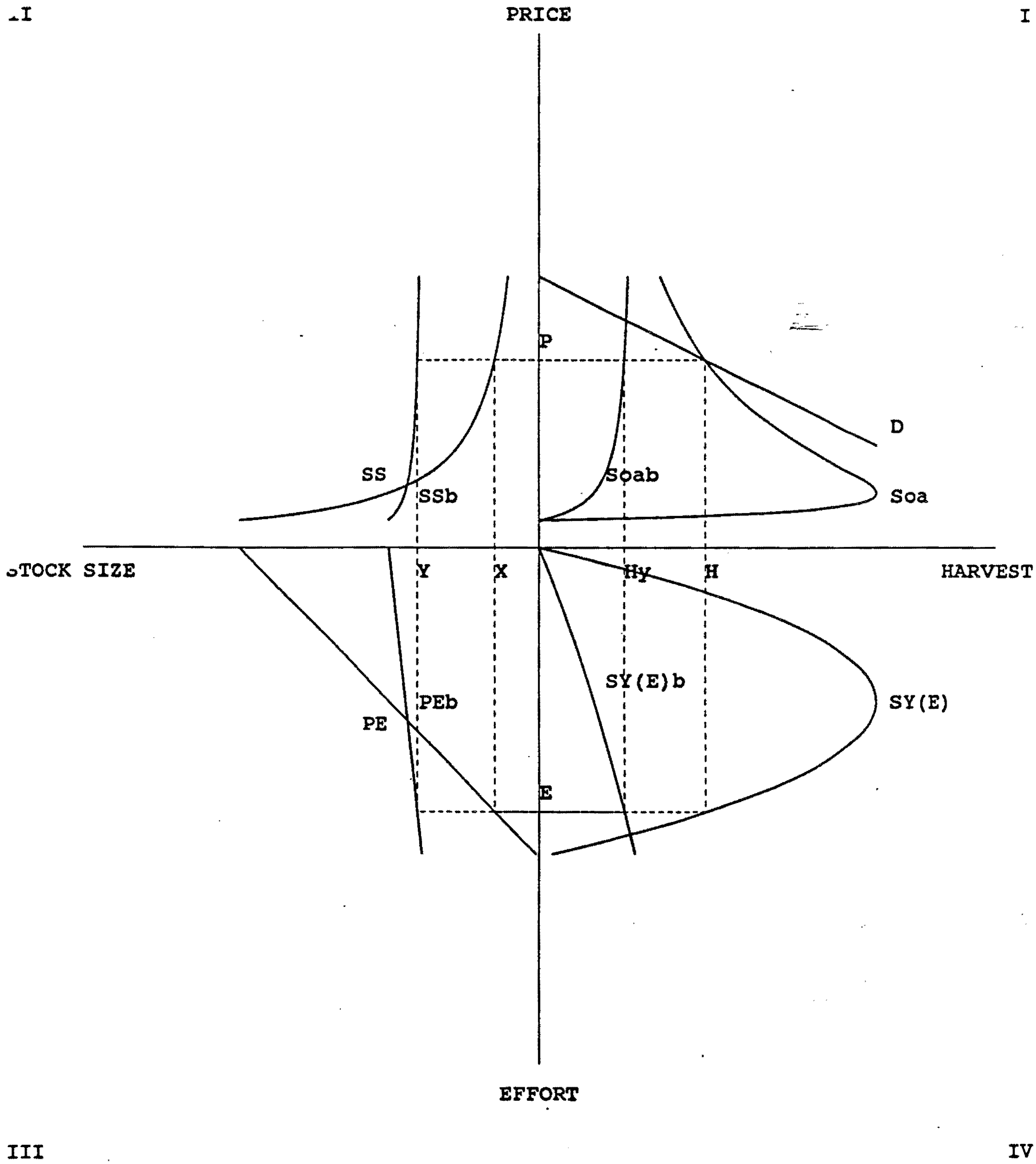


FIGURE R-12
Multispecies Fishery After
Gear Modification



without affecting the directed species fishing mortality or harvesting costs. As a result, the harvest level remains unchanged at (H), but the level of bycatch declines substantially as depicted by a comparison of (H_y) in quadrant I of Figures R-11 and R-12. The equilibrium stock size for the directed fishery species (X) remains the same as in Figure R-11, but the bycatch species stock size level (Y) increases in quadrant III relative to Figure R-11. Had harvesting costs (c_x) increased, reflecting the cost of the bycatch reduction device and its maintenance, and the fishing mortality of the fishing gear toward the directed species been reduced by the device, then the open access supply curve for the directed species (X) would have shifted upwards in quadrant I causing the counter intuitive result of an increase in equilibrium harvest of species (X) caused by the decline in the equilibrium level of fishing effort in quadrant IV and the rise in the equilibrium stock size (X) in quadrant III. The equilibrium level of bycatch would also have been further reduced because of this decline in the equilibrium effort level in quadrant IV.

In Figure R-13, prior to the adoption of the bycatch reduction device in the multispecies fishery, the equilibrium levels of harvest for the commercial bycatch species fishery is (H), the equilibrium fishing effort level is (E), and the equilibrium stock size is (Y) in quadrants, I, IV, and III, respectively. With the mandated adoption of the bycatch reduction device in the multispecies fishery, bycatch levels decline, and the recruitment level in the bycatch species fishery increases. However, the equilibrium stock size does not increase. Instead, fishing effort levels in quadrant IV increase form (E) to (E') due to the outward shift in the sustained yield curve from SY(E) to SY(E'). Harvest levels increase form (H) to (H') in quadrant I. However, the goal of stock conservation for the bycatch species (Y) is not achieved since the increased fishing effort drives the stock back to its original equilibrium level. Since harvest levels have increased only slightly with the substantial increases in fishing effort, net benefits to society are reduced.

In Figure R-14, the impact of the bycatch reduction device on the recreational fishery is hardly noticeable because the commercial fishery is allowed to harvest the increased abundance of fish before the recreational fishery has an opportunity to access the resource. Had the recreational fishery been given access to the resource first, the commercial fishery would have remained unchanged.

The dynamic equilibrium analysis extends the static bioeconomic model by relaxing the restrictive assumptions that the commercial fishery exploits the bycatch species before the recreational fishery, that no stock recruitment relationship exists, that the gear modification is costless to the fishery that generates the bycatch, and that gear efficiency in the harvesting of fish in the species (X) fishery is unaffected by the gear modification. The dynamic model also allows the impacts of proposed management regulations to be determined over time, i.e., costs and benefits can be calculated as the fisheries move from one equilibrium point to the next.

Figure R-15 shows some simulation results using the dynamic version of the model. The simulation results are based on a series of modifications to the bioeconomic model. First, the model converges on the equilibrium values for fishing effort, harvest levels, and bycatch levels in the directed fisheries for species (X) and (Y). Next, the bycatch catchability of the fishing gear used to harvest species (X) is reduced by 50 percent to correspond to the adoption of a bycatch reduction device (point A in Figure R-15). The next step is to

FIGURE R-13
Commercial Fishery
for Bycatch Species

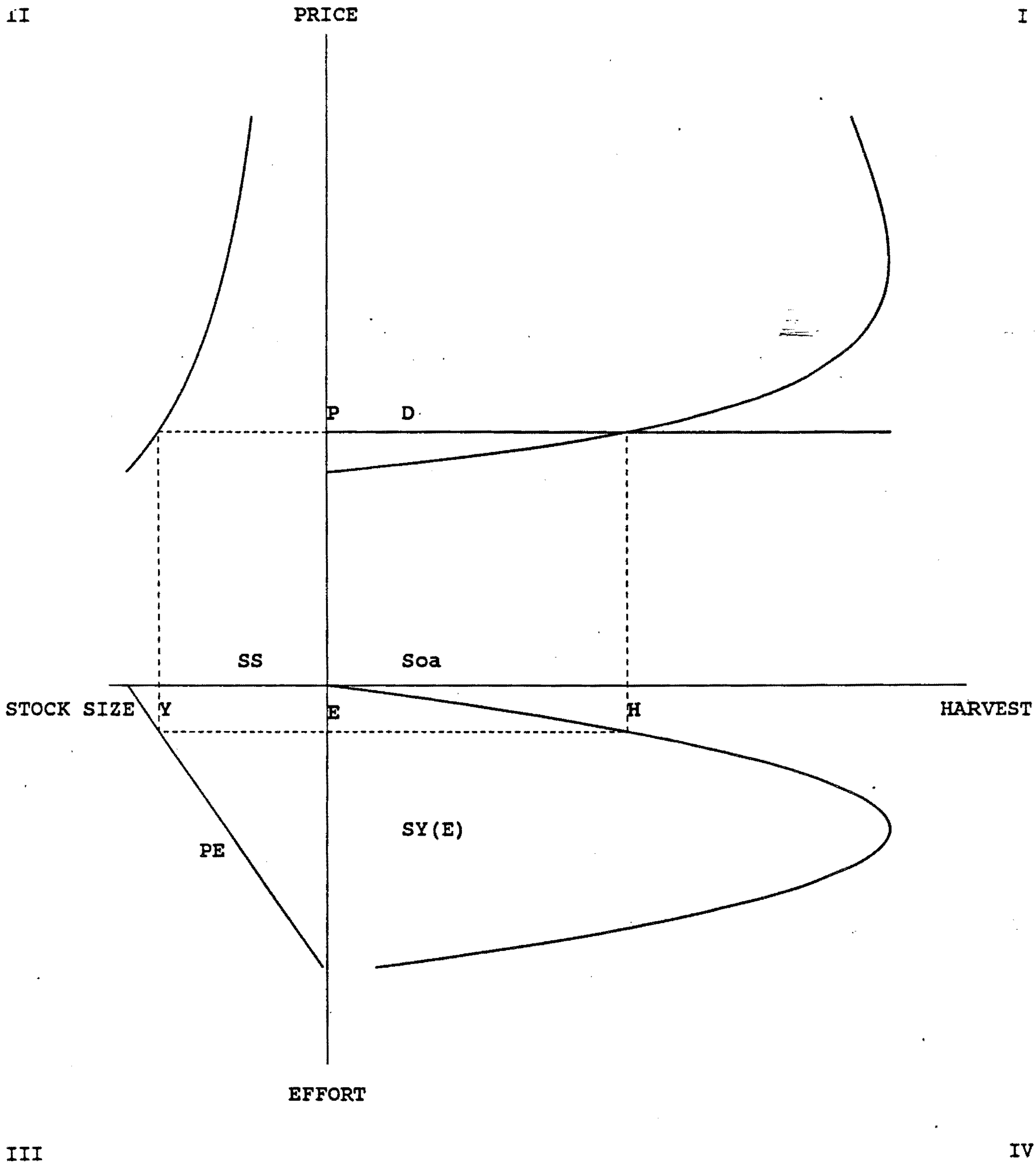


FIGURE R-14
Recreational Fishery
for Bycatch Species

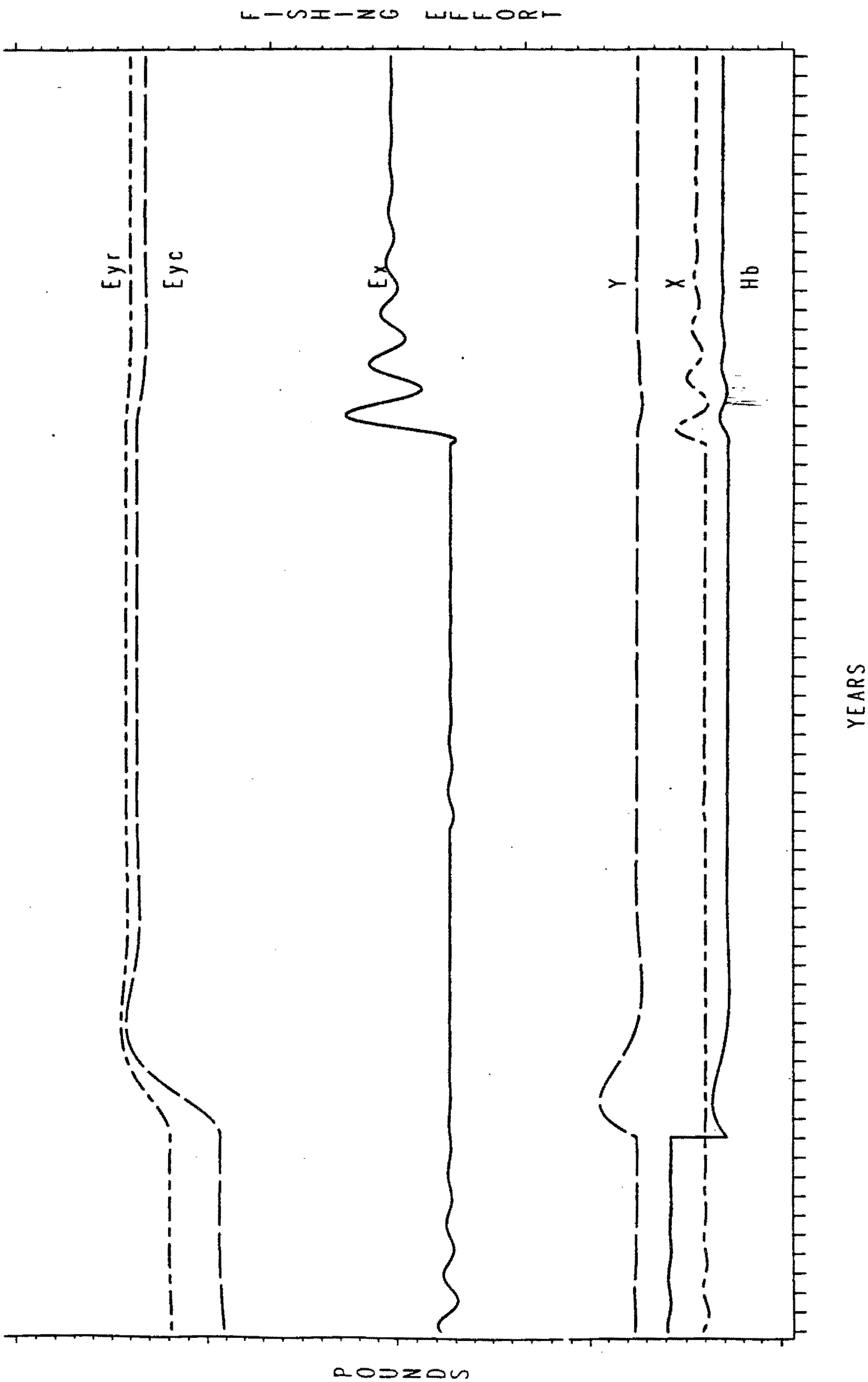
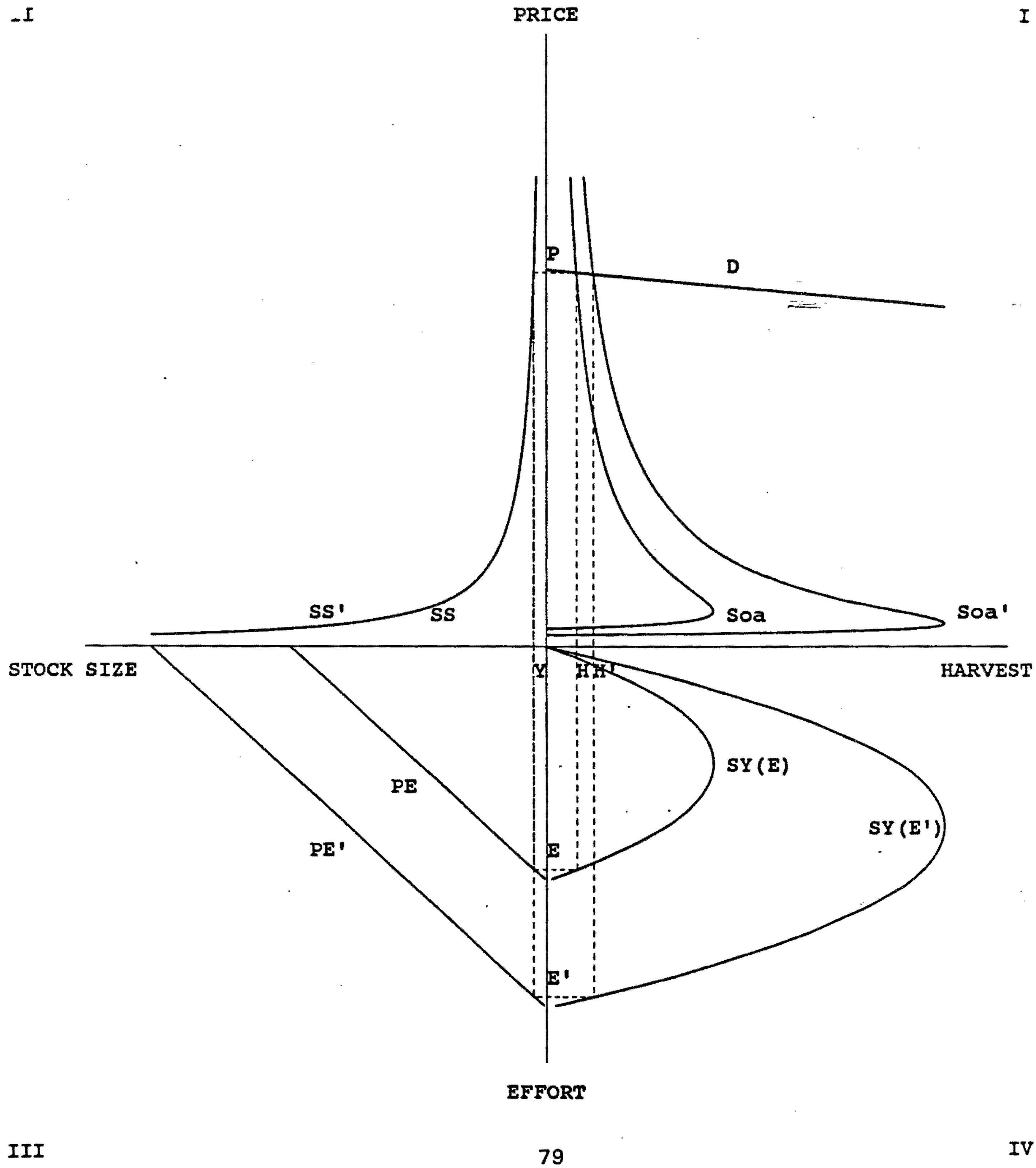


FIGURE R-15
Dynamic Bioeconomic Bycatch Model
Bycatch Reduction Device
Sequence of Impacts



incorporate a 1.6 percent increase in the operating costs of the species (X) fishery that corresponds to the expected maintenance and purchase costs of a bycatch reduction device (point B in Figure R-15). Lastly, the catchability of the fishing gear is reduced for species (X) reflecting the loss experienced during actual gear testing trials (point C in Figure R-15). Figure R-15 separates the impacts of a bycatch reduction device that increases bycatch levels from those that reduce bycatch levels over time for both fisheries and places them in perspective.

Based on the initial values given the system of equations, the initial equilibrium values for stock size (X) in the directed fishery, stock size (Y) in the bycatch species fishery, directed fishing effort (E_x), and the directed fishing effort for the commercial (E_{yc}) and recreational (E_{yr}) fisheries for the bycatch species (Y) are determined. Then, a 50 percent reduction in bycatch catchability is introduced at point A in Figure R-15. Since this reduction in the ability of the fishing gear to harvest the bycatch species (Y) in the species (X) fishery does not affect the catchability of the fishing gear for species (X) or the costs of fishing, the long run steady state equilibrium values of stock size (X) and fishing effort (E_x) levels do not change over time. However, this 50 percent reduction in gear catchability for the bycatch species (Y) does impact the recreational and commercial fishery for species (Y).

In the early stages of this adjustment, the bioeconomic model indicates an increase in stock size for the bycatch species (Y). This increase in stock abundance induces an increase in recreational (E_{yr}) and commercial (E_{yc}) fishing effort levels. This increase in fishing effort results in a decline in stock size below its initial equilibrium value before recovering to its original, long run, stable equilibrium.

Although stock sizes for the bycatch species (Y) did not improve, equilibrium bycatch levels (H_b) in the fishery for species (X) did decline by half. In the first time step after point A, a substantial drop in the bycatch level occurs. Then, as stock size (Y) increased as a result of adopting the bycatch reduction device, bycatch levels rose. As recreational (E_{yr}) and commercial (E_{yc}) effort levels increased, stock size (Y) declined, and bycatch levels also decreased.

Increasing harvesting costs by 1.6 percent to reflect the costs of adopting a bycatch reduction device (point B in Figure R-15) reduces fishing effort (E_x) slightly after minor fluctuations over time. As a result, equilibrium stock size of species (X) increases slightly. The reduction in fishing effort (E_x) also results in a slight decline in the equilibrium level of bycatch (H_b). This reduction in bycatch does not lead to an increase in the equilibrium stock size for species (Y). Instead, the equilibrium fishing effort levels (E_{yc} and E_{yr}) and the harvest levels (H_{yc} and H_{yr}) increase slightly. However, these effects are not noticeable in Figure R-15.

Finally, the catchability (q_x) of the fishing gear in the directed fishery for species (X) is reduced to reflect the loss experienced during actual gear testing trials (point C in Figure R-15). As with the increase in harvesting costs caused by the adoption of the bycatch reduction device, this reduction in revenue also impacts both fisheries. Stock size for species (X) fluctuates before converging on a steady state value that is higher than the initial equilibrium value. Surprisingly, however, equilibrium effort levels (E_x) also increase. This increase in equilibrium effort causes bycatch (H_b) levels to increase by a corresponding amount. While the increase in bycatch reduces equilibrium levels of recreational and commercial fishing effort (E_{yc} and E_{yr}) in the species (Y) fishery slightly, the equilibrium stock size of species (Y) remains unchanged.

Using a bioeconomic model of a stylized fishery reveals the complexity of the bycatch problem. Some conclusions of the bioeconomic model analyses are as follows. First, imposing a bycatch reduction device on the fishery for species (X) does not necessarily lead to an increase in stock size for the bycatch species. Second, the more inefficient the gear modification, the more bycatch is landed as effort levels (E_x) increase in the species (X) fishery. Third, increases in the cost of harvesting species (X) caused by the adoption of a bycatch reduction device result in reduced effort and bycatch levels. Finally, none of these qualitative estimates of bycatch, harvest, or effort levels can be interpreted as a prediction of actual changes in a fishery that discards bycatch. They are meant to show the direction of change predicted by bioeconomic theory employing a stylistic fishery to examine the bycatch problem.

Vessel Entry-Exit Behavior in the Gulf of Mexico Shrimp Fishery[5]

Ward and Sutinen (1994) developed a discrete choice model to predict the probability that a vessel will enter, exit, or remain in the Gulf of Mexico shrimp fishery. The model assumes that an individual firm uses myopic profit maximization as its entry-exit criterion; the heterogeneous fleet that operates in this highly competitive industry faces a competitive processing industry; an externality exists that is caused by vessel crowding; and the Gulf of Mexico shrimp fishery is characterized by highly variable recruitment with no stock-recruitment relationship. Variability in the fishery is incorporated into the model by allowing a generalist fleet to develop in response to market or biological variability. A generalist vessel is distinguished from a specialist vessel in that the former uses gear types other than shrimp gear. A specialist vessel uses the shrimp otter trawl, exclusively.

The model constructed and estimated is a probabilistic model that measures the probability of entry into the Gulf shrimp fishery from outside the southeastern region or the construction of a new vessel; the probability of entry into the Gulf shrimp fishery from an alternative fishery within the southeastern region; the probability of remaining in the Gulf shrimp fishery; and the probability of exit from the Gulf shrimp fishery for another fishery within the southeastern region. The probability of exit from the Gulf shrimp fishery for another region or the retirement of a vessel is derived as a complement to the four choices regarding entry and exit. Entry-exit choices are affected by shrimp price, fishing cost, shrimp fleet size, vessel length, vessel tonnage, shrimp abundance, whether vessels are recently bought or sold, and vessel mobility.

The data set used to estimate the model parameters is collected by the National Marine Fisheries Service and maintained in the Gulf of Mexico shrimp landings file and the vessel operating units file for the southeast region by U.S. Coast Guard vessel documentation number. The data set that results from merging the shrimp landings and vessel operating units files is too large to use in the estimation of the multinomial logit model parameters since between 2,000 and 7,000 vessels participate in the fishery in any given year. A random sample of approximately 300 vessels is taken for each year that data are available. The resulting data set for the years 1965 to 1975 and 1981 to 1983 contain approximately

[5]This section is based on a paper by Ward and Sutinen (1994).

2,650 observations. This random sample represents approximately 8 percent of the vessels in the data set and provides sufficient degrees of freedom for the estimation of the model parameters.

Although cost and return surveys have been conducted for the southeastern region shrimp fishery and budget simulators exist for the Texas shrimp fleet, cost information for the Gulf of Mexico shrimp fishery is not routinely collected by federal, state, or local government agencies. Without this theoretically important harvesting cost information, the estimated coefficients and the probabilities of entry, remaining in, or exit from the shrimp fishery in the multinomial logit model would be biased. To reduce this bias, the harvest cost per pound is calculated for each vessel from an indirect cost function estimated by Ward (1991). The indirect cost model uses cost and returns data collected by the NMFS and conforms with the requirements of duality theory. This indirect cost modeling, using updated cost/revenue information, is discussed in the next section.

Several major results from this modeling include: (1) vessels are more willing to enter the fishery when profits increase than to exit the fishery when profits decline; (2) the probability of entering (exiting) the fishery is mitigated (enhanced) by the size of the fishing fleet, although the influence of fleet size on the probability of entry into the shrimp fishery declined after 1967; (3) the probability of entry into the fishing fleet declines with increases in vessel length and increases with gross tonnage; (4) capital flows rapidly into and out of the shrimp fishery in response to changes in abundance; (5) the probability of entry is greater for vessels that have not been recently purchased, and exit is greater for recently purchased vessels; and (6) vessel mobility has no effect on a vessel's probability to enter into or exit from the shrimp fishery, indicating that during the time period of the analysis Gulf of Mexico shrimp fishermen did not act as if variability causes them to diversify their fishing operations into other fisheries or on to other fishing grounds.

Indirect Cost Function[6]

Cost and revenue information is necessary to determine both the direction and magnitude of change in net benefits for fisheries that are subject to fishery management regulations. Without this critical information, the change in fishing effort induced by the adoption of a proposed fishery management regulation cannot be determined. As a result, costs and benefits of a proposed regulation cannot be estimated. Even if regulations are adopted prior to developing net benefit estimates, the lack of accurate cost and revenue information prevents the assessment of the regulation's impacts. In highly variable fisheries, such as shrimp, this phenomenon is especially true. The impacts of regulations designed to improve the financial viability of the fleet or reduce pressures on the stocks cannot be separated from naturally occurring variations in stock abundance or from financial conditions that are beyond the control of individual fishermen.

Unfortunately, the routine collection of cost and revenue data is not conducted for fisheries in the southeastern region. Specialized data collection efforts are undertaken on an individual fishery basis at different points in time. Not only are data collected for different fisheries incompatible, but data collected for a given fishery are often not comparable because no common denominator exists between the surveys. Usually, mean estimates

[6]This section is based on a paper by Ward et al. (1995).

are provided to summarize data collected in different studies, and the original data are not available for future analyses.

Ward et al. (1995) conducted a study designed to address the compatibility problem of cost and revenue survey results. Newly collected cost and revenue data for shrimp vessels were combined with data from earlier studies. This report presents the cost and revenue data collected under contract (Resource Economics Consultants, 1994) and compares the financial performance of different aspects of the fleet based on vessel characteristics, e.g., hull construction material, vessel length, and reported home state over time. Several descriptive statistics to characterize the Gulf shrimp fishery are presented in this study; however, great care should be taken in applying these descriptive statistics to the actual financial viability of the Gulf of Mexico and Texas shrimp fisheries. The data set collected is based on individual data collection efforts that, while perfectly suited to analyzing a particular problem, may not reflect a random sample of the entire Gulf of Mexico shrimp fishery when analyzed collectively. For example, Ward and Nance (1994) reported net revenue trends from 1966 to 1990 for the shrimp fishery based on total revenue reported by the fishing fleet and operating costs estimated by an indirect cost model. The annual trend in mean net revenue in that report declined over time, but remained positive. However, this trend in net revenue is an average for vessels operating in the Gulf of Mexico. The indirect cost model should be modified to estimate the net revenue trend for the vessels operating out of Texas ports after incorporating the reported increases in insurance and maintenance costs and before making comparisons.

To account for these shortcomings, a simultaneous, 3-equation model of vessel operating costs is estimated by three stage least squares using 1,477 vessel observations for the Gulf of Mexico shrimp fishery. The three equations are: (1) total cost as a function of pounds landed, vessel length, fuel price, vessel age, abundance, and crew shares; (2) shrimp landing as a function of shrimp price, fishing cost, abundance, crew shares, days at sea, and vessel age; and (3) crew shares as a function of shrimp price, fuel price, supplies per day at sea, hull construction material (aluminum), and home state. The resulting model explains 74 percent of the variation in the observed data.

Results of this study indicate that total costs of operating the vessel increases as vessel length increases. On the other hand, qualitative variables representing home state and hull construction type are statistically insignificant in the total cost and the pounds landed equations. The qualitative variable for aluminum-hull construction type and home state of Alabama are statistically significant in the crew shares equation. The null hypotheses that home port and hull construction type do not directly affect total operating costs cannot be rejected.

Total costs increase with pounds landed, fuel price, and crew share; however, it declines with the age of the vessel and with the abundance of shrimp. As shrimp abundance increases, catch per unit effort should increase, cost per pound landed should decline, and total cost should decrease. The total operating cost equation behaves as theory would predict.

The pounds landed equation indicates that shrimp landings are positively related to shrimp price, crew share, and days at sea. Landings are negatively related to cost per pound landed, abundance of shrimp, and age. The shrimp price variable is statistically insignificant, but it is retained in equation because of its theoretical importance.

While pounds landed was expected to be positively related to abundance, a negative relationship resulted. This observation may be due to a work-leisure trade off with fishermen working less as catch per unit effort increases, or a vessel crowding externality may exist in the fishery.

Crew share is expected to be positively related to shrimp price and pounds landed, and negatively related to fuel price; however, the pounds landed variable is statistically insignificant and has been dropped from the crew share equation. Fuel price is expected to have a negative relationship with crew share since fuel costs are often deducted from total revenue before the crew share is calculated. Similarly, the supplies per day at sea variable is expected to have a negative sign. The positive sign on this variable with high statistical significance implies that supplies are not deducted from total revenue when crew shares are calculated. Vessels with aluminum hulls have lower crew shares and vessels with a home state of Alabama have higher crew shares. This equation is the only one in which any of the qualitative variables have statistical significance, suggesting that vessels of similar operational scale from any home state have similar operating costs. The perceived differences are actually due to variations in the physical characteristics of the vessels operating out of those states.

The statistical analysis indicates that theoretically valid estimates of total operating costs can be estimated using the combined data sets. While additional data analysis may be required, the results indicate that total cost estimates are available for use in developing models that explain changes in fishing effort caused by various proposed management regulations. Net benefits of proposed fishery management regulations can now be developed for the Gulf of Mexico shrimp fishery.

<u>Exvessel Price Analysis</u>[7]

Keithly et al. (1991) developed and estimated a model examining the U.S. and Japanese shrimp import markets in a simultaneous equations framework. The model consists of five structural equations and four identities. Two of the structural equations define import demand relationships for the United States and Japan. Two other equations define export supplies to the United states and Japan. The final equation defines demand for U.S. warm-water shrimp.

The U.S. import demand for shrimp is given as a function of the U.S. deflated import price of shrimp; the U.S., southeast, warm-water shrimp catch; beginning of the year U.S. inventories of shrimp; and U.S. real disposable personal income. U.S. import demand for shrimp is negatively related to import price of shrimp, U.S. shrimp catch, and U.S. inventories of shrimp, but positively related to U.S. disposable income.

The export supply of shrimp to the United States is expressed as a function of shrimp export supply price to the United States, foreign exchange rate among principal U.S. suppliers, export price of shrimp to Japan (the primary competitor to the United states in

[7]This section is based on a paper by Keithly et al. (1991).

the world shrimp market), the world supply of shrimp minus U.S. and Japan's production, foreign income among principal U.S. shrimp suppliers, and a trend variable to capture the shift in export supply to the U.S. market resulting primarily from the rapid introduction of Chinese shrimp starting in 1987. A positive relation is expected between the export of shrimp to the U.S. and the following factors: shrimp export supply price, foreign exchange rate, world supply of shrimp, and the trend variable. A negative relationship is expected between export supply of shrimp to the U.S. and the remaining factors, namely, export price of shrimp to Japan and foreign income.

Demand for warm-water shrimp is hypothesized to be negatively related to U.S. warm-water catch, U.S. beginning of the year inventories, and U.S. imports; and positively related to U.S. real, disposable, personal income. Japan's import demand for shrimp is specified in similar fashion as that for the U.S.; however, variables pertaining to the U.S. are replaced with those pertaining to Japan. The same is true for the specification of the export supply equation to Japan.

To complete the model, identities are added specifying market equilibrium in the U.S. import market and in the Japanese import market. The model consists of four, jointly determined structural equations and a warm-water dockside demand equation. The parameters were estimated using three stage least squares. Annual observations for the 1965-89 period were used for the analysis.

In general, the equations appear to have good structural fits as indicated by relatively high R^2s and the significance of most parameter estimates. They also appear to be theoretically sound as judged by the respective signs of the estimated parameters.

Due to the double logarithmic specification of the model, the estimated parameters can be readily read off as elasticities or flexibilities. Elasticity or flexibility of one variable with respect to another measures the responsivenes of that variable with respect to changes in the other variable. In general elasticities and flexibilities are reciprocals of each other. When the function is specified in such a way that the dependent variable is quantity and the independent variable is price, the term 'elasticity' is used; on the other hand, if the dependent variable is price and the independent variable is quantity, the term 'flexibility' is used instead.

Real price elasticity and income elasticity of U.S. shrimp import demand equaled -0.78 and 2.28, respectively, suggesting that U.S. import demand for shrimp is relatively inelastic with respect to its own real price and highly elastic with respect to real disposable income. That is, for example, a 10 percent increase in real price would result in a 7.8 percent reduction in imports, and a 10 percent increase in income would result in a 22.8 percent increase in imports. Beginning of the year inventories were found to have a somewhat larger impact on U.S. import demand than domestic warm water catch, the coefficients equaling -1.19 and -0.748, respectively. This means, for example, that a 10 percent increase in inventories would result in an 11.9 percent reduction in imports while a 10 percent increase in domestic warm water catch would result in a mere 7.48 percent reduction in imports.

The elasticity of export supply with respect to U.S. shrimp export price equaled 0.790 while the elasticity of export supply with respect to export of shrimp to Japan was 0.548.

The response of export supply to the U.S. with respect to world landings was elastic (elasticity coefficient = 1.59).

The U.S. warm-water shrimp catch and imports were found to have similar impacts on dockside price which was expected given their high degree of substitutability. Beginning of the year inventories, however, were found not to significantly impact price. A 10 million pound increase in warm-water production was estimated to result in a $0.093 decline in the real, warm-water dockside price of shrimp; while an identical increase in imports led to a $0.084 decline, all other things remaining constant. Because of a higher average level of imports, however, the real dockside price flexibility with respect to imports was -1.17 compared to -0.632 for warm water landings. That is, for example, a 10 percent increase in imports would result in an 11.7 percent reduction in dockside price; a 10 percent increase in warm water landings would result in a 6.32 percent reduction in dockside price. Real disposable income also significantly impacted dockside price.

Estimated parameters in Japan's import demand equation, with the exception of beginning of the year inventories, exhibited the anticipated signs and were significant. The elasticity of Japan import demand with respect to the real import price was -0.663; while the elasticity with respect to real income was 1.403. This estimated real price elasticity was lower than that found for the U.S. (-0.782); while Japan's real income elasticity (1.403) was also lower than that found for the United states (2.28).

The R^2 for the export supply of shrimp to Japan was adequate. Some of the parameter estimates, however, were either insignificant or exhibited unanticipated signs.

The parameter estimate for world supply exhibited the anticipated sign and was significant. The structural equation estimate, which equaled 0.165, was only about 60 percent of that estimated in the export supply equation to the U.S. (0.27). This observation appears reasonable in light of Japan's historical dependence on Asian produced shrimp.

Integrated Approach to Analyze Impacts of Bycatch Reduction Devices (BRDs)

The analysis of the four BRDs is done by using a model that integrates the dynamic shrimp model, the vessel entry-exit model, the indirect cost function, and the ex-vessel price analysis. The integrated model calculates producer and consumer surplus over a number of years, and the annual outputs are discounted and summed to provide an overall measure of how the shrimp industry would perform if all vessels used the same BRD. Hence, the outputs should be used as a relative indicator of the economic performance of the individual BRDs.

The dynamic model of the shrimp fishery consists of a set of algorithms that represent demand for shrimp, total operating costs, production, crew share, days at sea, and the probability that a fishing vessel will enter or exit the fishery. Based on these endogenous variables, consumer and producer surplus, catch (on per vessel and fleet basis), finfish bycatch levels, total cost, total revenue, and fleet size can be estimated interactively over time. Once the model achieves a long-run equilibrium fleet size, changes to the fishery can be imposed to determine the impact on the fishery from proposed fishery management regulations to reduce bycatch and to achieve optimum yield.

Initially, a set of default values is used to initiate the dynamic shrimp fishery model. These values are derived from the data used to estimate the relationships being studied in the empirical analyses summarized above. Based on these initial values, the model achieves a long run equilibrium reflecting an open access fishery. Consumer and producer surplus estimates for the open access fishery are based on this long run equilibrium state. The present value of consumer and producer surplus is calculated using a 7 percent discount rate over a time period that ends when the addition to the total surplus measure is less than 10 cents a year. Once the long run equilibrium is found for the open-access shrimp fishery, changes expected to occur under each proposed regulation are imposed on the dynamic model. The discounted present value of total surplus is calculated for each year until the model achieves a new equilibrium, and then over time until the addition to the total surplus measure is less than 10 cents a year. The change in total surplus due to the regulation is the difference between the open-access, total-surplus measure discounted over time and the total-surplus measure generated after the proposed regulation is adopted, also discounted over time.

It should be noted that the model is based on offshore shrimp vessels that historically operated on what is termed a long-term basis (defined as being in the shrimp harvesting fleet for 3 or more consecutive years. In other words, the model does not attempt to show results for shrimp boats (craft that are not documented by the USCG because of size); although it is known that some shrimp boats will undoubtedly be affected by the rules if they harvest shrimp from the EEZ during some part of the year. The quantified outputs of the model are based on the average shrimp fleet that existed from the late 1960's to the early 1990's because the model was built by using all the information available during that period. Subsequently the "baseline" shrimp fleet used by the model is not the 1996 fleet, but is probably more characteristic of the fleet that existed in the early 1980's. Nonetheless, the economic performance shown in the model is a representation of how the shrimp harvesting sector will react to change, and the results of different changes (in this case, different BRDs being employed) should clearly demonstrate the economic performance when different BRDs are used.

The economic performance of all the BRDs are ranked versus the status quo of no new management rules to reduce the level of finfish bycatch. It is important to recognize that the changes relative to the status quo are the results that are of major importance. Some comparison is also made between the various BRD types and what is termed "Optimal Yield" management. Optimal yield management is modeled by allowing the management authority or a business operation to capture the rent generated by the shrimp resource. One possible way for a management authority to capture the rent is by collecting fees based on the value of ITQs on shrimp. Viewed this way, optimal yield management may be considered to approximate roughly the situation wherein the shrimp fishery is managed under an ITQ program or some controlled access program. In the case of a business operation capturing the rent from the fishery, the management strategy presumes economic performance that would happen if one person owned all the shrimp harvesting capacity and could run the fleet in an optimum manner.

Undoubtedly, this model is less than ideal for analyzing the proposed management measures to reduce finfish bycatch in the Gulf of Mexico shrimp fishery. As the conceptual model implies, the reduction in finfish bycatch in the shrimp fishery will have consequences for the commercial and recreational finfish fishermen who exploit these stocks. However, the quantitative relationships necessary to quantify these effects on finfish fishermen are not available for the purpose of integrating them into the dynamic model. Commercial and recreational finfish fishery models need to be developed to quantify these impacts.

Approach to Analyze Closures

The integrated approach will be used mainly to analyze the effects of bycatch reduction devices. The current plan amendment also includes options on seasonally closing the shrimp fishery. Area closures are also a possibility, although the amendment document does not currently specify any options to this effect. Certain closure scenarios have already been studied by Hendrickson and Griffin (1993), and results from this study are used to address the impacts of closure alternatives.

Incidentally, Hendrickson and Griffin (1993) also analyzed the effects of using BRDs. Understandably, such analysis was conducted before tests on specific BRDs discussed in the current amendment were completed. In modeling various scenarios using BRDs, their study merely assumed that BRDs would effect a 5 or 10 percent reduction in shrimp catch.

Hendrickson and Griffin (1993) employed the general bioeconomic fishery simulation model (GBFSM) developed by Grant and Griffin (1979). The model has undergone several revisions and has been employed to assess the impacts of certain management scenarios affecting annual-crop fisheries.

The GBFSM consists of two main parts: the biological submodel and the economic submodel. The biological submodel simulates recruitment, growth, movement, and mortality of shrimp. The economic submodel calculates costs, revenues, and rent for each vessel class in each geographical area based upon the biological effects of the management policy implemented. When a management policy is imposed on the model, the biological submodel calculates the changes in days fished, number of vessels, and shrimp landings; the economic submodel then figures the monetary impact on shrimpers.

The model uses 5 depth zones, 4 geographical areas, and 3 vessel classes. Included in the model are the 3 major species of shrimp, namely, brown, white, and pink shrimp and 3 finfish species (red snapper, king mackerel, and Atlantic croaker). In this model, vessels are allowed to enter and exit the fishery at the end of each year based on an asset fixity model, and increase or decrease their number of days fished within a year based on how policy changes affected gross economic rent. Variable costs for each vessel class is based on a cost and revenue study by Ward (1988). Fixed cost, which includes opportunity cost, is calculated so that rent to vessel owners would be zero before TED regulation was implemented, because effort data used in the model were obtained before the use of TEDs.

Baseline conditions are established by running the model with TEDs. Various results from changing management through the imposition of BRDs or closures are compared against this baseline scenario. All simulations are run for 10 years; and within each year, days fished are allowed to increase (or decrease) up to 20 percent if gross rent (revenue above variable costs) for a given combination of vessel class, geographical area, depth, and shrimp species is greater (or lower) in the current time than that in previous time. The closure scenarios include a Gulfwide offshore fishery closure on May 1-July 15, May 1-July 31, January 1-March 31, January 1-April 30, and December 16-April 30. Simulations using

BRDs assume either a 5 or 10 percent reduction in shrimp catch and various reduction rates on finfish. On a Gulfwide basis, all model runs simulating the use of BRDs or closures result in losses of rents to the shrimp fishery.

Approach to Analyze BRD Exemption of Certain Areas

Some of the alternatives in the amendment would exempt certain areas from the use of BRDs. Specific areas that may be exempted are east of Cape San Blas, Florida, less than 10 fathoms in depth, and more than 100 fathoms in depth. Mainly a qualitative approach, supplemented with any available quantitative data, will be used to analyze these measures. This analysis will be done in reference to the quantitative analyses done for the BRD and seasonal closure measures in those cases where the model results may be used to determine the direction or relative magnitude of benefits or losses associated with the other types of measures.

Among the quantitative models and studies available, only the Hendrickson and Griffin (1993) study considered the effects of BRDs on several areas in the Gulf. Pertinent results from this study will be used to show the potential impacts of BRDs when some areas are exempted from the requirement. The study grouped the various statistical zones in the Gulf into 4 fishing areas. Among these 4 areas, Area 1 (comprising statistical zones 1 through 8) is the closest approximation to the scenario of east of Cape San Blas, Florida. None of the results of this study, however, can be used to analyze the effects of not requiring BRDs in waters less than 10 fathoms deep or more than 100 fathoms deep. In this case, a purely qualitative discussion of the effects will be undertaken.

ANALYSIS OF IMPACTS

Impacts on Shrimp Industry

The integrated dynamic model is set up to represent a common property fishery and is allowed to achieve a stable, long-run equilibrium (over 18 years). Once the long-run equilibrium is achieved, changes representing the proposed management regulation are imposed on the model which is then allowed to approach a new long-run equilibrium (up to 20 years). In addition, optimal management is modeled under the assumption that the management authority captures the rent generated by the shrimp fishery resource. Consumer and producer surplus estimates are calculated for each proposed management regulation and optimal yield management. The total surplus is discounted over time at a rate of 7 percent per year. The discounted net present value indicates the total worth of the resource under each management institution. The intent is to indicate if the management objective of reducing finfish bycatch levels in the shrimp fishery is achieved and at what cost or benefit to the fishery and the nation.

The open access, or status quo, strategy is the base case scenario. Once the model reaches equilibrium, the open access strategy assumes that conditions prevailing then would remain throughout the period considered. Other major assumptions include no reduction in shrimp abundance or finfish bycatch due to management changes or gear requirements such as TEDs or BRDs; however, TEDs are assumed to reduce shrimp catch by 6.75 percent per tow. This percentage is the same as that used in a study on TEDs conducted by NMFS (Ward et al. 1996). Over time, this strategy yields a total surplus of

$763.5 million. The heterogeneity of the fleet, whereby some vessels are more efficient than others, generally accounts for the existence of the surplus. In all simulations, consumer surplus accounts for a relatively small share of the total surplus.

a. Optimal Yield

This amendment does not contain an alternative management strategy designed to optimize yield. The modeled scenario of optimal yield in the fishery is mainly used in this discussion to determine whether changes in management due to the adoption of BRDs or closures would move toward or away from optimal yield management. This scenario portrays what would possibly occur if management captures rent from the fishery through some form of management such as controlled access.

Optimal yield management is modeled by allowing the management authority to capture the rent generated by the shrimp resource. Figure R-16 presents the impact on shrimp-fleet size as the result of adopting an optimal management program for the shrimp fishery.

Figure R-16. Impact on fleet size (Optimal Yield Management)

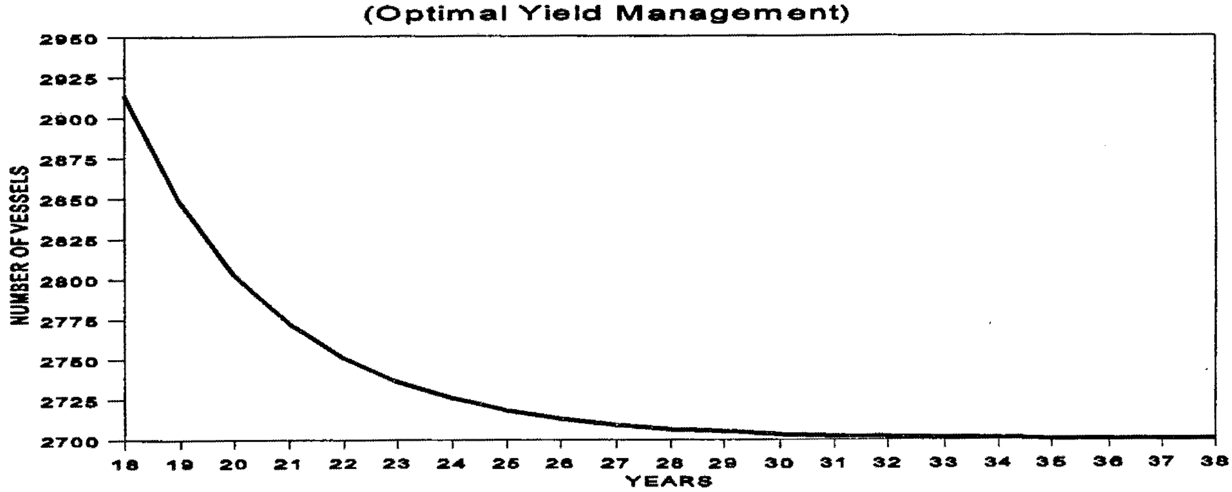
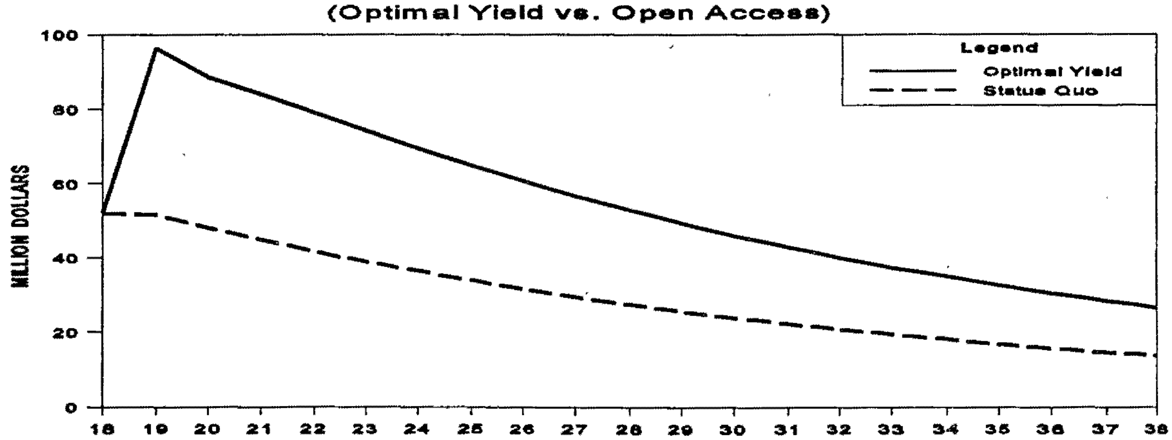


Figure R-17. Change in total surplus (Optimal Yield vs. Open Access)



Beginning in year 18 when the common property fishery has reached long-run equilibrium, optimal management causes a decline in fleet size of 214 vessels over the next 20 years. This reduction amounts to 7.3 percent of the number of vessels at the initial equilibrium level. Figure R-17 tracks the movement over time of total consumer and producer surplus under both the optimal management and open access strategies. Optimal management strategy shows consistently higher total surplus over time. Overall consumer and producer surplus increases under optimal yield management by $1.9 billion from $763.5 million under open access to $2.68 billion. The ratio of total surplus under optimal yield to total surplus under open-access management is $3.53:1. The optimal management strategy would result in a total finfish bycatch reduction of 12 percent as some vessels exit the fishery.

b. BRD Requirement: Fisheye (30 mesh)

The adoption of a fisheye 30 mesh position is modeled by increasing the cost of harvesting shrimp by $50 per installed fisheye (with an average of 4 trawls per vessel), reducing catchability of shrimp in shrimp trawls by 3 percent, and a reduction in the catchability of finfish in shrimp trawls by 31 percent with and without an ecologically induced reduction in shrimp abundance of 6 percent. Figure R-18 presents the impact on shrimp-fleet size caused by adopting this bycatch-reduction management program for the shrimp fishery.

Figure R-18. Impact on fleet size
(Adoption of Fisheye30 BRD)

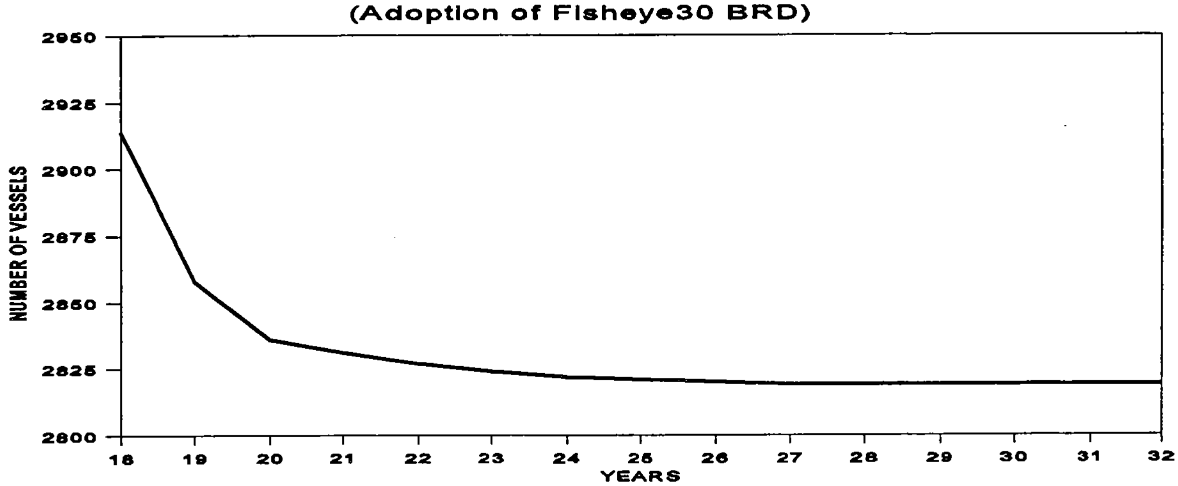
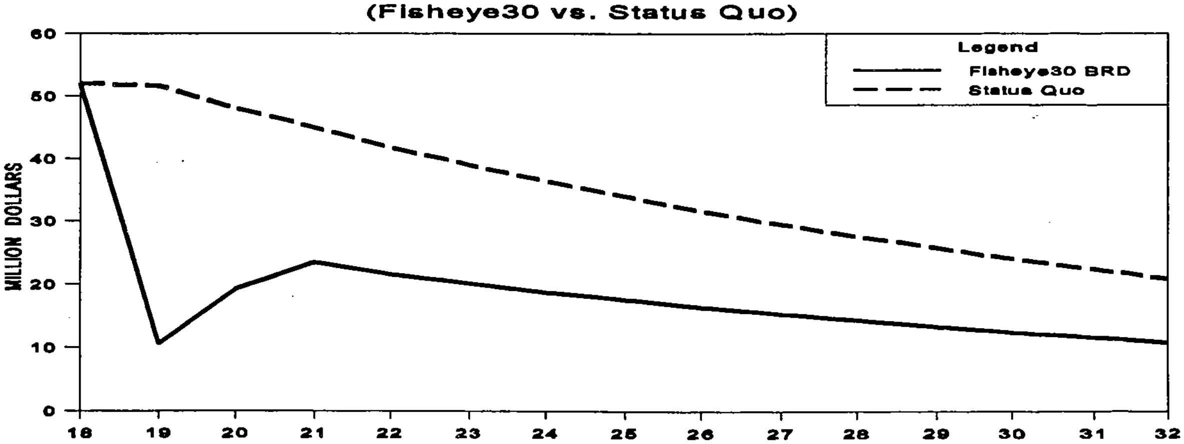
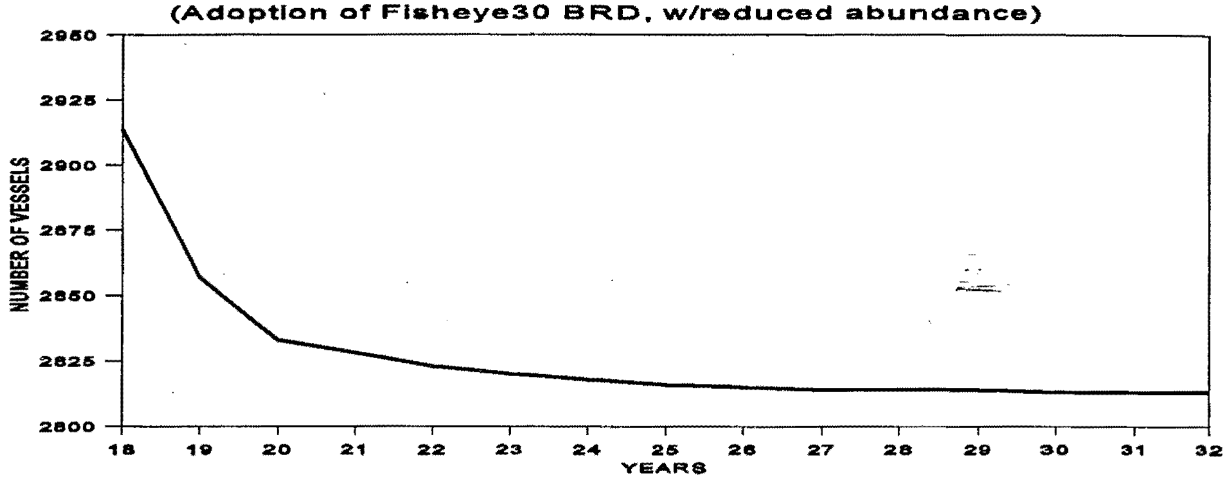


Figure R-19. Change in total surplus
(Fisheye30 vs. Status Quo)



Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption of the Fisheye 30 mesh BRD causes a decline in fleet size of 96 vessels over the next 12 years. Unlike the case of the optimal management strategy, however, the number of vessels first decreases and then increases before stabilizing at about 2,818. The corresponding movement over time of consumer and producer surplus is depicted in Figure R-19. Total surplus increases at first, and then declines before stabilizing at a higher level

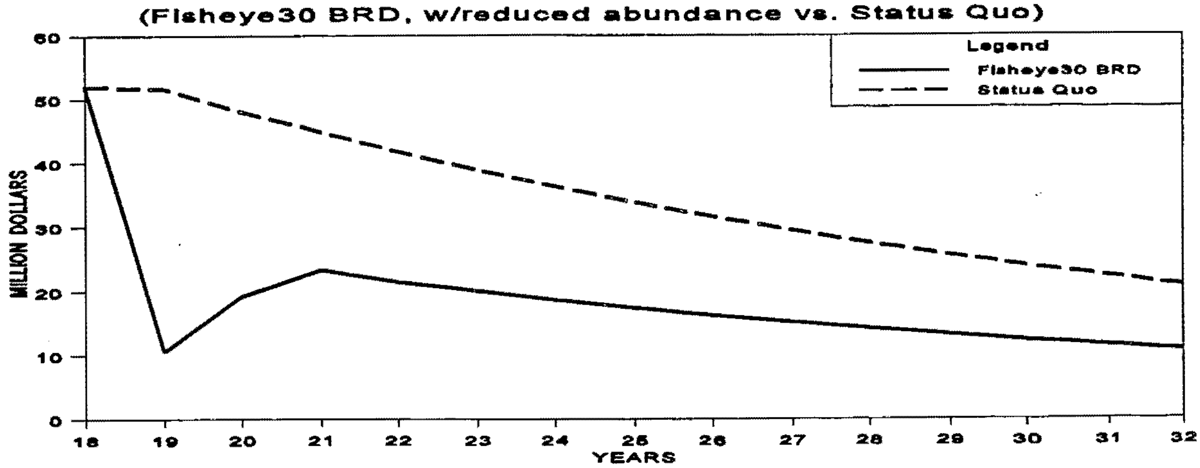
Figure R-20. Impact on fleet size
(Adoption of Fisheye30 BRD, w/reduced abundance)



than that of the status quo strategy. The overall result is an increase in total surplus under this management scenario. Total consumer and producer surplus decreases under this BRD management measure by $116.9 million from $763.5 million under open access (status quo) to $646.6 million. The ratio of total surplus under this management measure to total surplus under optimal yield is $0.24:1. Due to the decline in fleet size, finfish bycatch reduction increases from an initial level of 31 percent to 43 percent.

Figure R-20 presents the impact on shrimp-fleet size caused by adopting this bycatch-

Figure R-21. Change in total surplus
(Fisheye30 BRD, w/reduced abundance vs. Status Quo)

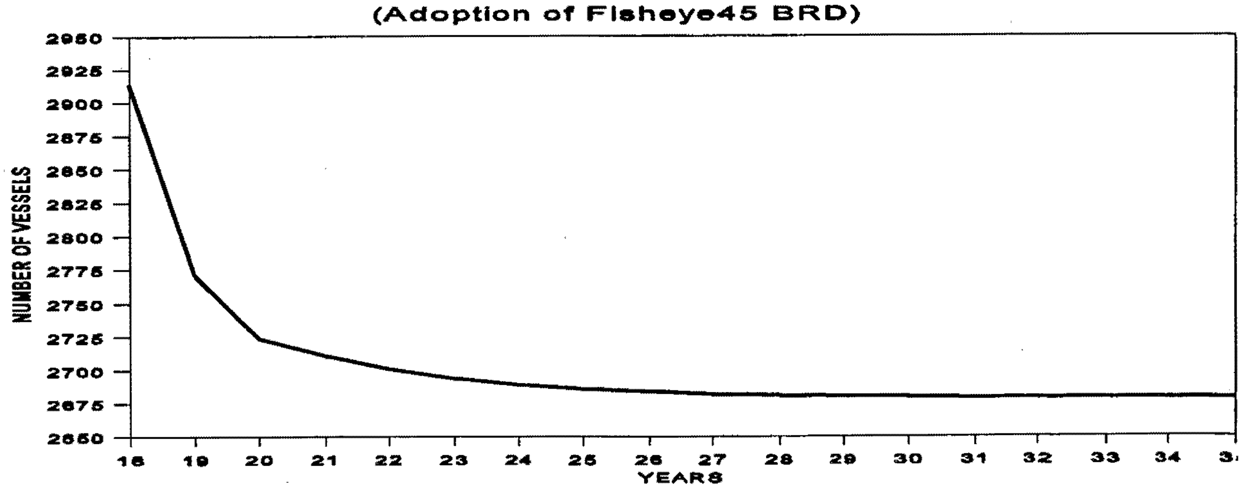


reduction management program for the shrimp fishery when the increased finfish stock size leads to a reduction in shrimp abundance of 6 percent. Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption of this bycatch reduction device causes a decline in fleet size of 101 vessels over the next 12 years, or 3.5 percent of the starting equilibrium fleet size. This decline in the number of vessels is not materially different from the previous result despite the reduction in shrimp abundance by 6 percent. Accompanying this decline in fleet size is a 43 percent decline in the level of finfish bycatch. Figure R-21 shows the corresponding level of total surplus over time. Total consumer and producer surplus again decreases under this BRD management measure by $116 million from $763.5 million under open access to $647.5 million. The ratio of total surplus under this management measure to total surplus under optimal yield is $0.24:1. The introduction into the model of a reduction in abundance has not materially altered the resulting change in consumer and producer surplus or the final reduction in finfish bycatch.

c. BRD Requirement: Fisheye (45 mesh)

The adoption of a fisheye 45 mesh position is modeled by increasing the cost of harvesting shrimp by $50 per installed fisheye (with an average of four trawls per vessel), reducing catchability of shrimp in shrimp trawls by 7 percent, and reducing the catchability of finfish in shrimp trawls by 30 percent with and without an ecologically induced reduction in shrimp abundance of 6 percent. Figure R-22 presents the impact on shrimp fleet size caused by adopting this bycatch-reduction management program for the shrimp fishery. Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption

Figure R-22. Impact on fleet size
(Adoption of Fisheye45 BRD)



of this BRD causes a decline in fleet size of 235 vessels over the next 14 years. Fleet size drops substantially in the first two years, and later stabilizes at substantially less than the initial size. The corresponding change in consumer and producer surplus is depicted in

Figure R-23. Change in total surplus
(Fisheye45 BRD vs. Status Quo)

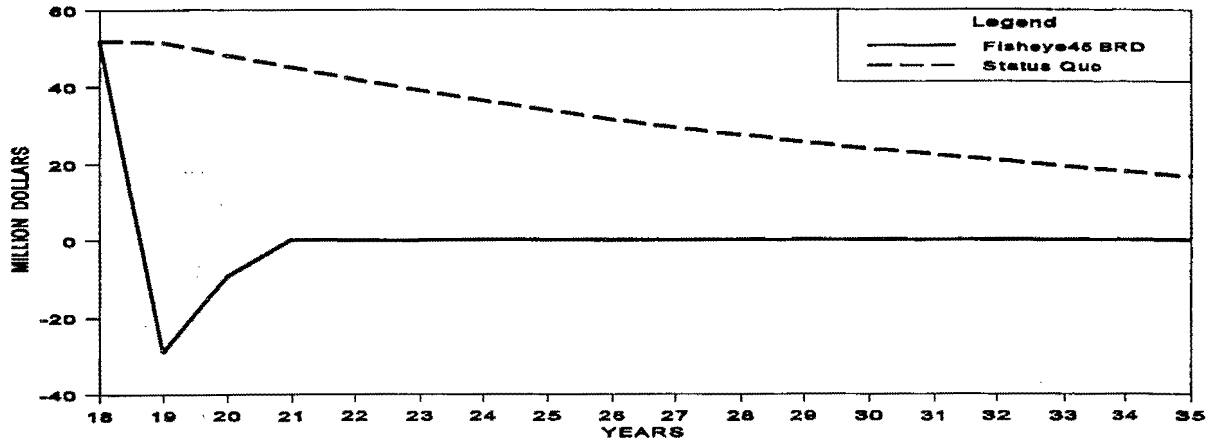
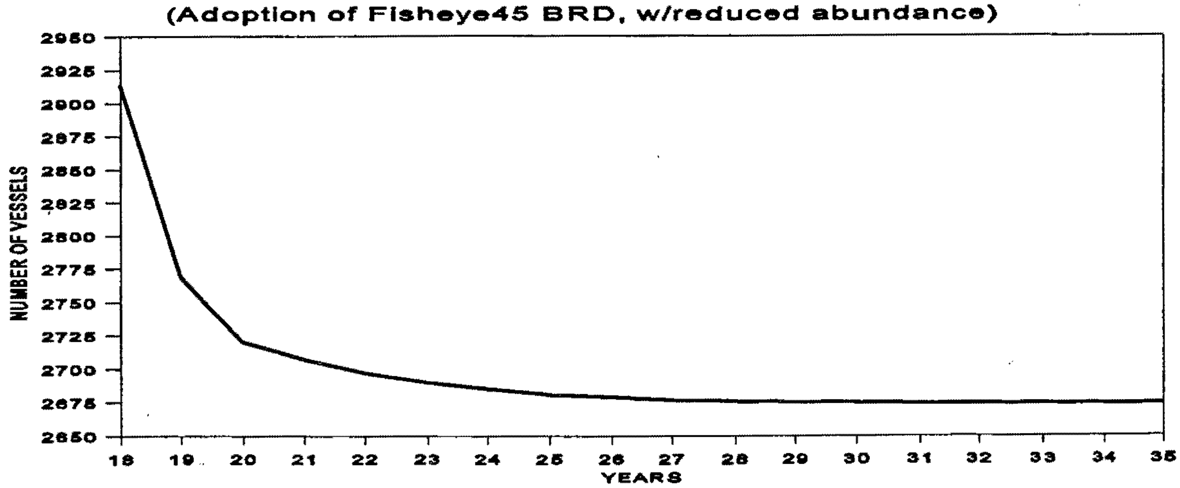


Figure R-23. The large drop in total surplus after the introduction of this type of BRD coincides with a substantial decline in fleet size. Over the entire period, total consumer and producer surplus decreases by $795.2 million from $763.5 million under open access to a negative $31.7 million. The ratio of total surplus under this management measure to total surplus under optimal-yield management is a negative $0.01:1. Due to the reduction in fleet size, bycatch reduction increases from 30 percent to 56 percent.

Figure R-24 presents the impact on shrimp fleet size caused by adopting the fisheye 45 mesh BRD for the shrimp fishery when the increased finfish stock size leads to a reduction in shrimp abundance of 6 percent. Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption of this BRD causes a decline in fleet size of

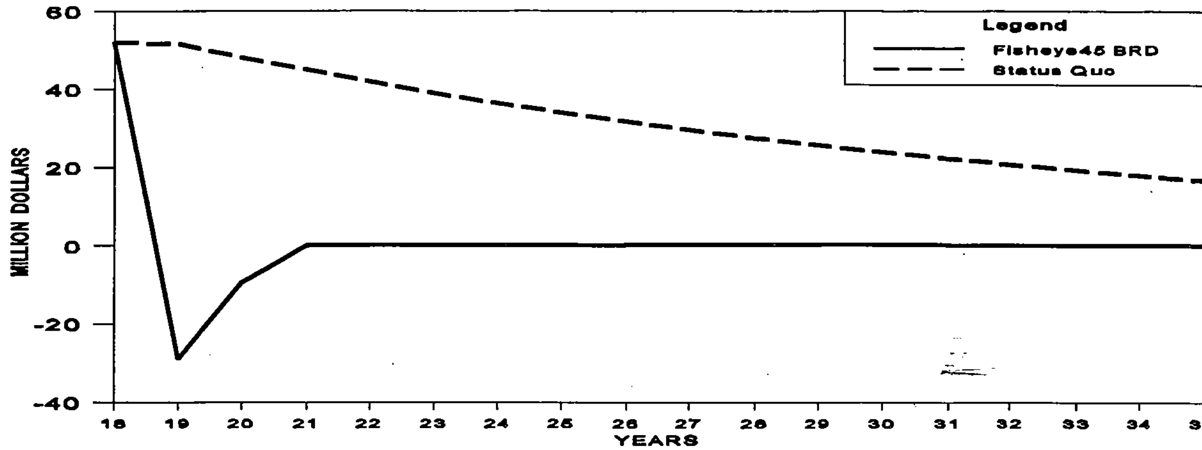
Figure R-24. Impact on fleet size
(Adoption of Fisheye45 BRD, w/reduced abundance)



240 vessels over the next 14 years. The movement over time of consumer and producer surplus is shown in Figure R-25. Total consumer and producer surplus decreases under this BRD management measure by $793.9 million from $763.5 million under open access to a negative $30.4 million. The ratio of total surplus under this management measure to total

surplus under optimal-yield management is a negative $0.01:1. It is again worth noting that the introduction of abundance reduction into the model has not significantly altered the results.

Figure R-25. Change in total surplus
(Fisheye45 BRD, w/reduced abundance vs. Status Quo)

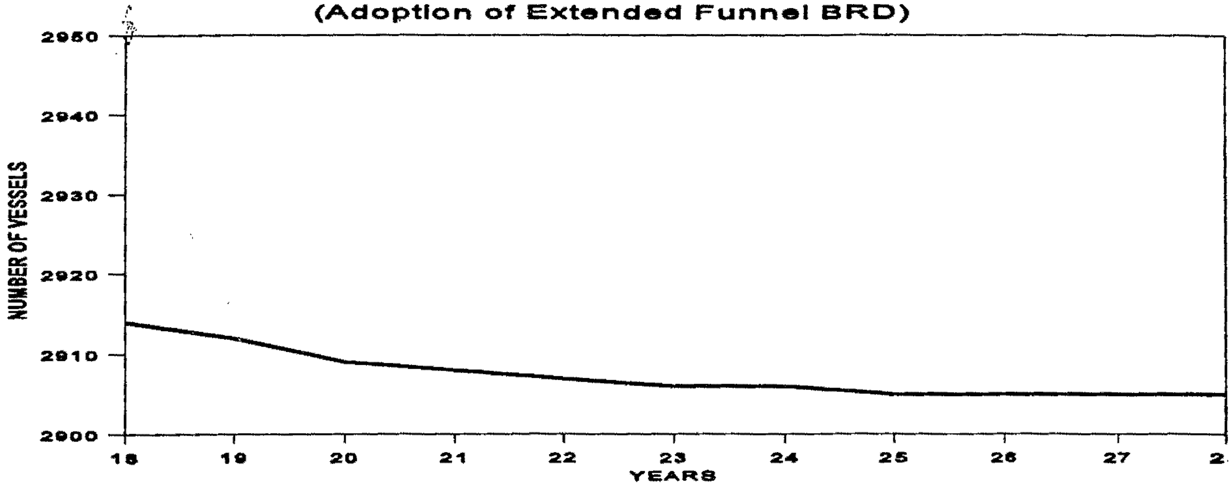


Using GBFSM, Hendrickson and Griffin (1993) determined that BRDs with a 5 percent shrimp loss would bring about a little over $9 million in rent losses to the fishery. Under the assumption of a 10 percent shrimp loss, the fishery would stand to lose over $16 million dollars in rent.

d. BRD Requirement: Extended Funnel

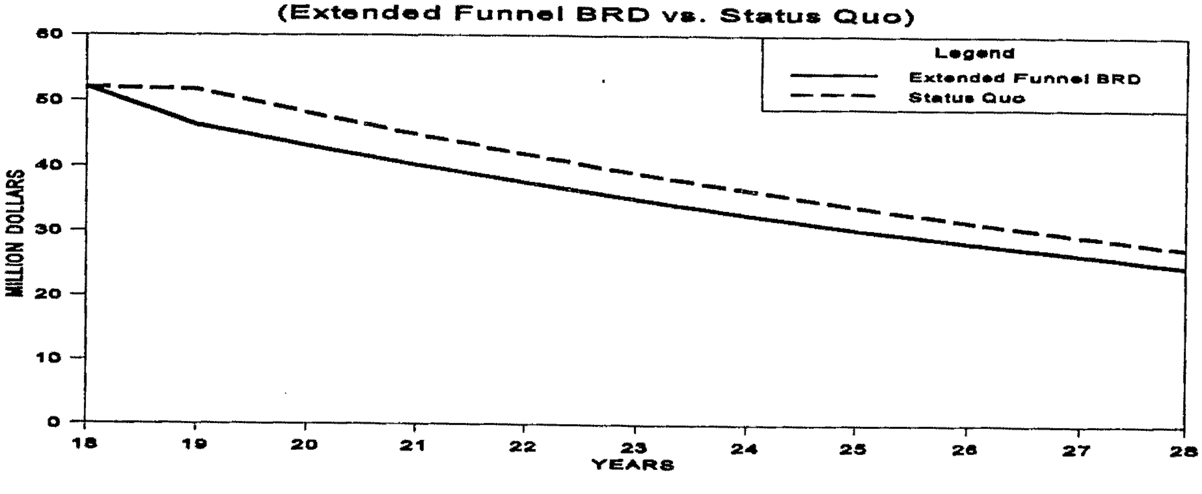
The adoption of an extended funnel BRD is modeled by increasing the cost of harvesting shrimp by $200 per installed device (with an average of four trawls per vessel), reducing catchability of shrimp in shrimp trawls by zero percent, and reducing the catchability of finfish in shrimp trawls by 34 percent with and without an ecologically induced reduction in shrimp abundance of 6 percent. Figure R-26 presents the impact on shrimp fleet size caused by adopting this BRD management program for the shrimp fishery. Beginning in

Figure R-26. Impact on fleet size
(Adoption of Extended Funnel BRD)



year 18 when the common property fishery has reached long-run equilibrium, the adoption of this BRD causes a decline in fleet size of 9 vessels over the next 9 years. This relatively small reduction in fleet size results in no change from the initial reduction in bycatch of 34 percent. Total consumer and producer surplus, shown in Figure R-27, increases under this BRD management measure by $336.5 million from $763.5 million under open access to $1.1 billion. The ratio of total surplus under this management measure to total surplus under optimal yield management is $0.41:1. Over the first 10 years, however, total surplus under this measure falls below that of the status quo, as shown in Figure R-27.

Figure R-27. Change in total surplus
(Extended Funnel BRD vs. Status Quo)



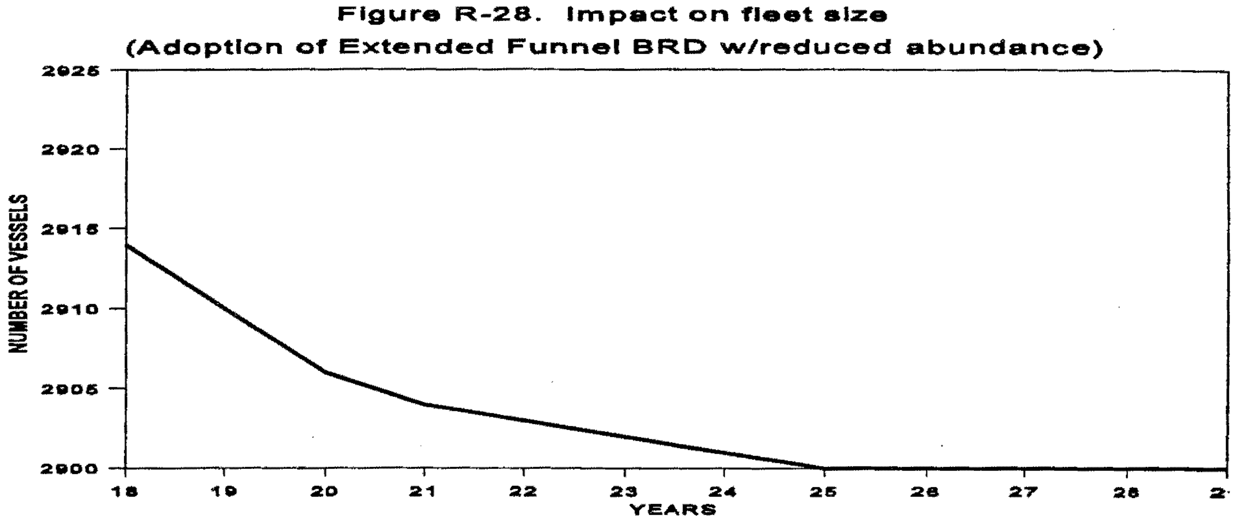
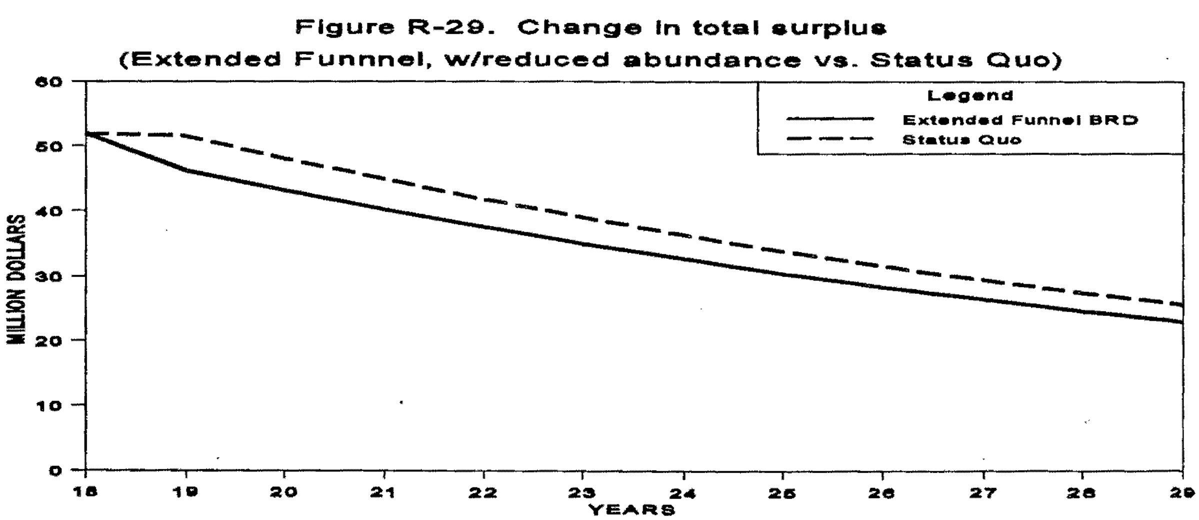


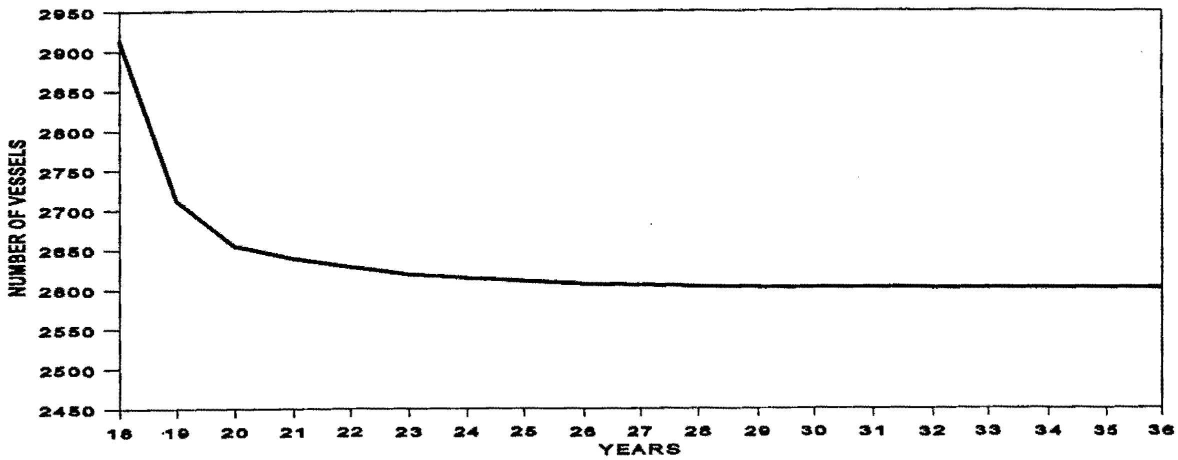
Figure R-28 presents the impact on shrimp fleet size caused by adopting this BRD management program for the shrimp fishery when the increased finfish stock size leads to a reduction in shrimp abundance of 6 percent. Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption of this BRD causes a decline in fleet size of 14 vessels over the next 10 years. As before, the small decline in fleet size has not affected the level of bycatch reduction, which remains at 34 percent. The introduction of abundance reduction into the model slightly changed the resulting total surplus. Total consumer and producer surplus, as illustrated in Figure R-29, increases under this BRD management measure by $336.5 million from $763.5 million under open access to $1.1 billion. The ratio of total surplus under this management measure to total surplus under open access management is $0.41:1.



e. BRD Requirement: Andrews TED

The adoption of an Andrews TED is modeled by increasing the cost of harvesting shrimp by $200 per installed device (with an average of 4 trawls per vessel), reducing catchability

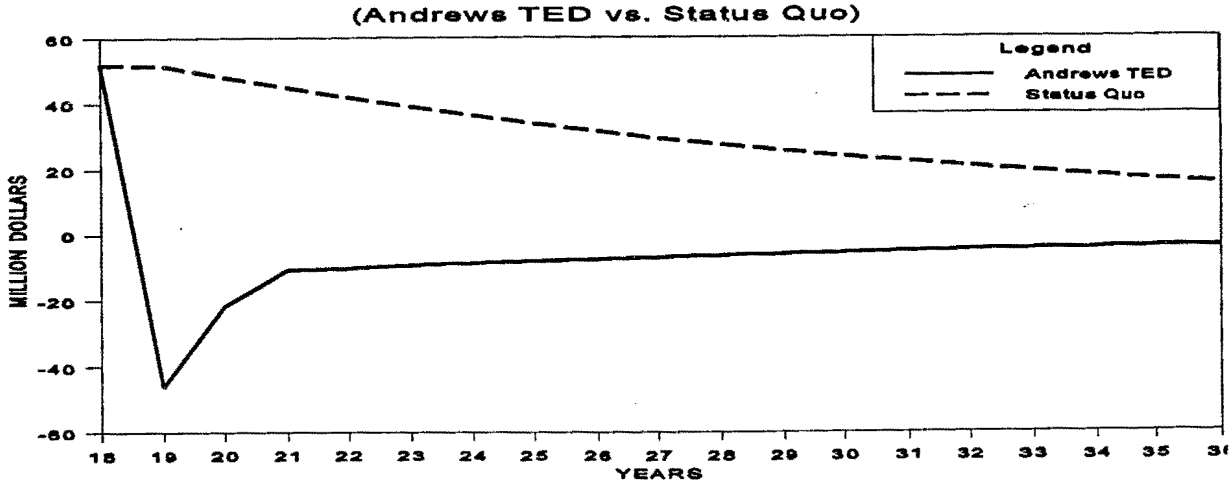
Figure R-30. Impact on fleet size
(Adoption of Andrews TED as BRD)



of shrimp in shrimp trawls by 16 percent, and the catchability of finfish in shrimp trawls by 57 percent with and without an ecologically induced reduction in shrimp abundance of 6 percent. Figure R-30 presents the impact on shrimp fleet size caused by adopting this bycatch reduction management program for the shrimp fishery. Beginning in year 18 when the common property fishery has reached long-run equilibrium, the adoption of this BRD causes a decline in fleet size of 313 vessels over the next 20 years. This reduction is rather significant, amounting to 10.7 percent of the fleet size at the initial equilibrium level. The accompanying change in total surplus is shown in Figure R-31. With a relatively large reduction in shrimp catch at 16 percent, total surplus remains negative and well below the total surplus under open access throughout the period. Total consumer and producer surpluses decrease under this BRD management measure by $1.1 billion from $763.5 million under open access to a negative $365.5 million. The ratio of total surplus under this management measure to total surplus under optimal-yield management is a negative $0.13:1. Due largely to the substantial reduction in fleet size, total finfish bycatch reduction increases from 57 percent to 86 percent.

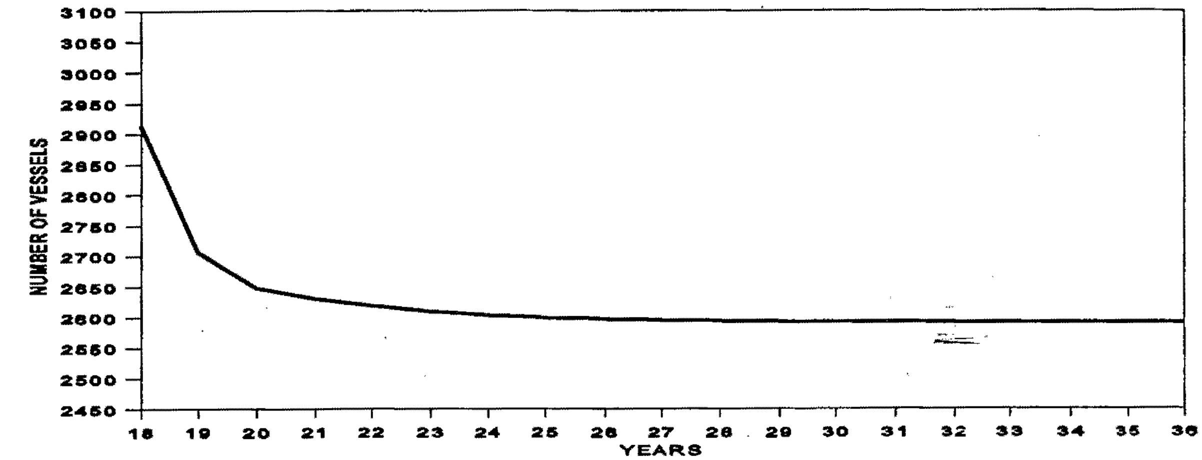
Figure R-32 presents the impact on shrimp fleet size caused by adopting this TED/BRD management program for the shrimp fishery when the increased finfish stock size leads to

Figure R-31. Change in total surplus
(Andrews TED vs. Status Quo)



a reduction in shrimp abundance of 6 percent. Figure R-33 presents the corresponding impact on consumer and producer surplus. These 2 graphs closely mimic the previous 2 graphs, indicating that the introduction of a 6 percent abundance reduction has not significantly changed the results. The shrimp fleet size still falls by as much as 11 percent and accompanying total surplus stands at negative $362.2 million.

Figure R-32. Impact on fleet size (Adoption of Andrews TED, w/reduced abundance)



Summary of the Results of the Integrated Model

There are several important general findings related to the analysis of the economic performance of the various management strategies. First, all alternatives to open access/status quo bring about reductions in the number of vessels ranging from less than 1 percent when requiring extended funnel BRD to about 11 percent when requiring Andrews TED. Second, all BRDs create short-term losses to vessels and one (extended funnel) creates long-term gains that outweigh the short-term losses. Third, when looking at the positive economic outcome, gains made from a smaller fleet size are larger than the losses resulting from lower individual shrimp catches and the cost of the BRDs. Fourth, the BRD that gives net economic benefits (long-term gains are greater than the short-term losses) has a zero shrimp loss. Fifth, the analysis indicates that in those cases where certain BRDs provide for an increase in long-term net benefits to society, the positive change does not approach the level of benefits which can be obtained through an "optimal yield" style of management. Sixth, no statistical test has been performed regarding the significance of the difference in the long-term economic benefits or losses obtained with BRD use and the economic outcome of the status quo. Seventh, all the model runs, except for Andrew's TED, assume that the increased stock size of finfish would reduce the baseline shrimp stock size by 6 percent (implying that the increased number of fish would eat more shrimp and that the shrimp stock size would decrease by 6 percent). However, the reduction in the shrimp stock size has no discernable effect on the overall economic results. The reason for this somewhat unexpected outcome is that the 6 percent is a decrease from a beginning stock size that is already very large in terms of numbers of shrimp and that the beginning stock size has no impact on the level of shrimp effort. Hence, with a large natural mortality and no related change in effort due to a different beginning stock size, the effects are not large relative to the level of shrimping effort that is related to overall productivity of the individual vessel. Eighth, there are no model runs assuming that all 4 BRD types would be legal and that different segments of the shrimp industry would tend to use different BRDs in an attempt to match their particular shrimping situation or strategy. If the results of combinations of BRD use were modeled, it is very likely that the results would be better than those of the Andrews TED and fisheye 45, but not as good as the results for the extended funnel and fisheye 30. Using a combination of BRD types would probably more closely approximate the results obtained from the status quo. Lastly, all model runs incorporate the reduction in shrimp catch, reduction in finfish bycatch, and increase in cost as a result of the previous requirement to use TEDs.

Table R-17 summarizes the impacts associated with the various BRD designs using the integrated approach described earlier.

Figure R-33. Change in total surplus
(Andrews TED, w/reduced abundance vs. Status Quo)

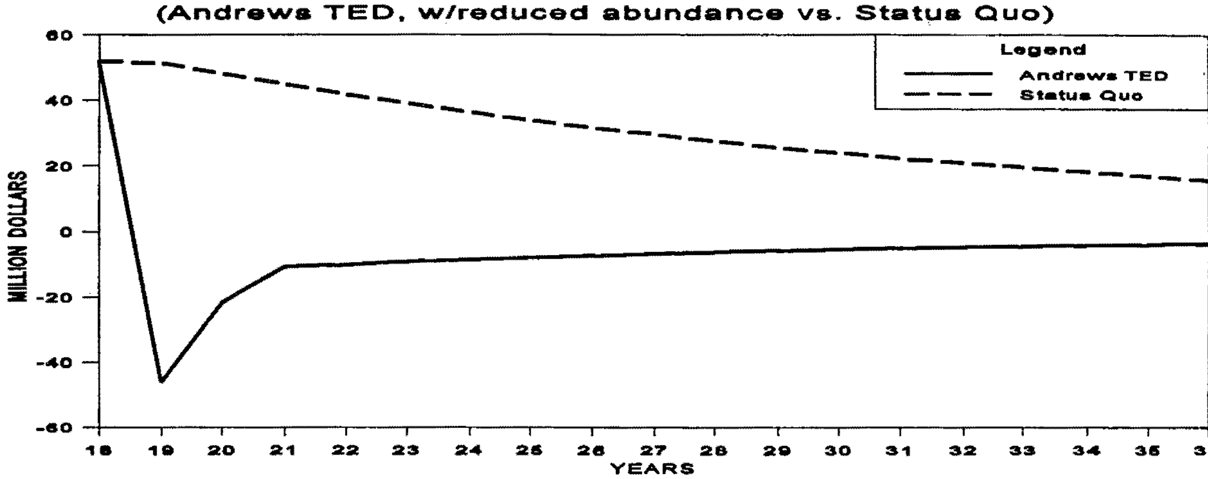


Table R-17. Summary of impacts.

Management Strategy	Shrimp Reduction (%)	Abund. Reduction (%)	Initial Bycatch Reduction[1] (%)	Final Bycatch Reduction[1] (%)	Total Surplus ($ Million)	Change in Total Surplus[2] ($ Million)	Vessel Reduction (%)
Open Access[3]	0	0	0	0	764	0	0.0
Optimal Yield	0	0	0	12	2,676	1,912	7.3
Fisheye 30	3	0	31	43	647	(117)	3.3
Fisheye 30, (reduced abund)	3	6	31	43	648	(116)	3.5
Fisheye 45	7	0	30	56	(32)	(796)	8.1
Fisheye 45 (reduced abund)	7	6	30	56	(30)	(794)	8.2
Extended Funnel	0	0	34	34	1,080	316	0.3
Extended Funnel (reduced abund)	0	6	34	34	1,104	340	0.5
Andrews TED	16	0	57	86	(366)	(1,130)	10.7
Andrews TED (reduced abund)	16	6	57	86	(362)	(1,126)	11.1

[1]Bycatch reduction applies to reduction of all finfish bycatch, not just red snapper.
[2]Change in total surplus is the difference between total surplus under each management strategy and total surplus under open access strategy.
[3]Open access management assumes a 6.75 percent shrimp reduction due to TEDs.

f. Seasonal Closures

Using GBFSM, Hendrickson and Griffin (1993) estimated the effects of various closure scenarios on the shrimp industry. Table R-18 summarizes their estimates of the cost of seasonal closures of the shrimp industry. All 5 closures generated large negative rents for owners and crews, but crews fared far worse. The reason for the disparity in rent distribution lies in the cost structures of vessel owners and crews. Fixed costs comprise a larger share of total cost for crews than for owners. During a closure, days fished falls to zero. Crews' total cost remains high because, under the assumption that crews remain idle during closures, fixed (opportunity) costs are incurred whether or not they fish. When the shrimp fishery is closed, jobs in other fisheries are not abundant considering the size of the shrimp fishery relative to other fisheries. Owners's total costs, on the other hand, are more equally divided between fixed and variable costs. If days fished decline, variable costs decline. Because variable costs are a larger proportion of total cost for owners than for crews, owners' total cost will fall by a greater percentage than crews' total cost. It is noted that in each of the closure scenarios modeled, the fishery reverts to status quo after the closed season. No additional regulation is imposed on the fishery other than the requirement of TEDs.

Table R-18. Estimated impacts of various closure scenarios over a 10-year period.

Closure Period	Present Value of Rent to Owners ($1,000)	Present Value of Rent to Crews ($1,000)	Total ($1,000)
May 1 - Jul 15	(18,614)	(31,199)	(49,813)
May 1 - Jul 31	(14,962)	(39,599)	(54,561)
Jan 1 - Mar 31	(22,098)	(13,084)	(35,182)
Jan 1 - Apr 30	(23,156)	(19,791)	(42,947)
Dec 16 - Apr 30	(26,602)	(27,647)	(54,249)

g. Area Closures

The Council has decided that this set of management alternatives are currently impractical; thus they are considered viable alternatives to address bycatch. Although not under consideration, the following discussion points out the implications of these management measures.

The results of the Hendrickson and Griffin (1993) model regarding seasonal closures can be used to forecast results for area closures. While the specific areas to be closed are not defined by the Council, it is clear that the areas to be closed would be areas of high juvenile red snapper abundance. Juvenile red snapper tend to be found in locations of high shrimp abundance and tend to be available for capture for a period of about 14 months. Further, the areas are extensive in the western and northern Gulf of Mexico. Consequently, large shrimping areas would have to be permanently closed if adequate protection were to be given to juvenile red snapper.

The appropriate area closures would likely approximate the seasonal closures analyzed through use of the Hendrickson and Griffin (1993) model. In their study, the economic performance of the shrimp industry during a 10-year period was negative relative to the status quo. Since area closures are seasonal closures extended throughout the year, it is expected that the economic outcome of area closures would be negative relative to the outcome for seasonal closures. Therefore, the conclusion of the RIR is that the measures relating to area closures will provide for a negative change in net benefits to society relative to the status quo.

h. Areas Exempt from BRDs

As a modification to the mandated use of BRDs by all shrimp craft operating in the Gulf of Mexico portion of the U.S. EEZ, the Council has considered two depth areas and one geographical area where the BRD requirements would not be in effect on the basis that the abundance of juvenile red snapper is not high in those areas. One of the potentially exempted depths is outside 100 fathoms, and the other is inside 10 fathoms. The geographical area identified for possible exemption is that portion of the Gulf of Mexico east of Cape San Blas, Florida.

An important consideration in the analysis of exempted areas is whether it is the objective of the amendment to reduce the catch of juvenile red snapper or reduce the catch of all finfish. The formal objective of the Council has been stated as "The goal of Amendment 9 is to reduce the bycatch of red snapper in the Gulf of Mexico with consideration of ancillary benefits to other species, and the reduction refers to age 0 and age 1 red snapper." According to this objective, the depth and area exemptions would provide for approximately the same level of red snapper bycatch reduction as requiring BRDs throughout the EEZ. Hence, the RIR determination has to be based on the economic effects on the shrimp industry and potential "ancillary" benefits to other finfish species.

It should be recalled that the determination of the economic effects on the shrimp industry has nothing to do with the level of bycatch reduction provided by any given BRD. In essence, the requirement to use a BRD provides for short-term losses for fishery participants, and the short-term losses cause a reduction in overall shrimp effort that is related to the individual actions taken by the shrimp fleet in total. The overall reduction in shrimp effort, characterized mostly as a reduction in overall fleet size, provides for long-term benefits to shrimp harvesting units that are able to stay in the fishery. It has been shown previously that the use of some BRDs provide for an overall increase in net benefits if the shrimp loss is not 7 percent or greater for individual shrimpers. Consequently, exempting certain areas from BRD use could get the unusual or unexpected result of a net increase in economic benefits even if the exempted areas are those where juvenile red snapper are not found. Unfortunately, the results are not that simple because excluding certain areas would change the economic performance of a portion of the fleet; and without modeling that change, it is impossible to determine whether or not the overall economic outcome is affected. Hendrickson and Griffin (1993) indicated that exempting areas east of Cape San Blas, Florida from BRD requirement would prevent a reduction in economic rent by about $5 million over a 10-year period under a 5 percent shrimp reduction due to BRDs.

There are some distributional effects from exempting geographical areas or depth areas, but these cannot be easily determined. For example, if the Florida coast east of Cape San Blas is to be exempted, and BRDs are required elsewhere; then these Florida harvesters might benefit because they would not incur the $5 million loss over a 10-year period. They might also benefit from increased prices from a reduced supply of shrimp coming from the rest of the Gulf of Mexico. They would not benefit from a reduced fleet size elsewhere because their individual catches are not dependent on the amount of shrimp harvesting effort that occurs in the rest of the Gulf of Mexico.

For the depth-area exemptions, there also would be distributional effects, and the nature of these would tend to be the same for exempting shallow versus deep areas. In the case of exempting shallow areas, the smaller vessels and boats may benefit because they may be able to continue their normal operations without undergoing the costs of BRDs or any shrimp loss associated with a reduced abundance of shrimp. The only known shrimping activities in depths greater than 100 fathoms relate to fishing for royal red shrimp. Vessels targeting this species are highly specialized in the sense that they are rigged mainly to catch royal red shrimp. Their reported activities in shallower depths are minimal. Thus, exempting these vessels from the BRD requirement would allow them to continue their normal operations and avoid potentially costly gear modification.

The conclusion of the RIR is that the exemption for certain areas may provide benefits in terms of preventing cost increases and potential losses of shrimp catch for shrimping operations occurring in those areas.

A potential problem with excluding certain areas from regulation is that these areas can provide a "loophole" that can lead to a lower level of compliance and/or a higher cost of enforcement. To the extent that such problems actually occur, the potential benefits from BRDs will be reduced by an unknown amount. To the extent that there is a compliance/enforcement problem with excluding certain areas, the effects will be different according to type of area to be excluded. In the case of excluding the area east of Cape San Blas, Florida, the only concern would be with vessels that move coastwise, and the effect would clearly be limited to a small number of vessels. With regard to the exclusion of all areas inside 10 fathoms, all vessels transiting the area would be involved, and the potential for compliance/enforcement problems would be much greater. For the area deeper than 100 fathoms, vessels transiting to the deeper water could create a potential problem, but the number of vessels operating that far offshore is quite small (about 10 vessels). They are also highly specialized; so the potential problem is not great. In conclusion, the RIR would not necessarily forecast a major problem in any case, and the only area exclusion that has the potential for a significant reduction in benefits would be the area described as less than 10 fathoms.

Impacts on Finfish Industries

As noted earlier, the use of BRDs (or closures) enhances the abundance of bycatch species over the first few years. If an open access system is the management regime in the finfish fisheries, the increase in abundance that would translate into an increase in catch would invite more effort into the fishery from both the commercial and recreational users of the resource. This would eventually bring down the equilibrium level of the finfish stock to about its original equilibrium level. In the process, an increase in cost to both the commercial and recreational sectors would likely result.

In the particular case of red snapper, the biological assessments done in the past several years have incorporated reduction of red snapper incidentally caught in shrimp trawls. This assumed reduction has been one critical factor in the Council's decision to maintain a relatively high level of TAC for the directed fishery relative to the overfished status of the stock. The recent proposal to increase TAC from 6.0 million pounds (MP) to 9.12 MP has been premised on the achievement of a 50 percent bycatch reduction target by 1997. The commercial quota would consequently be raised from 3.06 MP to 4.65 MP; while the recreational allocation would increase from 2.94 MP to 4.47 MP. An economic analysis done in conjunction with the proposal to raise TAC concluded that the commercial fishery would realize discounted net benefits amounting to $37.8 million over the period 1996-2000 and $117.9 million over the period 1996-2020. The corresponding impacts on the recreational red snapper fishery could not be quantified. To the extent that the proposed increase in TAC has allowed maintenance of the current 5-fish bag limit for the recreational sector, reductions in short-run benefits to this sector have been avoided. Noting that bag and size limits would not be totally effective in constraining the recreational sector to its allocation, the Socioeconomic Panel (1995) suggested the need to develop some long-run approach to address potential increases in recreational effort over time. This need is predicated on the results of the conceptual model previously discussed which concluded that without a rights-based approach, costs to the recreational sector would increase over time in the face of reduction in finfish bycatch in the shrimp fishery.

The estimated impacts on the commercial red snapper fishery from an increase in TAC has also been predicated on the assumption that the proposed ITQ program for the commercial red snapper fishery would commence in 1997. Recent Congressional action on the budget and the passage of the Sustainable Fisheries Act make it unlikely for the ITQ program will be in place in the near future. These actions could result in major changes in the estimate of impacts of the bycatch reduction program on the commercial red snapper fishery. This potential is further elaborated below.

If the ITQ program does not go into effect until the year 2000, potential benefits from the recent TAC increase will be limited to gains that may be possible if the Council selects an alternative regulatory system featuring quota management combined with a form of license limitation and transferrable licenses. That alternative was considered in Amendment 8 to the Reef Fish FMP, and the gains possible under such a system were described as positive, but considerably less than the increases that would occur if the ITQ system went into effect.

Even without the ITQ program, the overall quota would prevent biological overfishing, so the stock gains from a reduced shrimp bycatch of red snapper would not be eroded by additional effort. Nonetheless, the absence of an ITQ program would continue the derby fishery for the commercial fishery, and overall effort would not be curtailed, thus limiting any gains from cost reductions. Even though overall effort would not be curtailed, some degree of reduction in cost would be expected. This should happen because the transferable nature of the license limitation system would allow for less efficient fishermen to sell their licenses to more efficient fishermen; and over a number of years, there should be an overall decrease in the cost of harvesting the fixed commercial quota.

Prices would also be expected to rise by a small amount under license limitation relative to a continuation of the differential trip limit system that is a feature of the current set of red snapper management rules. The reasoning here is that the 200-pound limit allows for some small increase in total effort even though there is an overall cap on the number of reef-fish fishermen, i.e., permitted reef-fish fishermen can easily enter the red snapper fishery if they perceive that the stock is increasing. To the extent that such a scenario occurs, the derby becomes more intense; the season becomes shorter; and the concentration of red snapper landings in a shorter time period lowers the average ex-vessel price.

Since the red snapper stock assessment and current TAC determinations are based on the assumption of a reduction in shrimp bycatch, another way to view the change in benefits is to assume that there is no reduction in the bycatch of red snapper or that the reduction goal cannot be met. In that case, the current stock assessment forecasts that even if all directed effort was eliminated, the red snapper stock cannot recover within the time frame allowed under current rules. There is no current information, however that describes the impact on current TAC. The implication may be that without bycatch reduction, the TAC can remain at its current level, but the recovery goal would never be met. Another possibility may be that the Council could adjust its recovery schedule and maintain the current TAC or reduce the TAC. If the bycatch reduction goal for red snapper is not met, the implications for the level of TAC have not yet been described. Furthermore, the RIR cannot comment until such time as these implications are documented.

The Council's objective also mentions "ancillary benefits" to finfish species other than red snapper. One other species currently under management by the Gulf Council is king mackerel, and the stock assessment for this species indicates that shrimp bycatch is affecting the rate of recovery of that stock. There are basic differences between red snapper and king mackerel in reference to the shrimp bycatch issue. In the case of king mackerel, the stocks are not officially overfished; and there is no specific guidance relative to the need to reduce shrimp bycatch from a biological perspective. There are also major differences in the management regime for king mackerel as opposed to red snapper. The coastal migratory species group, of which king mackerel is one of the managed species, has no current regulations regarding effort limitations for either the commercial participants or the recreational participants; but the stock is under a quota management system. There is, however, a current proposal to impose a moratorium on the issuance of new commercial mackerel permits after the fishery's control date of October 16, 1995. Thus, for king mackerel, it can be predicted that a reduction in shrimp bycatch may lead to a larger king mackerel stock over time and that the overall quota regulations will maintain the stock. However, since there are no effort limitations, it can be expected that the higher stock levels will attract additional effort; and some of the potential benefits from a reduction in shrimp bycatch will be eroded because of cost increases related to the increased level of effort. On the recreational side, king mackerel and red snapper are managed alike, i.e., there are no effort controls and no formal quota management system. The likely outcome for a change in net benefits for king mackerel is a small level of increased benefits associated with a higher level of TAC, but with an accompanying increase in the costs of harvesting the higher level of TAC. Accordingly, the red snapper fishery will probably benefit more from bycatch reduction than will the king mackerel fishery.

The groundfish group of finfish species are also taken incidentally to the harvest of shrimp, and one of its major species is Atlantic croaker. It is well documented that the croaker stocks have declined as a result of the effects of shrimp bycatch, and it can be fully expected that croaker stocks should begin to experience some level of recovery if shrimp bycatch is reduced by a significant amount. In the usual case, stock recovery will encourage additional commercial and recreational effort; and there is no overall management system currently in place for croaker. Therefore, for croaker and similar stocks, the potential growth in the size of the resource may never be realized because effort increases will drive the stocks back toward some equilibrium and possibly overfished status. The implication in this and similar cases is that there is no stock recovery; so there are no biological benefits from a reduction in shrimp bycatch. Furthermore, the new equilibrium in the fishery implies a period of time during which effort would be higher. As a consequence, overall costs will be higher, and the overall result is a decline in benefits.

The preceding discussion makes the point that neither biological gains nor economic gains are guaranteed if shrimp bycatch is curtailed by a significant amount. On the other hand, the discussions also point to the fact that if rational management is implemented to deal with the expectation of larger stock sizes for the finfish species currently impacted by shrimp bycatch, then gains in terms of greater revenues and cost efficiencies can be realized. Furthermore, as was indicated in the case of red snapper, the potential gains are not only likely under rational management, but the gains could be large relative to the true economic benefits currently associated with finfish stocks.

Private and Public Costs

The preparation, implementation, enforcement, and monitoring of this or any Federal action involves the expenditure of public and private resources that can be expressed as costs associated with the regulations. Costs associated with this amendment include:

Council costs of document preparation, meetings, public hearings, and information dissemination	150,000
NMFS administrative costs of document preparation, meetings and review	75,000
Law enforcement costs	18,000
Public burden associated with BRD	None
TOTAL	$243,000

The Council and Federal costs of document preparations are based on staff time, travel, printing, and any other relevant items where funds were expended directly for this specific action. Since there is no permit or license requirement for using BRDs, the public burden is zero. Revenue reductions and cost increases due to the use of BRDs have already been included in the estimation of costs and benefits. Enforcement cost is relatively small, since BRD enforcement is done as part of the general enforcement activity for TEDs.

In addition to the above costs, federal funds have been expended to support BRD development and testing as well as research on major issues surrounding the bycatch problem. As of April, 1995 the following costs have been incurred:

Bycatch characterization	1,155,916
BRD development	1,926,231
Multiple objective research	3,364,886
Sociology/anthropology	301,643
Economics	269,471
Information and education	131,881
Other sources of mortality	275,501
Total	7,425,529

Some of the research projects include both the Gulf and South Atlantic areas of jurisdiction; however, most of the above costs were expended for the Gulf area. These cost figures are taken from NMFS (1995). More current estimates place the total figure at more than $10 million, although this latter number includes both private and public funds expended to develop and test more than 100 BRD designs for various species relevant to the Gulf and South Atlantic areas.

<u>Summary of Impacts</u>

The following discussions deal primarily with the impacts of the proposed options in relation to those of the rejected options, particularly the status quo.

Proposed Alternative A.2 requires the installation of NMFS-certified BRDs in shrimp trawls finishing in certain areas. The only other alternative is status quo. Over the short-run, BRDs, except the extended funnel, would affect shrimp-vessel profitability more from a reduction in revenues than from an increase in costs. Over the long-run, profits would be reduced further with increases in costs or reductions in revenues due to a decline in shrimp abundance. Notwithstanding such a profit reduction scenario, a situation may arise in which economic benefits to the entire industry may increase. This condition would happen if cost increases and/or revenue reductions forced mainly the inefficient vessels out of the fishery, leaving the more efficient vessels to continue operations. It is, however, in the finfish industries, such as the red snapper industry, that BRDs are likely to have the more important beneficial effects. As the red snapper stock recovers, TAC may be increased or maintained at its current level, and fishing costs may decrease due to an increase in fish abundance. Such an increase in benefits would be temporary if it merely invited more effort into an open-access fishery. While the Council's proposed limitation on the number of participants in the commercial fishery addresses this open-access-fishery problem, an analogous program for the recreational sector has not been developed.

Proposed Alternative B.2 delimits the use of NMFS-certified BRDs to trawling in the U.S. Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida. This proposal has similar effects as Proposed Alternative A.2, but the effects are more restricted to fisheries operating in the specified geographic region. Specifically, most shrimpers operating in the west coast of Florida or trawling beyond the 100-fathom contour (primarily those targeting royal red shrimp) are spared from incurring cost increases and revenue reductions in their operations. The Hendrickson and Griffin (1993) study indicates that exempting a good portion of the Florida west coast could prevent a reduction in economic rent by about $5 million over a 10-year period. To the extent that juvenile red snapper are not generally caught in these exempted areas, the proposed action would partially alleviate adverse economic impacts on the shrimp industry without loss in potential benefits to the red snapper industry. There may, nonetheless, arise some reduction in potential benefits to other finfish industries impacted by the shrimp-trawl bycatch problem.

Proposed Alternative C.1 specifies a minimum bycatch reduction that any BRD must meet in order to be certified. Based on the Councils goal of reducing bycatch mortality by 50 percent and considering current bycatch mortality in relation to the average bycatch mortality of juvenile red snapper during the period 1984-1989, the minimum bycatch reduction is set at 44 percent. Using this criterion, the fisheye 30 mesh position or its equivalent and the 5-inch Andrews TED would be the only gear certifiable as BRDs upon implementation of this amendment. The acceptability of Andrews TED is contingent on its not being banned by other applicable law or regulation. Table R-17 summarizes the economic impacts of various BRDs, including the fisheye 30 mesh position and the 5-inch Andrews TED. Over the long-run, a fisheye 30 BRD would reduce total economic surplus by about $117 million and the Andrews TED by about $1.1 billion. The number of shrimp vessels would decline by a little more than 3 percent with the fisheye 30 BRD and about 11 percent with Andrews TED. The large negative effect of the Andrews TED is primarily driven by the assumed 16 percent reduction in shrimp catch. The compensating benefits to the red snapper industry due to a BRD requirement has not been quantified due to insufficient information, particularly the quantitative modeling of the red snapper commercial and recreational fisheries. The only information available in this regard refers to the quantification of benefits to the commercial sector with an increase in quota from 3.06 million pounds to 4.65 million pounds. Such an increase in quota (due to an increase in TAC from 6.0 million pounds to 9.12 million pounds) has been predicated on the attainment of a 50 percent bycatch reduction by 1997. If this higher quota is maintained over the period 1996-2020, the increase in benefits to the red snapper commercial fishery would amount to $117.9 million. Higher benefits would be forthcoming after the rebuilding period. Such an increase was, however, premised on the implementation of an effort-control program in the red snapper commercial fishery. Due to Congressional actions, implementation of a Council proposed ITQ program has been delayed; however, the Council is currently considering a license-limitation program as a second best approach.

Maintaining the status quo regarding seasonal (or area) closures would prevent reductions in total benefits to the shrimp industry. Bioeconomic simulations conducted by Hendrickson and Griffin (1993) indicate that seasonal closures could result in reductions of economic rent to owners and crews ranging from $35 million to $54 million over a 10-year period. The impact of seasonal closure on bycatch reduction has been noted to be minimal (see discussion under Rejected Alternative A.1), primarily because juvenile snapper are vulnerable to minimal (see discussion under Rejected Alternative A.1), primarily because juvenile snapper are vulnerable to shrimp trawls for 14 months or more. Nichols (1996a) indicated that seasonality of bycatch is primarily indicative of seasonality of shrimping effort. In this regard, the potential benefits of seasonal shrimping closures to the red snapper industry is likely to be minimal.

The proposed action to establish a framework procedure for modifying the bycatch reduction criterion and establishing BRD certification criteria and a BRD testing protocol for certifying additional BRDs is mainly procedural in nature and is not expected to result in material economic impacts on the shrimp and red snapper industries. Worth noting, however, is that establishment of such a framework procedure may hasten the implementation of regulatory changes that would be beneficial to fishermen in various fisheries.

Determination of a Significant Regulatory Action

Pursuant to E.O. 12866, a regulation is considered a "significant regulatory action" if it is likely to result in: a) an annual effect on the economy of $100 million or more; b) a major increase in costs or prices for consumers, individual industries, federal, state, or local government agencies, or geographic regions; or c) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

Figures R-19 and R-21 depict the annual impacts of adopting a fisheye 30 BRD on the shrimp harvest industry over a 15-year period. Both figures show that the annual impacts are below the $100 million threshold. Figures R-31 and R-33 show the impacts of using the Andrews TED as a BRD. Both figures show that in the first year of using the Andrews TED, reductions in total surplus approach the $100 million threshold; however, such reductions fall below the threshold in subsequent years. There is currently a high likelihood that the Andrews TED will be decertified as a TED, thus effectively precluding its use as a BRD. On the basis of economic effects in terms of total surplus, the conclusion is that the $100 million annual impact would not be met.

It may be noted that the above numbers for impacts are in terms of total surpluses and not total revenues. While not shown in graphs, the integrated model used to estimate total surplus changes over time also generates changes in total revenues. These latter changes follow very closely the changes in total surplus, with annual reductions falling well below the threshold level of $100 million. Thus, the same conclusion as above can be made that the $100 million annual impacts would not be met.

Another way of determining revenue changes is to make a very strong assumption that the 3 percent reduction in shrimp catch per tow due to the use of a fisheye 30 BRD directly translates to a 3 percent reduction in overall catch, and to assert that there is a concomitant reduction in total revenue. Assuming total ex-vessel revenues for future years are equal to the 1994 revenue of $462 million, a 3 percent reduction translates into only about a $14 million reduction in annual revenue. Expanding this impact to other market levels would require at least a 7.14 multiplier to reach the $100 million mark.

Such s multiplier appears to be too high. At any rate, expanding the ex-vessel reduction in revenues to other market levels demands additional information that have not been developed. An important factor to consider, however, in such expansion is the high substitution of shrimp products beyond the harvest level. As indicated elsewhere in this document, the shrimp processing sector in the Southeast uses a relatively greater portion of imported products. To reiterate an earlier finding, it may be pointed out that the ratio of processed poundage to pounds landed has been increasing over the years, from 1.47 in 1973-75 to 1.75 in 1988-90. This high degree of substitution only means that a 7.14 multiplier is very unlikely for the fishery. On that basis, it is still concluded that the $100 million annual impacts would not be met by the requirement of a fisheye 30 BRD.

The BRD requirement is not expected to cause an increase in the price of shrimp, since the shrimp market is mainly dominated by imports. The share of imports to total supply has been increasing over the years, and in 1994, imports accounted for more than 75 percent of total shrimp supply in the U.S. Cost increase to the shrimp industry through the use of a BRD is relatively large as an absolute number but relatively small compared to the size of the industry. Most of this cost will be borne by shrimping operations in the Gulf west of Cape San Blas, Florida. The cost to the federal government in developing and implementing this amendment is estimated at $243 thousand. The other $7 million or so has been incurred in developing and testing BRD devices and researching certain issues pertinent to the implementation of BRDs. Additional costs may be incurred as more BRDs are developed and tested. The impacts of BRDs on competition and investment may not necessarily be adverse to the extent that the exit of certain vessels would render other vessels competitive and would eliminate some of the problems associated with the inflow of more capital into the industry than is necessary to harvest shrimp in a more efficient manner. Employment and productivity would be adversely affected to the extent that a lesser number of vessels would remain in the fishery and that harvest of shrimp would be reduced. The significance of this adverse effect is not known. The competitive ability of the domestic shrimp industry is not affected relative to domestic production, considering that foreign enterprises (if there are any) that may be operating in the Gulf would be subject to the same requirement as purely domestic enterprises. The ability of United States-based enterprises to compete in the export market may be adversely affected. While this effect is not known, it is probably small considering the relatively small participation of the domestic shrimp industry in the export market. The more important effect would probably fall on the share of domestic production on total supply of shrimp in the U.S.

In summary, the proposed action is deemed not to constitute a "significant regulatory action" under any of the mentioned criteria.

INITIAL REGULATORY FLEXIBILITY ANALYSIS

The Regulatory Flexibility Act requires a determination as to whether or not a proposed rule has a significant impact on a substantial number of small entities. If the rule does have this impact then an Initial Regulatory Flexibility Analysis (IRFA) has to be completed for public comment. The IRFA becomes final after the public comments have been addressed. If the proposed rule does not meet the criteria for "substantial number" and "significant impact," then a certification to this effect must be prepared.

This proposed rule, if promulgated, will require all shrimp harvesting craft operating in the Exclusive Economic Zone (EEZ) in the Gulf of Mexico west of Cape San Blas, Florida to utilize an approved bycatch reduction device (BRD) at all times while trawling for shrimp. It is clear that the rule will affect most of the roughly 5,000 shrimp vessels that operate in the Gulf of Mexico since the vast majority of such craft operate in the EEZ for at least part of the year. The rule would also affect a substantial, but unknown number of shrimp boats (craft that are smaller than USCG requirements to be documented), because it is well established that a portion of these shrimp harvesting craft, even though they are smaller than the typical offshore shrimp vessels, operate in the EEZ during periods of favorable weather when catchable populations of shrimp are found in the nearshore portion of the EEZ.

All of the vessels and boats affected by the rule will qualify as small business entities because their gross revenues are less than $3 million annually. Hence, it is clear that the criterion of a substantial number of the small business entities comprising the shrimp harvesting industry being affected by the proposed rule will be met. The outcome of "significant impact" is less clear but can be triggered by any of the five conditions or criteria discussed below.

<u>The regulations are likely to result in a reduction in annual gross revenues by more than 5 percent.</u> The accompanying Regulatory Impact Review (RIR) indicates that annual shrimp revenues will fall because the use of a BRD will reduce the total shrimp catch. The revenue effect will vary depending on the specific type of BRD employed because the different types of BRDs have different associated shrimp losses. Four BRD designs are considered by the proposed rule and the rate of shrimp loss varies from zero to 16 percent. These rates of shrimp loss are on a per tow basis and do not imply that the amount of shrimp lost over a full season will be this high. The explanation is that a portion of the shrimp that escape the trawl initially are caught later in the season and at a larger size than when first encountered. Nonetheless, for those BRD designs that lose high amounts of shrimp on each tow, the annual shrimp loss will be significant. On a per vessel or boat basis, there is an additional consideration because the RIR analysis indicates that some shrimp firms will cease business operations and the interpretation is that they lose all revenue. A complicating factor in making the determination of the size of revenue loss per firm is that any particular vessel has a choice of BRD designs, but the model used in the RIR analysis was run several times on the presumption that one particular design was used by all the craft. The overall conclusion is that if the proposed rule is implemented, the criterion of a loss of 5 or more percent in gross revenue will be met for a large, but unknown number of the shrimp craft affected by the rule.

<u>Annual compliance costs (annualized capital, operating, reporting, etc.) increase total costs of production for small entities by more than 5 percent.</u> The proposed rule will not increase capital costs or require reporting, so there is no impact associated with these items. However, the rule will increase operating costs because the annual costs of the BRDs will range from $200 to $800 depending on the style chosen. Since the RIR indicates that the annual operating costs of the shrimp craft likely to be affected by the rule range from $8,000 to $98,000, then the increase in operating costs would range from 0.2 percent to 10 percent and would likely be less than 5 percent since most of the craft affected are vessels that have the larger operating costs.

Compliance costs as a percent of sales for small entities are at least 10 percent higher than compliance costs as a percent of sales for large entities. All the firms expected to be impacted by the rule are small entities and hence there is no differential impact.

Capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities. Since a small, but unknown portion of the shrimp craft are very small firms in terms of costs and sales, these smaller firms could encounter difficulties in financing for the possible additional annual operating cost of $800 per year. There is not enough information available to estimate the number of firms that would be affected in this fashion.

The requirements of the regulation are likely to result in a number of the small entities affected being forced to cease business operations. This number is not precisely defined by SBA but a "rule of thumb" to trigger this criterion would be two percent of the small entities affected. One feature of the analysis in the RIR was a calculation of the number of full-time shrimp vessels in the fleet on an annual basis. This analysis clearly indicates that from 10 to 513 vessels would cease business operations with the range dependent on style of BRD used. The number of exiting full-time vessels translates to a range of .3 percent to 16.6 percent of the fleet size before implementation of the rule. It appears reasonable to forecast that more than 2 percent of the affected small businesses will cease operations if the rule is implemented.

Considering all the criteria discussed above, the conclusion is that small businesses will be significantly affected by the proposed rule. Hence, the determination is made that the proposed rule will have a significant economic impact on a substantial number of small business entities and an Initial Regulatory Flexibility Analysis (IRFA) is required.

Description of the reasons why action by the agency is being considered: Commercial shrimp harvesting activities result in a substantial bycatch of finfish. In the case of red snapper in particular, the resource is currently overfished and is under management designed to recover the stocks. Biologists have determined that even with a zero catch of adult red snapper by the recreational and commercial fisheries, the stocks cannot recover unless the bycatch of juvenile red snapper (which have no market value) can be reduced significantly.

Statement of the objectives of, and legal basis for, the proposed rule: The shrimp management plan contains eight specific objectives (shown on page 7 of the amendment document) and this amendment is designed to meet one of those specific objectives, namely, "Minimize the incidental capture of finfish by shrimpers, when appropriate." The Gulf of Mexico Fishery Management Council has determined that the proposed action constitutes an appropriate case since the red snapper stocks cannot be recovered unless some action to reduce the bycatch is taken. The Magnuson Fishery Conservation and Management Act of 1976 provides the legal basis for the rule.

Description and estimate of the number of small entities to which the proposed rule will apply: The proposed rule will apply to shrimp trawling craft while they are conducting shrimp trawling operations in the EEZ of the Gulf of Mexico. These craft include boats (not documented by the U.S. Coast guard) that may be as small as 25 feet and larger documented vessels that can exceed 80 feet. The annual revenues generated by these craft typically range from less than $10,000 to over $100,000. There are about 5,000 shrimp vessels and an undetermined, but significant number of shrimp boats that may be affected by the proposed rule.

Description of the projected reporting, recordkeeping and other compliance requirements of the proposed rule, including an estimate of the classes of small entities which will be subject to the requirement and the type of professional skills necessary for the preparation of the report or record: There are no projected reporting or recordkeeping requirements associated with the proposed rule. There will be a compliance requirement that all shrimp harvesting craft operating in the Gulf of Mexico portion of the U.S. EEZ will have to use a bycatch reduction device in each net used to trawl for shrimp. These devices are estimated to cost from $50 to $200 per device and individual shrimp craft tow from 1 to 5 nets during the trawling operation. The use of the BRD devices also results in some loss of shrimp and the amount will vary according to the particular BRD design used, the fishing area, the fishing season and the harvest tactics of the operator of the craft.

Identification of all relevant Federal rules which may duplicate, overlap or conflict with the proposed rule: Some provisions of existing and proposed rules to protect endangered and threatened populations of sea turtles under provisions of the Endangered Species Act may overlap or conflict with the proposed acted of the mandated use of BRDs. In particular, the measures to protect sea turtles currently require virtually all shrimpers to use Turtle Excluder Devices (TEDs) and one of those devices, the Andrews TED, is also considered to be a BRD device under the proposed BRD rule. There is the possibility that the Andrews TED may be removed from the list of acceptable TEDs and if so, then the choice of BRDs will be reduced. However, the Andrews TED is used principally in southwest Florida and that area is being considered as an area to be exempt from the BRD requirement. If the exemption is proposed as a part of this overall action, then the potential conflict with ESA rules will not exist. At this time no other Federal rules have been identified as sources of duplication, overlap or conflict.

Description of significant alternatives to the proposed rule and discussion of how the alternatives attempt to minimize economic impacts on small entities: Several types of alternatives, including status quo, have been considered as ways to meet the bycatch reduction objective while minimizing the economic effect on the shrimp industry. The status quo is always considered as an alternative and in this case was analyzed because recent events affecting the activities of shrimp harvesters may have led to some reduction in bycatch whether or not further action is taken. For example, the mandated full use of Turtle Excluder Devices since 1992 has clearly resulted in some level of bycatch reduction. In addition, there may have been additional reductions in bycatch through existing closures off Texas and Florida, an increase in untrawlable bottom via the creation of artificial reefs and a downward trend in shrimp harvesting effort during the 1990's. An examination of the overall reduction in bycatch from these potential sources indicated that additional bycatch reduction is needed if the red snapper stock is to be restored. Hence, the status quo was rejected as a viable alternative even though it would clearly have no negative short or longer term economic effects on the shrimp harvesting industry.

Another type of alternative was a consideration of closing the shrimp fishery for a portion of the year. An analysis of this alternative determined that juvenile red snapper are on the shrimp grounds throughout the shrimping season and a closure would most likely have the effect of increasing shrimp effort during the open season and hence not result in a major decrease in bycatch. In addition, an economic analysis determined that seasonal closures would create significant economic losses to shrimpers.

Permanently closed areas of high juvenile red snapper abundance were also investigated as an alternative to the proposed use of BRDs. The findings in the case of area closures was that juvenile red snapper concentrations tend to be highest in areas of high concentrations of shrimp. Since the areas to be closed would have to be quite large to provide for large decreases in bycatch, the bycatch reduction would be accompanied by large reductions in the catch of shrimp. It was concluded that this alternative, although capable of reaching the bycatch objective, would be more costly to the small businesses when compared to the proposed alternative of mandated use of BRDs.

The alternatives mandating the use of BRDs contain variations regarding depths and geographical areas where BRDs may be required. Exemptions reviewed include depths exceeding 100 fathoms, depths less than 10 fathoms, and in the area east of Cape San Blas, Florida. In general, these exemptions were considered because the abundance of juvenile red snapper is low in such areas, and the exemptions would tend to reduce adverse economic impacts on the shrimpers operating in these areas. In reviewing these alternatives, the Council had to determine whether or not the exemptions would create enforcement and compliance problems and render the mandated use of BRDs in most of the EEZ ineffective. The RIR and IRFA examine these alternatives and the proposed alternatives.

5.0 SOCIAL IMPACT ASSESSMENT

A. INTRODUCTION

The National Environmental Policy Act (NEPA) requires that federal agencies evaluate the effects of potential regulations on human as well as natural environments. In so doing, agencies should consider the direct, indirect, or cumulative effects on the aesthetic, historic, cultural, economic, social, or health conditions (Interorganizational Committee on Guidelines and Principles for Social Impact Assessments, 1994). The MFCMA requires that FMPs assess the impacts of management measures on the directed fishery as well as impacts (both direct and indirect) on other fisheries while achieving and maintaining on a continuing basis optimum yield (OY) from each fishery. Because of the large participation in the shrimp fishery of the Gulf of Mexico and the likelihood that regulations on the shrimp fishery will affect other fisheries and participants, management proposals require extensive scrutiny in order to ameliorate potential negative social impacts. Currently, there is a very limited amount of information upon which to assess the social impacts of the management alternatives in this amendment on the shrimp fishery or their effects on other fisheries. The following characterization of shrimp fishermen in the Gulf and the potential social implications of requiring additional regulations, particularly BRDs, are taken practically verbatim from Thomas, et al. (1995). Ancillary analyses of shrimp fishermen in the south Atlantic who were facing requirements for TED usage (Kitner 1987) are also included. Finally, an assessment of the social condition of commercial red snapper fishermen in the Gulf from Thomas et al. (1993) as incorporated in Amendment 8 to the Reef Fish Management Plan for the Reef Fish Resources of the Gulf of Mexico is included. Sufficient data to assess the social impacts of the alternatives presented in this amendment on other commercial finfish fishermen and recreational fishermen that may be affected are not available.

B. GULF SHRIMP FISHERMEN - from Thomas et al. (1995)

The degree to which humans take advantage of the resource potential of their environment is determined by the technology they develop and use. Thus, there is an interdependency between the social organization of humans, their environmental situation, and the technology they employ. Subsequently, as more of the resource potential of the environment is harnessed through technological changes, the social organization tends to increase in complexity. As a result, policy decisions directed at the technological component of this relationship will have concomitant effects on both the social and physical environments.

Given the complexity of social relations, it is difficult to predict the way in which people will be affected by changes in technology. Social scientists are frequently asked to make these predictions. This task is made particularly difficult by the fact that they lack information about the conditions of the social organization existing prior to changes in technology. Recently, shrimp fishermen have had to adjust to changes brought about by the mandated use of turtle excluder devices (TEDs). Once again, shrimp fishermen find themselves on the eve of additional regulations which may alter the technology they use to harvest shrimp. But, unlike previous regulatory actions, we have information about the social state of fishermen prior to the policy being enacted.

The assessment presented here describes the current social conditions among shrimp fishermen and the perceptions fishermen have about how bycatch regulations may affect them. It reviews the following: (1) background of the research and the methods used, (2) basic demographic characteristics of fishermen, (3) economic characteristics, (4) occupational features, (5) physiological and psychological indicators of health, and (6) perceptions fishermen have of the future.

Background and Methods

The data presented by Thomas et al. (1995)were collected under the auspices of a two year MARFIN grant. What made this research proposal particularly appealing was the fact that extensive data from Alabama that had been collected in 1987, and this would allow for longitudinal comparisons to be made among Alabama fishermen. More importantly, it can be argued that changes from past to present in one area of the Gulf can reflect changes occurring Gulf-wide.

Again, this was a two year project. The first year was designed to develop and test the instruments needed to measure the various social, economic, occupational, physical, and psychological features of fishermen and to begin testing the questionnaire and collecting data in Alabama. During the second year, the questionnaire was refined to eliminate problematic questions; a gulf-wide sampling frame was developed based on a two year average of the amount of shrimp landed at key ports along the Gulf, and in person interviews were conducted from Key West, Florida to Brownsville, Texas. The sampling frame developed resulted in 577 interviews which yields a confidence level of plus or minus four for the Gulf as a whole. The samples from each state are as follows:

FLORIDA	34
ALABAMA	117
MISSISSIPPI	34
LOUISIANA	244
TEXAS	148
ALABAMA - 1987	113

Note that the table above includes the 1987 sample from Alabama. Throughout the following sections comparisons will be made where possible between 1987 and 1994 for Alabama, and between Alabama 1994 and the rest of the Gulf. Finally, the population to which generalizations can be made is predominately white males. Interviews were conducted only in English and among those capable of comprehending the nature of the complex questions asked. All interviews were obtained at dockside and only captains were queried.

Demographic Characteristics

The following table presents some of the basic demographic features of shrimp fishermen. First, the data suggest that fishermen are aging without replacement. While the average age of Alabama fishermen in 1987 was 38.6 years, this changed to about 43 for both Alabama 1994 and the rest of the Gulf. If fishermen were replacing themselves, the average age would tend to remain relatively stable as new entrants replaced those leaving. This interpretation is consistent with the number of years fishermen have fished. While Alabama fishermen in 1987 had fished on average for 19 years, those in 1994 had significantly more experience fishing.

Overall, the educational level of shrimp-boat captains is less than high school completion level. Most of the captains in the sample were married. Interestingly, while not significant statistically due to sample size, the percent married in Alabama has dropped nearly 10 percentage points between 1987 and 1994. Finally, while most captains have had other work experience the majority of them had that experience before entering their current occupation. On average, that "other experience" is over 20 years old.

DEMOGRAPHIC CHARACTERISTICS

	Gulf-Wide[1]	Alabama[2] 1994	Alabama[3] 1987
Age	42.6	42.7	38.6*
Years of education	10.4	10.6	10.2
Number of years a commercial fisherman	21.9	22.8	19.0*

Percents

	Gulf-Wide[1]	Alabama[2] 1994	Alabama[3] 1987
Married	78.2	80.0	88.5
Other work experience	70.4	67.8	73.6

[1]n=577; [2]n=116; [3]n=113
* = t-test (p<.05)

Economic Characteristics

In the following tables, some of the downward economic trends in the industry can be observed. First, there has been a significant shift in boat ownership. In 1987, only half of the captains interviewed owned and operated their own boats; but by 1994, that number had significantly increased to nearly 63 percent. There has also been a significant shift in the number of captains leaving the nearshore component of the fishery and a concomitant increase in those working offshore. Finally, there is a trend, although not significant statistically, to use more relatives as crew. This finding is compatible with the fact that captains are using significantly fewer crew members (2.1 in 1987 for Alabama to 1.9 in 1994). What this may indicate is a kind of "hunkering down" pattern in which captains are reducing their costs by reducing crew size, but also are restructuring the composition of their crew to include close family members. The labor cost to captains is being minimized, but the benefits are maximized by investing in family members. Certainly, this compounding of obligations weighs heavily in the decisions to stay or leave fishing.

Economic Characteristics

	Percent Yes		
	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Captain owns boat	72.5	62.9	49.5*
Relatives work on boat	43.8	51.9	49.5
Two or more relatives as crew	32.2	29.6	21.3
Fish inshore waters	32.3	31.0	32.7
Fish nearshore waters	41.1	36.2	47.8*
Fish offshore waters	26.6	32.8	19.5*

[1]n=577; [2]n=116; [3]n=113
*Chi Square (p<.05)

	Means		
	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Length of boat (feet)	59.6	67.3	66.0
Number of crew	1.6	1.9	2.1*
Number of months shrimp per year	9.2	9.9	10.4
Number of days at sea	182.3	208.5	219.2
Number of trips per year	45.8	36.5	29.6
Number of trips per month	5.8	4.0	3.7

[1]n=577; [2]n=116; [3]n=113
* = t-test ($p<.05$)

While the previous two tables concentrated on basic economic characteristics and activities of captains, the following table displays the returns from fishing and the value of their boats and gear. In fact, the figures listed below indicate that captains are experiencing some rather dramatic changes in the return on their investment. For example, Alabama captains are making significantly less money today than they were in 1987. On average, captains Gulf-wide report making slightly less that $14,000 per year. Consistent with self-reported incomes are significant drops in the value of the stock landed and value of stock per day at sea. While not significant statistically, the income per day at sea (unadjusted for inflation) dramatically drops from $140/day in 1987 for Alabama to $102/day in 1994.

Further, when asked to list the current value of their boats and gear, presently and five years ago; captains perceived a drop in value. Interestingly, for both Alabama 1994 and the rest of the Gulf, the average drop is roughly $40,000. This decline is well above what would be expected under conditions of normal depreciation and constant demand.

Key Economic Trends

	Means		
	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Income from fishing[4]	13,610	16,082	25,158*
Value of stock harvested[4]	77,837	114,562	197,751*
Value of stock/days at sea[4]	478	558	925*
Income from shrimping/days at sea[4]	105	102	140
Value of boat now	94,603	142,048	NA
Value of boat five years ago	134,441	185,505	NA

[1]n=577; [2]n=116; [3]n=113 [4]n=adjusted to 1984 dollars
* = t-test ($p<.05$)

These data indicate that radical economic changes in shrimp fishing have occurred. Those captains fishing today are likely to own the boat they are working, are supporting a greater number of close relatives serving as crew, and have seen serious declines in the value of the stock they land, in income, and in the value of their boats and equipment. Captains are working under the belief that these are not good times economically.

Occupational Dimension

In this section, additional information is presented on types of pressures fishermen are experiencing. These include a characterization of the stressors associated with fishing and variables linked to job satisfaction.

Research conducted in 1987 among Alabama shrimp fishermen (Thomas et al. 1987) sought to distinguish fishermen from those working land-based jobs on the basis of the stressors to which they are subjected. These stressors, outlined by the World Health Organization, include role conflict, work overload and underload, migration anxiety, having to work while not fully rested and several others. In all, the stressor scale developed for this research consists of over 40 variables which were subsequently reduced to three significant dimensions by factor analysis. These three dimensions are defined in the table below. Of these three, factor one shows a statistically significant change from 1987 to 1994 in Alabama. That is, Alabama fishermen are experiencing a significantly greater degree of stressors associated with work overload. These include: (1) working when not fully rested, (2) not enough sleep because of the amount of work being done, and (3) having more work than can be handled.

This finding is consistent with the fact that captains have reduced the size of their crew and may be working harder to make up for the felt declines in both income and the value of the stock they land. Factor two, an indicator measuring the degree of conflict and cooperation among crew, has remained relatively constant, as has factor three which is a measure of underload, boredom or having little to do at work.

Occupational Dimension

Means

	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Stressor Factor 1: overload[4]	11	11	9.9*
Stressor Factor 2: worker relations[5]	7	6	6.3
Stressor Factor 3: underload[6]	4	3	3.6

[1]n-577' [2]n=116; [3]n=113
[4]Stressor 1 consists of the variables: working when not fully rested, not enough sleep because of work and more work than can be handled.
[5]Stressor 2 consists of the variables: conflict with the demands of fellow workers, amount of cooperation with fellow workers and amount of conflict with fellow workers.
[6]Stressor 3 consists of the variables: create work just to have something to do and little to do at work.
*t-test ($p < .05$)

Job Satisfaction

Another multidimensional scale used to characterize fishermen and the nature of their work is the degree to which fishermen are satisfied or unsatisfied with their jobs. Again, a number of variables served to comprise a job satisfaction scale including enjoyment of fishing, number of hours worked in a row, length of trip taken and several others. These variables were again reduced using factor analysis which yielded two meaningful dimensions. Factor one can be viewed as an intrinsic value of fishing dimension. Items loading on factor one include enjoyment of fishing, the importance of being a fisherman, the worthwhileness of the work, and the peace of mind being a fishermen gives one. Factor two identified the extrinsic features of fishing. Here, variables concerning the number of hours worked, the length of trips made, and the mental pressures associated with fishing loaded on a single dimension.

The lower the value for a given factor the lower the level of satisfaction. In the table below Alabama captains report significant declines from 1987 to 1994 in the intrinsic satisfaction associated with fishing. The value from Alabama for 1994 is similar for the Gulf as a whole. There has also been a decline in the extrinsic rewards of fishing. Again, while the trend is in the same direction, the differences between 1987 and 1994 are not statistically significant.

Job Satisfaction Scores: 1987-1994

	Means		
	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Job satisfaction factor 1: intrinsic features of fishing [4]	15.0	15.6	16.3*
Job satisfaction factor 2: extrinsic features of fishing[5]	12.6	13.6	14.0

1n=577; 2n=116; [3]n=113
[4]Job Satisfaction Factor 1 consists of the variables: enjoyment of fishing, being a fisherman, worthwhileness of work, peace of mind derived from fishing.
[5]Job Satisfaction Factor 2 consists of the variables: number of hours worked, length of trips taken in the past year and the mental pressures associated with fishing.
*t-test ($p < .05$)

Physical and Psychological Dimensions

The data presented in the last few tables suggest that fishermen perceive themselves to be experiencing real changes economically, in the nature of their work, and in the satisfaction they derive from being fishermen. As a result, one would expect to see fishermen manifesting their distress either physically, psychologically, or both.

The following table provides summary data on one physical health and five psychological scales: somatization, mastery, stress, depression, present life satisfaction and future life satisfaction or optimism. Interestingly, fishermen show few changes in physical symptoms of their distress. Research in other areas has demonstrated that fishermen have a tendency to deny the physical rigors of their work. However, four of the five psychological scales show significant changes from past to present. Fishermen feel they have less mastery or control over their own labor today than they did in 1987. They are experiencing greater stress, and, they are less satisfied with their current life situation and not optimistic about their future as fishermen. Lack of optimism is particularly important since it is so closely linked to stress and other mental health factors. It is also strongly associated with such important work variables as commitment to work and willingness to invest in the future.

Physical and Psychological Dimensions

	Gulf-Wide[1]	Alabama 1994[2]	Alabama 1987[3]
Somatization	7.5	7.5	7.4
Mastery	13.9	13.9	14.9*
Stress	9.8	10.1	9.0*
Depression	8.0	7.7	7.6
Present life satisfaction	5.4	5.8	7.2*
Future life satisfaction	3.4	3.9	7.7*

[1]n=577; [2]n=116; [3]n=113
* t-test ($p < .05$)

Surprisingly, the scale used to measure depression fails to show significant changes from past to present, and is relatively consistent between Alabama and the Gulf as a whole for 1994. One possible interpretation is that this scale is not sensitive enough to capture real and significant levels of mental distress. For the purpose of this project, a screening diagnostic referred to as the Primary Care Evaluation of Mental Disorders (PRIME-MD) recently developed by physicians at the University of South Alabama medical school was administered to fishermen Gulf-wide. Since this measure was unavailable in 1987, comparisons between the two time periods for Alabama are not possible. Instead, comparisons can be made to similar studies done on the population in general. One such study, the Epidemiological Catchment Area Program conducted in five cities across the country, reports distress levels for a number of psychological disorders. Since, the sample of shrimp fishermen is all male, only the comparisons to males in the epidemiological study are made. The results appear in the following table.

Comparisons Between ECA and Shrimp Fishermen

Disorder	Percent ECA[1]	Percent Shrimp Fishermen
Major Depression	1.4[3]***	6.5[4]
Major Depression in Partial Remission	NA	13.2[5]
Minor Depression	NA	4.8[4]
Dysthymia	2.2[6]***	5.1[5]
Panic	0.9[3]***	1.9[7]
Generalized Anxiety	0.9[8]***	9.0[7]
Alcohol Dependence/Abuse	11.9[8]	3.4[9]
Any/All Disorders	14.5[10]***	30.7[11]

*** $p<.001$; ** $p<.01$; * $p<.05$
[1]n=8211; [2]n=567
[3]Symptoms occurred in the last year.
[4]Symptoms occurred in the last two weeks.
[5]Symptoms occurred in the last two years
[6]Lifetime rate.
[7]Symptoms occurred in the last month.
[8]Symptoms occurred in the last year; this data is derived from only three sites, from second wave data and from assessment procedures that differ somewhat across sites.
[9]Symptoms occurred in the six months.
[10]Includes major depressive episode, mania episode, generalized anxiety disorder, panic disorder, phobia, obsessive-compulsive, somatization, alcohol abuse/dependence, drug abuse/dependence, schizophrenia, schizophrenia-form disorder and antisocial personality.
[11]Includes major depressive disorder, major depressive disorder in partial remission, dysthymia, generalized anxiety disorder, anxiety disorder (not otherwise specified), and alcohol dependence/abuse.

When compared to a national sample, the results for shrimp fishermen are startling. In every case it can be seen that the level of mental distress is significantly higher among shrimp fishermen than those in the general population. In fact fishermen have three times the depression rate; more than twice the incidence of dysthymia and panic disorder; ten times the generalized anxiety rate, and twice the rate of overall mental distress than the population in general. In contrast, fishermen are almost four times less likely to abuse alcohol than the general population. What this means is that nearly one third of all shrimp fishermen are distressed to the point that if they were to see a physician, they could expect to receive treatment of some type.

It is important to note here that depression should not be interpreted in the common sense notion of mere sadness. Depressive symptoms include: depressed mood, loss of interest in usual activities, loss of appetite, insomnia, psychomotor retardation, loss of energy, feelings of worthlessness and guilt, diminished ability to think and poor concentration, and suicidal thought or action. Depressed fishermen would make poorer fishermen because they would lack initiative to carry out some of the routine activities necessary to operate efficiently, address problems that arise, and maintain safety.

In summary, fishermen believe that they have seen real economic declines in their incomes and the value of their boats and equipment, and they perceive themselves to be working harder than they have in the past. The enjoyment they once derived from fishing and being a fishermen is significantly less than in the past. These perceptions are real and the consequences of these perceptions are equally real, as can be seen in the level of psychological distress shrimp fishermen are currently manifesting.

Perceptions of the Future

Given the current state of fishermen, it is unclear what changes would result from increased regulatory requirements, including the requirement of placing BRDs in their nets. As noted in the previous section, comparisons of the level of depression and other physical and psychological disorders could not be made on shrimpers from 1987 to 1994; consequently, it is unknown whether their current state has resulted from past regulations (especially the requirement of TEDs) or other factors, e.g., operational costs, competition, lost fishing grounds, etc. The underlying question is: what do they intend to do if conditions persist or worsen, and what are their beliefs upon which these intentions are based?

Fishermen are certainly aware that regulations aimed at reducing incidental bycatch are on the horizon. Such regulations come closely on the heels of the mandated use of turtle excluder devices (TEDs). Many fishermen also believe that TEDs have had a significant adverse effect on their fishing operations and are in part responsible for declines in income. Only three fifths of the fishermen interviewed believe that they will be able to survive the first year should bycatch regulations be imposed on them. Only two fifths believe they would be able to survive in the following two to three years. Half of them believe that would seek work on shore, while only 30 percent would move to another fishery (see table below). (It is noted that "bycatch regulations" as queried in this portion of the study include any additional regulations that would be placed on fishermen to reduce bycatch. In other words, any or all of the alternatives proposed in this amendment).

Perceptions of Occupational Intentions, Given Current Conditions and Further Bycatch Regulations

	Percent Agree	
	Current Conditions	Bycatch Regulations
1. "I intend to stick with shrimp fishing for the next year."	91.1	58.5
2. "I intend to stick with shrimp fishing for the next 2-3 years.	80.6	36.9
	Percent Likely	
3. "How likely is it that you will move to on shore work?"	30.2	48.1
4. "How likely is it that you will move to another fishery?'	9.7	27.9

n=577

Intentions to act are based both on what people believe and how effective their behavior will be, as well as what others who are important to them believe they should do. Fishermen were asked a series of questions about what they believed they could do or what would happen to them if conditions remained as they were at the time of the interview and what would happen to them should bycatch regulations come into being. These questions concentrated on income concerns fishermen had previously expressed and on alternative economic options and behavioral actions they felt might be open to them. There responses appear in the table below. Generally speaking, fishermen anticipate substantial effects of bycatch regulations on these already economically marginal positions.

FUTURE PERCEPTIONS OF FISHERMEN

	Percent likely	
	Current Conditions	**Bycatch Regulations**
1. Make enough money to support your family	39.9	5.4
2. Get a higher price for shrimp	26.0	19.9
3. Fish more often for other species	22.3	27.5
4. Make enough money to make boat payments	51.4	9.4
5. Spend more time away from home	70.1	70.6
6. Spouse will have to work full-time	57.7	68.8
7. Find reliable crew members	24.6	9.7
8. Get a second job	52.7	66.6
9. Your sons will go into fishing	12.7	5.2
10. Move to another town to find another job	23.2	32.9
11. Enjoyment of fishing	34.7	4.7

n=577

Finally, the decisions fishermen make to stay or leave shrimp fishing is also influenced by what others believe they ought to do. When asked what others who are important to them believe that they should do, nearly half (48.1 percent) stated that someone close to them believes they should quit fishing!

What are the characteristics of those most likely to leave? The data presented here suggests that those for whom fishing is no longer extrinsically rewarding are certainly among those likely to leave. This would include those unable to make boat payments, or unable to support their families on the income they can generate from fishing. Those who no longer experience the intrinsic rewards of fishing are also likely to leave. This would include those who claim that fishing and being a fishermen is no longer enjoyable. Finally, those having close family members and friends encouraging them to leave would also tend to quit before someone having relatives and friends urging them to stay.

C. SOUTH ATLANTIC FISHERMEN AND COMPARISONS WITH THE GULF

The only comparable study of commercial shrimp fishermen in the south Atlantic was conducted by Kitner (1987), and her research involved perceptions and opinions regarding the impending requirement for the use of turtle excluder devices (TEDs). It has been noted that these perceptions and attitudes toward TEDs could be applicable to the requirement for BRD usage (SAFMC)

Kitner (1987) found that fishermen who were previously exposed to the use of TEDs were less likely to view their loss of shrimp and salable fish from such usage as a disadvantage. Approximately 30 percent saw no important disadvantages. She also noted that the state with the least familiarity with TEDs was North Carolina. Subsequently, BRDs have been required in state waters of North Carolina, and ironically both fishermen and state personnel have reported that BRDs have been accepted and are viewed as an improvement to trawling.

As with Thomas et al. (1995), Kitner (1987) found that the greatest worry of shrimpers was economic losses. In both studies, the additional requirement of bycatch regulations or TEDs, respectively, was expected to increase problems with meeting financial obligations. Another consistent finding that can be extrapolated from both studies is that shrimpers are probably more relieved when they are a part of the decision process and have options, e.g., different TED or BRD designs. By involving fishermen at the early stages of implementing certification criteria and providing technological options for meeting the criteria, implementation will probably be enhanced and a greater level of acceptance achieved.

D. CONCLUSIONS OF THE SIA REGARDING SHRIMP FISHERMEN IN THE GULF

1. Shrimp fishermen were experiencing a higher level of work-related stress in 1994 versus 1987, and this level of stress could have health considerations.

2. The primary cause of the increased stress and anxiety was economic uncertainty possibly caused by previous regulations, including TEDs, or other factors, e.g., competition, price of shrimp, costs of operation, etc., or a combination of both TEDs and other factors.

3. The proposal of additional regulations, e.g., bycatch regulations of any kind and including those alternatives presented in Section 2.0, will likely increase the level of stress currently being experienced by shrimp fishermen, and there are no data to assess differences among stress levels that might be encountered by the different alternatives presented in Section 2.0.

4. If bycatch regulations, e.g., requiring BRDs results in increased efficiency and reduced workload (as reported in North Carolina), the stresses of shrimp fishing could be reduced.

5. Shrimp fishermen are more likely to accept and comply with bycatch regulations if they are made a part of the process to develop bycatch reduction criteria, and they are more likely to accept and use BRDs (if required), when they are allowed to participate in the design and testing of these gear.

E. GULF RED SNAPPER COMMERCIAL FISHERMEN

With the exception of the conclusions of the effects of this amendment on commercial red snapper fishermen, the following discussion is taken practically verbatim from "Amendment 8 to the Reef Fish Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico."

Thomas et al.. (1993) conducted a survey of red snapper fishermen who own and operate their own boats (owner/operators) and who were issued a red snapper endorsement, allowing trip limits of 2,000 pounds. Owner/operators consisted 72 percent of all persons holding red snapper endorsements (131). Of these, 79 percent (75 fishermen) were interviewed. The survey determined the salient attitudes, practices and beliefs the fishermen held about the fishery and regulatory effects applied to the fishery, as well as demographic information. The survey asked fishermen to contrast several social and economic indicators for periods of pre-regulation (1986-1989) and post-regulation (after quotas were established, and annual season were closed). The survey also utilized a social theoretical model to describe, explain and empirically test the decision-making processes used by the fishermen in their efforts to pursue a livelihood.

Fishing Practices in and Dependence on the Fishery:

Almost all of the fishermen (70 percent) surveyed by Thomas et al.. (1993) used bandit rigs to target red snapper and other reef fish. In addition to bandit rigs, nearly half (45.9 percent) used rods and reels. Approximately 19 percent used longlines for species other than red snapper.

A comparison of fishing behavior prior to the implementation of closures in 1992 and 1993, with that after the closures, reveals that the fishery is now closed for three of the six primary months for red snapper fishing. This is a source of frustration for many fishermen.

Prior to implementation of restrictive quotas, fishermen surveyed by Thomas et al.. (1993) exercised a greater degree of diversity in fishing behavior. Only 77.3 percent fished all year long for red snapper. Nearly 23 percent fished for red snapper during specific months with this period being predominantly October through March. After implementation of the quotas all fishermen target red snapper only in the months of the open season.

A consequence of the short season and derby fishery has raised concern among surveyed fishermen over safety issues. Fishermen feel that they are being forced to fish in weather they normally would avoid. Nearly half (49.2 percent) indicated weather that they normally would have avoided occurred in 6 to 15 of their trips, while only 12.3 percent did not fish in such weather.

Since the implementation of regulations in the red snapper industry, a significant number of fishermen report increases in their effort directed at the harvest of triggerfish, silk snapper, vermillion snapper, and king mackerel. One of the unintended effects of regulations on red snapper may be increased stress on the stocks of these other species. This suggests that fisheries managers need to conceptualize policy in terms of a more general fisheries management program.

Typically those fishermen that in the pre-regulation period (1986-1989) targeted red snapper all year also targeted (or caught) a greater diversity of finfish species than fishermen who targeted red snapper in certain months (Thomas et al.. 1993 - Tables 10 and 11). In the post-regulation period and after red snapper season was closed a significantly greater effort was applied to targeting vermilion snapper and king mackerel, with more modest increases directed at other species. Fishermen that targeted red snapper only during certain months in the pre-regulation period directed significantly greater effort at triggerfish, silk snapper, scamp, and tuna in the post-regulation period.

The great majority of respondents (over 80 percent) intend to continue fishing commercially for red snapper for the next two to three years despite the fact that: (1) most are pessimistic about the future price of fish (84 percent); (2) many are concerned about their ability to make payments or buy supplies (58 percent); and (3) slightly less than half (49 percent) are confident they will earn enough to support their families.

A model for decision making behavior, derived from the Fishbein-Azjen theory of reasoned action, was developed for explaining labor intentions of fishermen. The intention to remain in the fishery was found to be related to the following factors: (1) relative economic optimism for the fishery; (2) the willingness among fishermen to change fishing behavior in order to persist in the industry; (3) support of significant others for remaining in fishing; (4) confidence that one's sons will be able to have a future in fishing; and (5) an unwillingness to move away from one's hometown.

Thomas et al.. (1993) predicted that these fishermen are likely to continue fishing for red snapper long after it would appear economically rational for them to do so. Furthermore, when fishermen do decide to leave that particular fishery, it is reasonable that they will opt for other fisheries before pursuing work options on land. These social analyses indicate a major degree of dependency on the fishery.

<u>Income and Labor Effects of Management:</u>

Thomas et al.. (1993) examined economic trends and perceptions in their survey of owner/operators holding red snapper endorsements. These were examined for pre-regulation (1986-1989) and post-regulation periods and are summarized below.

Several social and economic indicators show declines for fishermen from the period of 1986-89 to the present. Fishermen report an average fall in income from the late 1980's to 1993 of $15,836, a decline of 40 percent. During the same time period, they report an average depreciation in the value of their boats of $29,556, a decline of 31 percent. The number of crew reported for an average trip declined by 1 crew member, a decline of 26 percent in this labor segment of the fishery. Focus group data suggest that family members are increasingly relied upon to supplement crews. Most fishermen report changes in the amount of money available for boat maintenance.

Owner/operators sampled reported that average income in the pre-regulation period was $39,554, after regulations $30,768, and a projected 1993 average income of $23,718, i.e., a significantly different change for each period. In addition to reporting an average reduction of crew from 3.8 to 2.8, 40.5 percent of them reported that regulations had a large effect on their ability to maintain a steady crew. They reported a decrease in both the number of trips and length of trips after regulation. Although the percentage of income derived from red snapper did not change materially, (i.e., from 64.0 to 59.1 percent), the value of red snapper declined.

Fishermen's beliefs about their future over the next 2 to 3 years were largely pessimistic. A fairly high percentage felt it was unlikely that they would make enough to support their family (38 percent), get a higher price for red snapper (84 percent), be able to make boat payment and buy supplies (33 percent), or have sons enter the fishery (89 percent). They believed it likely that they would fish more often for other species (64 percent) and would have to spend more time away from home (65 percent).

Despite recent economic hardship, and pessimism for the future of the industry, it appears that the majority of these fishermen will continue to fish for red snapper for as long as they possibly can. Many will adapt to stressed conditions by increasing effort in fishing for other species. Few are likely to pursue successfully nonfishing employment, at least in the near future.

Demographic and Social Information Relevant to the Fishery:

Endorsed owner operators tend to be fairly old (49 years), have considerable experience as commercial fishermen (19.5 years), have paid off their boats (67 percent), and have another source of family income (51 percent). Most have no experience working on land or in fishing without hooks and line. This profile suggests that these men have financial and personal investments in red snapper fishing which preclude an easy movement to other lines of work.

Thomas et al.. (1993) found that typically the fishermen had fished for red snapper for 16.9 years, utilizing boats averaging 46.2 feet (24-85) and had 11.4 years of education. Eighty-five percent were married. More than half (58.1 percent) had no experience working on land and more than 80 percent (83.8) lacked experience in fisheries not involving hook-and-line gear.

The majority of respondents reported increased conflict among fishermen, and a significant fraction (42 percent) reported decreased cooperation. Self ratings of quality of life showed a 37 percent decline over the last five years, and most fishermen anticipated further declines in the next five years.

The decline in cooperation between fishermen was largely attributed to the red snapper endorsement system where some vessels received 2,000 pound trip limits and all others 200 pound trip limits. Thomas et al.. (1993) summarized that the increased conflict serves to retard the ability of fishermen to act collectively in addressing management issues. This likely results in much testimony on issues being self-serving statements of fragmented segments of the industry.

F. CONCLUSIONS OF THE SIA REGARDING COMMERCIAL RED SNAPPER FISHERMEN

Further reductions in, or the elimination of the directed fishery quota for red snapper as a result of inadequate management of shrimp-trawl bycatch could increase pressure on other reef fish stocks or displace fishermen from the fishery or to other fisheries.

G. OTHER COMMERCIAL AND RECREATIONAL FINFISH FISHERMEN

Other than those previously mentioned, no studies have been conducted regarding the potential effects of the alternatives presented in this amendment on other commercial or recreational fishermen. Any reductions in the bag limits of red snapper as a result of inadequate management of shrimp-trawl bycatch could have negative effects on both the recreational fishery for red snapper as well as the for-hire industry.

6.0 ENVIRONMENTAL CONSEQUENCES

FISHERY RESOURCES

Mandating the use of BRDs could have a negative effect on the shrimp stock biomass based on the results of ecological modeling. Martinez, et al. (1996) evaluated four scenarios regarding shrimp biomass that considered the potential for increased abundance of bottomfish predators from the requirement of BRDs (see Section A.2-Ecological Impacts and Appendix B). Three of the four scenarios showed shrimp biomass reductions that would likely result from increased predation; however, one scenario noted the potential for a small increase in shrimp biomass. This scenario assumed that larger fish would seek alternative prey, and the predation rate on shrimp would decrease by approximately 30 to 50 percent.

The environmental consequences of the proposed alternatives in terms of biological, economic, and social impacts, particularly as they relate to red snapper stocks and the shrimp fishery, are discussed in Sections 2.0, 3.0, and 4.0. The proposed action will reduce the bycatch in areas where the use of BRDs is required. Because BRDs are not 100 percent effective, some reduced level of incidental take will occur. A reduction or loss of shrimp through the BRD may also occur. The amount of shrimp loss would be dependent on the type of BRD used and the operation of the trawl and vessel. In areas not directly affected by this action (i.e., state controlled waters), the shrimp fishery may continue to take incidental catch; however, some voluntary use of BRDs may occur in these areas.

While the NMFS' stock assessment model concludes that red snapper will rebound with a substantial reduction in the bycatch mortality of the juveniles, the ecological consequences of reducing the bycatch mortality of other fishes and invertebrates, particularly those that have little commercial value due to size or marketability, are not fully understood. Estimates of bycatch have been determined by species, quantity, and area in the Gulf (Bryan et al. 1982, Pellegrin 1982, Nichols et al. 1987); however, such estimates become meaningful only when considered in the context of the species' overall stock size, its bycatch by age class, and the magnitude of shrimp bycatch relative to other sources of directed and nondirected fishing mortality (NMFS, 1995). Such information does not exist or is extremely limited for most species. The more abundant fishes on the Gulf of Mexico continental shelf were characterized by Chittenden and McEachran (1976) as small, short-lived species with high annual mortality rates. Sheridan, et al. (1984) noted that the seven dominant species also reproduce at or before age 1.

Divita, et al. (1983) examined fish taken by trawl off Texas during the May-July seasonal closure. Their analysis of fish stomach contents found that 50 of the 81 species of trawl-susceptible fishes examined did not feed on penaeid shrimps, and only 6 species had eaten brown shrimp. Due to their small size, the shrimp predators preferred smaller penaeids. Both benthic and epibenthic feeding fishes seemed to prefer the smaller shrimps (Trachypenaeus and Acetes), the latter being planktonic (Franks et al. 1972). Brewer et al. 1991 found that in an area with low fishing pressure where fish are larger and more abundant, their feeding has a relatively high impact on the abundance of penaeid shrimp.

Discards serve as a food source for sea birds, marine mammals, coastal pelagics, and sharks that are attracted to shrimping operations. Hill and Wassenberg (1990) found that discards from trawlers have the effect of transferring large quantities of biological material from the bottom to the surface making food available to surface scavengers that otherwise would be inaccessible.

Hill and Wassenberg (1990) further reported:

> "Fish made up 78 percent, noncommercial crustaceans 18 percent, and cephalopods 3 percent by weight of the material studied. Nearly all fish were dead when discarded, and about half sank. About half of the non-commercial crustaceans were alive when discarded and all sank when discarded. Few cephalopods (2 percent) were alive when discarded, and around 75 percent sank.
>
> Sharks and dolphins were the most common scavengers of floating discards at night. Birds (common and crested terns, and lesser and greater frigates) scavenged only during the day. Discards that sank did so rapidly, taking less than 5 minutes to reach 25 m depth. A high rate of loss of baits set for 10 minutes in the water column (24 percent in trawled area at night) indicated significant scavenging in mid-water--probably by sharks. Observations of baits set on the bottom showed that teleosts (nemipterids) and sharks ate most of the material that reached the bottom; scavenging by invertebrates was negligible."

In an inshore fishery, Wassenberg and Hill (1990) reported that about 3 percent of the discards from prawn trawlers in Moreton Bay, Queensland (Australia) float, and the rest sinks. The floating component was almost entirely fish that were eaten at night by gulls, terns, and bottlenose dolphin. While there is little daytime trawling, cormorants joined the scavengers at dawn. Birds and dolphins scavenged only fish and cephalopods, not crustaceans or echinoderms.

Wassenberg and Hill (1990) continued:

> "Most of the material that sinks is crustaceans (54 percent) and echinoderms (18 percent); the rest is elasmobranchs and rubble. At night, about half of

the fish that sink are eaten by diving birds and by dolphins. There was no indication of mid-water scavenging of sinking discards, except for cormorants and dolphins in the upper water column. Approximately 11 percent of the discards that reach the bottom comprise fish and crustaceans, which are eaten by crabs (Portunus pelagicus) and fish. The remainder--chiefly crabs, echinoderms and elasmobranchs--reach the bottom alive. Altogether, about 20 percent of discards are eaten by surface and bottom scavengers. Discards are probably important in maintaining populations of the major scavengers."

In studies conducted in the North Sea, Berghahn and Rosner (1992) found that 68 to 90 percent of smelt and whiting discarded by a shrimp vessel was consumed by gulls.

Walter and Becker (1994) reported that interactions between the Wadden Sea brown shrimp fishery were characterized by competition for the same stocks of fish and shellfish. Additionally, changes in the ecosystem brought about by the fisheries and their discards may influence seabird populations. Along with poorly documented changes in the ecosystem and food web structure, the provision of offal and discards was considered to have strong influences on food availability and consequently on numbers of seabirds.

Browder (1983) developed a simulation model of the nearshore, marine ecosystem of the north-central Gulf of Mexico that evaluated reduction of fish bycatch in shrimp trawls. It suggested that a reduction in fish bycatch would result in increased total availability of food for shrimp, and increased competition from bottomfish for that food. The increased supply of food ultimately would outweigh the increased competition from bottomfish, and the shrimp standing stock and shrimp yield would recover in spite of a higher standing stock of bottom fish. Predation of shrimp by the bottomfish had minor influence.

The following observations of the GSAFDF (1994) are especially appropriate in terms of the expected ecological consequences:

> "From an ecological perspective, with a programmatic goal of reducing finfish bycatch by 50 percent, the successful development of BRDs for the shrimp fishing fleet will have a significant measurable positive ecological impact on the faunal community that inhabits areas where shrimp are abundant. Considering that much of this catch is unwanted by shrimp fishermen, use of BRDs have the indirect benefit of developing a more ecologically favorable fishery, thus ameliorating a negative perception about waste in this fishery.
>
> More importantly, reduction in juvenile finfish mortality is anticipated to increase available stocks of fishes for other commercial and recreational fisheries. This will be especially important for those species, such as red snapper, which are highly prized and targeted by an intense directed recreational and commercial effort. Finally, successful completion of a bycatch reduction program will, in turn, provide fisheries management agencies with alternative strategies to enhance stocks of impacted finfish, and potentially alleviate user-group conflicts stemming from current management restrictions."

Additional study is needed to ascertain the environmental and ecological effects of bycatch reduction on fishery resources of the Gulf.

HUMAN ENVIRONMENT

This subject is discussed in Section 1.0 Description of the Fishery, in Section 4.0 of the Regulatory Impact Review, and Section 5.0 Social Impact Assessment. As noted, shrimp fishermen will be adversely affected to the extent that their catch is reduced through the loss of shrimp from the requirement of BRDs, and any resultant loss of catch from potential reductions in the total shrimp biomass as discussed in Proposed Alternative A.2. Conversely, red snapper fishermen (recreational and commercial) should benefit from the predicted recovery in the stock of red snapper. Fishermen who target other highly sought-after species that are also taken in bycatch (e.g., king and Spanish mackerel) also should benefit to the extent that populations of these species increase.

The following observations of the GSAFDF (1994) are especially appropriate in terms of some expected positive impacts on the shrimp fisherman's environment:

> "Reduction of finfish bycatch in the shrimp fishery is ecologically and economically beneficial to the industry through reduced cost to harvest and process the catch, as well as in providing a higher quality product. There will be a measurable positive impact to shrimp fishermen because of decreased workload in culling the unwanted bycatch, and a concurrent reduction in the time that valuable shrimp must remain on deck during the culling process. This will, in turn, provide for a higher quality product through two means: (1) less damage to shrimp during towing and haul-back because of a reduced amount of total catch (weight) in the net, and (2) more rapid processing of shrimp off the deck and into a cold storage system, lessening the chance of spoilage. Additionally, as the weight load in the nets increases during towing, the otter doors are pulled closer together, reducing the total area swept by the net. With a reduction in weight load in the net, this reaction of the doors will be reduced, and the area swept may increase, thus potentially increasing catch per tow."

EFFECT ON ENDANGERED AND THREATENED SPECIES

See Section 10.0.

EFFECT ON WETLANDS

The proposed amendment will have no effect on any flood plains, wetlands, trails, or rivers.

MITIGATING MEASURES RELATED TO THE PROPOSED ACTION

The proposed use of BRDs is intended to reduce the incidental take of bycatch in the shrimp fishery of the EEZ. Similarly, the required use of TEDs in the shrimp fishery has been implemented under provisions of the Endangered Species Act to reduce the incidental take of sea turtles.

UNAVOIDABLE ADVERSE EFFECTS

The proposed action will reduce the bycatch in areas where the use of BRDs is required. Because BRDs are not 100 percent effective, some reduced level of incidental take will occur; however, the overall effect of BRD usage should be ameliorating adverse environmental effects. A reduction or loss of shrimp through the use of BRDs may occur, and the amount of shrimp loss will be dependent on the type of BRD used and the operation of the trawl and vessel. In areas not directly affected by this action (state controlled waters), the fishery will continue unchanged, unless states adopt similar regulations or some level of voluntary use of BRDs occurs in such areas.

RELATION BETWEEN LOCAL, SHORT-TERM USES OF THE RESOURCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The primary objective is to allow for a long-term recovery of the red snapper stock (i.e., by the target date of the year 2019) by reducing mortality of juveniles in shrimp trawls to acceptable levels in 1997. The intent is to achieve this reduction with a minimum cost to shrimp fishermen.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

A relatively small cost to modify a shrimp trawl to exclude unwanted bycatch can increase trawl efficiency, reduce fuel costs, and reduce sorting time of the catch. If this can be accomplished without loss of shrimp there will be no additional commitment of resources.

CUMULATIVE EFFECTS

The cumulative effect of the shrimp fishery on the stock of red snapper has been adverse in that the incidental bycatch of juveniles prevents stock recovery to the target SPR level. Cumulative impacts to other finfish populations have probably been adverse because of the substantial bycatch, but in most cases the impacts are unknown or not well understood. The overall cumulative effect of the proposed measures to reduce bycatch is positive to the extent practicable in federal waters in terms of the red snapper stock. For most of the other finfish species the impact is unknown, but probably positive. Although the cumulative effects of the proposed bycatch reduction measures may be positive for finfish, they may be negative in terms of a lower shrimp biomass because of increased predation and reduction in nutrient levels available for recycling. Whether this will result in a corresponding reduction in shrimp catch is unknown at this time.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

ISSUES / PROBLEMS

ALTERNATIVES	*Red Snapper bycatch*	*Bycatch of other fishery species*	*Shrimp catch loss*	*Physical habitat*
No action	Excess bycatch mortality continues	Bycatch continues unabated	no effect	no effect
Require BRDs <100 fm	Maximizes bycatch reduction over largest geographic area in EEZ	Maximizes bycatch reduction over largest geographic area in EEZ	any loss from BRDs would be limited to this geographic area	no effect
Require BRDS <100 fm west of Cape San Blas, FL	Reduces bycatch---- targets east/west area where red snapper are concentrated	Bycatch reduction limited to this geographic area - - no reduction for most of FL west coast	any loss from BRDs would be limited to this geographic area	no effect
Require BRDs between 10-100 fm	Reduces bycatch---- targets Gulf-wide depth zone where most red snapper occur	No bycatch reduction for species occurring shallower than 10 fm	any loss from BRDs would be limited to this geographic area	no effect
Require various % juvenile red snapper bycatch reduction criteria	variable but 50% reduction needed to rebuild stock by 2019	Varies by species and % desired, if any	variable -- depends on BRD selected and %	no effect
Require various % shrimp retention criteria	no effect	no effect	variable -- depends on BRD and criteria chosen	no effect
Require seasonal closures	no net reduction in bycatch	no net reduction in bycatch	probable increase	no effect

7.0 TIME AND LOCATION OF PUBLIC HEARINGS:

Public hearings on the amendment were scheduled from 7:00 p.m. to 10:00 p.m. at the following locations:

Monday, October 7, 1996

Holiday Inn Beachside
3841 North Roosevelt Boulevard
Key West, Florida 33040

Lake Charles Civic Center
900 Lakeshore Drive
Lake Charles, LA 70602

Tuesday, October 8, 1996

Thibodaux Civic Center
310 North Canal Boulevard
Thibodaux, LA 70301

Radisson Inn
12635 Cleveland Avenue
Fort Myers, FL 33907

Wednesday, October 9, 1996

Radisson Bay Harbor Inn
7700 Courtney Campbell Causeway
Tampa, FL 33607

Radisson Inn New Orleans Airport
2150 Veterans Memorial Boulevard
Kenner, Louisiana 70062

Monday, October 14, 1996

Franklin County Courthouse
33 Market Street
Appalachicola, FL 32320

Holiday Inn Fort Brown
1900 East Elizabeth
Brownsville, TX 78520

Tuesday, October 15, 1996

Pensacola Civic Center
201 E. Gregory
Pensacola, FL 32501

Port Aransas Civic Center Auditorium
710 West Avenue A
Port Aransas, TX 78373

Wednesday, October 16, 1996

Radisson Admiral Semmes Hotel
251 Government Street
Mobile, AL 36602

Bauer Community Center
2300 Highway 35 Bypass
Port Lavaca, Texas 77979

Thursday, October 17, 1996

J. L. Scott Marine Education Center
& Aquarium
115 East Beach Boulevard
U.S. Highway 90
Biloxi, Mississippi 39530

Texas A&M University
200 Seawolf Parkway
Galveston, TX 77553

Written comments on this draft must be received by the responsible agencies by November 1, 1996.

RESPONSIBLE AGENCIES

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Lincoln Center, Suite 331
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8.0 LIST OF PREPARERS

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- Antonio Lamberte, Economist
- Richard Leard, Fishery Biologist
- Terrance Leary, Fishery Biologist
- Bill Lindall, Fishery Biologist
- Wayne Swingle, Fishery Biologist

National Marine Fisheries Service
- Richard Raulerson, Economist
- John Ward, Economist

9.0 LIST OF AGENCIES AND PERSONS CONSULTED

Gulf of Mexico Fishery Management Council's
- Scientific and Statistical Committee
- Shrimp Advisory Panel
- Shrimp Stock Assessment Panel

Coastal Zone Management Programs
- Louisiana
- Mississippi
- Alabama
- Florida

National Marine Fisheries Services
- Southeast Fisheries Center
- Fisheries Operations Branch - Southeast Regional Office

Trade Associations
- Texas Shrimp Association
- Louisiana Shrimp Association
- American Shrimp Processors Association
- Southeastern Fisheries Association
- Organized Fishermen of Florida
- Southern Offshore Fishermen's Association
- Save America's Seafood Industry

Others
- Center for Marine Conservation
- National Coalition for Marine Conservation, Inc.
- Coastal Conservation Association

10.0 OTHER APPLICABLE LAW

VESSEL SAFETY

This amendment does not impose unsafe gear or require unsafe vessel operation.

PAPERWORK REDUCTION ACT

This amendment requires no additional reporting requirements or permitting.

COASTAL ZONE MANAGEMENT CONSISTENCY

The Assistant Administrator has determined that this proposed action will be implemented in a manner that is consistent to the maximum extent practicable with the approved coastal zone management programs of the affected states in the management area. This determination has been submitted for review by the states under Section 307 of the Coastal Zone Management Act.

FEDERALISM

This amendment does not contain policies with federalism implications sufficient to warrant preparation of a federalism assessment under E.O. 12612.

EFFECT ON ENDANGERED SPECIES AND MARINE MAMMALS

Listed endangered and threatened species under the Endangered Species Act (ESA) with NMFS jurisdiction and protected marine mammals under the Marine Mammal Protection Act (MMPA) that occur in the Gulf of Mexico include:

Whales and Dolphins:

(1) Eubalaena glacialis - the (endangered) northern right whale
(2) Balaenoptera musculus - the (endangered) Blue whale
(3) Balaenoptera borealis - the (endangered) sei whale
(4) Balaenoptera physalus - the (endangered) fin whale
(5) Balaenoptera edeni - the (protected) Bryde's whale
(6) Balaenoptera acutorostrata - the (protected) Minke whale
(7) Megaptera novaeangliae - the (endangered) humpback whale
(8) Physeter catodon - the (endangered) sperm whale
(9) Kogia breviceps - the (protected) pygmy sperm whale
(10) Kogia simus - the (protected) dwarf sperm whale
(11) Mesoplodon densirostris - the (protected) Blainville's beaked whale
(12) Mesoplodon europaeus - the (protected) antillean beaked whale
(13) Mesoplodon mirus - the (protected) True's beaked whale
(14) Ziphius cavirostris - the (protected) goosebeaked whale
(15) Feresa attenuata - the (protected) pygmy killer whale
(16) Pseudorca crassidens - the (protected) false killer whale
(17) Orcinus orca - the (protected) killer whale
(18) Peponocephala electra - the (protected) melon-headed whale
(19) Globicephala macrorhynchus - the (protected) short-finned pilot whale
(20) Steno bredanensis - the (protected) rough-toothed dolphin
(21) Delphinus delphis - the (protected) saddleback dolphin
(22) Tursiops truncatus - the (protected) Atlantic bottlenose dolphin
(23) Grampus griseus - the (protected) grampus
(24) Stenella frontalis - the (protected) bridled dolphin
(25) Stenella plagiodon - the (protected) Atlantic spotted dolphin
(26) Stenella coeruleoalba - the (protected) striped dolphin
(27) Stenella longirostris - the (protected) spinner dolphin
(28) Stenella clymene - the (protected) short-snouted spinner dolphin
(29) Lagenodelphis hosei - the (protected) Fraser's dolphin

Sea Turtles:

(30) Caretta caretta - the (threatened) loggerhead turtle
(31) Chelonia mydas - the (threatened/endangered) green turtle
(32) Dermochelys coriacea - the (endangered) leatherback turtle
(33) Eretmochelys imbricata - the (endangered) hawksbill turtle
(34) Lepidochelys kempii - the (endangered) Kemp's ridley turtle

(NOTE: Green turtles in U.S. waters are listed as threatened except for the Florida breeding population that is listed as endangered).

Fish:

(35) the (threatened) Gulf sturgeon - Acipenser oxyrhynichus desotoi

Of the aforementioned endangered and threatened species, the NMFS has determined that shrimp trawling activities adversely affect sea turtles. Under the MMPA, the southeastern U.S. shrimp trawl fishery is classified as Category III, for infrequent takes of bottlenose dolphins. For sea turtles, though, the rate of taking in shrimp trawls in the southeast U.S. in the 1970's and 1980's was known to be far more serious. Using data collected by observers aboard commercial trawlers from 1973 through 1984, Henwood and Stuntz (1987) estimated that approximately 47,000 turtles were captured annually in the Gulf and South Atlantic commercial shrimp fisheries, and 11,000 turtles died in trawls.

The ESA provides the NMFS with the responsibility for protecting sea turtles in federal waters, where the GMFMC has jurisdiction, as well as the territorial seas and internal waters of the Gulf states. It was thus under the authority of the ESA, and not via the GMFMC, that the NMFS developed and implemented a program to reduce the incidental capture and mortality of marine turtles in shrimp trawls that focused on Turtle Excluder Devices (TEDs), that allow turtles to escape from shrimp trawls, while allowing the shrimp fishery to continue. TEDs of two different classes were developed: hard TEDs made of rigid pipes or bars and soft TEDs made of flexible netting. The standard for approval of new TEDs was set at a 97% reduction in sea turtle capture. On June 29, 1987, ~~the~~ NMFS issued final regulations (52 FR 24244) under the ESA to conserve endangered and threatened sea turtles. In offshore waters, that rule required all shrimp trawlers 25 feet and longer to use turtle excluder devices (TEDs) in shrimp trawls. Smaller trawlers were required to limit their tow times to 90-minutes or to use TEDs. Actual implementation of these regulations was delayed by various law suits and Congressional and Administration actions.

In 1990, the National Academy of Sciences (NAS) reviewed the biology and information on the incidental take of sea turtles in shrimp trawls and concluded that all life stages of sea turtles are susceptible to human-induced mortality. The most important human-associated source of mortality for juveniles, subadults, and breeders in coastal waters was the incidental capture in shrimp trawls. This source accounted for more than the combined totals for other sources, such as other fisheries, dredging, oil and gas platform removals, collisions, and other human-related factors. Annual estimated mortality from incidental captures in shrimp trawls was between 5,000 to 50,000 loggerheads, 500 to 5,000 Kemp's ridleys, and varying amounts of other species. The NAS noted that the actual kill of sea turtles may be four times greater than the NMFS estimate.

In 1992, the NMFS evaluated shrimp trawling under then-current TED regulations in the southeastern United States and concluded that the TED regulations, assuming 100 percent compliance, had resulted in a 67 percent reduction in sea turtle mortalities by shrimp trawlers in U.S. waters. Under the 1992 regulations, an estimated 23,376 turtles were captured annually by shrimp trawlers, and 4,360 turtles drown. Based on the above study by NAS, these estimates may understate true mortality by a factor of four (Henwood et al. 1992).

In order to enhance the effectiveness and enforceability of the sea turtle conservation regulations, a final rule was published on December 4, 1992 (57 FR 57348) which phased out exemptions from the TED requirements for trawlers in inshore waters and small boats.

The NMFS and the U.S. Fish and Wildlife Service approved recovery plans for the loggerhead and green turtles in 1991, leatherback and Kemp's ridley turtles in 1992, and hawksbill turtles in 1993. These recovery plans contained recommendations for federal, state, and local agencies, and the other interested parties to follow in enhancing the conditions for the recovery of these reptiles. Use of TEDs in shrimp trawls was an integral part of the recovery plans for these reptiles throughout their range.

The ESA Section 7 consultation conducted on the promulgation of the 1992 revisions to the sea turtle conservation regulations concluded that shrimp trawling in the southeastern U.S. was not likely to jeopardize the continued existence of listed species under NMFS jurisdiction (August 19, 1992). The incidental take statement (ITS) associated with the 1992 biological opinion (BO) assumed that TEDs, which would be required in shrimp vessels in all waters throughout the southeastern U. S. on a phased-in basis, would exclude 97% of all sea turtles encountered by shrimp trawls. Unprecedented sea turtle stranding levels reported in association with heavy nearshore shrimp trawling in 1994 indicated that takes beyond those anticipated were occurring in nearshore Texas, Louisiana and Georgia waters. Gear modifications were implemented in an attempt to reduce lethal takes of sea turtles associated with shrimp trawling (59 FR 33447, June 29, 1994), but elevated strandings continued. Ultimately during 1994, a total of 488 turtles stranded on Texas offshore beaches, including 243 Kemp's ridleys. An additional 174 turtles, including 134 Kemp's ridleys, stranded in Louisiana during 1994. Strandings were high in Georgia as well, with 216 documented strandings reported, compared to the previous three years' average of 144 strandings.

In a November 14, 1994 BO, the NMFS concluded that the long-term operation of the shrimp fishery, resulting in mortality of Kemp's ridleys at levels observed in 1994, was likely to jeopardize the continued existence of the Kemp's ridley population and could prevent the recovery of the loggerhead population. The opinion found that the high level of sea turtle mortality resulted from the incorrect installation and improper use of TEDs by shrimpers in the southeastern U.S., the certification of TEDs that were ineffective due to their complexity or incompatibility with some net types, and intensive fishing effort in areas of high sea turtle abundance during the spring and summer of 1994. The simultaneous occurrence of intensive pulse fishing and sea turtles may have led to the repeated submergence of individual turtles in short time periods, that could have contributed to the high levels of strandings. A reasonable and prudent alternative was identified that allowed shrimping to continue in spite of the jeopardy opinion. Among the requirements of the reasonable and prudent alternative, NMFS had to reevaluate the effectiveness of certain types of TEDs including bottom-opening TEDs and soft TEDs.

Under NMFS' regulatory authority to implement further restrictions to fishing activities in order to prevent unauthorized takings, temporary additional restrictions were imposed on shrimp fishing four times during 1995 (60 FR 21741, May 3, 1995; 60 FR 32121, June 20, 1995; 60 FR 44780, August 29, 1995; 60 FR 42809, August 17, 1995) and one time during 1996 ((61 FR 33377, June 27, 1996). The restrictions responded to elevated levels of sea turtle strandings, and all of them included temporary prohibitions against the use of soft TEDs and required the use of TEDs in try nets larger than 12 feet in headrope length or 15 feet in footrope length. Some of the temporary measures also limited bottom-opening hard TEDs and TED flap lengths.

The NMFS conducted additional gear research in 1994, 1995 and 1996 designed to investigate performance problems with existing TED types and possibly identify solutions therefore. The testing identified problems with commercially available Morrison TEDs (which captured 8 out of 24 turtles tested) and Andrews TEDs (which captured 21 out of 42 turtles tested. The poor performance of the soft TEDs resulted from the incompatibility of the TEDs with certain net designs, the difficulty of installing taut soft TEDs consistently, and general design problems. Research into various configurations of hard TEDs revealed problems with the release efficiency of bottom-opening hard TEDs that could be improved by modifying the grid angle and shortening the webbing flap. Other studies showed that try nets also capture sea turtles, even though try nets up to 20 feet in headrope length had been exempted from TED requirements. The turtle capture rate in try nets appeared to be dependent on the size of the try nets.

To address the problem of continuing shrimping-related mortality of sea turtles, the NMFS has published a final rule (61 FR 66933, December 19, 1996) to amend the regulations protecting sea turtles. The final rule establishes Shrimp Fishery Sea Turtle Conservation Areas (SFSTCAs) in the western Gulf and in the Atlantic along the coast of Georgia and South Carolina. Within the SFSTCAs, effective March 1, 1997, the rule will require TEDs to be installed in try nets with a headrope length greater than 12 feet or a footrope length greater than 15 feet, will prohibit the use of soft TEDs, and will modify the requirements for bottom-opening hard TEDs. Outside of the SFSTCAs, effective December 19, 1997, TEDs will be required in try nets with a headrope length greater than 12 feet or a footrope length greater than 15 feet, and existing soft TEDs will no longer be approved for use (if improvements or modifications can be and are made to any of these soft TED designs so that they exclude turtles effectively, NMFS will institute a rulemaking to continue or reinstate the approval of any such soft TEDs as improved or modified).

A November 13, 1996 BO was prepared for that final rule which concluded that the continued long-term operation of the shrimp fishery in the southeastern U.S. under the sea turtle conservation regulations, as amended, is not likely to jeopardize the continued existence of the Kemp's ridley, loggerhead, or any other listed species. During informal consultation over Amendment 9, the NMFS concluded that the measures of Amendment 9 were not likely to change the basis for the findings of the November 13, 1996 BO. Amendment 9 would require shrimpers in the Gulf EEZ west of Cape San Blas, Florida within the 100-fathom contour to equip their nets with either Andrews TEDs or 30-mesh fisheye BRDs, presumably in conjunction with a TED. Presently, the area east of Cape San Blas is where the largest proportion of Andrews TEDs are used, in relation to other TED types. Consequently, Amendment 9 would likely dramatically increase the use of the Andrews TED in other areas of the Gulf. With the latest data on Andrews TED performance indicating a 50% turtle capture rate (21 out of 42 trials), expanded use of the Andrews TED would likely result in an increase in shrimping-related turtle mortality unless modifications are developed to reduce turtle capture and maintain acceptable bycatch reduction. The new TED rule, however, restricts the use of soft TEDs and eventually removes the approval of the Andrews TED (unless solutions are found to make the Andrews TED effective at excluding sea turtles).

In 1980, a Section 7 Consultation on the Shrimp FMP was initially conducted with the U.S. Fish and Wildlife Service. The BO indicated that the management actions to be implemented through this plan were not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The BO was based on an evaluation of the FMP, the FEIS, and other data available at that time.

Since then, the NMFS has conducted Section 7 consultations on: (1) modifications to the closure of federal waters off Texas (1986) and the Tortugas shrimp sanctuary from 1988 through 1991; (2) Amendment 4 (1990); (3) Amendment 5 (1990); (4) the shrimp fishery (1991); (5) Amendment 6 and the shrimp fishery (1992); (6) Amendment 7, royal red shrimp fishery, and the shrimp fishery for species other than royal red shrimp (1994); and (7) Amendment 8 and the royal red shrimp fishery (1995). Generally, these consultations resulted in opinions similar to the current BO that management actions were not likely to jeopardize the continued existence of any endangered species. Instead, these actions provide an additional layer of protection to the marine turtles by prohibiting trawling for shrimp in certain areas, e.g., off Texas, during periods of rapid shrimp growth. This period generally coincides with the period when turtles may be present in these coastal waters or nesting on the adjacent land.

11.0 REFERENCES

Berghahn, R., and H. U. Rosner. 1992. A method to quantify feeding of seabirds on discard from the shrimp fishery in the North Sea. Netherlands Journal of Sea Research 28(4): 347-350.

Blomo, V. J., W. L. Griffin, and J. P. Nichols. 1978. Catch-effort and price-cost trends in the Gulf of Mexico shrimp fishery: Implications on Mexico's extended jurisdiction. Marine Fisheries Review: 40(8):24-28.

Brewer, D.T., Blaber, S.J.M., and Salini, J.P. 1991. Predation on penaeid prawns by fishes in Albatross Bay, Gulf of Carpentaria. Marine Biology (Berlin) 109: 231-240.

Browder, J.A. 1983. A simulation model of a nearshore marine ecosystem of the north-central Gulf of Mexico. In: K. Turgaon (editor). Marine Ecosystem Modeling, Proceedings of a Workshop held April 6-8, 1982, Frederick, Maryland. NOAA-USDOC, Washington, D.C.

Brown, G. L. 1981. A survey of recreational shrimping in the bay and sound systems of the Gulf coast for 1980. Final Report, Gulf States Marine Fisheries Commission, Ocean Springs, Mississippi 147 pp.

Bryan, C.E., T.J. Cody, and G.C. Matlock. 1982. Organisms captured by the commercial shrimp fleet on the Texas brown shrimp (Penaeus astecus Ives) grounds. Texas Parks and Wildlife Department. Technical Series Number 31, 26 pp.

Chittenden, M. E., Jr. and J.D. McEachran. 1976. Composition, ecology and dynamics of demersal fish communities on the northwestern Gulf of Mexico continental shelf, with a similar synopsis of the entire Gulf. Sea Grant Publication. TAMU-SG-76-208. 104 pp.

De Sylva, D. P. 1954. The live bait shrimp fishery of the northeast coast of Florida. Technical Series, No. 11, Marine Laboratory, University of Miami, Coral Gables, Florida.

Divita, R., M. Creel, and P.F. Sheridan. 1983. Foods of coastal fishes during brown shrimp, Penaeus aztecas, migration from Texas estuaries (June-July 1981). Fishery Bulletin: 81 (2): 396-404.

Franks, J.S., J.Y. Christmas, W.L. Siler, R. Combs, R. Waller, and C. Burns. 1972. A study of nektonic and benthic faunas of the shallow Gulf of Mexico off the State of Mississippi as related to some physical, chemical and geological factors. Gulf Research Reports 4:1-148.

Fonyo, C., J. A. Browder, and S. L. Brunenmeister. 1983. Mobility patterns and characteristics of shrimp vessels fishing off Texas, 1981. NOAA Technical Memorandum, NMFS-SEFC-120. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Fisheries Center, Miami Laboratory, 75 Virginia Beach Drive, Miami, Florida 33149-1099.

GMFMC, 1979. Final environmental impact statement and fishery management plan for the stone crab fishery of the Gulf of Mexico. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

GMFMC, 1981a. Fishery Management Plan for the Shrimp fishery of the Gulf of Mexico, United States Waters. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 881, Tampa, Florida 33609.

GMFMC, 1981b. Draft Fishery Management Plan, Environmental Impact Statement, and Regulatory Analysis for Groundfish in the Gulf of Mexico. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

GMFMC, 1991. Regulatory amendment to the reef fish fishery management plan for setting the 1991 red snapper total allowable catch. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

GMFMC, 1994. Report to the Gulf Council on shrimp effort. Prepared by the shrimp effort committee: Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

GMFMC, February 1996 minutes. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

Goodyear, C.P. 1994. Red Snapper in U.S. waters of the Gulf of Mexico. NMFS-SEFSC Contribution: MIA-94/94-63. Miami, Florida.

Goodyear, C. P. 1995. Red Snapper in U.S. Waters off the Gulf of Mexico. NMFS-SEFSC Contribution: MIA-95/96-05. Miami, Florida.

Goodyear, C. P. Personal communication. National Marine Fisheries Service, Southeast fisheries Science Center, 75 Virginia Beach Drive, Miami, Florida 33149-1099.

Grant, W. E. and W. L. Griffin. 1979. A bioeconomic model of the Gulf of Mexico shrimp fishery. Transactions of the Amenrican Fisheries Society, 108(1): 1-13.

Griffin, W. L. and L. L. Jones. 1975. Economic impact of commercial shrimp landings on the economy of Texas. Marine Fisheries Review 37(7): 12-14.

Griffin, W. L. and J.P. Nichols. 1976. An analysis of increasing costs to Gulf of Mexico shrimp vessel owners" 1971-75. Marine Fisheries Review 38(3):8-12.

Griffin, W.L. and C. Oliver. 1991. Evaluation of the economic impacts of turtle excluder devices (TEDs) on the shrimp production sector in the Gulf of Mexico. Draft report, MARFIN Project NO. NA-87-WC-H-06139. Agricultural Economics Department, Texas A&M University, College Station, TX 77843-2124.

Griffin, W. L. and B. R. Beattie. 1978. Economic impact of Mexico's 200-mile offshore fishing zone on the United States Gulf of Mexico shrimp fishery. Land Economics 54(1): 27-38.

GSAFDF, 1994. Organization and management of a Gulf of Mexico and South Atlantic Ocean fishery bycatch management program. Final report (Year II). Gulf and South Atlantic Fisheries Development Foundation, 5401 West Kennedy Boulevard, Suite 997, Tampa, Florida 33609.

Harrington, D. Personal Communication. University of Georgia. Athens, Georgia.

Hendrickson, H.M., and W.L. Griffin. 1993. An analysis of management policies for reducing shrimp bycatch in the Gulf of Mexico. North American Journal of Fisheries Management. 13: 686-697.

Henwood, T., W. Stuntz, and N. Thompson. 1992. Evaluation of U. S. turtle protective measures under existing TED regulations including estimates of shrimp-trawler-related shrimp mortality in the wider Carribean. NOAA Technical memorandum, NMFS-SEFSC-303. 15pp.

Hill, B.J., and T. J. Wassenberg. 1990. Fate of discards from prawn trawlers in Torres Strait. Australian Journal of Marine and Freshwater Research 41: 53-64.

Holiman, S. 1996. Economic assessment of the Gulf of Mexico recreational mackerel fishery. NMFS-SERO, 9721 Executive Center Drive, St. Petersburg, FL 33702-2432.

Howell, P. Unpublished data. National Marine Fisheries Service, Southeast Regional Office, 9721 Executive Center Drive, North, St. Petersburg, Florida 33702.

Idyll, C.P. 1963. The shrimp fishery. Pages 160-182. In: M.E. Stansby (editor), Industrial fishery technology. Reinhold Publishing Co., New York. 393 pp.

Interorganizational Committee on Guidelines and Principles for Social Impact Assessments, 1994.

Kearney-Centaur. 1989. Economic activity associated with fishery products in the United States. Final report. National Fisheries Education and Research Foundation, Inc., July 1989.

Keithly, W. R., K. J. Roberts, and J. M. Ward. 1991. Effects of shrimp aquaculture on the U.S. market: an econometric analysis. Draft Report, Louisiana State University, Baton Rouge, Louisiana.

Keithly, W. R., K. J. Roberts, and H. Eyster-Kearney. 1993. The southeastern seafood processing industry: an economic assessment for private and public management decision making. Final report to the National Marine Fisheries Services. Contract No. NA90AA-H-SK-53, Coastal Fisheries Institute, Center for Coastal, Energy, and Environmental Resources, Louisiana State University, Baton Rouge, Louisiana.

Kitner, K. R. 1987. TEDs: study of the South Atlantic shrimp fishermen's beliefs, opinions, and perceptions regarding the use of turtle excluder devices. SAFMC Technical Report 5. 47pp.

Klima, E.F. and R.S. Ford. 1970. Gear and techniques employed in the Gulf of Mexico shrimp fishery. Conference on the Canadian Shrimp Fishery. 26 pp.

Martinez, E.X., J.M. Nance, and R.J. Zimmermann. 1996. A model for the assessment of ecological interaction among living marine resources in the Gulf of Mexico: Implications for bycatch management and shrimp production. NMFS-SEFSC. Galveston, Texas Laboratory. Report to GMFMC. 19 pp.

Moberg, M. and C. Dyer. 1994. Conservation and forced innovations: Response to turtle excluder devices among Gulf of Mexico Shrimpers. Human Orgnaization 53(2): 160-166.

Nance, J.M. 1993. Shrimp trawl bycatch characterization study. MARFIN Final Report. 93NMFS20. NMFS-SEFSC. Miami, Florida.

Nance, J.M. 1994. Shrimp trawl bycatch characterization study. Presentation to the GMFMC. May 1994. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

Nichols, S. 1990. The spatial and temporal distribution of the bycatch of red snapper by the shrimp fishery in the offshore waters of the U.S. Gulf of Mexico. Report of the NMFS Mississippi Laboratories. Pascagoula, Mississippi.

Nichols, S. 1994. Update and revision of bycatch estimates for king and Spanish mackerel 1972-1993. Report of the NMFS Mississippi Laboratories. Pascagoula, Mississippi.

Nichols, S. 1996a. An update of bycatch findings for mackerels and cobia in the Gulf of Mexico shrimp fishery. NMFS-SEFSC. Mississippi Laboratories, Pascagoula, Mississippi. Memo File Report. 11 pp.

Nichols, S. 1996b. An update on some issues relating to the distribution of red snapper bycatch. NMFS-SEFSC. Mississippi Laboratories, Pascagoula Mississippi. Memo File Report. 9 pp.

Nichols, S. Personal communication. National Marine Fisheries Service, Pascagoula Laboratories, Pascagoula, Mississippi.

Nichols, S., A. Shah, G. Pellegrin, Jr., and K. Mullin. 1987. Estimates of annual shrimp fleet bycatch for 13 finfish species in the offshore waters of the Gulf of Mexico. Unpublished manuscript. Available from Pascagoula Facility, Mississippi Laboratories, Southeast Fisheries Center, National Marine Fisheries Service, P. O. Drawer 1207, Pascagoula, Mississippi 39568.

Nichols, S. and G.J. Pellegrin, Jr. 1992. Revision and update of estimates of shrimp fleet bycatch 1972-1991. NMFS Mississippi Laboratories, Pascagoula, Mississippi.

Nichols, S., J. Nance, P. Goodyear, A. Shah and J. Watson. 1995. Some considerations in determining bycatch reduction requirements. NMFS-SEFSC. Miami, Florida. Memo File Report. 18 pp.

NMFS, 1990. Report of the workshop to evaluate potential management alternatives for reducing directed effort and shrimp trawl bycatch of red snapper. NMFS-SEFSC. Mississippi Laboratories, Pascagoula, Mississippi. Memo File Report. 14 pp. (plus attachments).

NMFS, 1994. Status report on the potential of gear modifications to reduce shrimp trawl bycatch in shrimp trawls in the southeastern United States. NMFS-SEFSC. Miami, Florida.

NMFS, 1995. Cooperative research program addressing finfish bycatch in the Gulf of Mexico and South Atlantic shrimp fisheries, a report to Congress.

NMFS, 1996. Summary report on the status of bycatch reduction device development. NMFS. Mississippi Laboratories, Pascagoula, Mississippi. 5 pp. (plus attachment).

NOAA, 1995. Our living oceans, report on status of U.S. living marine resources. NOAA Technical Memorandum. NMFS-F/SPO-19. 160 pp.

Oravetz, C. Personal communication. NMFS-SERO. 9721 Executive Center Drive North, St. Petersburg, Florida 33702.

Osburn, H. Personal communication. Texas Parks and Wildlife Department. 4200 Smith School Road, Austin, Texas 78744.

Osterbind, C. and R. A. Pantier. 1965. Economic study of the shrimp industry in the Gulf and South Atlantic States. Final report, Contract No. 14-17-008-118, The Bureau of Commercial Fisheries, Fish and Wildlife Service, United States Department of the Interior, Washington, D. C.

Pellegrin, G., Jr. 1982. Fish discards from the southeastern United States shrimp fishery. In: IRDC, Fish bycatch, bonus from the sea: Report of a technical consultation on shrimp bycatch utilization held in Georgetown, Guyana, October 27-30, 1981. 33pp.

RFSAP. 1994. 1994 Report of the reef fish stock assessment panel. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida.

RFSAP. 1995. 1995 Report of the reef fish stock assessment panel. Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida.

Resource Economics Consultants, 1994. Estimation of Gulf of Mexico shrimp fishing costs and returns. Final report prepared for U.S. Department of Commerce, NOAA, National Marine Fisheries Service, 9721 Executive Center Drive, St. Petersburg, Florida 33702-2432.

Roberts, K. J., W. Keithly, and C. Adams. 1992. The impact of imports, including farm-raised shrimp, on the southeast shrimp processing sector. NOAA Technical Memorandum NMFS-SEFC-305, USDOC, NOAA, NMFS.

SEP. 1995. Report of the socioeconomic panel meeting on reef fish. Gulf of Mexico Fishery Management Council, 5401 west Kennedy Boulevard, Suite 331, Tampa, Florida 33609.

Sheridan, P.F., D.L. Trimm, and B.M. Baker, 1984. Reproduction and food habits of seven species of Northern Gulf of Mexico fishes. Contributions in Marine Science 27: 175-204.

Southeast Area Monitoring and Assessment (SEAMAP) Reports. Various dates. Gulf States Marine Fisheries Commission, Post Office Box 726, Ocean Springs, Mississippi 39566-0726.

South Atlantic Fishery Management Council (SAFMC). Southpark Building, Suite 306, Southpark Circle, Charleston, South Carolina 29407-4699.

Swingle, H. A., D. G. Bland, and W. M. Tatum. 1976. Survey of the 16-foot trawl fishery of Alabama. Alabama Marine Resources Bulletin 11. p. 51-57.

Thomas, J.S., C.M. Formichella, M. Jepson, and G.B. Olsen. 1987. A comparison of optimism between fishermen and landbased workers in an Alabama coastal fishing community. Paper presented at the American Anthropological Association meetings. Chicago, Illinois.

Thomas, J. S., G. D. Johnson, C. M. Formichella, and C. Riordan. 1993. Perceived social and economic effects of current management policies on red snapper fishermen operating in the Gulf of Mexico: a report to the Gulf of Mexico Fishery Management Council. Available from the Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609. 39 pp. (plus appendix).

Thomas, J.S., C.M. Formichella, G.D. Johnson, and C.A. Riordan. 1995. Shrimp Fishermen on the Eve of Bycatch Regulations. A Report to the Gulf of Mexico Fishery Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609. October 1995. 19pp.

U.S. International Trade Commission. 1985. Conditions of competition affecting the U.S. Gulf and South Atlantic shrimp fishery. U.S.I.T.C. Publication 1738, Washington, D.C.

Vondruska, J. 1985. Trends in the U. S. markets for processed shrimp. Presented at the annual meeting of the National Shrimp Processors. Lake Buena Vista, Florida.

Vondruska, J. 1992. Southeast shrimp fishery market conditions - 1991. National Marine Fisheries Service, 9721 Executive Center Drive, St. Petersburg, FL 33702-2432.

Vondruska, J. 1995a. Southeast shrimp fishery market conditions - 1994. National Marine Fisheries Service, 9721 Executive Center Drive, St. Petersburg, FL 33702-2432.

Vondruska, J. 1995b. Economic assessment of the Gulf of Mexico commercial mackerel fishery. NMFS-SERO, National Marine Fisheries Service, 9721 Executive Center Drive, St. Petersburg, FL 33702-2432.

Vondruska, J. Personal communication. National Marine Fisheries Service, Southeast Regional Office, 9721 Executive Center Drive, North, St. Petersburg, Florida 33702.

Walter, U., and P.H. Becker. 1994. The significance of discards from the brown shrimp fisheries for seabirds in the Wadden Sea - preliminary results. Ophelia Suppl. 6: 253-262.

Ward, J. M. 1988. A synthesis of cost and revenue surveys for Gulf of Mexico shrimp vessels. Marine Fisheries Review 50(1):47-52.

Ward, J. M. 1991. Modeling vessel mobility: the Gulf of Mexico shrimp fleet. Ph. D. dissertation. University of Rhode Island.

Ward, J. M. and J. M. Nance. 1994. 1994 update of the stock assessment and fishery evaluation (SAFE) report for the Gulf of Mexico shrimp fishery. National Marine Fisheries Service, Southeast Regional office, 9721 Executive Center Drive, North, St. Petersburg, Florida 33702.

Ward, J. M. and J. G. Sutinen. 1994. Vessel entry-exit behavior in the Gulf of Mexico shrimp fishery. American Journal of Agricultural Economics 76(4):916-923.

Ward, J. M., T. Ozuna, and W. Griffin. 1995. Cost and revenues in the Gulf of Mexico shrimp fishery. NOAA Technical Memorandum NMFS-SEFSC-371. 76 pp.

Ward, J. M. and S. Macinko. 1996. Static and dynamic implications designed to reduce bycatch in a stylized fishery. In press, The Southern Journal of Business and Economics.

Wassenberg, T.J., and B.J. Hill. 1990. Partitioning of material discarded from prawn trawlers in Moreton Bay. Australian Journal of Marine and Freshwater Research 41: 27-36.

Waters, J. and J. Nance. 1990. A description of trip data collected from the 1987 inshore shrimp fishery of Galveston Bay, Texas. NOAA Technical Memorandum, NFMS-SEFC-257.

Watson, J.W. Personal communication. NMFS-SEFSC. Mississippi Laboratories, Pascagoula, Mississippi.

12.0 FIGURES:

FIGURE 1: Shrimping effort from 5-50 fathoms in grids 9-21 and predicted cumulative bycatch fishing mortality for post-bycatch natural mortality rates of 0.1, 0.15 and 0.2.

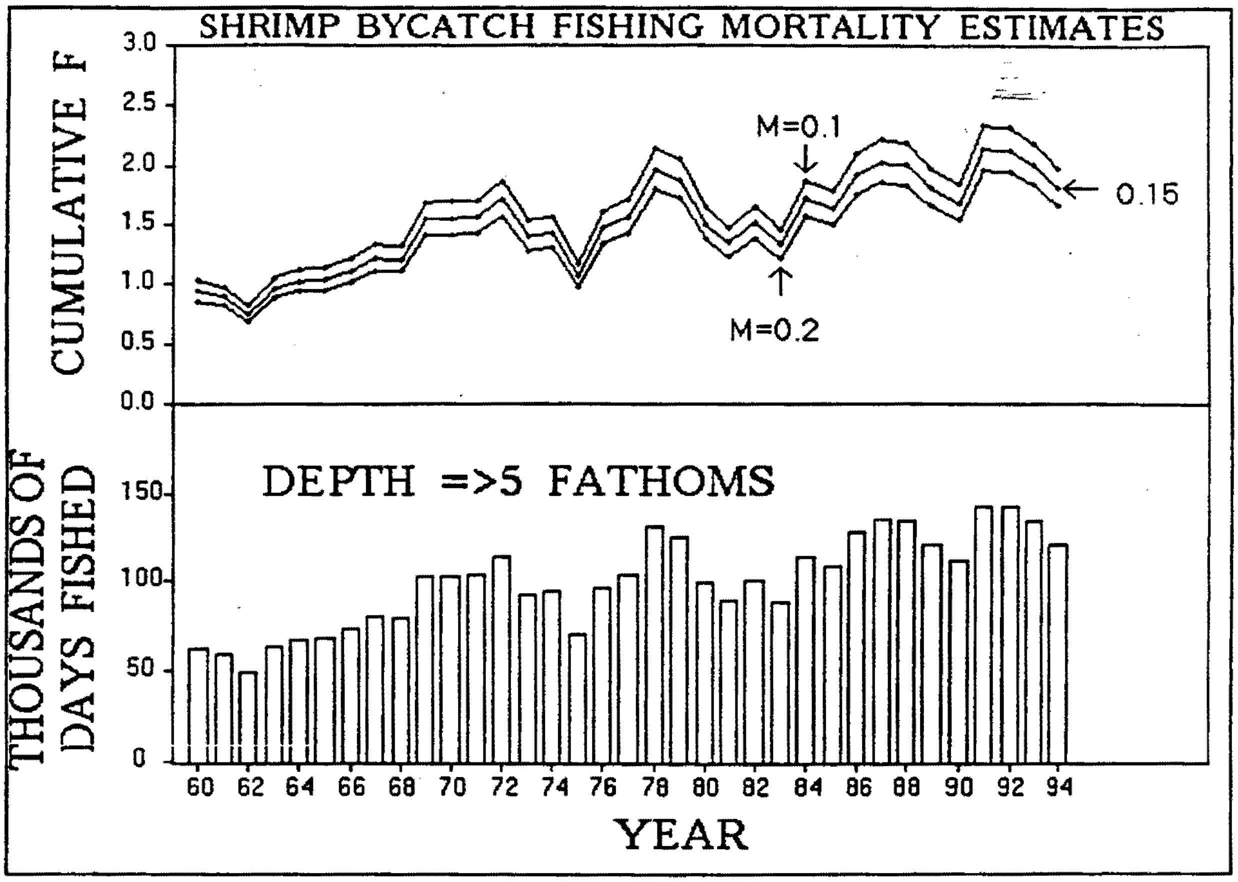
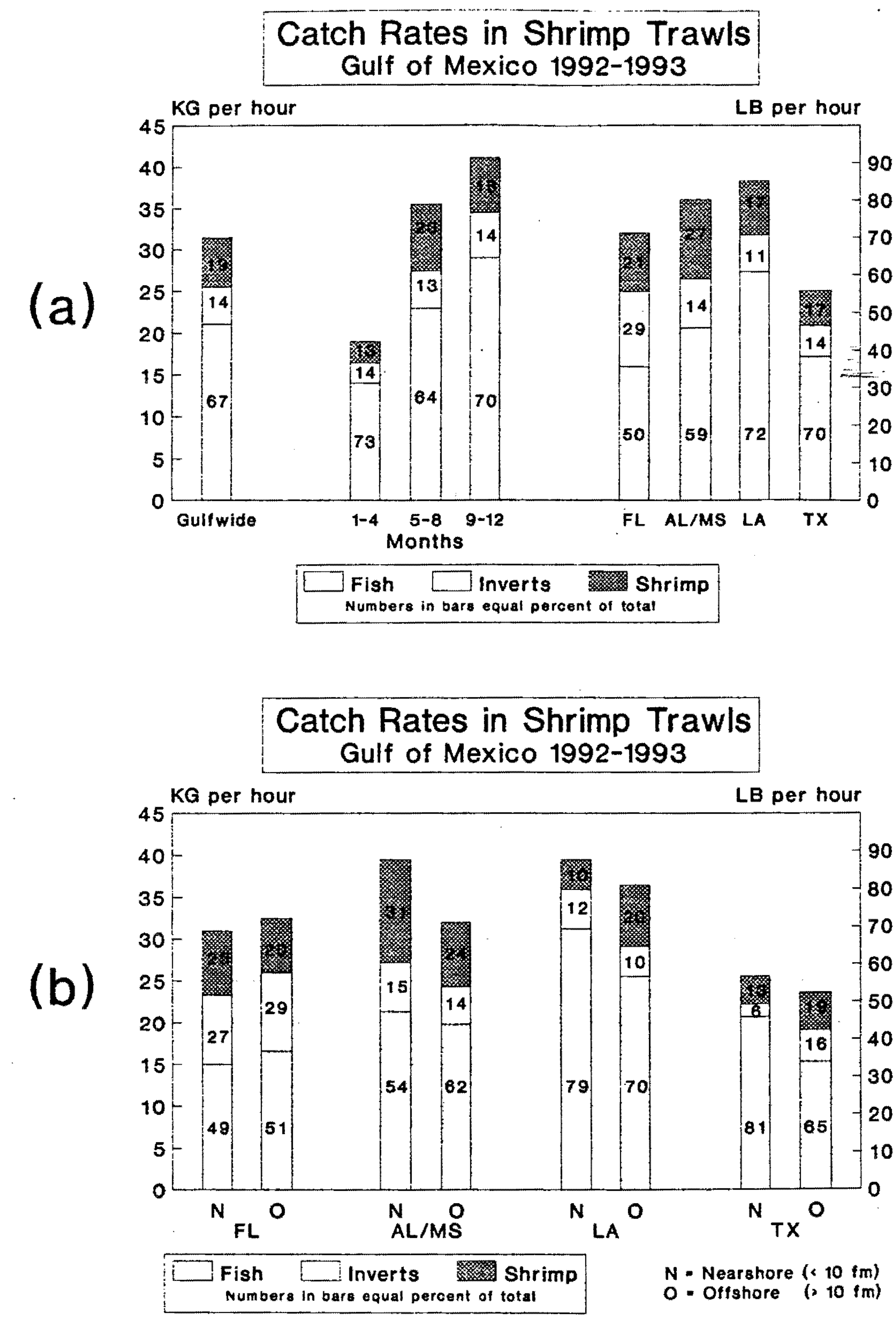
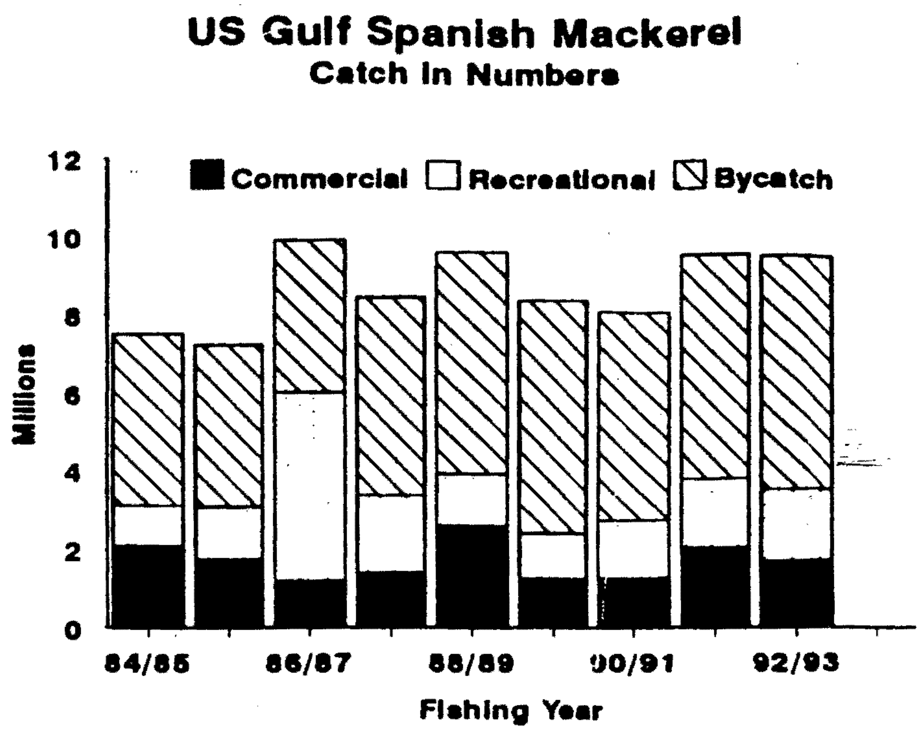


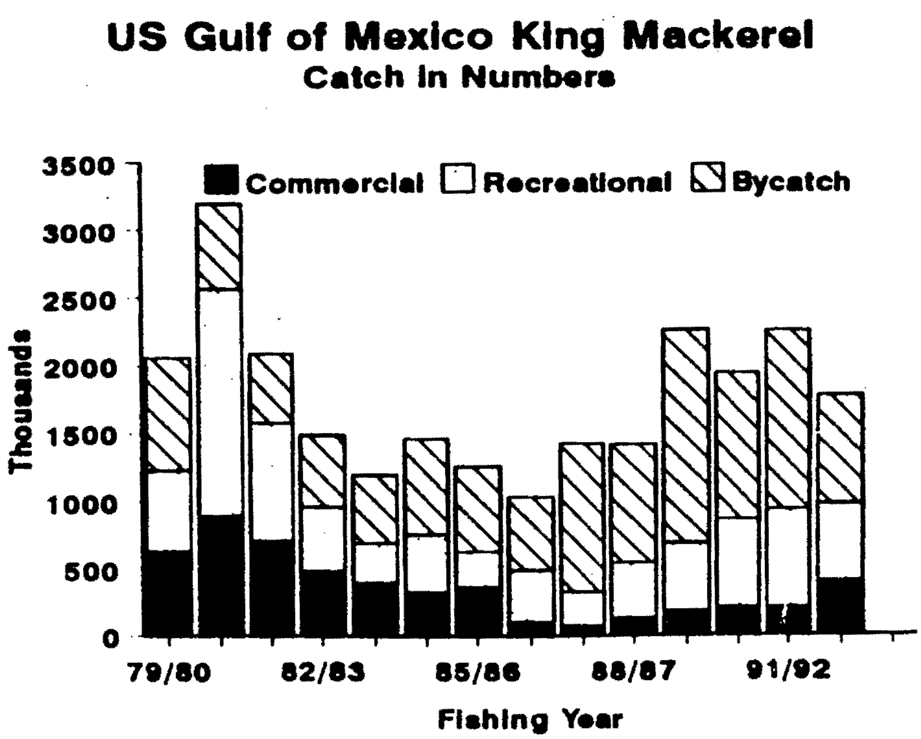
FIGURE 2: Catch rates and distribution of shrimp and bycatch groups.



Source: GSAFDF (1994)

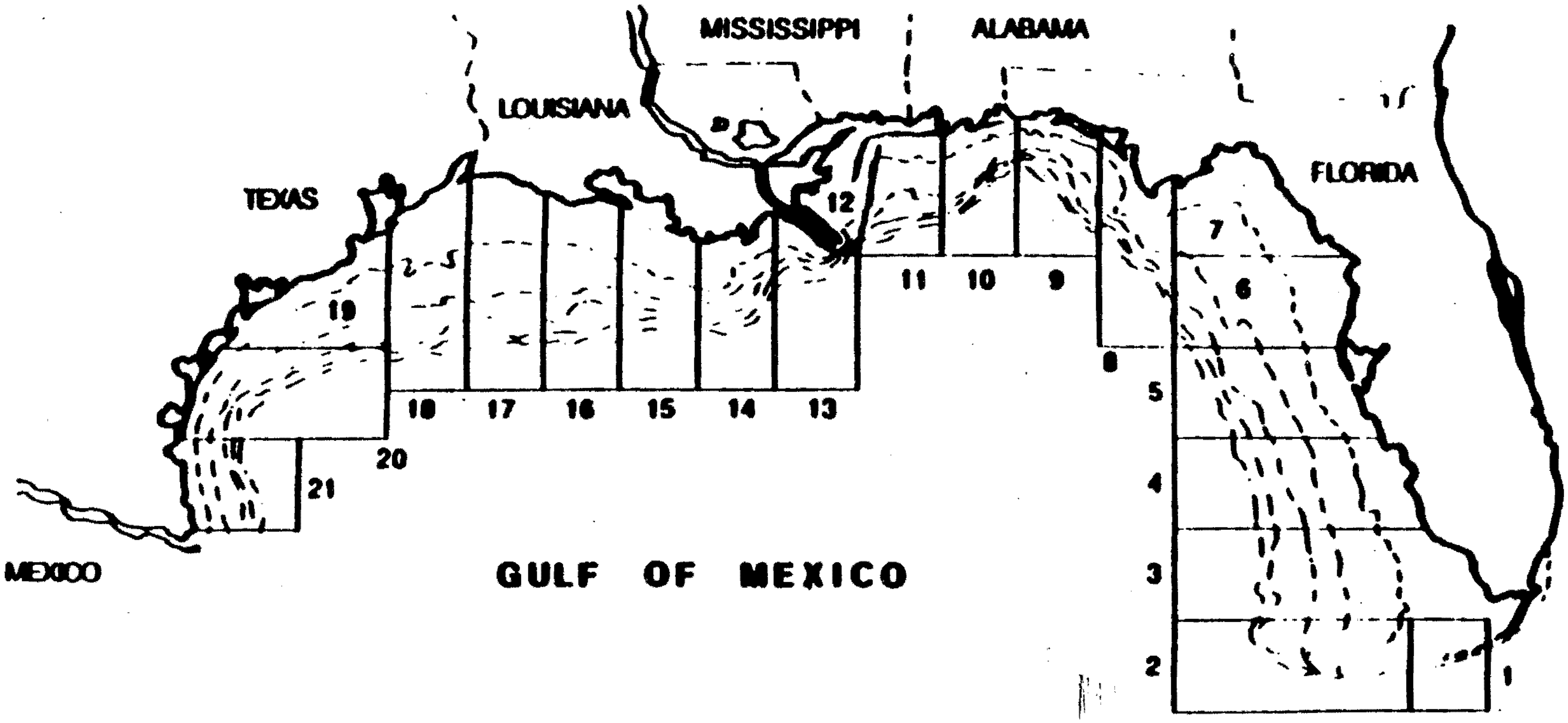
FIGURE 3: Bycatch of mackerels by number and source, fishing years ending 1985 through 1993.





Source: Powers et al. (1994)

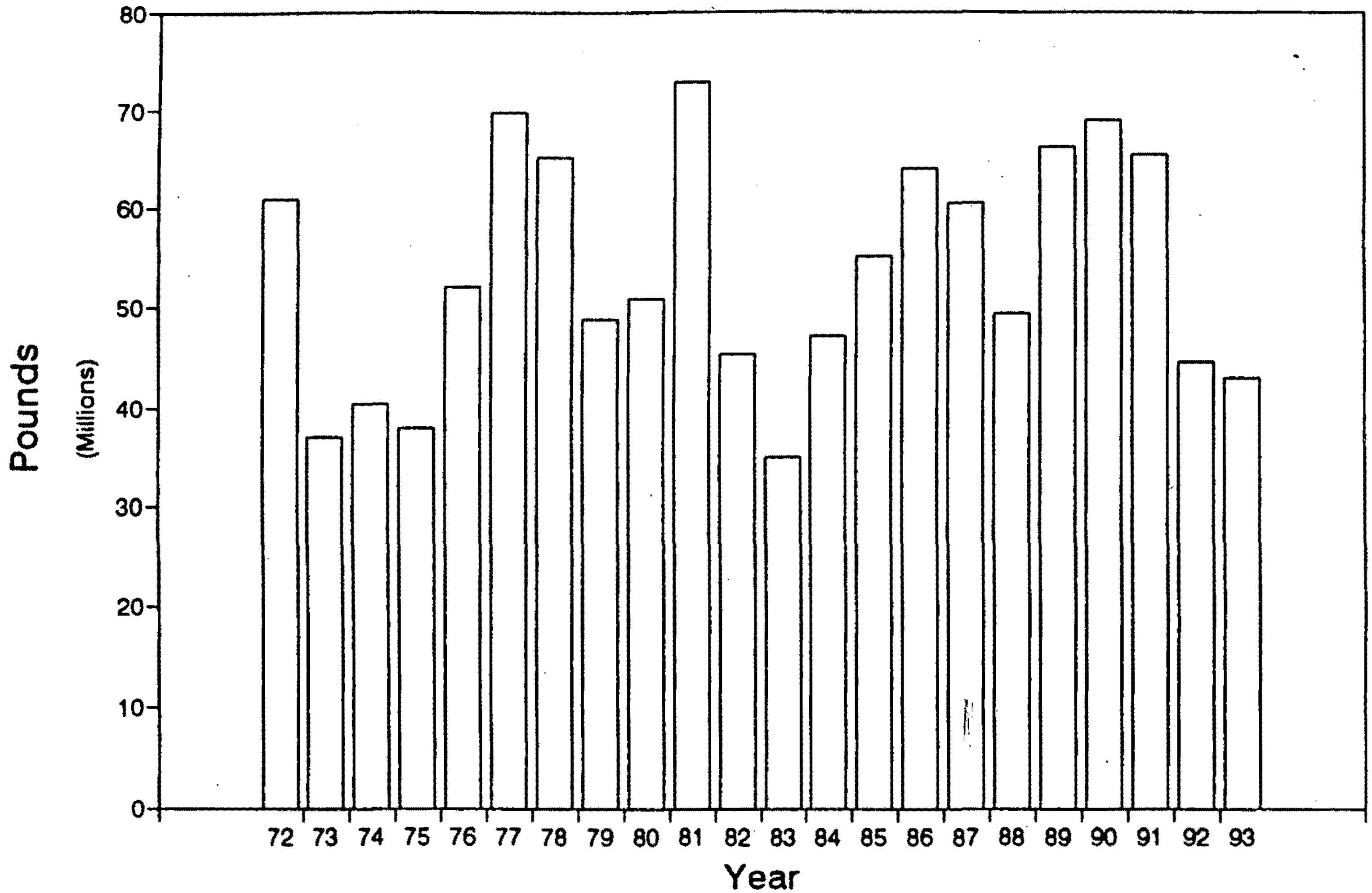
FIGURE 4: Statistical zones in the U. S. Gulf of Mexico



Statistical zones in the Gulf of Mexico. Bathymetric lines represent 60-ft depth intervals.

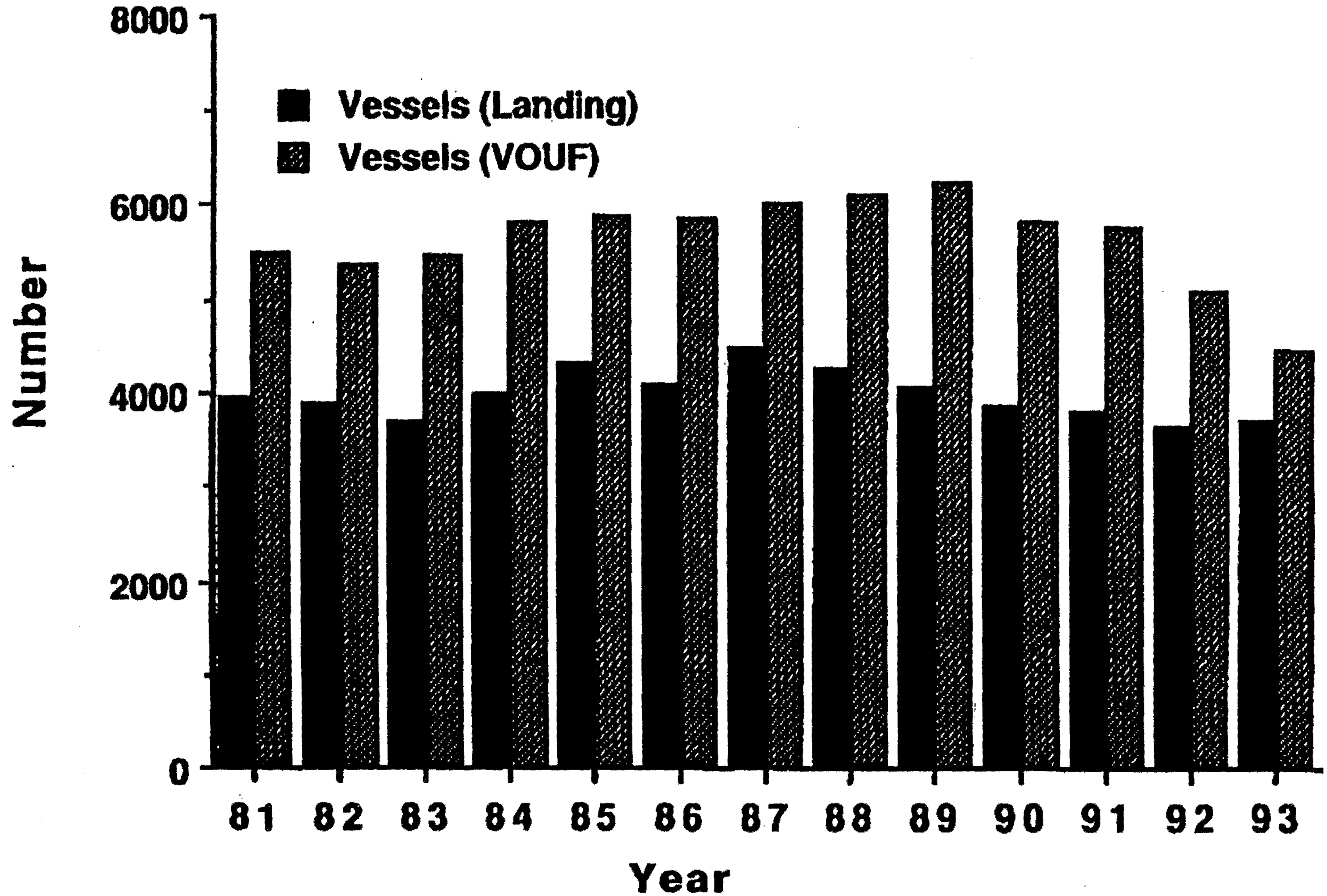
Source: Goodyear (1994)

FIGURE 5: Brown shrimp catches from offshore waters of the U. S. Gulf of Mexico, 1972 through 1993.



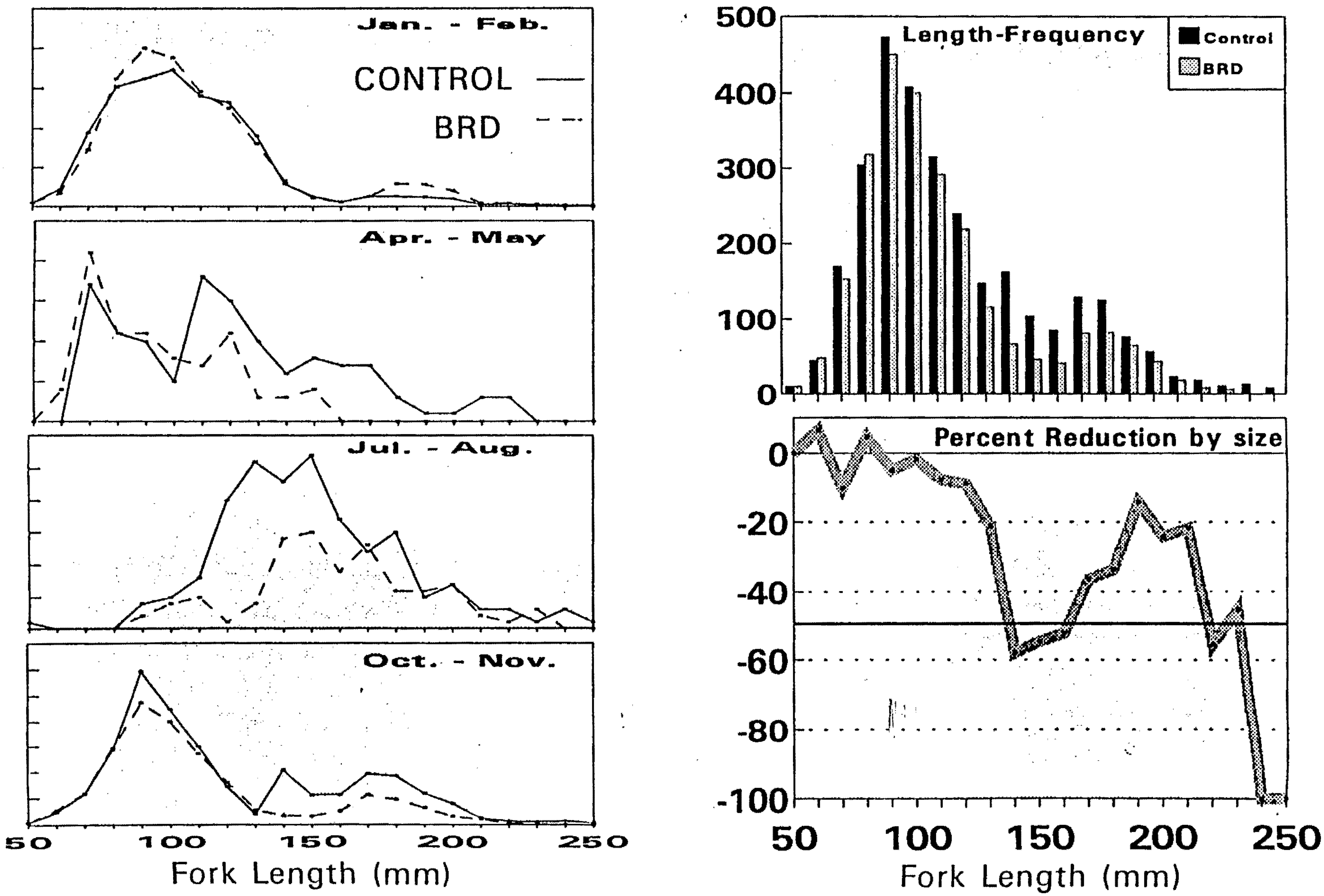
Source: NMFS, SEFSC

FIGURE 6: Estimated numbers of commercial shrimp vessels fishing in the U. S. Gulf of Mexico, 1981 through 1993.



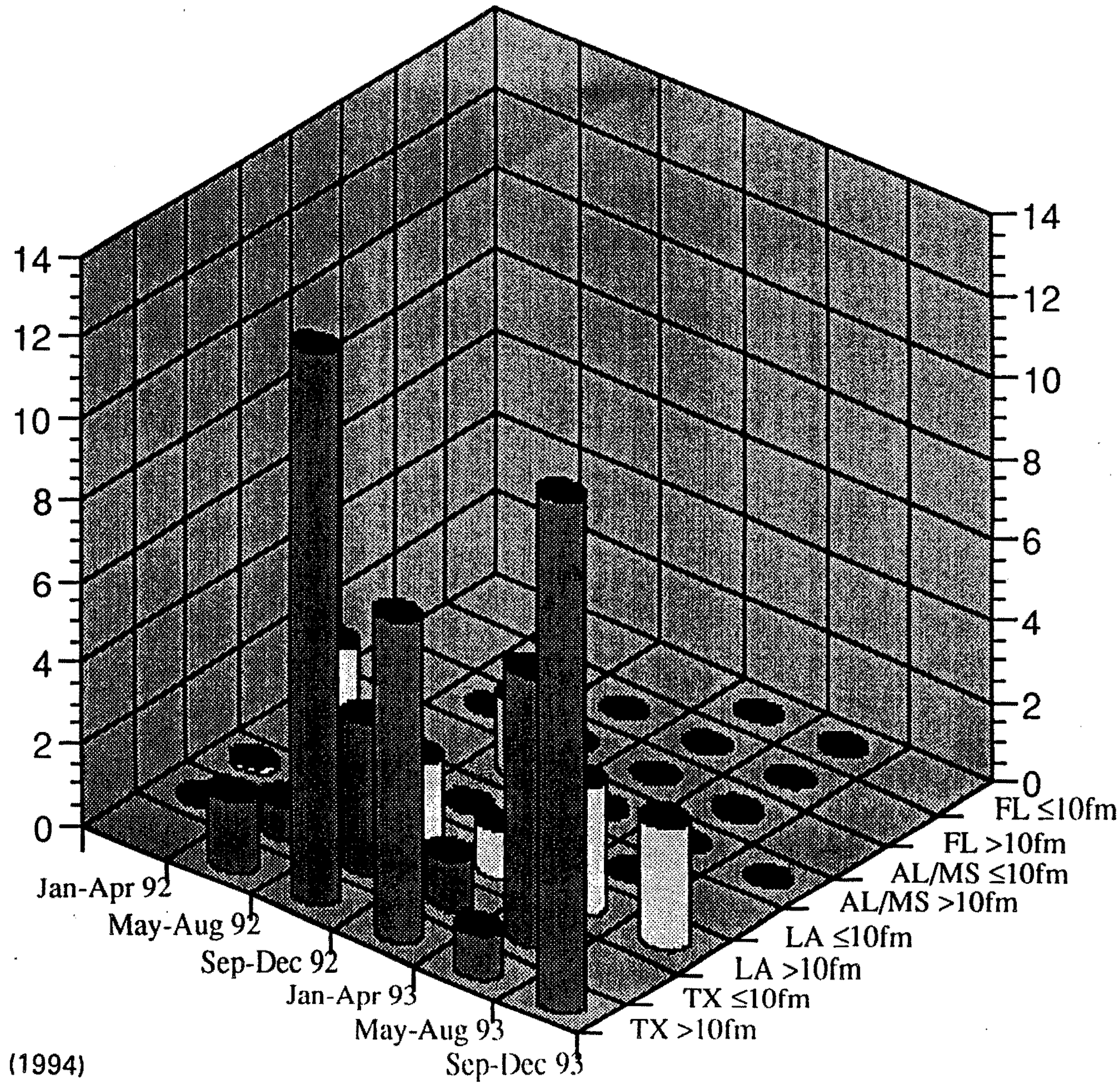
Source: NMFS, SEFSC

FIGURE 7: Red snapper length-frequencies, percent reductions by size, and catch comparisons for the fish-eye BRD versus naked net, 1993.



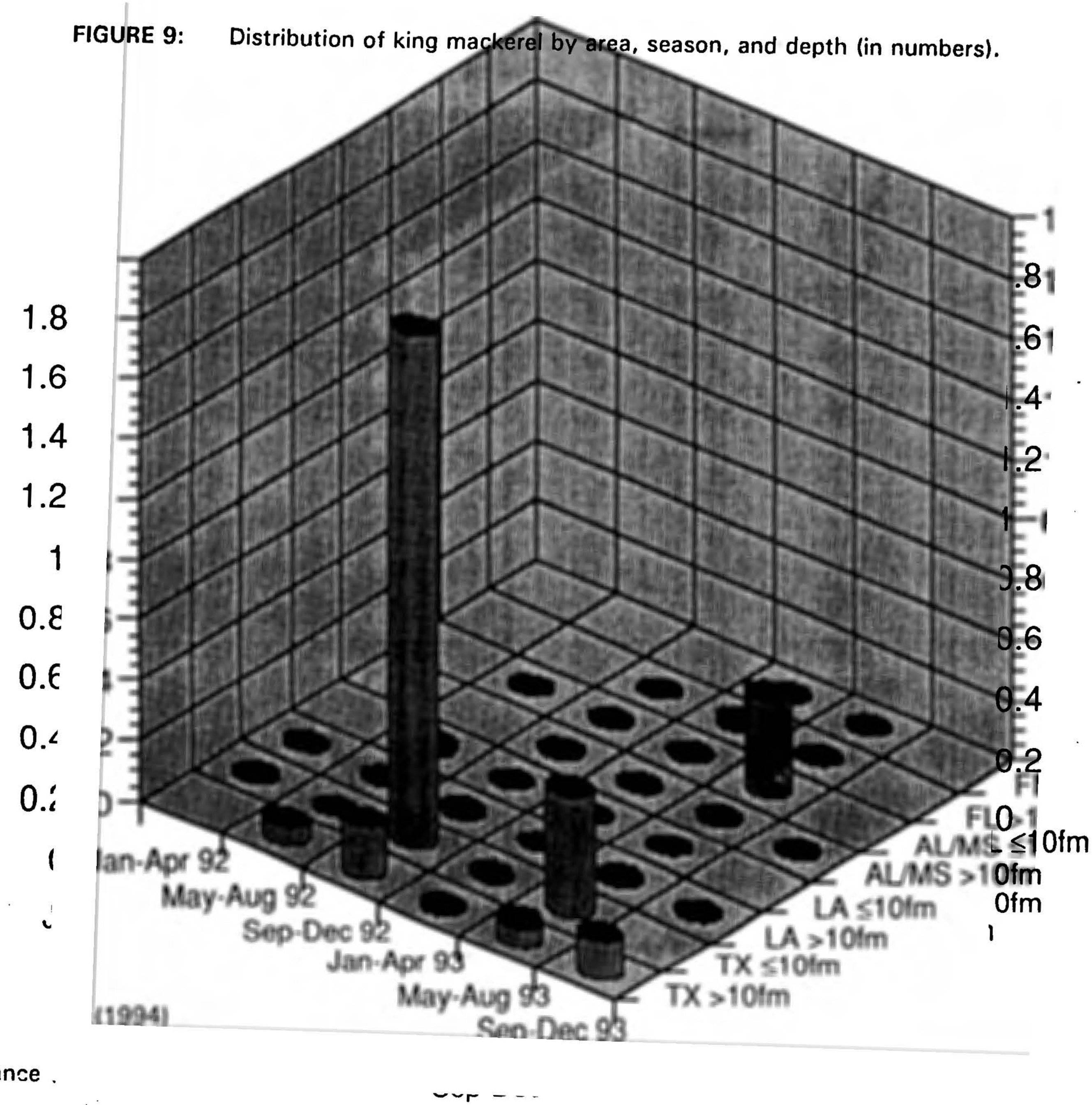
Source: GSAFDF

FIGURE 8: Distribution of red snapper by area, season, and depth (in numbers).



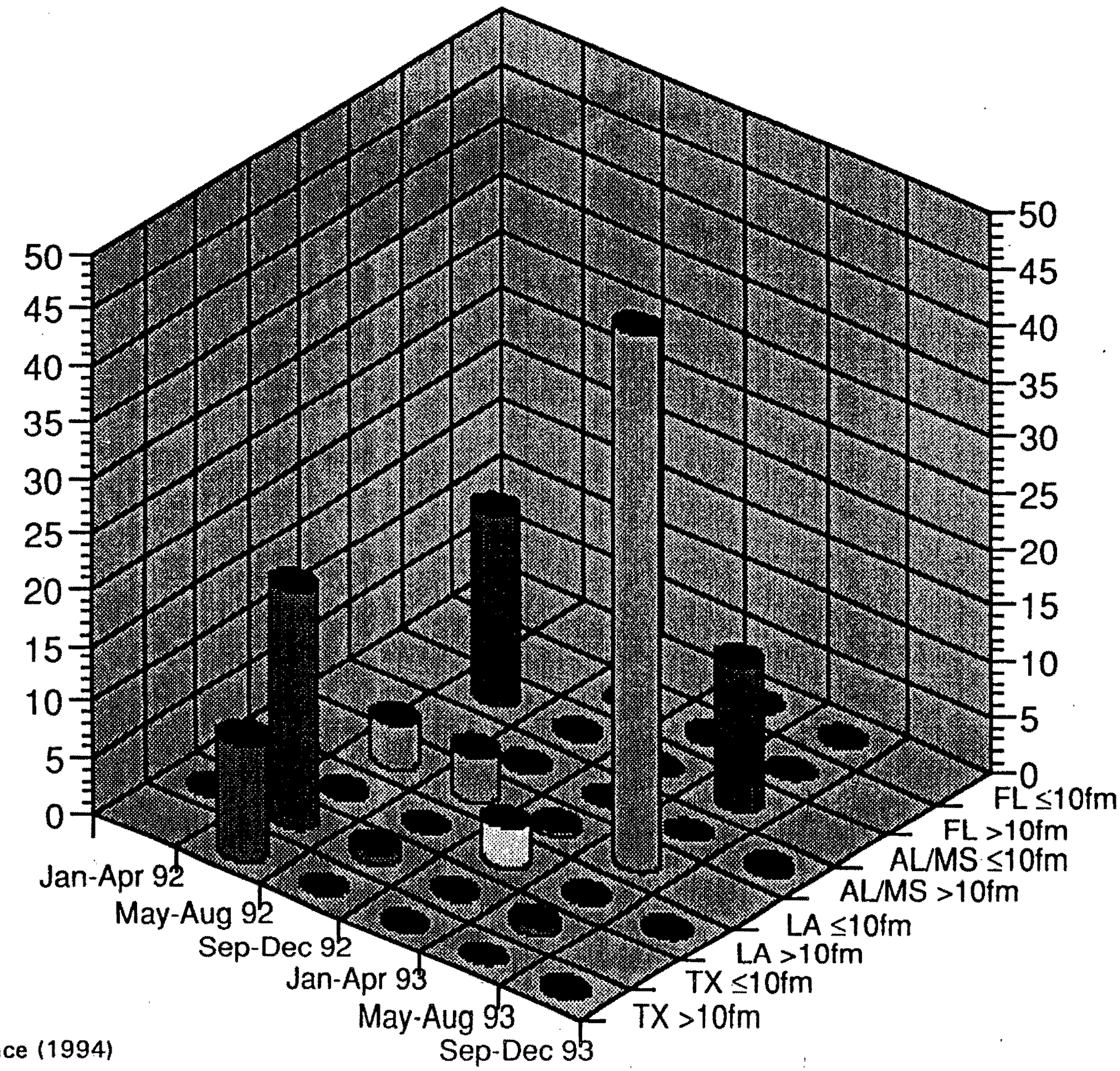
Source: Nance (1994)

FIGURE 9: Distribution of king mackerel by area, season, and depth (in numbers).



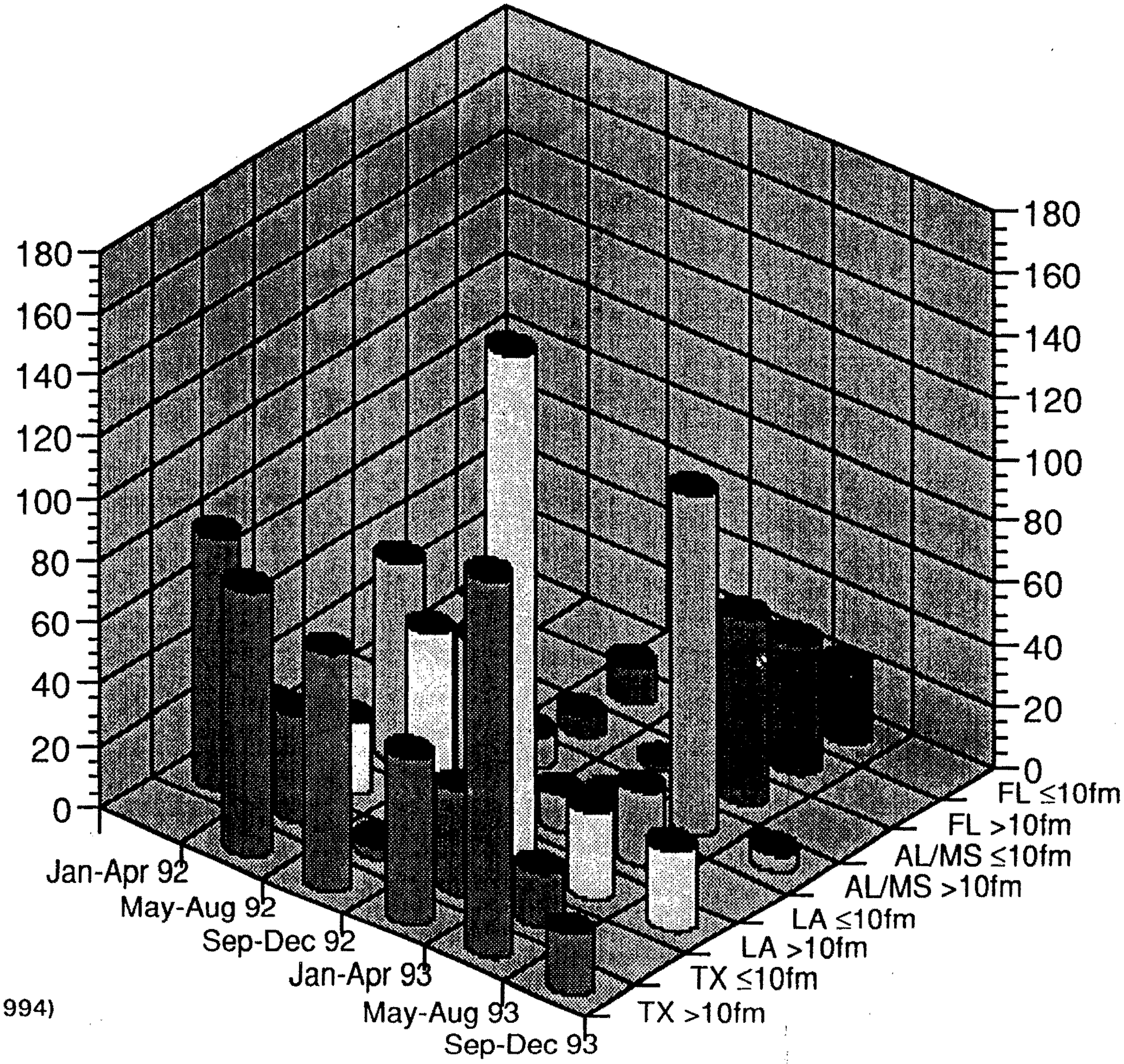
Source: Nance .

FIGURE 10: Distribution of Spanish mackerel by area, season, and depth (in numbers).



Source: Nance (1994)

FIGURE 11: Numbers of samples by area, season, and depth.



Source: Nance (1994)

APPENDIX A

SUMMARY REPORT ON THE STATUS OF BYCATCH REDUCTION DEVICE DEVELOPMENT

NOVEMBER, 1996

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
SOUTHEAST FISHERIES SCIENCE CENTER
MISSISSIPPI LABORATORIES
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PASCAGOULA, MS 39567

INTRODUCTION

In response to mandates of the Magnuson Fishery Conservation and Management Act amendments passed by Congress in 1990, the National Marine Fisheries Service Southeast Region has developed a program in cooperation with the Gulf and South Atlantic Fisheries Development Foundation to address shrimp trawl bycatch. One of the objectives of this program is to identify, develop, and evaluate gear options for reducing bycatch in the Gulf and South Atlantic shrimp fisheries. The research plan calls for gear modification studies to be conducted in inshore, nearshore, and offshore waters focusing on key FMP managed species (i.e., Gulf red snapper, Atlantic weakfish, king mackerel and Spanish mackerel, and coordinated through a technical review panel (TRP). The technical review panel is responsible for selecting the best prototype gear modifications for commercial evaluation, monitoring testing in different shrimping areas, and prioritizing gear modification options for management consideration.

The goal of the gear development project is to develop shrimp trawl gear modifications and or fishing tactics which are capable of reducing the bycatch of finfish with minimum loss of shrimp production. Specific objectives of the program were to evaluate existing bycatch reduction techniques, collect data on behavior of fish and shrimp in trawls, and to develop and evaluate new bycatch reduction techniques. The key species targeted for reduction are red snapper, weakfish, king mackerel and Spanish mackerel.

METHODS

The research plan (GSAFDF, 1992) identified a four phase gear development program which included:

1. **Initial Design and Prototype Development -** The full technical range of trawl design and modification approaches was identified. Industry techniques, ideas solicited from fishermen, net shops designs, and research studies conducted by various research groups were evaluated. Fish behavior, gear instrumentation, and gear performance studies were conducted on each design using SCUBA, , remote video cameras, and other techniques. This work evaluated fish behavior and feasibility of prototype concepts. The results of this phase were subjectively evaluated based on the experience and expertise of the gear designer and research team. Operational data was taken on the modified net, and preliminary catch performance data obtained during comparative gear trials. The second phase of development was initiated once a design was determined to offer bycatch reduction potential and integrated into the construction of a net.

2. **Proof of concept -** Objectives during this phase were to evaluate prototype devices on key species, determine total finfish reduction rates, and establish shrimp catch rates. Proof of concept testing evaluated adequacy of design for safety and for problems with operational use. Proof of concept testing was conducted under a specific scientific protocol developed under the "Shrimp Trawl Bycatch Research Requirements (NMFS, 1991). The most successful designs were prioritized based on proportional bycatch reduction and shrimp retention and reviewed by a

technical review panel for inclusion in operational evaluation by the commercial shrimping industry throughout the Southeast.

3. **Operational evaluation** - The objective in this phase was to test the BRD/TED gear combination against a standard TED net under conditions encountered during commercial shrimping operations. Trained observers were placed aboard cooperating commercial vessels to collect data on both shrimp and finfish catch rates as well as species composition. BRD/TED combinations were tested on trawlers using the same TED employed in both the test and control gear. Testing was conducted over a wide range of geographic areas, seasons, and conditions.

4. **Industry evaluation** - The commercial shrimping industry will be responsible for fleet testing of candidate BRDs.

RESULTS

Nine BRD designs were evaluated in 1996 of which 3 were recommended for proof of concept testing bringing the total number of BRD designs evaluated between 1990 and 1996 to 96, and of these designs 29 were recommended for proof of concept testing . Designs included modified trawl designs, modified TED designs, fisheye designs, funnel designs, and fish stimulator designs (Watson, et. al., 1993). Three designs have been approved by the gear review panel for operational evaluation based on their performance in the proof of concept phase and are now approved for industry evaluation. Designs approved for commercial evaluation are the top position fisheye design (fig. 3), the expanded mesh design, and the extended funnel design (fig. 4).

Operational testing of these designs has been conducted in the Gulf of Mexico on commercial shrimp vessels by the Gulf and South Atlantic Fisheries Development Foundation (GSAFDF), the National Marine Fisheries Service (NMFS) Galveston Laboratory, and in the South Atlantic by GSAFDF and the North Carolina Department of Marine Fisheries (NCDMF). An extensive data base consisting of over 2,800 tows has been compiled at the NMFS Galveston laboratory. This data base was used to calculate reduction rate estimates for key species which are under existing or proposed management plans including shrimp, red snapper, weakfish,and mackerel (fig.5). Reduction rate estimates were also calculated for croaker, spot, butterfish, and trout which are predominant species considered economically important. Statistical methods used were the paired t test and ratio estimation techniques and data are presented as point estimates and 95% confidence intervals.

BRD designs with the best potential for snapper mortality reduction (overall F reduction) are the midsize fisheye in the 30 mesh position and the extended funnel. The results for the expanded mesh design did not indicate significant reduction for red snapper but performed well for all other species and is recommended for use in the South Atlantic.

The midsize fisheye in the top 30 mesh position had the best total snapper reduction rate point estimate of 40% with a 95% confidence interval between 22% and 58% (figure 10). Shrimp reduction rates were estimated to be 7% for the total data base with a confidence interval between 3% and 10% (figure 10). These data included testing conducted in the south Florida, Tortugas fishery where red snapper do not occur. The shrimp reduction rate for the northern Gulf, excluding the Tortugas fishery, was estimated to be 3% (GSAFDF). The overall reduction in fishing mortality (F) for red snapper was calculated based on the reduction of red snapper by length (figure 11). There was a good correlation between snapper length and reduction rate for the fisheye in the 30 mesh position with the reduction rate increasing from 32% for 100 mm fish to over 92% for fish 260 mm in length (figure 11). Overall red snapper fishing mortality reduction estimate (F) for the fisheye in the 30 mesh position was 58%-61% (Goodyear). Reduction rate estimates for croaker, spot, butterfish, and trout are shown in figure 12.

Red snapper reduction point estimate for the top fisheye in the 45 mesh position was 26% with a 95% confidence interval of 13% - 38% (figure 13). There was no significant difference in the shrimp catch rates with the fisheye in the 45 mesh position (figure 13). Reduction of red snapper by length increased from 11% for 100 mm snapper to 83% for 260 mm snapper (figure 14). Overall red snapper fishing mortality reduction estimate (F) for the fisheye in the 45 mesh position was 33% (Goodyear). Reduction rate estimates for croaker, spot, butterfish, and trout are shown in figure 15.

Red snapper reduction point estimate for the 3 mesh extended funnel BRD was 38% with a 95% confidence interval of 29% - 47% (figure 16). There was no significant difference in the shrimp catch rates with the 3 mesh extended funnel BRD (figure 16). Reduction by length group data for the extended funnel BRD did not show a good correlation (figure 17). Reduction rate estimates for croaker, spot, butterfish, and trout are shown in figure 18. Red snapper reduction point estimate for the 5 mesh extended funnel BRD was 33% with a 95% confidence interval of 24% - 43% (figure 19). There was no significant difference in the shrimp catch rates with the 5 mesh extended funnel BRD (figure 19). Reduction rate estimates for croaker, spot, butterfish, and trout are shown in figure 20. There does not appear to be any significant difference in reduction rates for red snapper between the 3 mesh extended funnel and the 5 mesh extended funnel design. Overall red snapper fishing mortality reduction estimate (F) for the extended funnel BRD was 32% (Goodyear).

An operational problem with the extended funnel BRD was identified in November 1995 by NMFS gear specialists working with commercial fishermen who were voluntarily using extended funnels during commercial fishing operations. Fishermen reported the BRDs worked well initially, but reduction rates decreased with extended use. After examining the BRDs gear specialists determined that the problem was related to the quality of webbing used in the construction of the funnel. After extended use the funnels stretched out to the point that they closed off the large mesh fish escape openings. For proper operation clearance must be maintained between the funnel and the escape openings. It was apparent that consistent performance could not be maintained with the extended funnel BRD due to difficulty in obtaining quality material for use in funnel construction. As a result the funnel used in the construction of the large mesh funnel and extended funnel BRD designs has been redesigned using a tapered funnel design. This design does not require the use of high quality heat set and depth stretched poly webbing and should eliminate the problem of the funnel closing off the fish exit openings by allowing maximum clearance between the funnel and the openings. Extended funnel BRDs using the tapered funnel are being deployed on commercial vessels and preliminary reports indicate they are performing well. The new funnel design will be tested extensively in 1996.

SUMMARY

Commercial evaluations indicate that the midsize fisheye in the top position and the extended funnel BRD are capable of significantly reducing juvenile red snapper fishing mortality in shrimp trawls. Overall red snapper fishing mortality reduction estimates (F) for red snapper was 33% - 61% for the top position fisheye BRD, and 32% for the extended funnel BRD. Shrimp reduction rates in the northern Gulf of Mexico ranged from 0-3% for the fisheye and 0% for the extended funnel.

The extended funnel design has been recently modified to solve operational problems associated with quality of webbing material used in the construction of the funnel. Data on the performance of the modified design will be collected in 1996.

Technical specifications, minimum suggested requirements, and construction and installation instructions for the extended funnel, expanded mesh, and fisheye BRDs are included in this document. The expanded mesh (large mesh) BRD is recommended for use in the South Atlantic only.

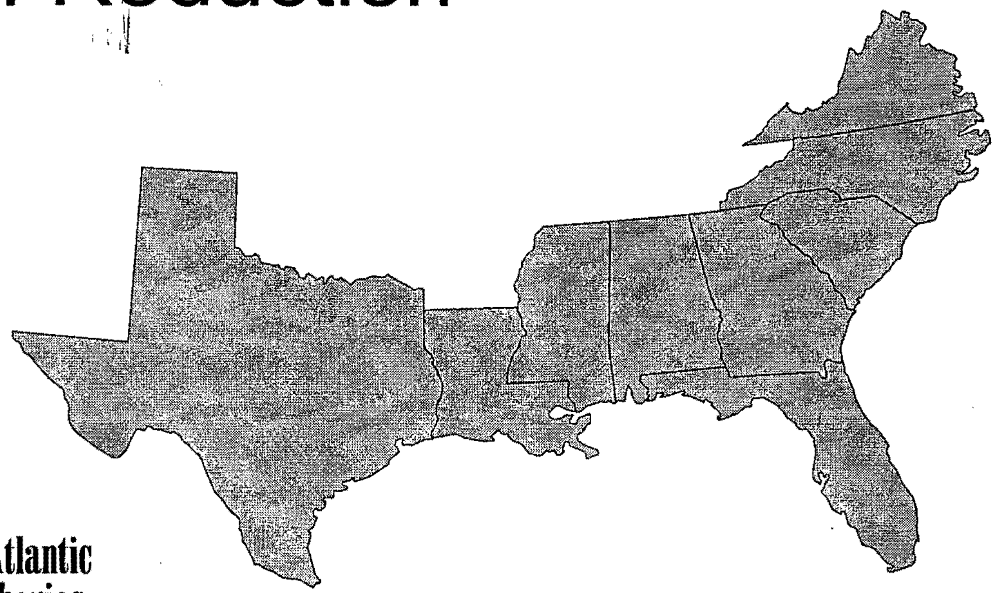
References

Hoar, P. et al. (ed). 1992. A research plan addressing finfish bycatch in the Gulf of Mexico and South Atlantic shrimp fisheries. Gulf and South Atlantic Fisheries Development Foundation, Inc. Tampa, FL.

NMFS. 1991. Shrimp trawl bycatch research requirements. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami, FL and Southeast Regional Office, Miami, FL.

Watson, J. W., et al. 1993. Status report on the potential of gear modifications to reduce finfish bycatch in shrimp trawls in the southeastern United States. NOAA technical memorandum, NMFS-SEFC-327.

Shrimp Fishery Bycatch Reduction



Gulf & South Atlantic Fisheries Development Foundation Inc.

NOAA

Regional Research Program

NUMBER OF DESIGNS EVALUATED (1996)

- PROTOTYPE TESTING - 9 DESIGNS
- PROOF OF CONCEPT - 3 DESIGNS

FIGURE 1.

TOTAL NUMBER OF DESIGNS EVALUATED

- PROTOTYPE TESTING - 96 DESIGNS
- PROOF OF CONCEPT - 29 DESIGNS
- OPERATIONAL EVAL. - 3 DESIGNS

FIGURE 2.

FISHEYE

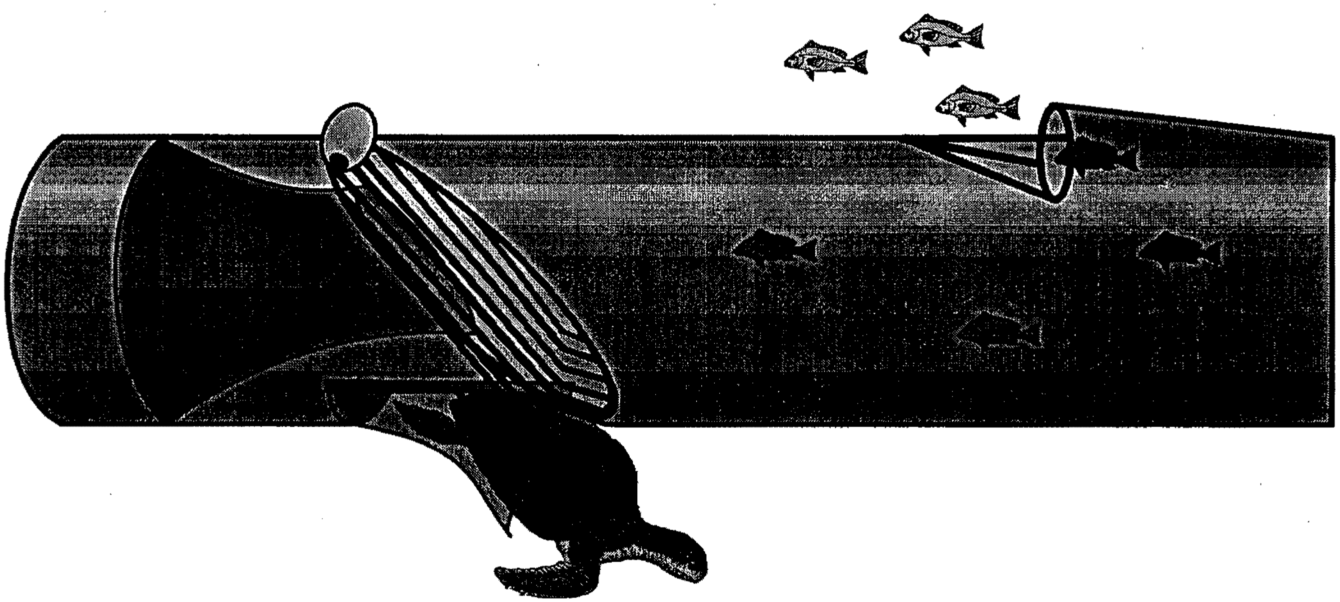


FIGURE 3.

EXTENDED FUNNEL

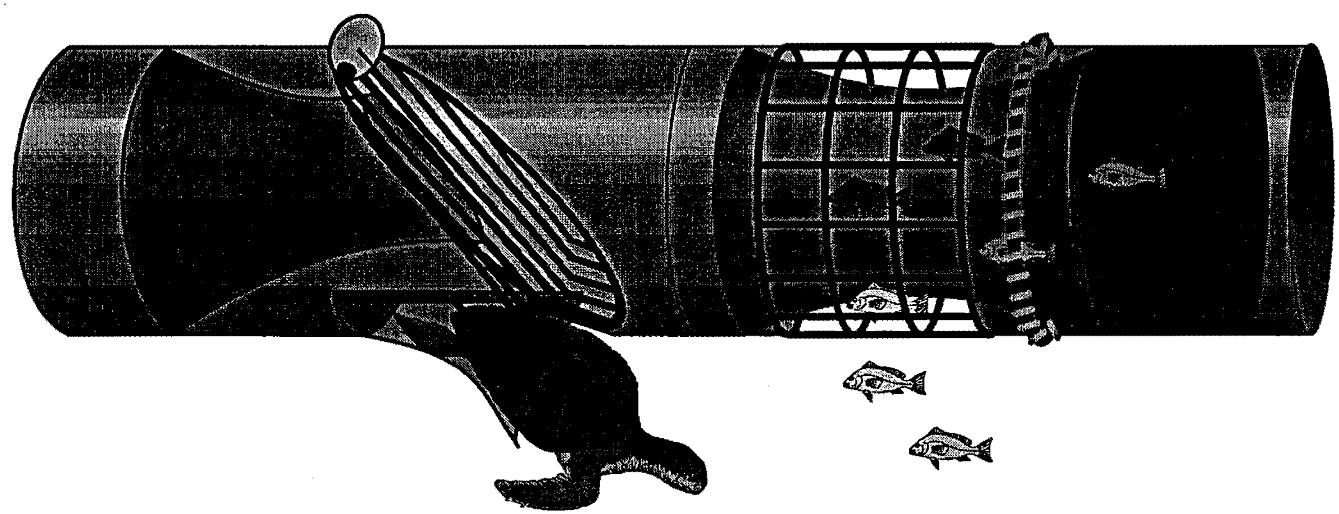


FIGURE 4.

KEY SPECIES

- GULF OF MEXICO
  - SHRIMP
  - RED SNAPPER
  - MACKEREL
- SOUTH ATLANTIC
  - SHRIMP
  - WEAKFISH
  - MACKEREL

FIGURE 5.

BRD EVALUATION DATA BASE
1992-1996

- GULF AND SOUTH ATLANTIC FISHERY DEVELOPMENT FOUNDATION
  - TEXAS SHRIMP ASSOCIATION
  - TEXAS A&M SEA GRANT
  - UNIVERSITY OF GEORGIA SEA GRANT
  - NORTH CAROLINA STATE SEA GRANT
- NATIONAL MARINE FISHERIES SERVICE
  - GALVESTON LABORATORY
  - MISSISSIPPI LABORATORY

FIGURE 6.

BRD EVALUATION DATA

- FISHEYE = 799 TOWS
- EXTENDED FUNNEL = 420 TOWS
- OTHER DESIGNS = 193 TOWS

FIGURE 7.

ANALYSES OF BRD DATA BASE

- REDUCTION RATES
  - Key species
  - Economically important species
- STATISTICAL ANALYSES
  - Paired t Test
  - Ratio estimation
- DATA PRESENTATION
  - Point Estimate and 95% Confidence interval

FIGURE 8.

ECONOMICALLY IMPORTANT SPECIES

- CROAKER
- SPOT
- BUTTERFISH
- TROUT

FIGURE 9.

MIDSIZE FISHEYE
30 Mesh Position with Hard TEDs

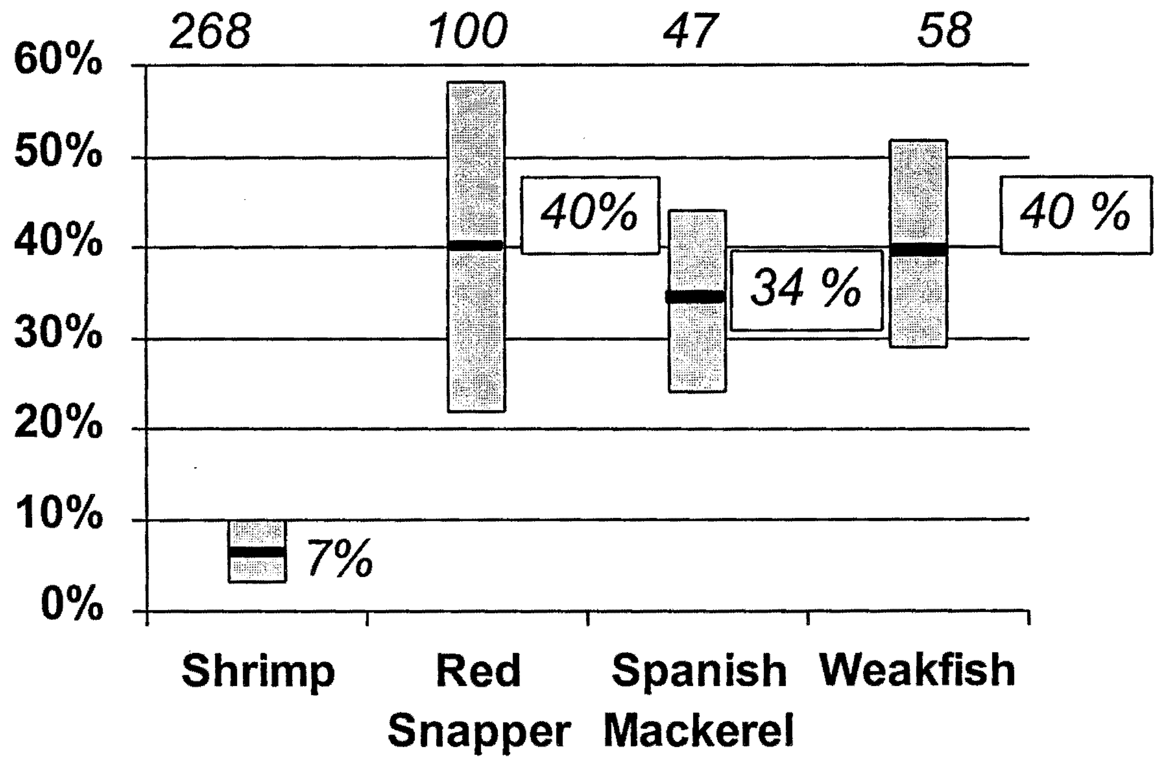
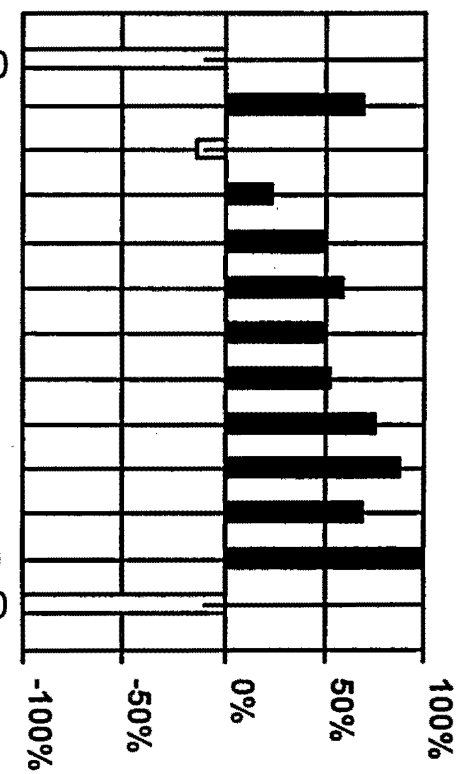


FIGURE 10.

Red Snapper Reduction Estimates by Length Groups for Fisheye (30m) BRD

(January, 1996)

Length Group	Standard Trawl	BRD	% Reduction
1 (0-19mm)	0	0	-
2 (20-39mm	0	12	-100
3 (40-59mm)	13	4	69
4 (60-79mm)	177	205	-14
5 (80-99mm)	334	254	24
6 (100-119mm)	159	80	50
7 (120-139mm)	176	73	58
8 (140-159mm)	203	106	48
9 (160-179mm)	130	63	52
10 (180-199mm)	107	27	75
11 (200-219mm)	113	15	87
12 (220-239mm)	39	12	69
13 (240-259mm)	12	0	100
14 (260-279mm)	0	1	-100
15 (280-299mm)	1	1	0



n = 99 tows

Figure 11.

MIDSIZE FISHEYE
30 Mesh Position with Hard TEDs

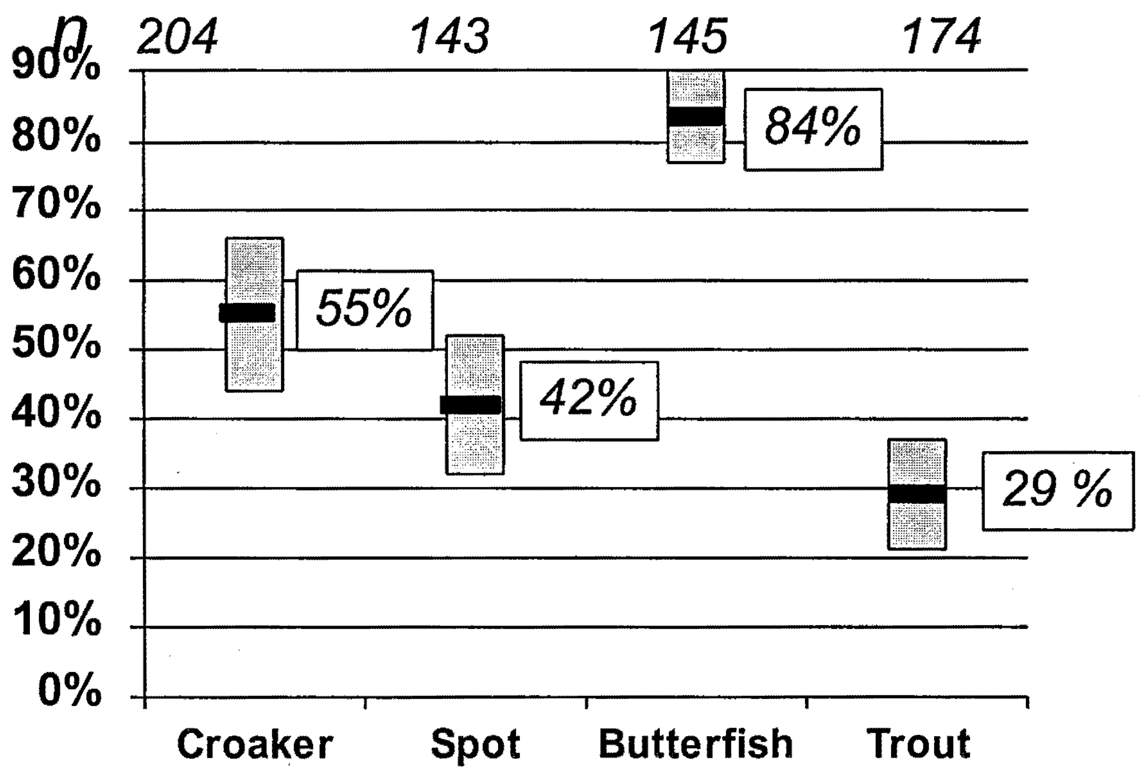


FIGURE 12.

MIDSIZE FISHEYE
45 MESH POSITION

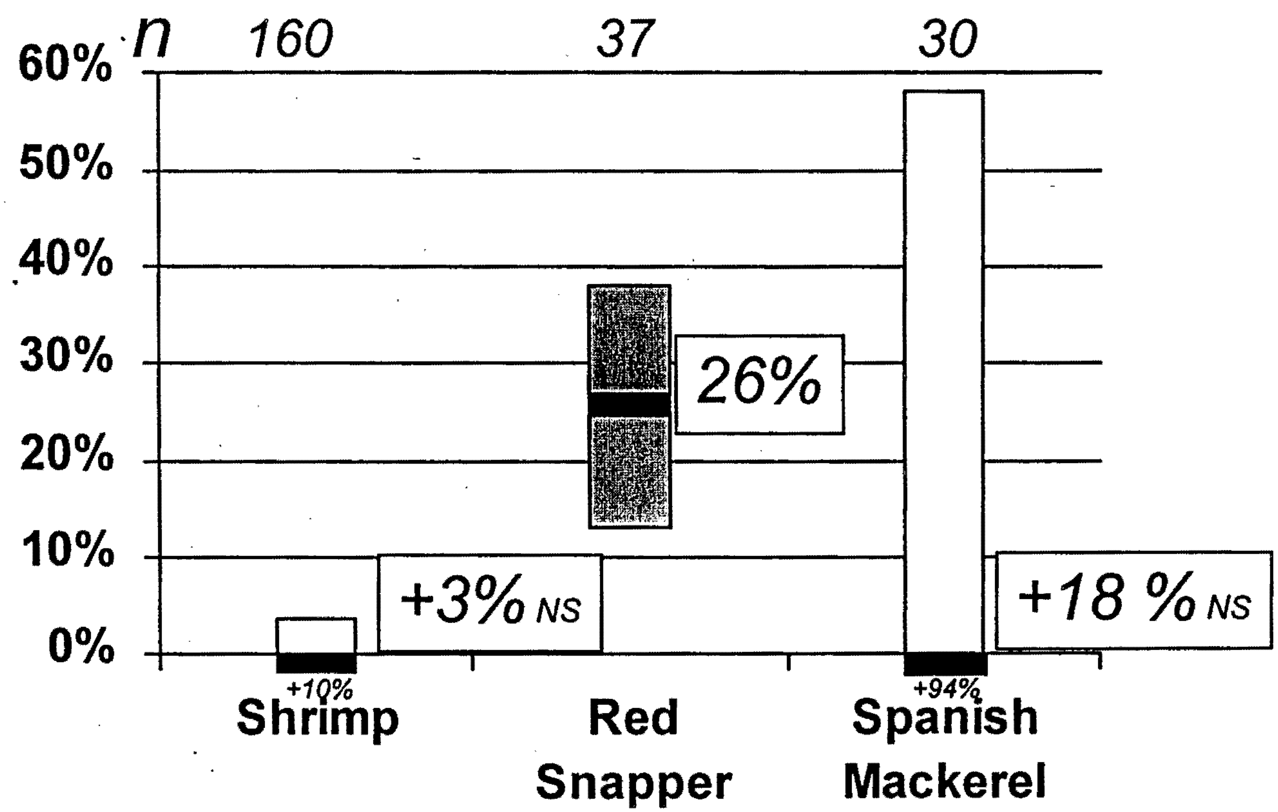
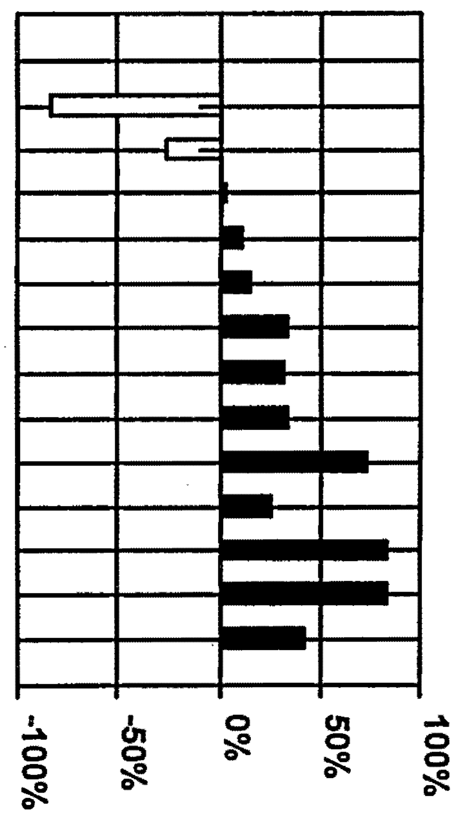


Figure 13.

Red Snapper Reduction Estimates by Length Groups for Fisheye (45m) BRD

(January, 1996)

Length Group	Standard Trawl	BRD	% Reduction
1 (0-19mm)	0	0	-
2 (20-39mm	0	0	-
3 (40-59mm)	1	6	-83
4 (60-79mm)	37	50	-26
5 (80-99mm)	141	137	3
6 (100-119mm)	306	272	11
7 (120-139mm)	93	78	16
8 (140-159mm)	117	79	33
9 (160-179mm)	277	188	32
10 (180-199mm)	239	155	35
11 (200-219mm)	89	23	74
12 (220-239mm)	27	20	26
13 (240-259mm)	36	6	83
14 (260-279mm)	12	2	83
15 (280-299mm)	12	7	42



n = 37 tows

Figure 14.

MIDSIZE FISHEYE 45 MESH POSITION

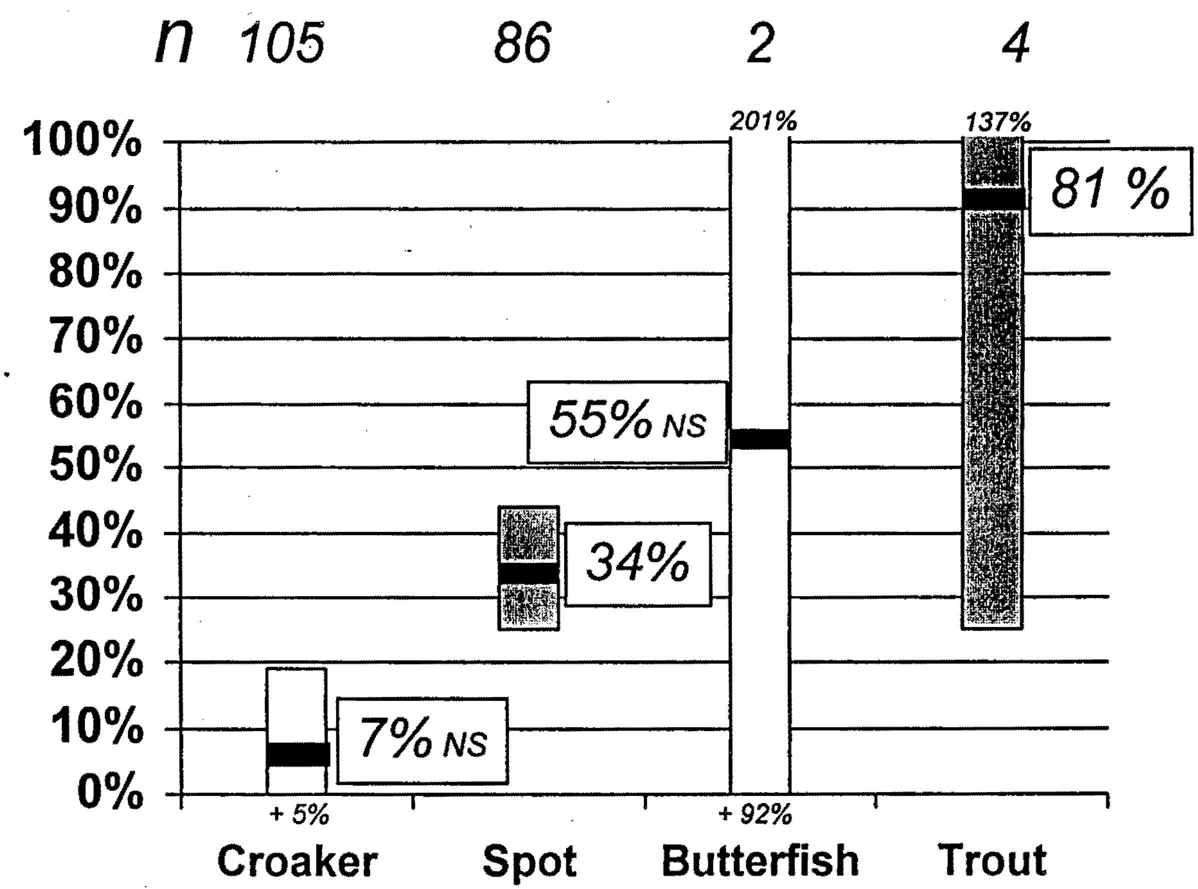


Figure. 15.

3 MESH EXTENDED FUNNEL

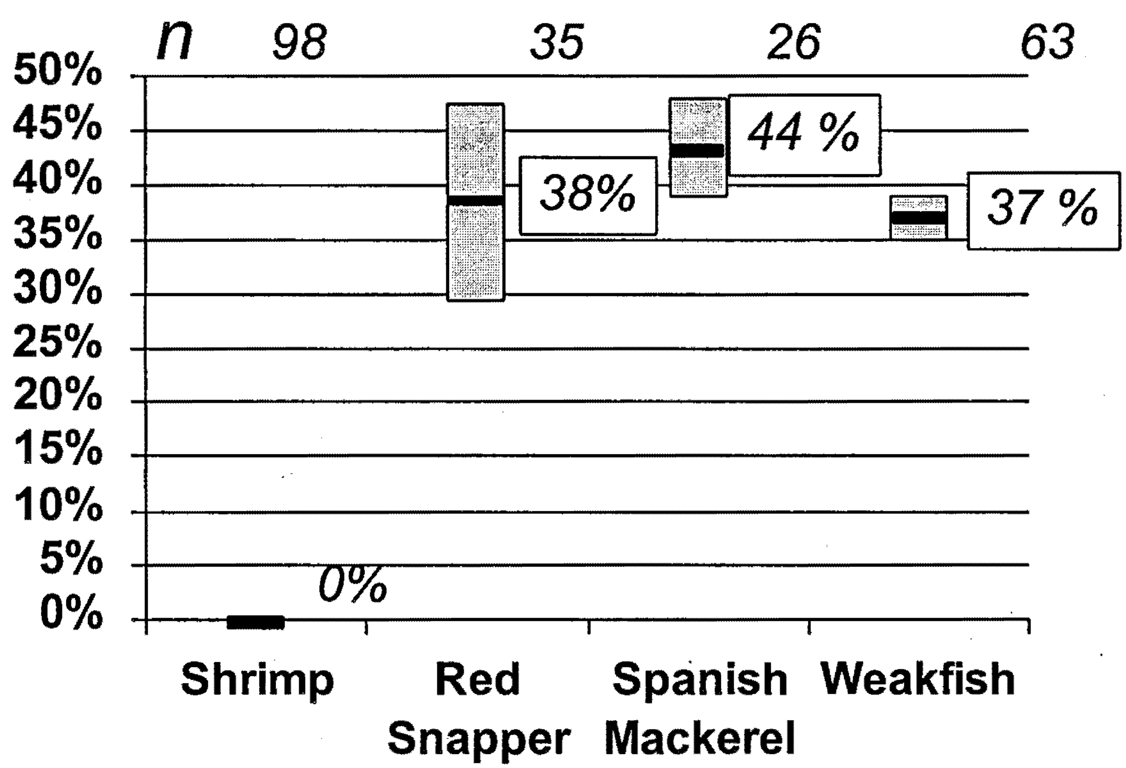


FIGURE 16.

Red Snapper Reduction Estimates by Length Groups for Extended Funnel BRD

(January, 1996)

Length Group	Standard Trawl	BRD	% Reduction
1 (0-19mm)	0	0	-
2 (20-39mm	24	8	66
3 (40-59mm)	276	261	5
4 (60-79mm)	1716	1169	32
5 (80-99mm)	1894	1261	33
6 (100-119mm)	1342	1259	6
7 (120-139mm)	557	547	2
8 (140-159mm)	197	167	15
9 (160-179mm)	174	60	66
10 (180-199mm)	250	124	50
11 (200-219mm)	186	80	57
12 (220-239mm)	78	43	45
13 (240-259mm)	47	31	34
14 (260-279mm)	30	46	-35
15 (280-299mm)	3	17	-82

n = 205 tows

Figure 17.

3 MESH EXTENDED FUNNEL

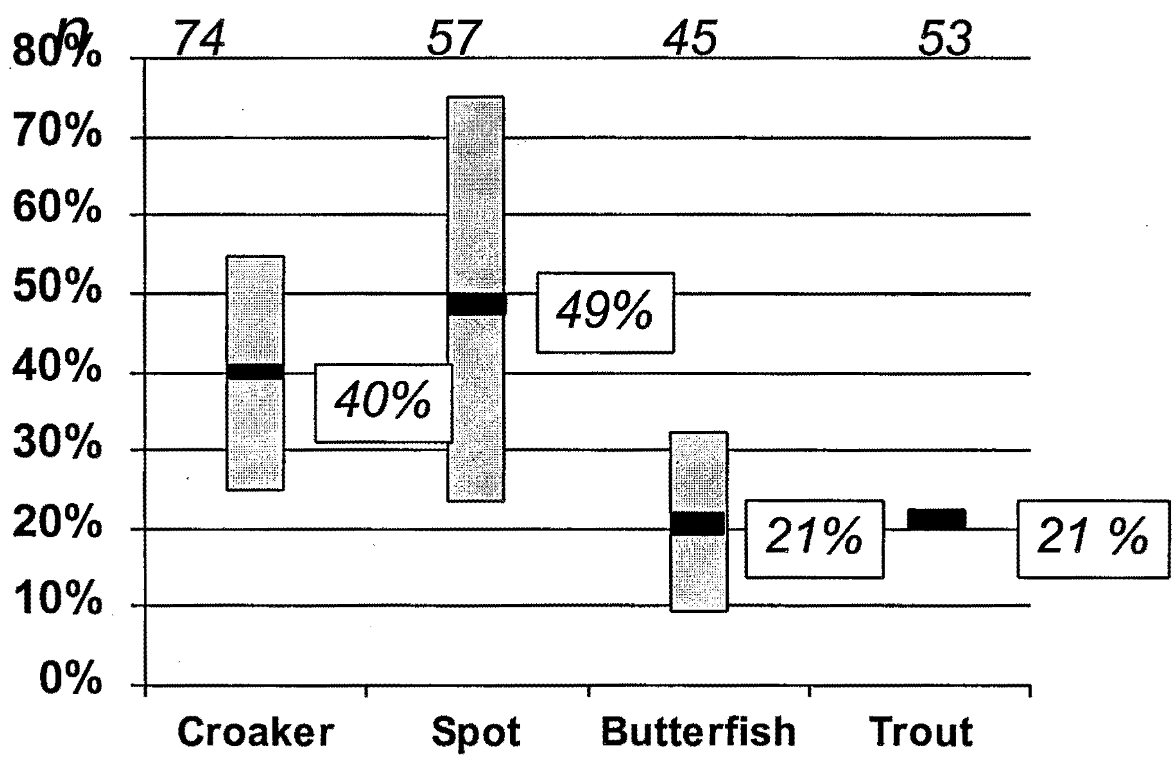


FIGURE 18.

5 Mesh Extended Funnel with Flap

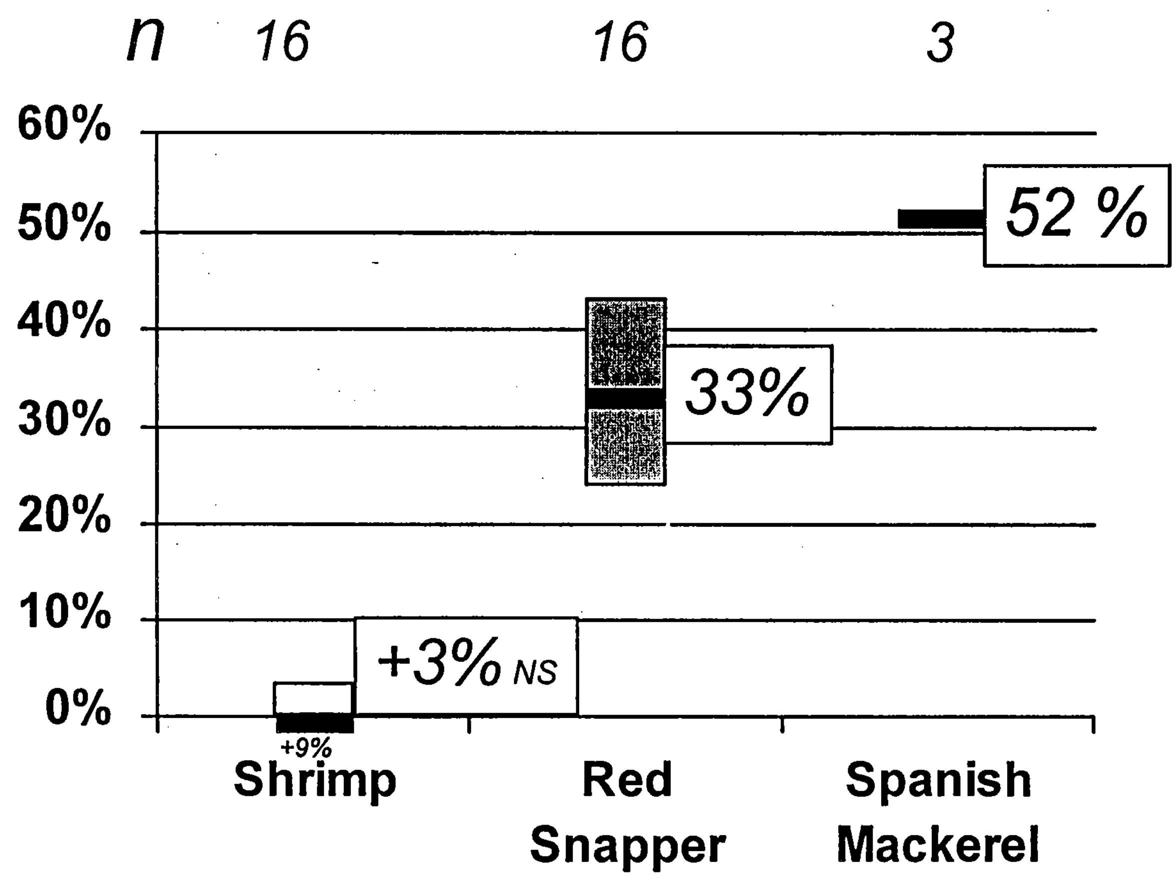


Figure 19.

5 Mesh Extended Funnel with Flap

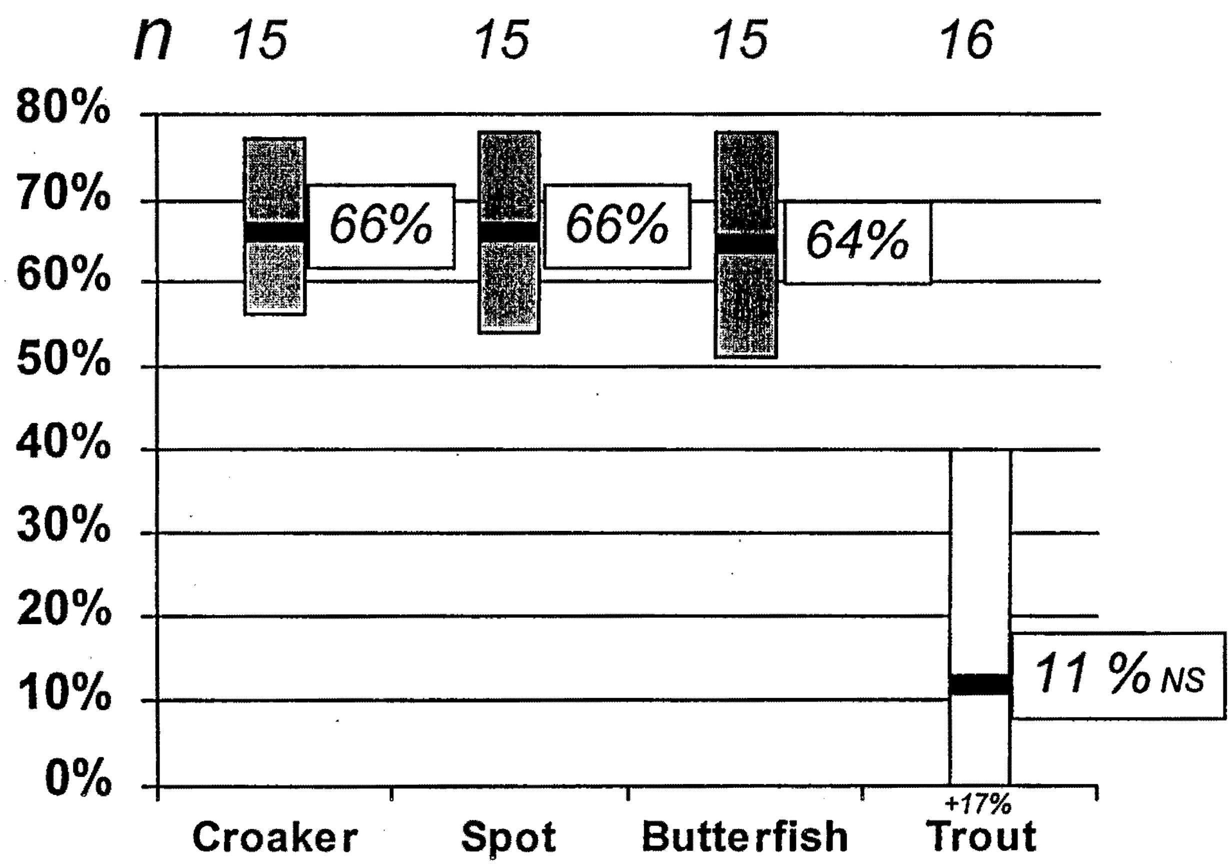


Figure 20.

TECHNICAL SPECIFICATIONS AND MINIMUM REQUIREMENTS FOR THE EXTENDED FUNNEL, AND EXPANDED MESH BRDS

Extended Funnel Description

The extended funnel BRD consists of an extension with large mesh webbing in the center and small mesh webbing on each end held open by a semi-rigid hoop. A funnel of small mesh webbing is placed inside the large mesh section to form a passage for shrimp to the codend. It also creates an area of reduced water flow to allow for fish escapement through the large mesh. One side of the funnel is extended vertically to form a lead panel and area of reduced water flow. There are two sizes of extended funnel BRDs, a standard size and a smaller inshore size.

Minimum Construction and Installation Requirements

Extension Material - the small mesh used on both sides or the large mesh escape section is constructed from No. 30, 1-5/8 inch (stretch mesh) nylon webbing. The front section is 120 meshes around by 6 ½ meshes deep. The back section is 120 meshes around by 23 meshes deep.

Large Mesh Section - the large mesh escape section is constructed of 8- 10 inch stretch mesh webbing. This section is cut on the bar to form a section that is 15x95 inches in circumference. The leading edge is attached to the 6 ½ mesh extension section and the rear edge is attached to the 23 mesh extension section.

Funnel - the funnel is constructed of 1 ½ inch (stretch mesh) No. 30 depth stretched and heat set polyethylene webbing. The circumference of the leading edge is 120 meshes and the back edge is 104 meshes. The short side of the funnel is 34 to 36 inches long and half of the opposite side of the funnel extends an additional 22 to 24 inches. The leading edge of the funnel is attached 3 meshes forward of the large mesh leading edge. Seven meshes of the short side of the funnel is attached to the back section of extension webbing on the top and bottom 8 meshes back from the trailing edge of the large mesh section. The extended side of the funnel is attached on a slight angle to the top and bottom of the back extension webbing.

Semi-Rigid Hoop - A 30 inch diameter hoop constructed of plastic coated trawl cable swaged together is installed evenly 5 meshes behind the trailing edge of the large mesh section

Installation - the extended funnel BRD is attached behind a hard TED 8 inches behind the posterior edge with the codend attached to the trailing edge of the BRD. If a soft TED is used a second hoop must be installed in the front section of the BRD extension webbing at the leading edge of the funnel.

INSTRUCTIONS FOR LARGE MESH & EXTENDED FUNNEL BRD
National Marine Fisheries Service, Mississippi Laboratories
P.O. Drawer 1207, Pascagoula, MS 39568-1207

November, 1996

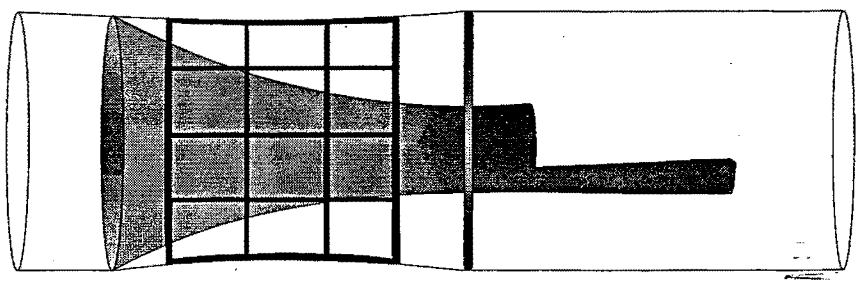


Figure 1.
Construction of the Webbing Extension and Large Mesh Section

The webbing extension is made from a single piece of 1 5/8" stretch mesh # 30 nylon twine, 30 meshes x 120 meshes. Form a tube from the extension webbing by sewing the 30 mesh sides together. The large mesh section is made by cutting a 3 mesh strip by 18 ½ bars long from 10" by 10 mm PES webbing. Sew the narrow ends together to form a 3 square by 19 square (15" x 95") tube.

Figure 2. Attachment of Large Mesh to the Extension

Starting at the top center seam of the extension, count back 6 ½ meshes and cut around the extension to divide it into two pieces. Attach the large mesh section to the 6 ½ mesh piece (front) of the extension. The sewing sequence for attaching the large mesh section to the extension is 6 meshes to one large mesh, 6 meshes to one large mesh and 7 meshes to one large mesh. Repeat this sewing sequence until you are all the way around the large mesh piece. Repeat the sewing sequence when attaching the other end of the large mesh section to the 23 mesh extension section.

Figure 3. 30" Hoop Ring

A single hoop is constructed of ½" plastic coated cable 94 1/4" in length. It is joined by a 3/8" nicropress sleeve. Starting at the top center seam of the 23 mesh extension section (back section) count back 5 meshes then attach the extension to the 30" ring. Then count 60 meshes around the extension to find the bottom center attachment point. Starting at the top center then count 30 meshes on each side of the extension to find the side attachment points. Finding these points is necessary to insure that the extension webbing is equally distributed around the ring. When the four attachment points are located and attached to the ring, lace the extension webbing to the ring around the entire circumference.

Figure 4. Construction of the Funnel

The funnel is constructed from 4 sections of 1 ½", number 30, depth stretched and heat set polyethylene webbing. The two side sections are rectangular in shape with one side being 29 ½ meshes on the leading edge by 38 ½ meshes deep and the other 29 ½ meshes on the leading edge by 23 meshes deep. The top and bottom sections are 29 ½ meshes on the leading edge by 23 meshes deep and tapered 1 point 2 bars on both sides down to 8 meshes across the back. The four sections are sewn together to form the funnel.

Figure 5. Attachment of the Funnel in the Extension

The funnel is installed inside the extension 3 meshes forward of the large mesh. Beginning at the seam of the extension webbing and the middle of the leading edge of the top funnel section, sew the funnel to the extension mesh for mesh. The back edge of the top and bottom sections are attached 3 meshes behind the soft cable hoop at the top and bottom of the extension webbing. The longer side section of the funnel is attached to the extension webbing on the top and bottom. Beginning at the back edge of the top and bottom section, attach the remainder of the long side panel by sewing 2 meshes straight and one mesh in on the extension webbing. This angles the extended side panel in toward the center of the extension webbing.

Figure 1.

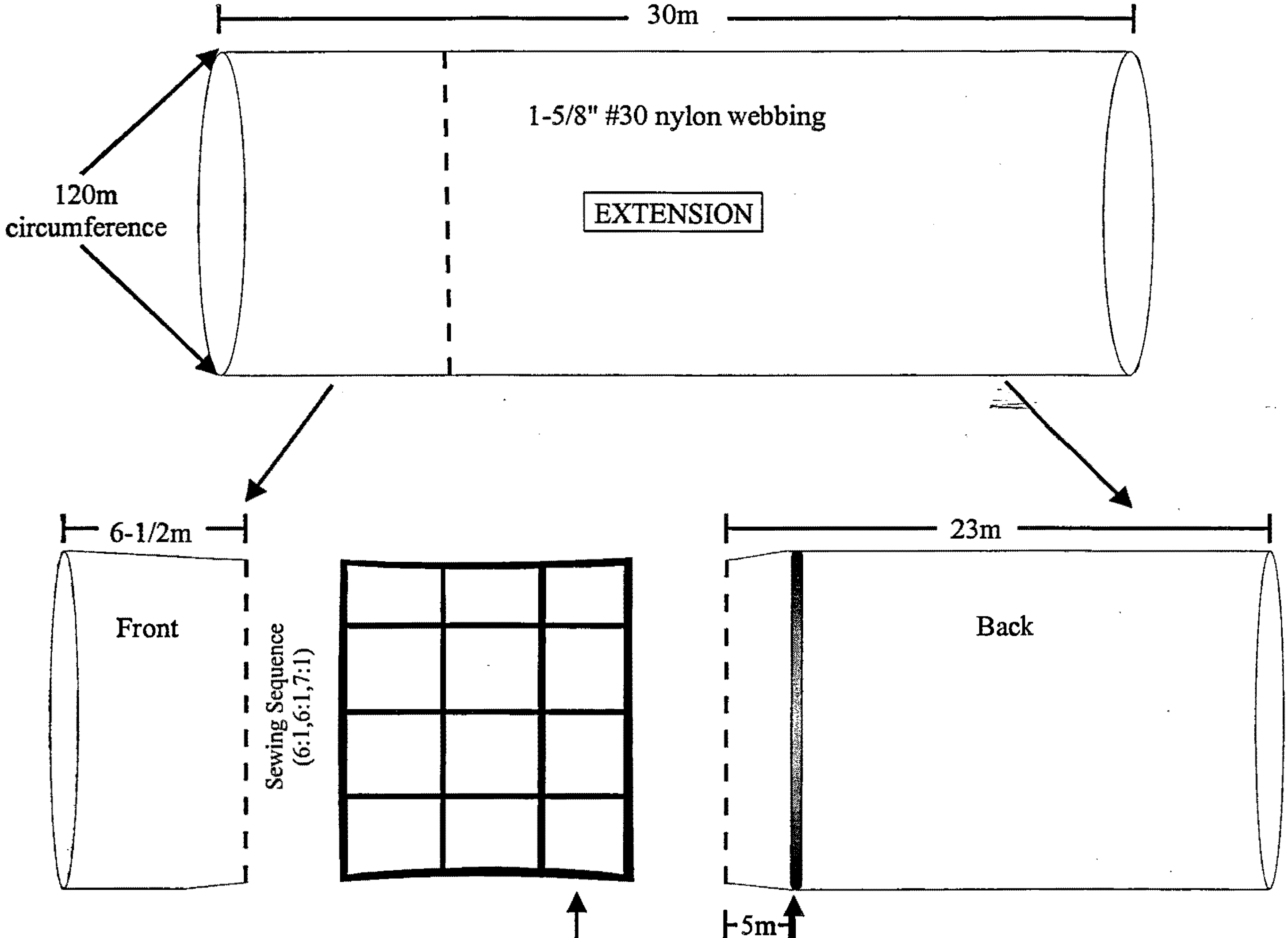
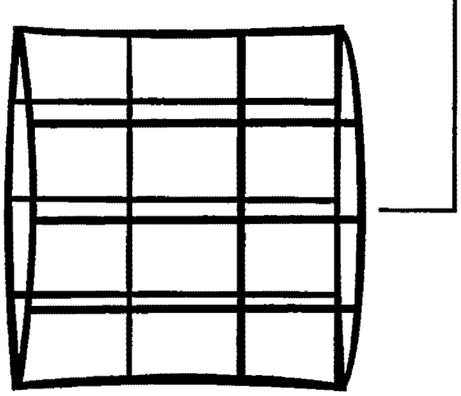
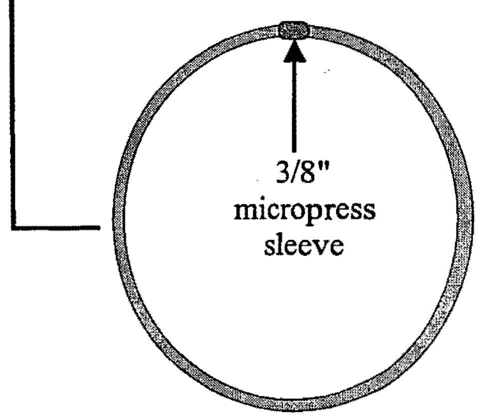


Figure 2.



Large Mesh
10" x 10mm polyester
3 meshes 19 bars (15" x 95")

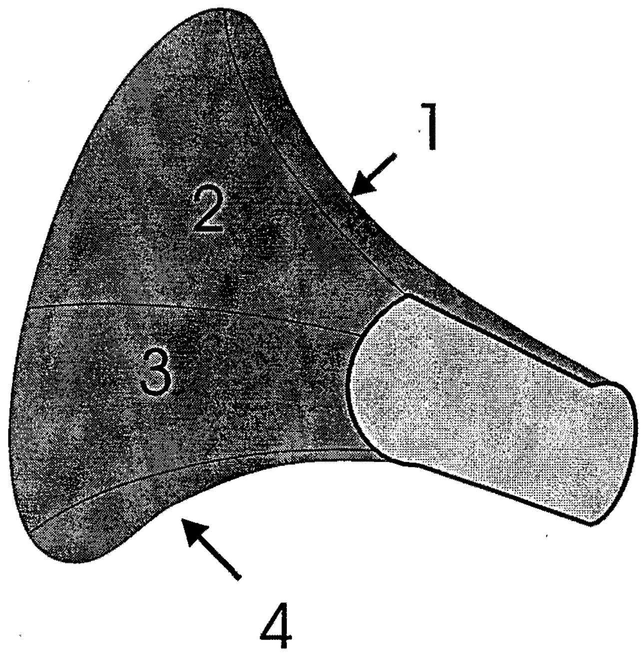
Figure 3.

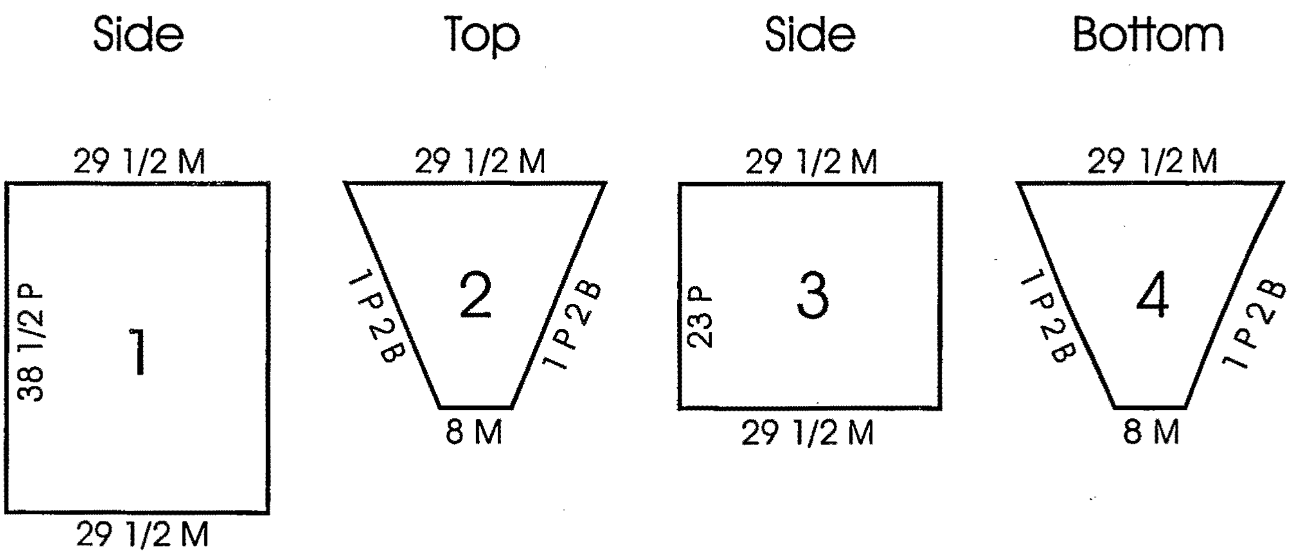


1/2" plastic coated cable
ring circumference 94-1/4"

Figure 4

Funnel

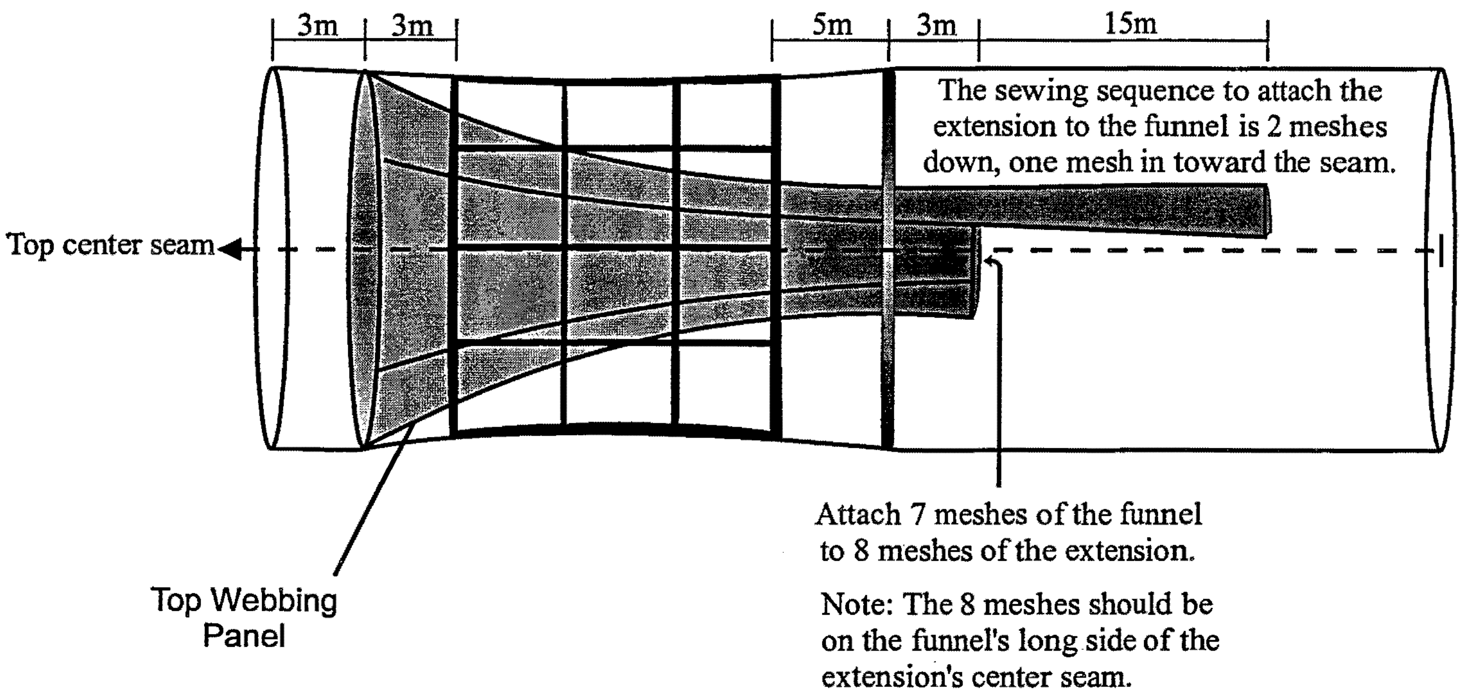




Webbing Panels

Figure 5.

Top View



Minimum Construction and Installation Requirements for Inshore Size

Extension Material - the small mesh used on both sides of the large mesh escape section is constructed from No. 18, 1-38 inch (stretch mesh) nylon webbing. The front section is 120 meshes around by 6 ½ meshes deep. The back section is 120 meshes around by 23 meshes deep.

Large Mesh Section - the large mesh escape section is constructed of 8-10 inch stretch mesh webbing. This section is cut on the bar to form a section that is 15x75 inches in circumference. The leading edge is attached to the 6 ½ mesh extension and the rear edge is attached to the 23 mesh extension section.

Funnel - the funnel is constructed of 1 3/8 inch (stretch mesh) No. 18 depth stretched and heat set polyethylene webbing. The circumference of the leading edge is 120 meshes and the back edge id 78 meshes . The short side of the funnel is 30 to 32 inches long and half of the opposite side of the funnel extends an additional 20 to 22 inches. The leading edge of the funnel is attached 3 meshes forward of the large mesh leading edge. Seven meshes of the short side of the funnel is attached to the back section of extension webbing on the top and bottom 8 meshes back from the trailing edge of the large mesh section. The extended side of the funnel is attached on a slight angle to the top and bottom of the back extension webbing.

Semi-rigid Hoop - a 24 inch diameter hoop constructed of plastic coated cable swaged together is installed evenly 5 meshes behind the trailing edge of the large mesh section.

Installation - the extended funnel BRD is attached behind a hard TED 8 inches behind the posterior edge with the codend attached to the trailing edge of the BRD. If a soft TED is used a second hoop must be installed in the front section of the BRD extension webbing at the leading edge of the funnel.

Expanded Mesh Description

The expanded mesh BRD is constructed and installed exactly the same as the extended funnel BRD except the funnel is not extended to form the lead panel.

INSTRUCTIONS FOR INSHORE LARGE MESH & EXTENDED FUNNEL BRD
National Marine Fisheries Service, Mississippi Laboratories
P.O. Drawer 1207, Pascagoula, MS 39568-1207

November, 1996

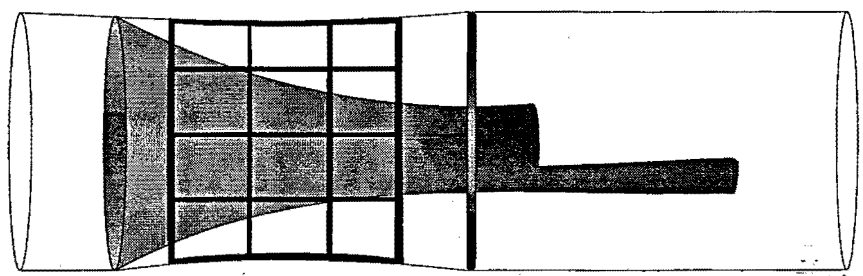


Figure 1. Construction of the Webbing Extension and Large Mesh Section

The webbing extension is made from a single piece of 1 3/8" stretch mesh # 18 nylon twine, 30 meshes x 120 meshes. Form a tube from the extension webbing by sewing the 30 mesh sides together. The large mesh section is made by cutting a 3 mesh strip by 14 ½ bars long from 10" by 10 mm PES webbing. Sew the narrow ends together to form a 3 square by 15 square (15" x 75") tube.

Figure 2. Attachment of Large Mesh to the Extension

Starting at the top center seam of the extension, count back 6 ½ meshes and cut around the extension to divide it into two pieces. Attach the large mesh section to the 6 ½ mesh piece (front) of the extension. The sewing sequence for attaching the large mesh section to the extension is 8 meshes to one large mesh. Repeat this sewing sequence until you are all the way around the large mesh piece. Repeat the sewing sequence when attaching the other end of the large mesh section to the 23 mesh extension section.

Figure 3. 24" Hoop Ring

A single hoop is constructed of 3/8" plastic coated cable 75 1/2" in length. It is joined by a 5/16" nicropress sleeve. Starting at the top center seam of the 23 mesh extension section (back section) count back 5 meshes then attach the extension to the 24" ring. Then count 60 meshes around the extension to find the bottom center attachment point. Starting at the top center then count 30 meshes on each side of the extension to find the side attachment points. Finding these points is necessary to insure that the extension webbing is equally distributed around the ring. When the four attachment points are located and attached to the ring, lace the extension webbing to the ring around the entire circumference.

Figure 4. Construction of the Funnel

The funnel is constructed from 4 sections of 1 3/8", number 18, depth stretched and heat set polyethylene webbing. The two side sections are rectangular in shape with one side being 29 ½ meshes on the leading edge by 38 ½ meshes deep and the other 29 ½ meshes on the leading edge by 23 meshes deep. The top and bottom sections are 29 ½ meshes on the leading edge by 23 meshes deep and tapered 1 point 2 bars on both sides down to 8 meshes across the back. The four sections are sewn together to form the funnel.

Figure 5. Attachment of the Funnel in the Extension

The funnel is installed inside the extension 3 meshes forward of the large mesh. Beginning at the seam of the extension webbing and the middle of the leading edge of the top funnel section, sew the funnel to the extension mesh for mesh. The back edge of the top and bottom sections are attached 3 meshes behind the soft cable hoop at the top and bottom of the extension webbing. The longer side section of the funnel is attached to the extension webbing on the top and bottom. Beginning at the back edge of the top and bottom section, attach the remainder of the long side panel by sewing 2 meshes straight and one mesh in on the extension webbing. This angles the extended side panel in toward the center of the extension webbing.

Figure 1.

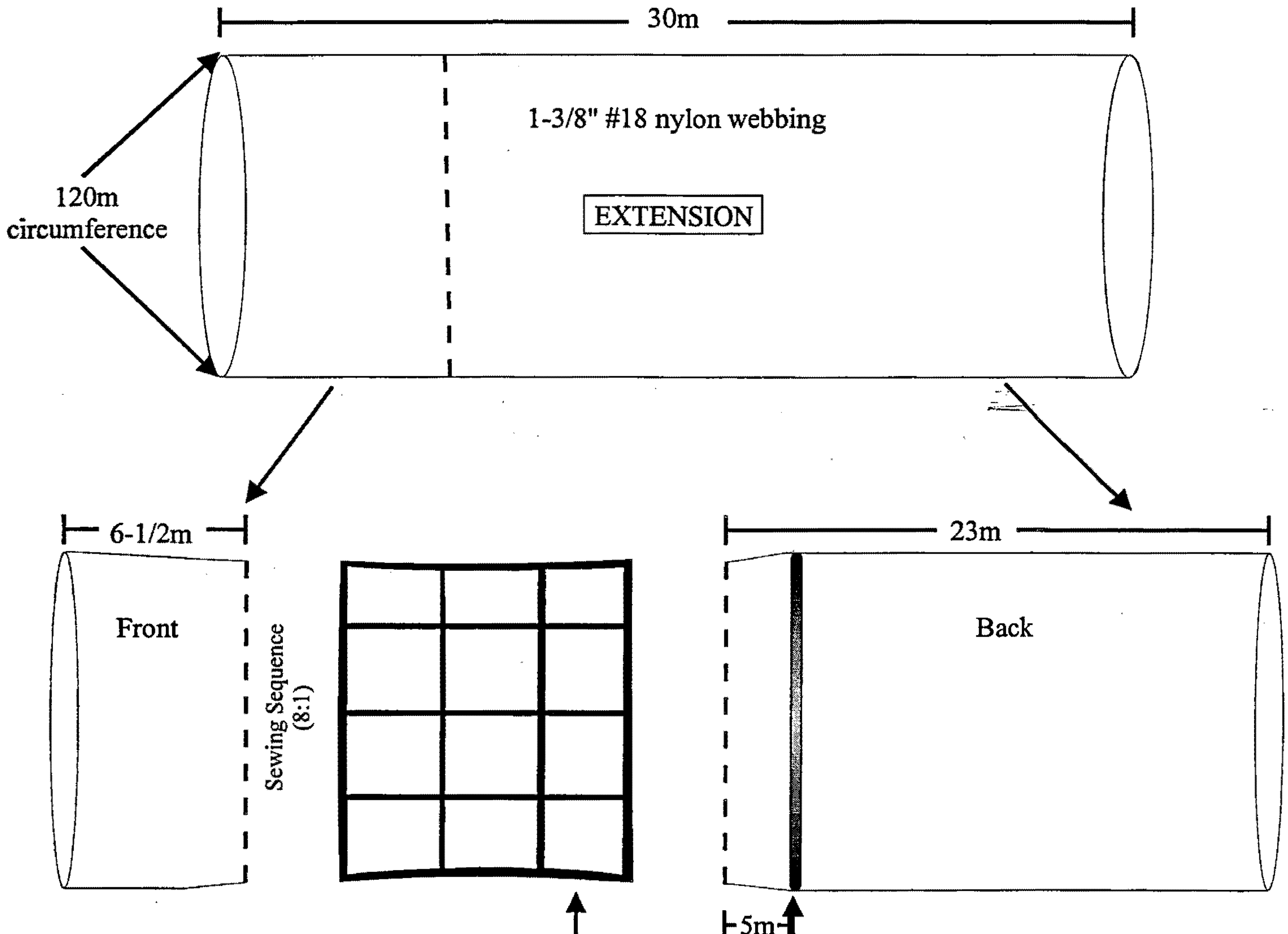
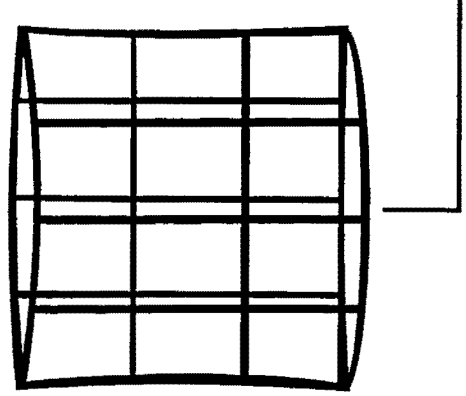
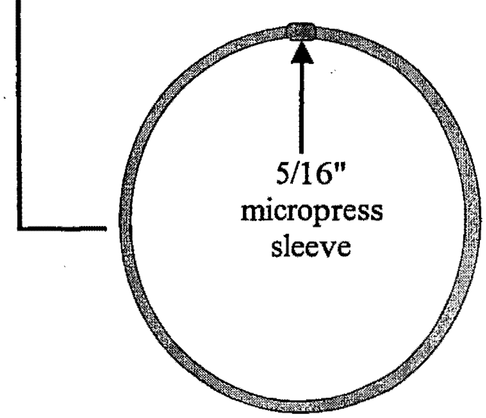


Figure 2.



Large Mesh
10" x 10mm polyester
3 meshes 15 bars (15" x 75")

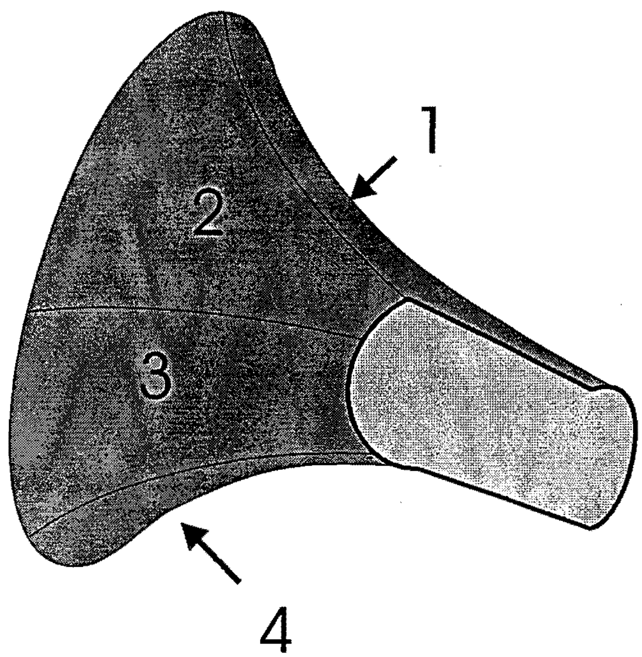
Figure 3.

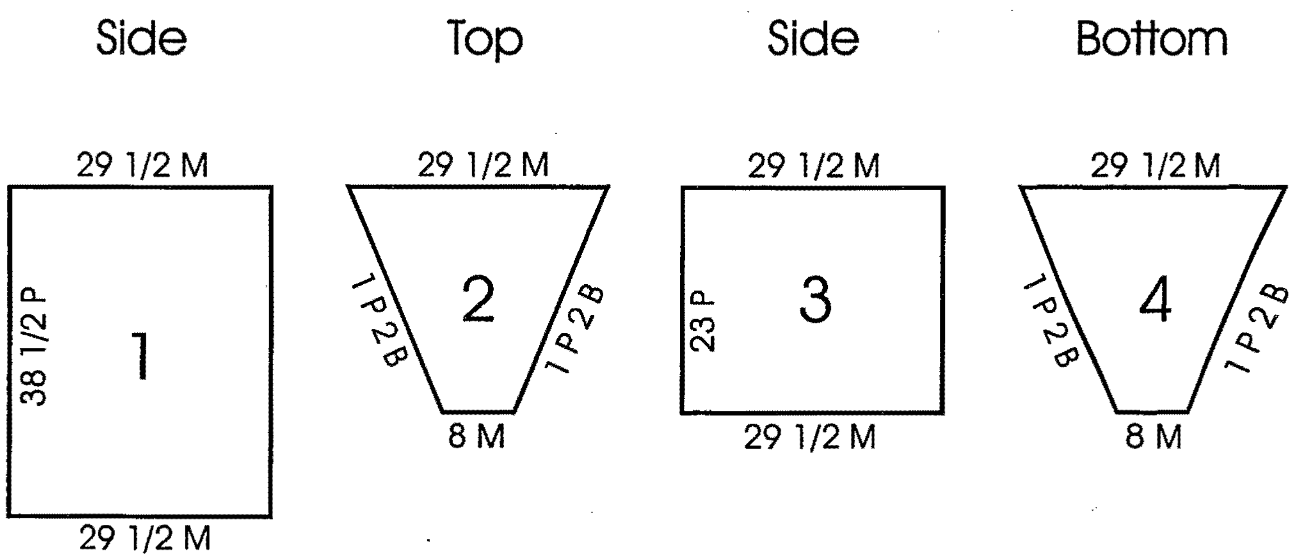


3/8" plastic coated cable
ring circumference 75 1/2"

Figure 4

Funnel

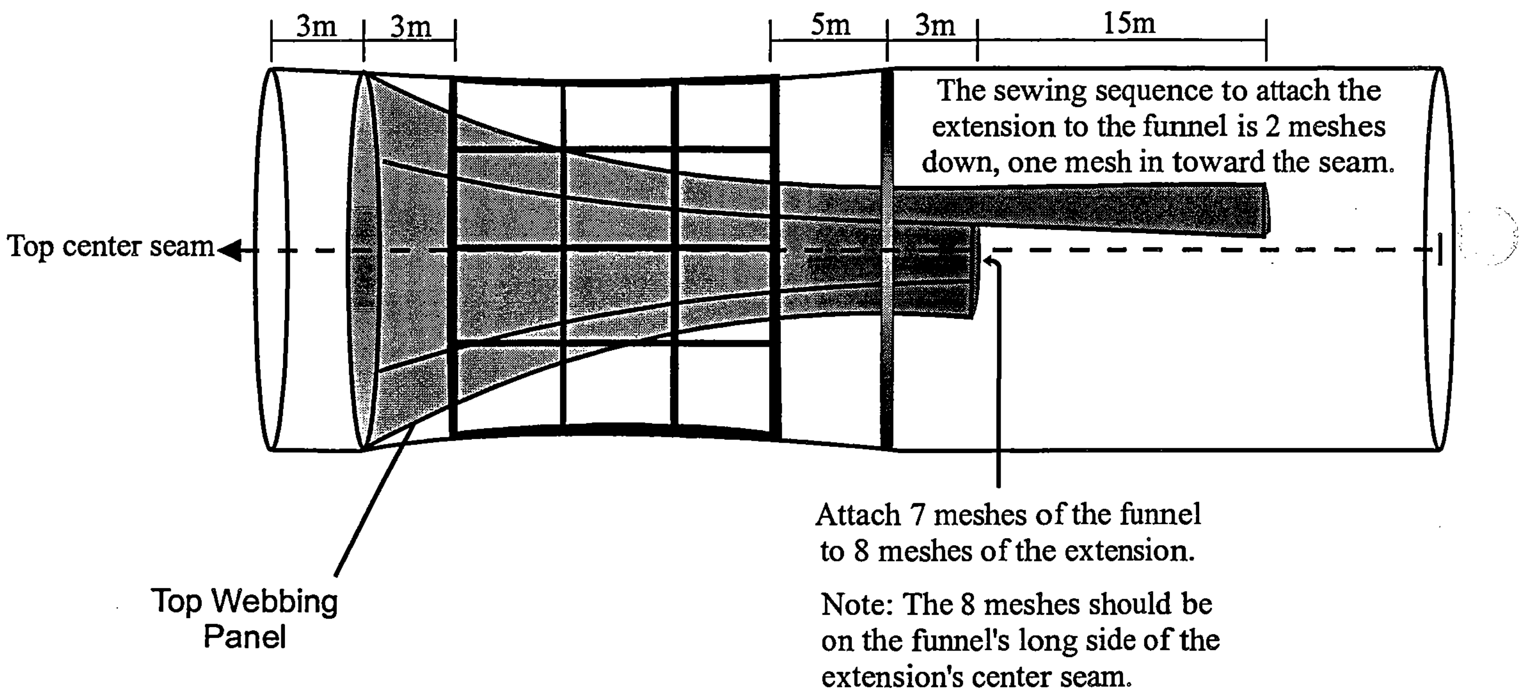




Webbing Panels

Figure 5.

Top View



TECHNICAL SPECIFICATIONS AND MINIMUM REQUIREMENTS FOR THE FISHEYE BRD

Fisheye Description

Approved fisheyes are cone shaped rigid frames constructed from aluminum or steel which are inserted into the top center of the codend to form an escape opening.

Minimum Construction and Installation Requirements

Fisheyes should be constructed of aluminum or steel rod of at least 1/4" diameter with a minimum opening dimension of 5 inches and a minimum total opening area of 36 square inches. Fisheyes must be installed in the codend of the trawl to create an opening in the trawl facing in the direction of the mouth of the trawl no further forward than 70% of the distance between the codend drawstring (tie off rings) and the beginning of the codend (excluding any extension) or 11 ft, whichever is the shorter distance.

INSTRUCTIONS FOR FISHEYE BRD

National Marine Fisheries Service, Mississippi Laboratories
P.O. Drawer 1207, Pascagoula, MS 39568-1207

November, 1996

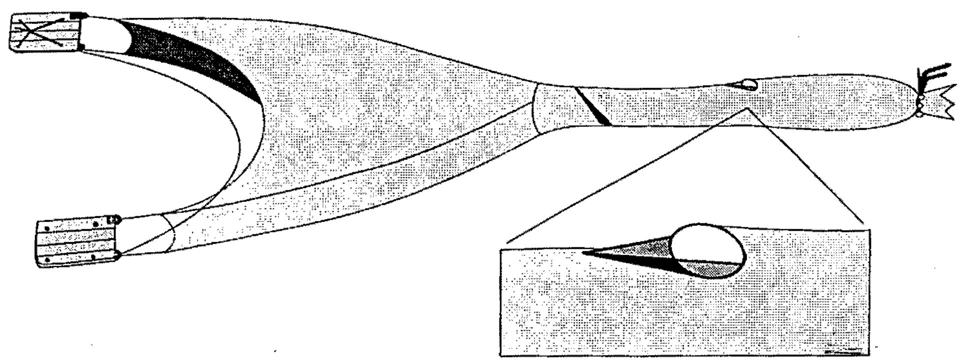


Figure 1. Construction of the Fisheye Frame

The fisheye frame is constructed of steel or aluminum rod of at least 1/4 in. diameter. It consists of an exit opening frame with an apex of three bars to orient the exit opening. The exit opening frame has varying shapes but should not have a diameter any smaller than five inches or total exit opening area of smaller than 36 sq. inches.

Figure 2. Placement of the Fisheye in the Trawl

The fisheye frame should be installed in the trawl with the apex pointing forward. It must be installed in the trawl codend not farther than 70% of the distance between the codend drawstring (tie-off rings) and the beginning of the codend or 11ft., whichever is the shorter distance.

Figure 3. Example of Fisheye Installation

The following is an example of the proper installation of a 6" x 12" fisheye in a 120 mesh bag. Proper installation will vary depending on the frame and codend sizes.

Starting with a codend that is 120 X 120 meshes of 1-5/8 (#42) nylon webbing, count down the seam 32 ½ meshes (70% of the distance between the tie-off rings and the front of the codend) from the forward edge of the codend. Cut the exit opening perpendicular to the seam. For a 6" X 12" frame, an exit opening of 20 meshes (10 on each side of the seam) should be cut.

The frame is installed in the webbing by orienting the frame so the apex is pointed toward the front of the trawl and the center apex bar is against the webbing. The forward side of the exit opening cut is laced on the inner portion of the frame opening. The aft side of the cut is laced on the outer portion. The frame apex is then laced to the trawl webbing to secure the frame.

Figure 1.

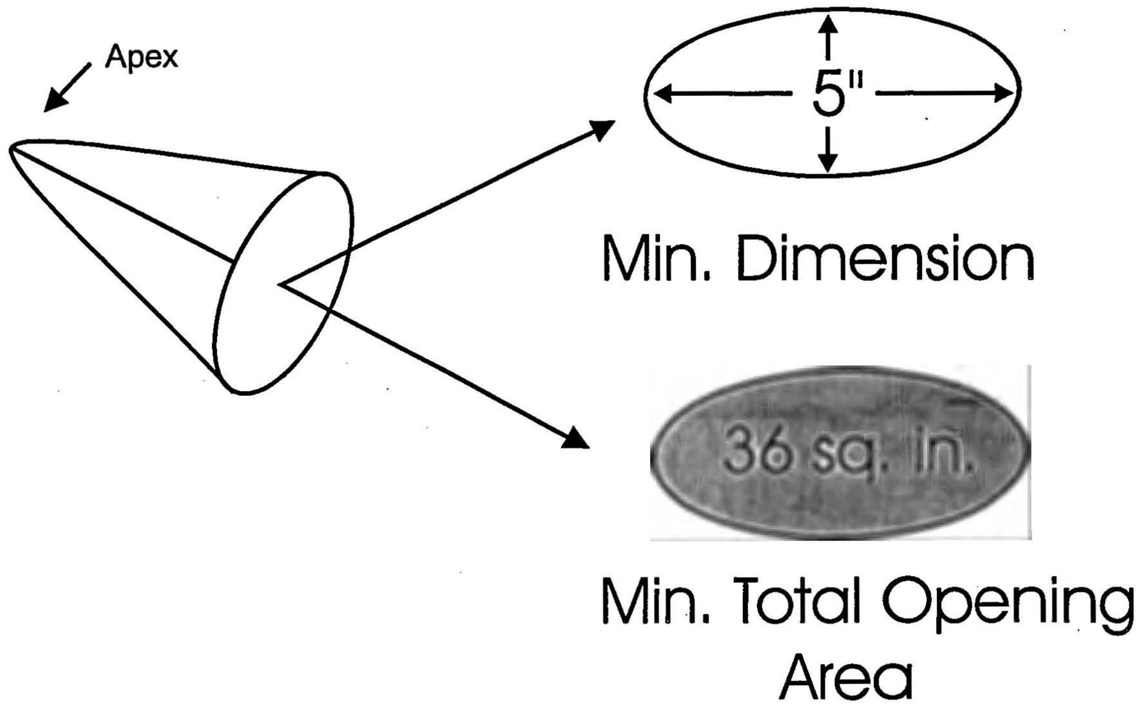


Figure 2.

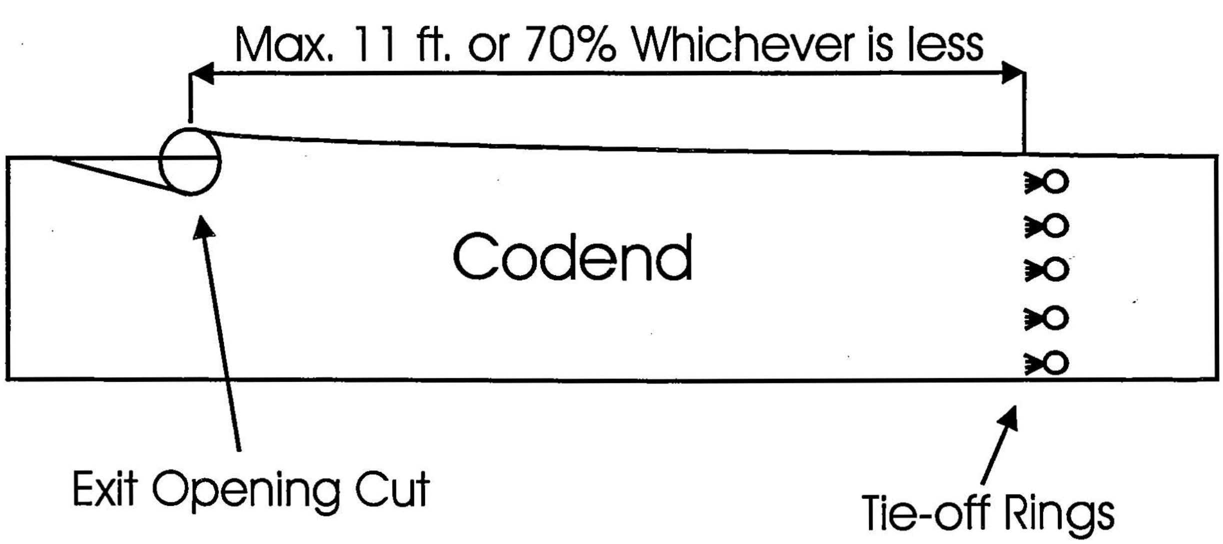
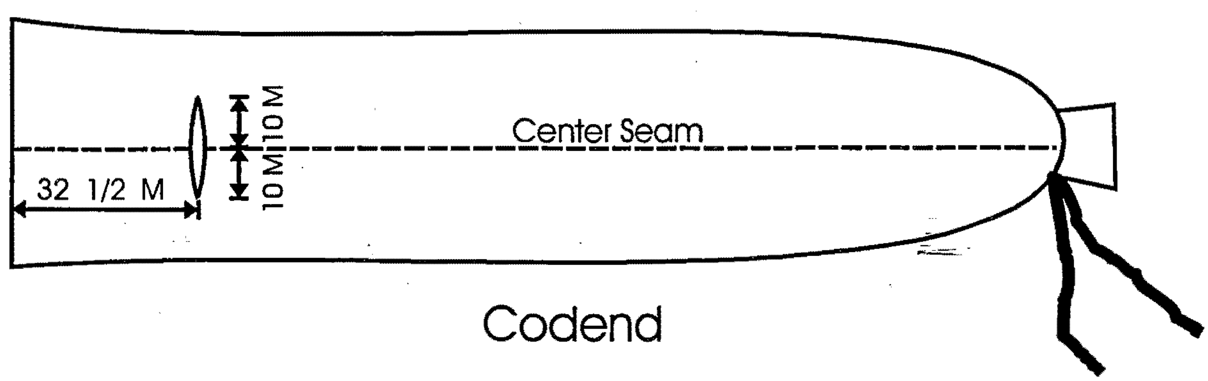
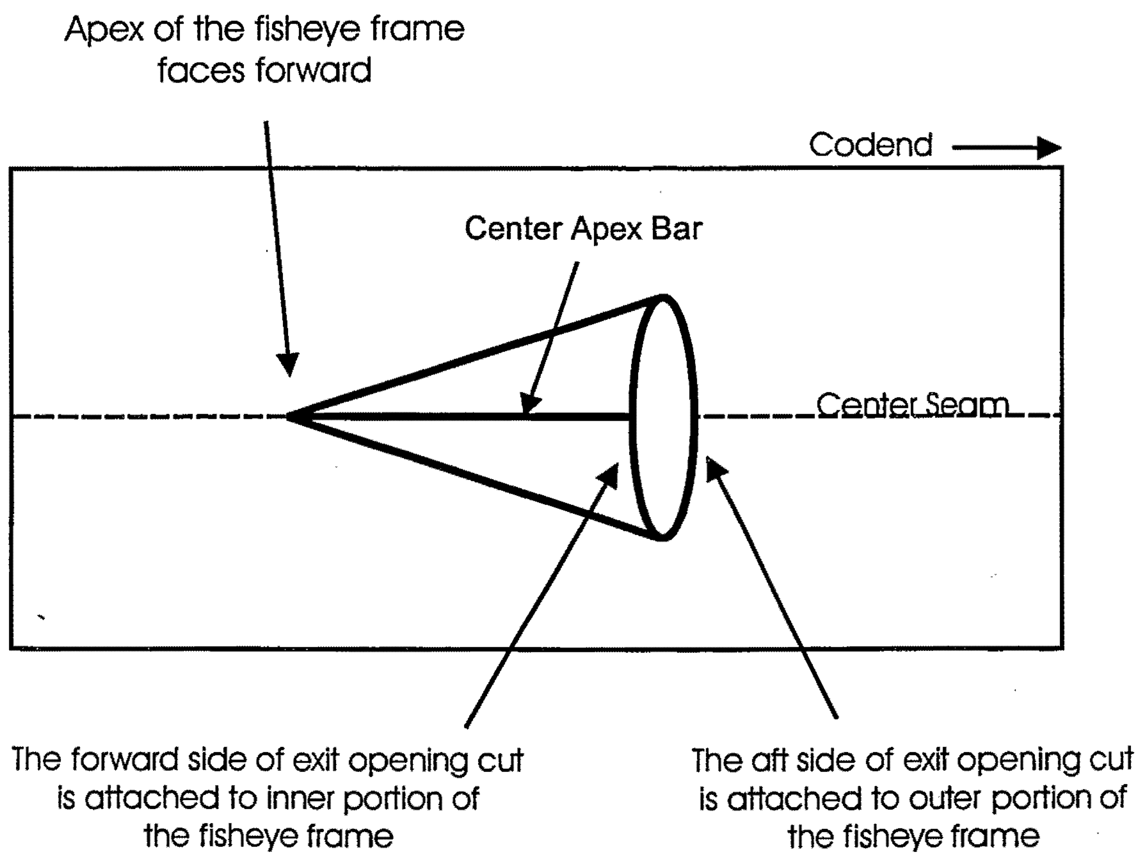


Figure 3.



Codend



MARFIN Annual Project Report

A. Project Title: Shrimp Trawl Bycatch Reduction

B. Principle Investigator: Scott Nichols

C. Project Number: ______

D. Period Covered: From October 1, 1995 To September 30, 1996

E. Report:

Introduction

Shrimp trawl bycatch continues to be a leading management issue for fisheries managers in the southeastern United States. The Harvesting Systems Division of the NMFS-SEFSC Pascagoula, MS Laboratory, working cooperatively with state and university researchers and the shrimp fishing industry, has been studying fishing gear alternatives as a management option since 1990. Over the last seven years, numerous bycatch reduction device (BRD) designs have been evaluated and tested, and two designs, the large mesh extended funnel (LMEF) and the fisheye, have shown acceptable bycatch reduction rates for most species with minimal or no shrimp loss.

The LMEF and the fisheye BRDs are providing a starting point from which regulations are being developed, but these designs may not be the answer to all shrimp trawl bycatch related problems. As bycatch regulations are implemented, industry will likely take a larger part in the development of new BRD designs and design modifications to meet the needs dictated by the fishing conditions they encounter. These designs and modifications will have to be evaluated and tested before approval for use. There is also a need for more cooperative work to develop improved BRD designs or alternative methods to protect species like the red snapper which is extremely hard to exclude from a shrimp trawl.

The goal of this year's project was to meet present and gear for future bycatch reduction needs. A high priority was to educate shrimp fishers on how to incorporate bycatch reduction gear into their fishing practices. Project objectives for FY 96 included:

1. Conducting evaluations of industry developed bycatch reduction gear designs and modifications.

2. Completing development and evaluation of techniques for certification of commercially developed bycatch reduction designs.

3. Providing technology transfer assistance to the shrimp industry in adoption and use of appoved bycatch reduction gear and techniques.

Materials and Methods

The R/V Caretta, a 60 foot shrimp trawler, was used to evaluate four new BRD designs and five modifications to existing designs (Attachment A). The BRDs were evaluated in a 50-ft flat trawl attached to 8-ft x 40-in trawl boards and 40-fathom bridles. Standardized trawl diving techniques were used to obtain measurements of water flow in and around the devices and to observe operational characteristics.

As part of the evaluation of techniques for certification of commercially developed bycatch reduction designs, a study of juvenile red snapper reefs was conducted. The study looked at reef size, profile and materials (including polyethylene webbing and oyster shell) to determine what reef features most attract juvenile red snapper. To determine their efficacy, the number of juvenile snapper attracted to the reefs was compared to snapper occurrence at randomly selected sites around the reef study area.

Harvesting Systems personnel provided technical assistance to fisheries managers, training to law enforcement officials, and BRD workshops to commercial fishers. The workshops addressed BRD installation and fishing and handling techniques.

Harvesting Systems personnel conducted a comprehensive analysis of the regional bycatch program BRD evaluation data base and presented the results to fishery managers, the Gulf of Mexico and South Atlantic fishery management councils and industry organizations.

Results and Discussion

Four of the nine BRD designs evaluated including three modifications of the LMEF BRD and one combination TED-BRD, the Falana BRD, showed promise and were recommended for further testing. One modification, a change in the taper of the extended funnel, has since proven to be more effective and has replaced the original funnel used in the LMEF. Another modification where the large mesh webbing section of the LMEF was replaced with chain is undergoing further testing for approval for use in North Carolina.

A fifth BRD design, the Sea Eagle - a PVC modified fisheye, was recommended for modification before further testing. The modifications and additional testing have since been completed, and the Sea Eagle is now approved for use in the North Carolina shrimp fishery.

Results of the juvenile red snapper reef study show that young snapper prefer complex habitat with some vertical profile and holes or spaces to enter into the reef. The limitation to snapper recruitment appears to be the size of the fish. Larger red snapper will limit the recruitment of smaller snapper (i.e. depending on the size of the reef, 0 year class red snapper do not normally recruit to reefs that are already occupied by one year or older snapper).

Another factor that appears to limit the recruitment of juvenile red snapper to a reef site is temperature. In 1996, young of the year recruits did not start to show up on the study reefs until late

July. This was more than a month later than their first appearence in 1995. The most noticable difference between the two years was the time that it took for the thermocline to dissipate. In 1996, the thermocline remained in the study area until late July, and postlarval red snapper were not observed on the reefs until the bottom water warmed to about 23° C.

A listing of technical assistance sessions, law enforcement training programs and BRD workshops is given on Attachment B. BRD technical assistance was provided to the Florida Department of Environmental Protection. Law enforcement training was given in Florida and Mississippi, and workshops for commercial fishers were held in North Carolina, Georgia, Florida, Mississippi and Texas.

The results of analyses of the regional bycatch BRD evaluation data base was presented in a report entitled "Summary report on the status of bycatch reduction device development" (attachment c). A video report "Cooperative research addressing finfish bycatch in the Gulf of Mexico and South Atlantic shrimp fishery" was produced and presented at industry meetings, MAFAC, Council meetings and NMFS and NOAA briefings for fishery managers.

Attachment A

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pascagoula Facility
P.O. Drawer 1207
Pascagoula, MS 39567

Harvesting Systems Branch
Project Report

Shrimp Trawl Bycatch Reduction Study Conducted From R/V Caretta

May 28 - June 4, 1996

INTRODUCTION

The Harvesting Systems Branch of the National Marine Fisheries Service Pascagoula, Mississippi Laboratory conducted a cruise aboard the R/V Caretta from May 28 to June 4, 1996. The purpose of the cruise was evaluate nine prototype industry and NMFS bycatch reduction device (BRD) designs. The evaluations were conducted by divers in the relatively clear waters off Panama City, Florida.

OBJECTIVE

Conduct diver evaluations of prototype BRD designs.

GEAR DESCRIPTION AND METHODS

The R/V Caretta was equipped with two 50-ft flat trawls attached to 8-ft x 40-in trawl boards and 40 fathom bridles. The trawls were rigged with a TED and BRD or TED-BRD combination and towed at 2.0 and 2.5 knots for the evaluations.

Three industry and six NMFS BRD designs were evaluated (Table 1). Evaluations were conducted by divers using standardized trawl diving techniques. Water flow in and around the BRDs was observed by injecting dye into the water and documented with an underwater video camera. Water flow speed was measured with a diver operated General Oceanics current meter.

RESULTS

All nine BRD designs were evaluated (Table 2). In addition to evaluating water flow characteristics and flow speeds in the industry BRD designs, modifications were made if necessary to help improve their performance. Video copies of the evaluations were provided to the BRD designers.

Four of the BRD designs including the modified taper polyethylene and nylon large mesh extended funnels, the chain modified extended funnel and the Falana BRD #1 (Figures 1-3) showed the most promise for further testing. All four of these designs had good water flow characteristics with flow speeds at the excluder openings in the range considered favorable for the exclusion of juvenile red snapper. Further testing necessary to complete the evaluations of these BRD designs would include diver observations of fish (preferably juvenile red snapper) behavior in relation to the BRD designs and comparative towing tests (Proof of Concept testing).

PROJECT PARTICIPANTS

Ian Workman
John Watson
John Mitchell
Dan Foster
Dominy Hataway
Charles Taylor
Kendall Falana
Jack Forrester

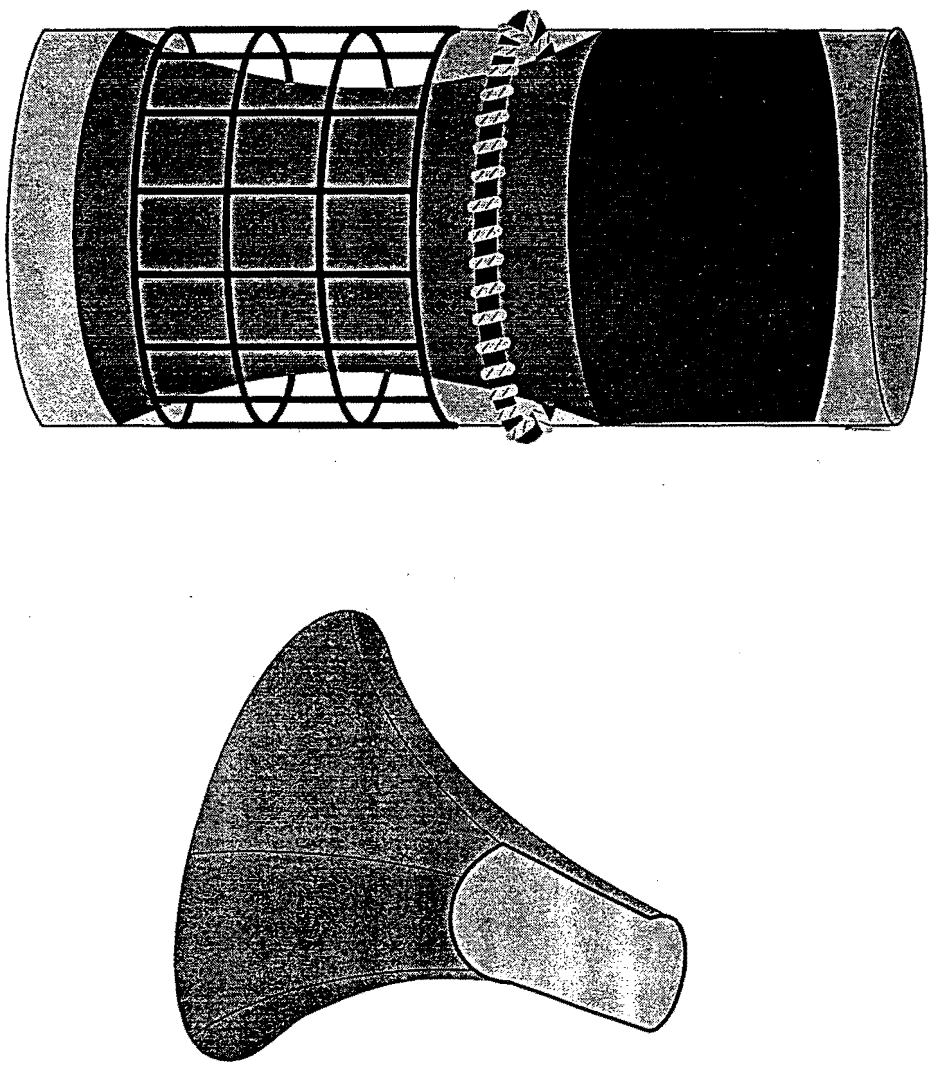


Figure 1. Large Mesh Extended Funnel with a modified tapered funnel (polyethylene or nylon webbing)

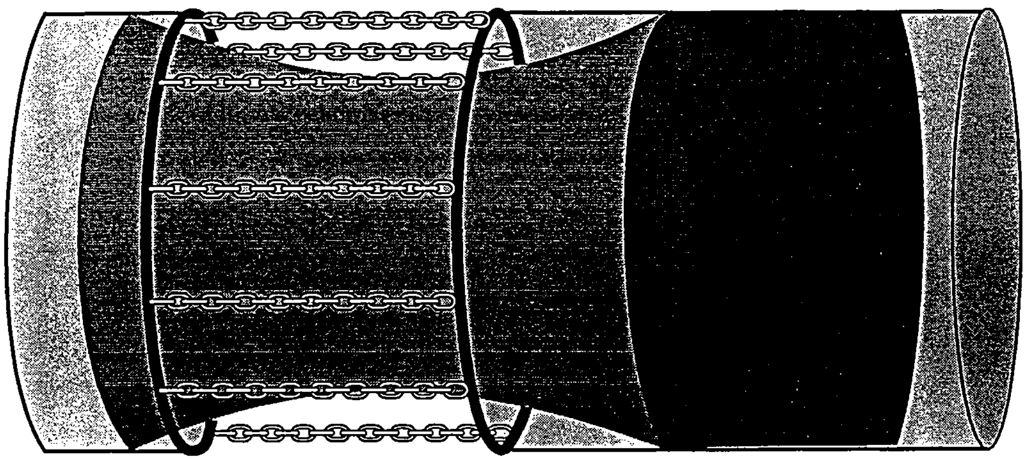


Figure 2. Chain Modified Large Mesh Extended Funnel

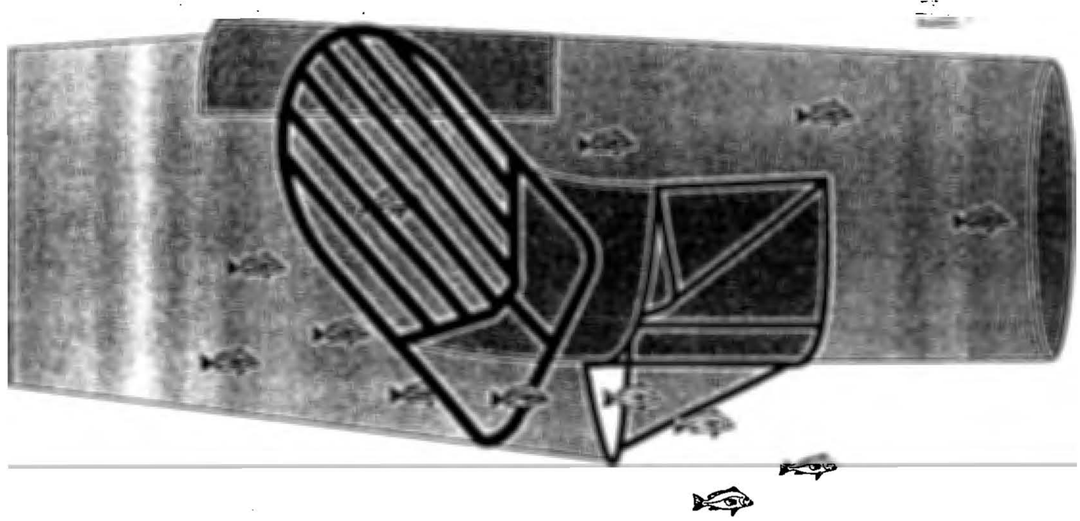


Figure 3. Falana BRD

Table 1. BRDs evaluated May 28 - June 4, 1996.

	BRD	Type	Designer
1.	8" Sea Eagle (PVC Fisheye)	BRD	Bill Hickman/Industry
2.	6" Sea Eagle (PVC Fisheye)	BRD	Bill Hickman/Industry
3.	Chain modified large mesh extended funnel	BRD	Steve Parish/Industry
4.	Alario Brothers' TED w/ side openings	TED/BRD	Industry/NMFS
5.	Modified taper large mesh extended funnel (polyethylene)	BRD	NMFS/Jack Forrester
6.	Modified taper large mesh extended funnel (nylon)	BRD	NMFS/Jack Forrester
7.	Falana BRD #1 (short section)	TED/BRD	NMFS/Kendall Falana
8.	Falana BRD #2 (long section)	TED/BRD	NMFS/Kendall Falana
9.	Barbour BRD	TED/BRD	NMFS/James Barbour

Attachment B

BRD Technical Assistance, Law Enforcement Training, And Workshops Conducted In FY 96

Technical Assistance

October 1995 - Florida Department of Environmental Protection

August 1996 - Florida Department of Environmental Protection

Law Enforcement Training

April 1996 - Mississippi

June 1996 - Florida

BRD Workshops

January 1996 - Mississippi

January 1996 - Texas

March 1996 - Mississippi (for Mexico)

March 1996 - North Carolina

April 1996 - Mississippi (two workshops)

June 1996 - Florida (three workshops)

July 1996 - Georgia (three workshops)

Table 2. Evaluator comments and modifications made to test BRDs.

BRD	Modification	Evaluator Comments
8" Sea Eagle		At 2.0 knots flapper opened 3" and closed. At 2.5 knots the flapper remained fully open. On haul back the device rolled to one side and the flapper remained open.
	Added 5" float	Device remained upright and flapper stayed 80-90% open during tow. Flapper oscillated when trawl slowed and did not completely close during haul back.
6" Sea Eagle		Functioned much the same as the 8" Sea Eagle after 5" float was attached.
Chain mod. lg. mesh ext. funnel		Funnel too lose.
	Lengthened chains ≈ 4" and removed K-50 float	Funnel looked good, but back hoop sagged without floatation.
	Replaced K-50 float	BRD looked good.
Alario Brothers' TED	Side openings	Water flow too fast at excluder openings.
Mod. taper lg. mesh ext. funnel (polyethylene)		BRD looked good.
Mod. taper lg. mesh ext. funnel (nylon)		BRD looked good.
Falana BRD #1		Lead panel was a little lose, but overall BRD looked good.
Falana BRD #2		Lead panel was lose.
Barbour BRD		Not enough clearance between TED funnel and large meshes.

APPENDIX B

APPENDIX B

Executive Summary

A Model for Assessment of Ecological Interactions Among Living Marine Resources in the Gulf of Mexico: Implications for Bycatch Management and Shrimp Production

Report to the Gulf of Mexico Fishery Management Council
March, 1996

Eduardo X. Martinez, James M. Nance and Roger J. Zimmerman
National Marine Fisheries Service, Southeast Fisheries Science Center
4700 Avenue U, Galveston, TX

Introduction

Background

In recent years, the Gulf of Mexico shrimp fishery (*Penaeus* spp.) has experienced increased scrutiny regarding the impacts of trawl bycatch on natural resources. Bycatch is comprised of non-targeted species which are captured incidentally during trawling operations and are released dead, injured or stressed. Conservation agencies and environmental organizations generally view trawling as a destructive or wasteful fishery that negatively impacts other living marine resources (Fowle and Bierce 1992). Globally, shrimp trawling has been identified as the fishery with the largest and most serious bycatch issues (Alverson et al. 1994). Excess bycatch in shrimp trawls is seen as an important cause for declines in stocks of some commercially important finfish, endangered sea turtles and other living resources in the Gulf of Mexico (Henwood and Stuntz 1987; Goodyear and Phares 1990; National Research Council 1990; Caillouet et al. 1991; Goodyear 1991). Measure to reduce bycatch (bycatch reduction devices) have been proposed to alleviate such declines. These measures may have the effect of releasing more shrimp predators or allowing small fish to grow larger and thus become predators. Shrimp stocks might then be impacted by increasing the incidence of finfish predation. Although the interaction of shrimp and finfish predators in a Gulf of Mexico estuary has been described in detail (Minello et al. 1989), limited information is available regarding shrimp predation in offshore waters, and its effect on shrimp stocks. Development of an ecosystem-based model is desirable to guide research and management. However, it is important to remember that predictive results of such models are based on assumptions and the quality information available.

Previous Modeling Efforts

Research completed in the early 1980's resulted in the development of several models to examine potential fish predation on shrimp stocks in offshore waters (Browder 1983; Sheridan et al. 1984a). The purpose of the models was that reduction of shrimp trawl bycatch affected shrimp stock dynamics and, ultimately, shrimp fishery yield. The models were used to simulate dynamics of living resources in the ecosystem subsequent to bycatch reduction (perturbation). Initially, quantitative data which specified *Penaeus* as a prey item was minimal and indicated a low incidence of finfish predation on shrimp (Browder 1983; Sheridan et al. 1984a). Information regarding competition among fish species was even more limited. One model utilized traditional population dynamics techniques (matrix operations); the other was an ecosystem simulation model with numerous compartments representing different trophic groups linked by energy flow and nitrogen cycling within the system.

The population dynamics model indicated that even the most favorable discard practices could increase shrimp harvest by only 8% (Sheridan et al. 1984a). This assumes no discards of shrimp and a high rate of discards for bottomfish. Furthermore, a major assumption was that reassimilation of fish discards would "be directly translated into shrimp yield" (Sheridan et al. 1984a). However, the authors indicated that the actual benefit would probably be less since assimilation rates in the model were overestimated; therefore, results from the population dynamics model were not considered to be very accurate. The trophic model provided greater flexibility for inclusion of biotic and abiotic factors such as riverine input of nitrogen, solar radiation, plankton and benthic components, fishing effort, and stocks of shrimp, bottomfish, migratory and pelagic finfish, large predators (dolphins), scavengers (sharks), and utilization of bycatch by fishermen. Results from this model suggested that shrimp production (biomass) would decline approximately 25% if discards were reduced by 50% through utilization (i.e., removal of biomass from the ecosystem). Model results also indicated that only an 8% reduction in shrimp production would be observed with the introduction of trawls which reduced bycatch, assuming that excluded finfish do not exhibit selective predation against shrimp as a prey item. Consequently, the authors concluded that using bycatch reduction devices (BRD's) or similar techniques to reduce finfish capture would result in no long term effect on shrimp harvest if finfish exhibited even moderate selectivity against shrimp as prey. Shrimp biomass would decrease initially, but shrimp stocks would rebound and stabilize after the first or second year following implementation of BRD's (Browder 1983; Sheridan et al. 1984). The trophic model of Browder has been generally accepted in evaluating predator-prey interactions in the shrimp fishery since data from many different research efforts up to that time were used to parameterize and quantify the model.

New Research

Since 1980, when the Browder models were developed, new research has provided additional information on predator-prey interactions between shrimp and finfish stocks in the Gulf of Mexico. Scientists of the Southeast Fisheries Science Center (SEFSC) and other investigators have continued to examine foods of trawl-susceptible and coastal pelagic fishes and consequently identified the dominant shrimp predators and their frequency of predation on penaeid shrimp (Naughton 1981; Divita et al. 1983; Manooch and Haimovici 1983; Manooch and Hogarth 1983; Manooch et al 1983; Saloman and Naughton 1983a, 1983b; Sheridan and Trimm 1983; Sheridan et al. 1984b; Sheridan, unpublished data). Of

161 fish species examined, only 14 fish species have been identified as predators on shrimp of the genus *Penaeus*. These include Atlantic croaker (*Micropogonias undulatus*), sand seatrout (*Cynoscion arenarius*), spotted seatrout (*Cynoscion nebulosus*), silver seatrout (*Cynoscion nothus*), ocellated flounder (*Ancylopsetta quadrocellata*), inshore lizardfish (*Synodus foetens*), bighead searobin (*Prionotus tribulus*), smooth puffer (*Lagocephalus laevigatus*), red snapper (*Lutjanus campechanus*), lane snapper (*Lutjanus synagris*), Spanish mackerel (*Scomberomorus maculatus*), rock sea bass (*Centropristis philadelphica*), dwarf sand perch (*Diplectrum bivittatum*), and Atlantic sharpnose shark (*Rhizoprionodon terraenovae*). The relative importance of shrimp predation by each of these species is presented in Table 1. Sand seatrout represent the dominant predator of shrimp in gulf waters, despite the low occurrence of *Penaeus* in their stomachs. This is attributed to the abundance of the sand seatrout population in the Gulf of Mexico (NMFS, unpublished data).

Since 1990, research on bycatch characterization and bycatch reduction devices (BRD's) have produced data on the magnitude, composition, and distribution of bycatch species captured in trawls and on effectiveness of trawls equipped with BRD's. Bycatch characterization studies (> 450 trips, > 4,000 observer days) have recorded > 250 species of finfish. Characterization data includes size and weight characteristics of fish as well as catch per unit effort (CPUE) by area, season, and depth fished (NMFS, unpublished data). BRD evaluations indicate that certain gear types can release up to 79% of a given species (biomass; NMFS, unpublished data). Seven species of known shrimp predators were evaluated with respect to exclusion from trawls using BRD's. CPUE was reduced for Atlantic croaker, Spanish mackerel, lane snapper, and red snapper. CPUE remained unchanged for rock sea bass, smooth puffer and inshore lizardfish.

A review panel of scientists from NMFS and academic institutions was assembled to examine areas for improvement of the existing models. This working group identified the need for inclusion of additional functional relationships in the model. In addition, new parameters were identified for components describing stocks of phytoplankton, zooplankton, bycatch, discards, shrimp and several finfish groups (reefish, pelagics, etc.).

Methods

Model Design

The design of the new model follows Browder (1983) and Sheridan et al. (1984a). A generalized version of the model is shown in Figure 1. Nitrogen is used as the common currency of material flow within the model since it can quantitatively describe biotic (stocks) and abiotic (environmental) components of the model. Therefore, nitrogen substitutes for biomass of living marine resources through simple conversion of biomass (kg) to nitrogen units (mg N_2/m^2). The model is programmed using the Stella/iThink simulation software for Macintosh computer platforms. The model contains 110 variables including:

1. ***Abiotic components***: river runoff, sedimentation rates, water temperature, and photoperiod.

2. ***Biological components***: N_2 pools (inorganic and organic), planktons, benthos (infauna and epifauna), crustaceans, finfish (bottomfish, pelagics, migratory fish), dolphins, sharks and birds.

3. ***Ecological components***: predation, excretion, respiration, natural mortality, assimilation, and denitrification rates.

4. ***Fishery components***: species-directed effort, catch, discards, and bycatch reduction rates.

The bottomfish component of the model includes reef fish species such as red snapper which are susceptible to incidental capture in trawls at some stage of their lives.

Data Input and Model Parameterization

Examples of the inputs and outflows of nitrogen for individual stocks of living marine resources are shown in Figure 2. The nitrogen inputs for each component in the model are detailed in Table 2. Removal of material in nitrogen components is achieved through burial (sedimentation), denitrification, or uptake by resources. In stocks of living marine resources, removal of nitrogen from the stock is achieved through respiration, decomposition, harvest, and predation by other resources. The majority of the data used to parameterize the model was taken from published reports on life history and ecological requirements of individual species. Data on river flow into the Gulf of Mexico (Atchafalaya and Mississippi Rivers) were obtained from the U.S. Army Corps of Engineers, New Orleans District. Data from NMFS statistical surveys were used to quantify fishing effort and landings for commercial species of shrimp and fish. Due to the lack of quantitative information, the components describing dolphins, sharks, and sea birds were not utilized in the simulations despite anecdotal reports that these stocks could have significant impacts on other resources, especially through predation of discards. Because these components were closed off (i.e., no predation on other components), the simulations results presented in this report must be viewed as preliminary, but probably represent the upper bounds of the effects on the shrimp stocks.

Results

Model Simulations

Output of the model is contingent upon the assumptions and data constraints imposed on the parameters and simulations. The model was parameterized using data for the Gulf of Mexico offshore waters, from Alabama to Brownsville (NMFS statistical areas 11-21). Mortality of discards from bycatch was assumed to be 100% for simulation purposes. This implies 'worst-case' scenarios with regard to the fate of the discards. Bycatch that is not scavenged or consumed by predators returns to the general stock of organic nitrogen in the ecosystem. The model was used to simulate the ecosystem for a one year period under four hypothetical perturbations. Results of these scenarios were compared against baseline simulations to examine the effect of bycatch management measures (i.e., BRD's) on shrimp stocks. The baseline conditions considered are before BRD-implementation into the fishery. It is important to note that the results reflect differences in production within the stock of shrimp, and not fishery yield. Results as they may affect shrimp stocks are reported below and summarized in Figures 3-6. No similar analyses was completed for other resources or stocks in the model.

Model Simulations - BRD effects

Scenario 1: BRD effect - equivalent release of finfish.

The first simulation is a general overview of the effects of bycatch reduction policy on shrimp stocks. It was run for comparative purposes with the other simulations and is to demonstrate the BRD effect if all finfish were released at an equivalent rate. This scenario examines reduction in biomass of all bottomfish by 10, 25 & 50%, without selective BRD effects. Values for stocks of shrimp (biomass represented by nitrogen) with each simulation were compared to the baseline values. Results indicate a general decrease in shrimp stocks by reduction of finfish biomass. Over a one year period, shrimp stocks declined by 0.8% with 10% bycatch reduction, by 5.5% with bycatch reduction of 25%, and by 10.7% with 50% decrease in bycatch (Figure 3). The decline in shrimp stocks is attributed to an increase in the abundance of bottomfish predators and a reduction in the organic nitrogen pool (which is augmented by discards in the baseline simulation). However, predation on shrimp is the primary reason for the differences because bottomfish nitrogen stock increased 4-19% due to bycatch reduction.

Scenario 2: BRD effects - selective release of finfish.

In actuality, BRD's do not release all finfish at equivalent rates. Some finfishes are released at higher rates than others, and others are not released at all. However, because restoration of red snapper stocks is driving the bycatch reduction policy, BRD's have been tested with the goal of achieving a 50% reduction in mortality of juvenile red snapper. Three gear types tested by NMFS and evaluated through the bycatch research program approach or attain this goal. These BRD's include a front position fisheye (30 mesh location) on top of the trawl, a middle position fisheye (45 mesh location), and the extended funnel design. However, each of these gear types exhibits variable exclusion rates with respect to different finfish species. Analysis of this information reveals that exclusion of these species accounts for a reduction in CPUE (by weight) of 30.6% (front fisheye), 29.6% (middle fisheye), and 34% (extended funnel) of nitrogen in the bottomfish component of the model. This amount is returned to the sea alive and augments the stock of fish which may prey on shrimp. Incorporating these data into the model yields a reduction in shrimp stocks of 6.7% for the front position fisheye, 5.9% for the middle position fisheye, and 8.2% for the extended funnel design (Figure 4). The release of finfishes by BRD's will allow more larger sized fish in the population. An important assumption is that finfish predation on shrimp is expected to change as fish increase in size (i.e., depending on food habits of larger fish predation on shrimp may either increase or decrease).

Model Simulations - Finfish size effects

Scenario 3: Finfish size effect - increase in shrimp predation.

Finfish excluded from trawls will continue to grow, possibly leading to increased consumption rates on shrimp prey. Ecologically, consumption of prey types by finfish is largely dependent on the size structure of both predator and prey populations. Smaller fish which could not prey on the larger shrimp in the Gulf of Mexico may be able to do so if given the opportunity to grow larger. Data to describe changes in predation or growth rates of finfish are not currently adequate for use in the model developed here. Consequently, a sensitivity analysis of variable predation rates was undertaken to provide some insight as to the impacts on shrimp stocks. An average bottomfish exclusion rate (31.4%; CPUE by weight) for the three gear types described in Scenario 2 was used for this sensitivity analysis. This yields a decrease in shrimp stocks by 6.2% over baseline conditions. Predation rates were then increased by 10, 25, and 50%, and results from one year simulations were compared with the baseline values. A 10% increase in the predation rate on shrimp by excluded bycatch results in an 8.2% decline in shrimp stocks. Shrimp stocks declined by 10.8% with a 25% increase in predation rates, and by 16.7% with a 50% increase in predation rates by excluded finfish (Figure 5). The relationship between finfish predation rates and shrimp stocks appears to be linear and is discussed below.

Scenario 4: Finfish size effect - decrease in shrimp predation.

As fish grow they may change dietary habits. Under this assumption, fish of larger size will decrease predation on shrimp due to preference for alternate prey. Optimal foraging theory and research on predator-prey interactions of fish provide evidence of such occurrences in estuarine and oceanic ecosystems. Using our model, a series of simulations (similar to scenario 3 above) were conducted to examine the effect of decreasing predation rates by excluded fish on shrimp stocks. As in the previous simulation scenario, the baseline conditions reflect general bottomfish exclusion rates of 31.4% (CPUE by weight). In this set of sensitivity analyses, predation rates were decreased by levels of 10, 25, and 50%. Generally, a reduction in the predation rates by excluded fish has smaller impacts on the shrimp stocks. A 10% decrease in predation on shrimp by excluded bycatch results in a 4.1% decline in shrimp stocks, and a 25% decrease in predation rates reduced shrimp stocks by 1.3%. As predation rates continue to decrease, there could be some benefit to the shrimp stocks: a 50% decrease in predation rates by excluded finfish resulted in a 4.7% increase in the amount of nitrogen in the shrimp stock (Figure 6). The interaction between finfish predation rates and shrimp production is represented by a linear relationship (Figure 7). For every percent change in predation rate, there is 0.21% change in shrimp stock size.

Conclusions and Recommendations

Revision of the ecosystem-based bycatch model is enhanced through incorporation of new information on bycatch characterization, stock assessments, and efficiencies of bycatch reduction devices. The large number of variables in the model represent movement toward a realistic evaluation of ecosystem effects in the dynamics of the Gulf of Mexico shrimp fishery. The initial output, however, is of relatively low resolution due to aggregation of information within larger components (e.g., seatrouts, snappers, etc. are described within the bottomfish group). Data used to parameterize the model include specific rates for individual components (e.g., sediment burial rates, respiration rates of shrimp) and general trends or average values for other components (e.g., species-directed effort patterns, respiration rates for benthic infauna, natural mortality rates for phytoplankton and zooplankton). The model is used to simulate several different hypothetical scenarios which encompass possible changes in ecosystem dynamics with the implementation of bycatch management policy. Depending on bycatch exclusion rates and assumptions relative to predator selection of shrimp prey, simulated shrimp stock biomass could increase by 4.7% or decrease by 17%. The decrease in the shrimp stocks is primarily due to predation, but is also due to a reduction in the amount of nitrogen recycled from discards. However, nitrogen returned to the ecosystem through discards is minimal in comparison to the rather large input from riverine sources.

These model simulations indicate possible outcomes within the fishery and the ecosystem. A number of factors, some remaining unmeasured, may have profound effects on the actual response of the ecosystem to changes in resources. The fate of discards from the Gulf of Mexico trawl fishery is not fully understood. Generally, scientific data are lacking to adequately address the scope of the ecosystem, its inhabitants, and their interactions. This is especially evident with respect to stock size, predator-prey interactions, and competition among individual groups such as bottomfish, sharks, birds, and dolphins. Our assumption of 100% mortality of discards has not been investigated or documented. Other assumptions with inadequate information include: changes in fishing effort due to variability in size or mobility of the shrimp fleet, variability in recruitment or survivability for living resources, changes in life history within stocks, loss of habitat, selection of alternate prey, and competition among species. Over the past 5 years, the natural variability of production in the shrimp fishery has approached 12% of average landings. When considering the potential decrease in shrimp stocks due to bycatch reduction and higher predation, it is likely that changes or impacts in production will be within the natural annual variability and therefore may be difficult to detect. The actual effects of bycatch management on the shrimp resources will remain undetermined until bycatch reduction is implemented and follow-up observations are completed.

References

Alverson, D. L., M. H. Freeberg, S. A. Murawaski and J. G. Pope, 1994. A global assessment of fisheries bycatch and discards. FAO Technical Series Paper. No. 339. Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. 233 pp.

Browder, J., 1983. A simulation model of a near-shore marine ecosystem of the north central Gulf of Mexico. In: Turgeon, K. W. (ed.), Marine Ecosystem Modeling. NOAA/National Environmental Satellite, Data and Information Service, Washington, D.C. pp 179-222.

Caillouet, C. W., M.J. Duronslet, A.M. Landry, D. B. Revera, D. J. Shaver, K. M. Stanley, R. W. Heinly and E. K. Stabenau, 1991 Sea turtle strandings and shrimp fishing effort in the northwestern Gulf of Mexico, 1986-1989. Fishery Bull., 89: 712-718.

Divita, R., M. Creel and P. F. Sheridan, 1983. Foods of coastal fishes during brown shrimp, *Penaeus aztecus*, migration from Texas estuaries (June-July 1981). Fishery Bull., 81: 396-404.

Fowle, S., and R. Bierce, (editors), 1991. Proceedings of the shrimp trawl bycatch workshop, November 22-23, 1991. St. Petersburg, FL. Center for Marine Conservation, 183 pp.

Goodyear, C. P, 1991. Sensitivity of shrimp-bycatch mortality estimates to natural mortality for red snapper. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami Laboratory, Miami, Fl., Contribution, MIA 90/91-28. 6 pp.

Goodyear, C. P. and P. Phares, 1990. Status of red snapper stocks of the Gulf of Mexico - Report for 1990. National Marine Fisheries Service, Southeast Fisheries Science Center, Miami Laboratory, Miami, Fl. Laboratory Report, Contribution # CRD-89/90-05.

Henwood, T. A. and W. E. Stuntz, 1987. Analysis of sea turtle captures and mortalities during commercial shrimp trawling. Fishery Bull., 85: 813-817.

Manooch, C. S. and M. Haimovici, 1983. Foods of greater amberjack, *Seriola dumerili*, and almaco jack, *Seriola rivolana* (Pisces:Carangidae), from the South Atlantic Bight. J. Elisha Mitchell Sci. Soc., 99: 1-9.

Manooch, C. S. and W. T. Hogarth, 1983. Stomach contents and giant trematodes from wahoo, *Acanthocybium solanderi*, collected along the south Atlantic and Gulf coasts of the United States. Bull. Mar. Sci., 33: 227-238.

Manooch, C. S., D. L. Mason and R. S. Nelson, 1983. Food and gastrointestinal parasites of dolphin, *Coryphaena hippurus*, collected along the southeastern and Gulf coasts of the United States. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-SEFC-124, 36 pp.

Minello, T. J., R. J. Zimmerman and E. X. Martinez, 1989. Mortality of young brown shrimp *Penaeus aztecus* in estuarine nurseries. Trans. Am. Fish. Soc., 118: 693-708.

National Research Council, 1990. Decline of the sea turtles; causes and prevention. National Academy Press, Washington DC, 259 pp.

Naughton, S. P. and C. H. Salomon, 1981. Stomach contents of juveniles of king mackerel (*Scomberomorus cavalla*) and Spanish mackerel (*S. maculatus*). NE Gulf Sci., 5: 71-74.

Salomon, C. H. and S. P. Naughton, 1983a. Food of king mackerel, *Scomberomorus cavalla*, from the southeastern United States, including the Gulf of Mexico. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-SEFC-126, 25 pp.

Salomon, C. H. and S. P. Naughton, 1983b. Food of Spanish mackerel, *Scomberomorus maculatus*, from the Gulf of Mexico and southeastern seaboard of the United States. U.S. Dept. of Commerce, NOAA Tech. Memo., NMFS-SEFC-128, 22 pp.

Sheridan, P. F. and D. L. Trimm, 1983. Summer foods of Texas coastal fishes relative to age and habitat. Fishery Bull., 81: 643-647.

Sheridan, P. F., J. A. Browder and J. E. Powers. 1984a. Ecological interactions between penaeid shrimp and bottomfish assemblages. In: Gulland, J. A. and B. J. Rothschild (eds.), Penaeid Shrimps - Their Biology and Management. Fishing News Books, Ltd., Farnham, Surrey, UK. pp. 235-254.

Sheridan, P. F., D. L. Trimm and B. M. Baker. 1984b. Reproduction and food habits of seven species of northern Gulf of Mexico fishes. Contr. Mar. Sci., 27: 175-204.

Table 1. Fish predators of penaeid shrimp in the gulf of Mexico, ranked in order of importance (based on predation rates and magnitude of predator stock). The table provides information on percent frequency of occurrence of shrimp in stomachs examined and abundance of fish captured in trawls during NMFS bycatch characterization surveys on commercial vessels during 1992-1994 (offshore only).

	Scientific Name	Common Name	% Frequency of Penaeus in Stomachs	Mean Fish/Hr. in Trawls
1	*Cynoscion arenarius*	Sand Seatrout	0.55	16
2	*Cynoscion nebulosus*	Spotted Seatrout	4.76	< 1
3	*Micropogon undulatus*	Atlantic Croaker	0.02	177
4	*Synodus foetens*	Inshore Lizardfish	0.19	18
5	*Centropristis philadelphica*	Rock Sea Bass	0.12	18
6	*Ancylopsetta quadrocellata*	Ocellated Flounder	1.14	< 1
7	*Diplectrum bivittatum*	Dwarf Sand Perch	0.08	12
8	*Lutjanus synagris*	Lane Snapper	0.42	< 1
9	*Lagocephalus laevigatus*	Smooth Puffer	0.38	< 1
10	*Prionotus tribulus*	Bighead Searobin	0.32	1
11	*Rhizoprionodon terraenovae*	Atlantic Sharpnose Shark	2.17	2
12	*Scomberomorus maculatus*	Spanish Mackerel	0.19	< 1
13	*Lutjanus campechanus*	Red Snapper	0.09	2
14	*Cynoscion nothus*	Silver Seatrout	0.06	2

Table 2. Nitrogen inputs for individual components in the ecosystem model. Despite their inclusion as a functional relationship in the model, some of the specific parameters may be set to zero due to lack of quantitative data.

Model Component/Stock	Source of Nitrogen Input
Organic Animal Nitrogen	Riverine input, zooplankton fecal pellets, discarded bycatch (dead), natural mortality of benthos, shrimp, other crustaceans, fish, sharks, dolphins
Organic Plant Nitrogen	Phytoplankton mortality and unassimilated phytoplankton
Dissolved Inorganic Nitrogen	Riverine input, degradation of organic nitrogen (plant and animal), excretion from zooplankton, shrimp, crustaceans, fish, sharks and dolphins
Phytoplankton	Riverine input, inorganic and organic nitrogen pools
Zooplankton	Phytoplankton, organic nitrogen pools
Benthos	Organic Nitrogen Pools
Shrimp	Organic nitrogen (plant and animal), benthos
Other Crustaceans	Organic animal nitrogen, benthos
Pelagic Fish (Menhaden)	Phytoplankton, Zooplankton
Bottomfish and Reefish	Organic nitrogen (plant and animal), benthos, shrimp, crustaceans, discards
Migratory Fish	Shrimp, crustaceans, pelagics, bottomfish
Dolphins	Shrimp, crustaceans, pelagics, bottomfish, migratory fish, discards
Sharks	Shrimp, crustaceans, pelagics, bottomfish, migratory fish, dolphins, discards
Birds	Discards

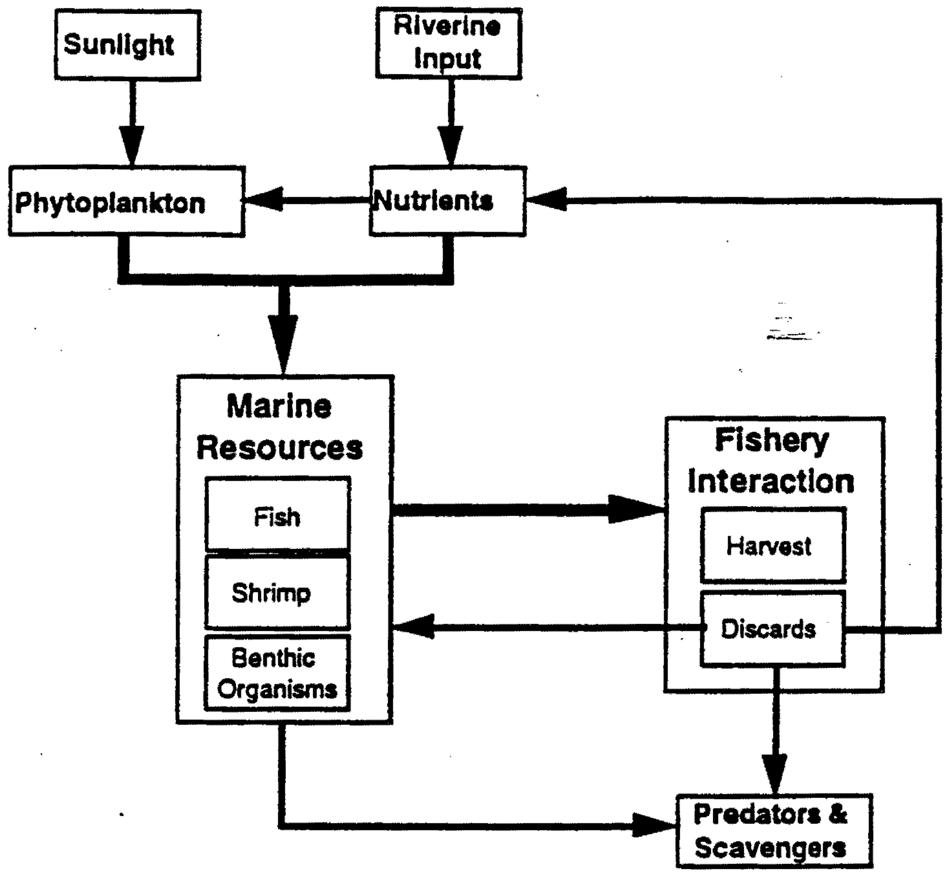


Figure 1. Generalized conceptual ecosystem model to evaluate impacts of shrimp trawl bycatch in the Gulf of Mexico.

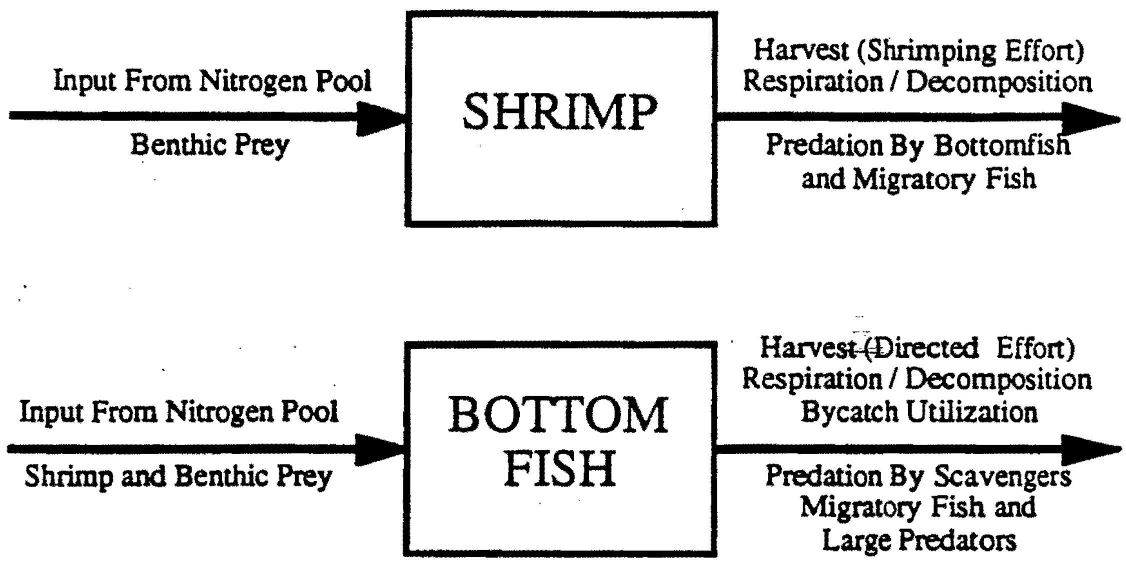


Figure 2. Input and removal of nitrogen from stocks of shrimp and bottomfish. The flows of nitrogen in components of all living marine resources follow the general pattern shown.

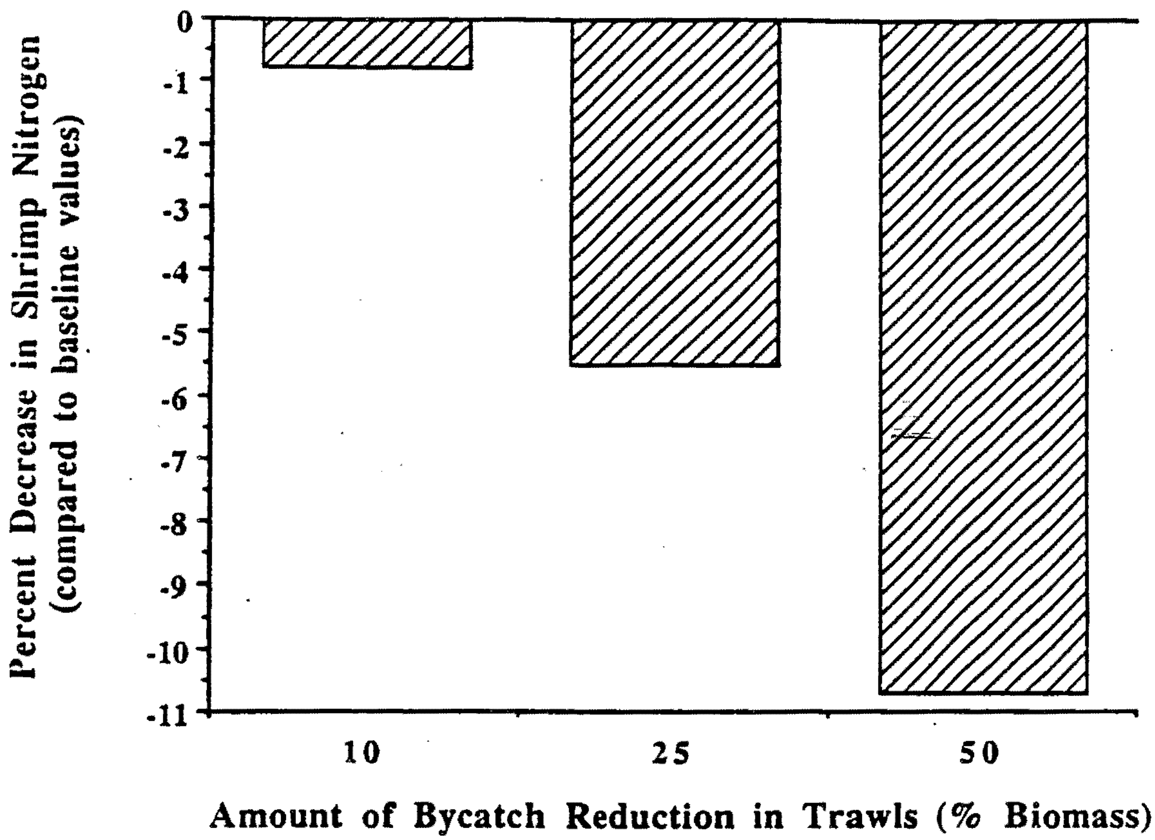


Figure 3. Decrease in size of shrimp stocks for simulation scenario 1 (predation increases due to greater numbers of fish in the ecosystem).

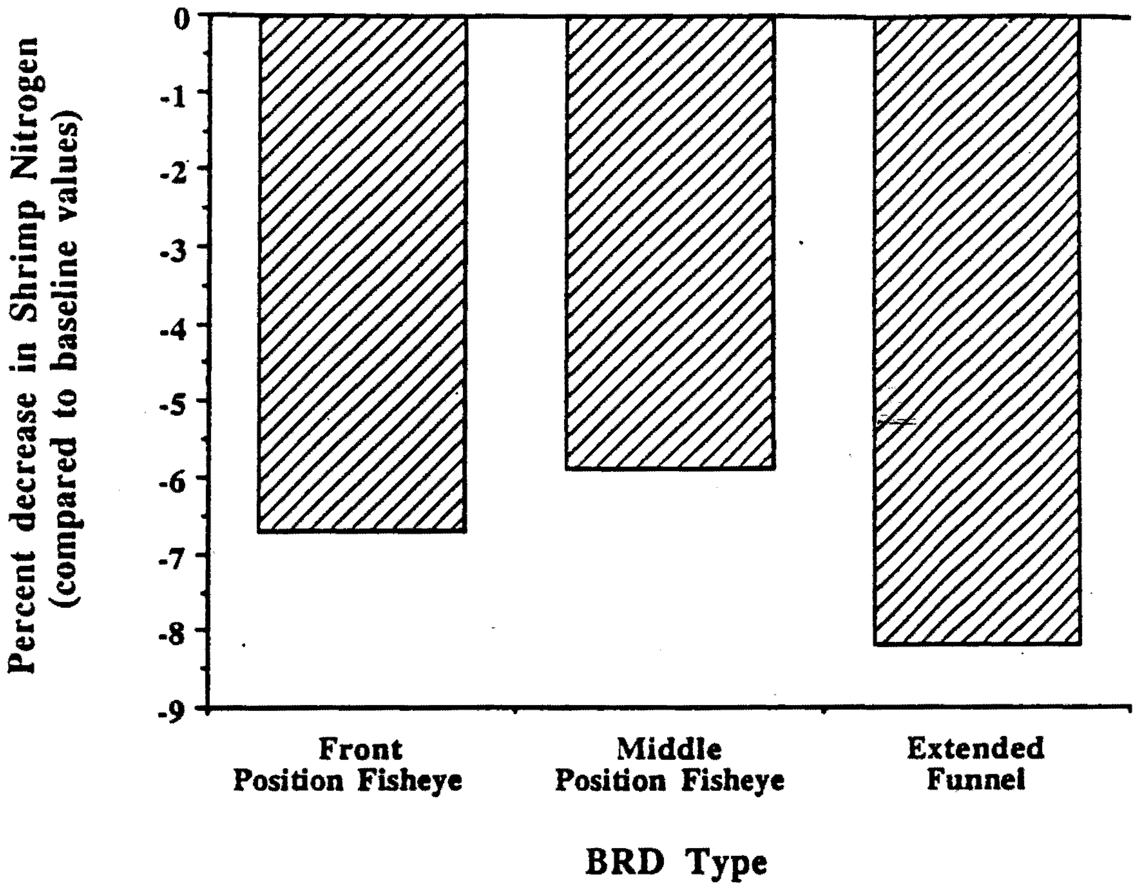


Figure 4. Decrease in size of shrimp stocks for simulation scenario 2 with 3 types of bycatch reduction devices (BRD's): predation increases only for excluded fish.

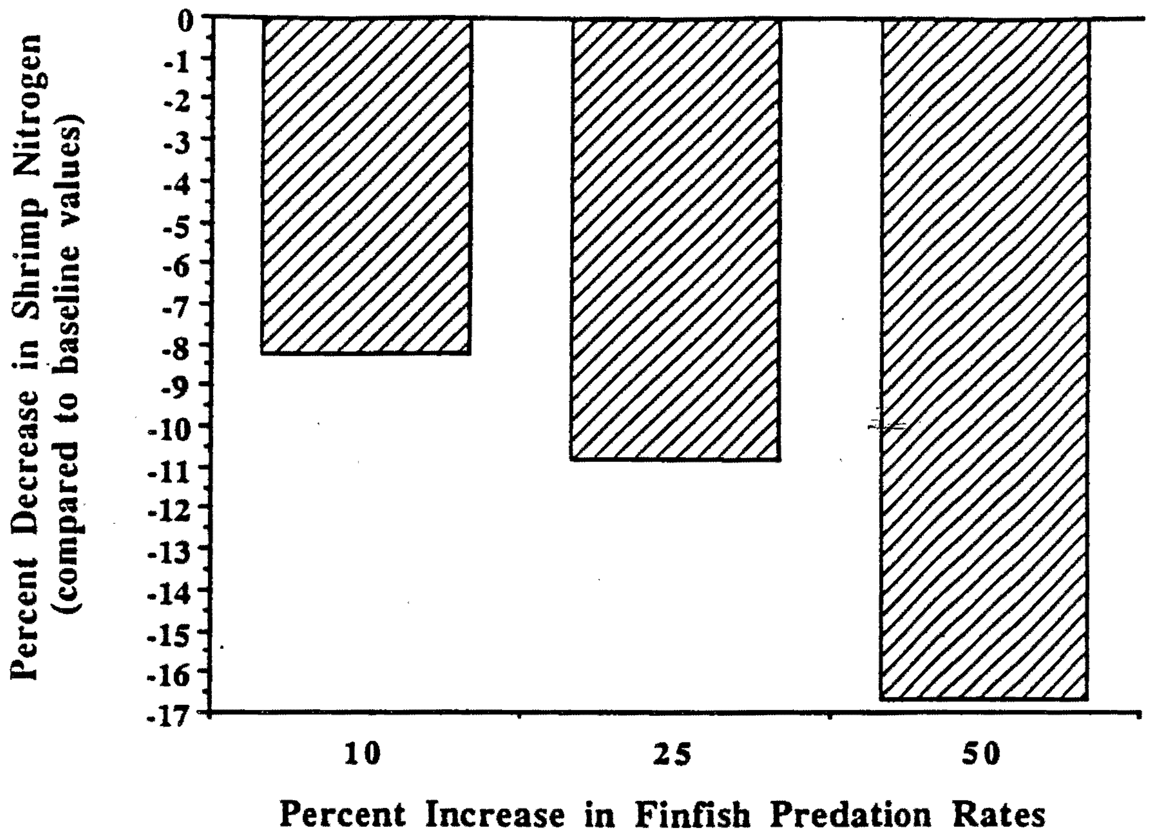


Figure 5. Decrease in size of shrimp stocks for simulation scenario 3 with average bycatch reduction: predation rates increase as the size structure of fish stocks change. As small fish are allowed to continue growing, they might attain a size at which they become predator on shrimp, thus increasing the overall predation rate.

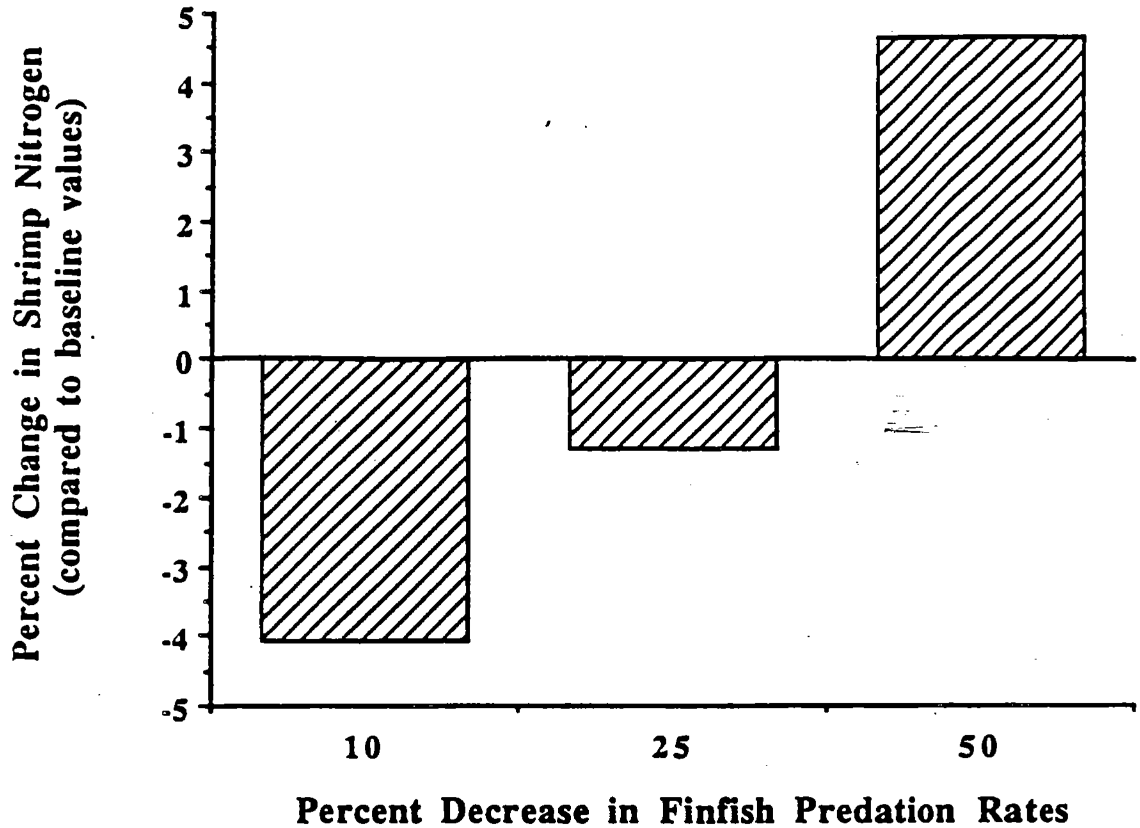


Figure 6. Decrease in size of shrimp stocks for simulation scenario 4 (with average bycatch reduction): predation rates decrease as the size structure of fish stocks change. This scenario assumes that as shrimp predators continue to grow, they will select for alternate prey items over shrimp.

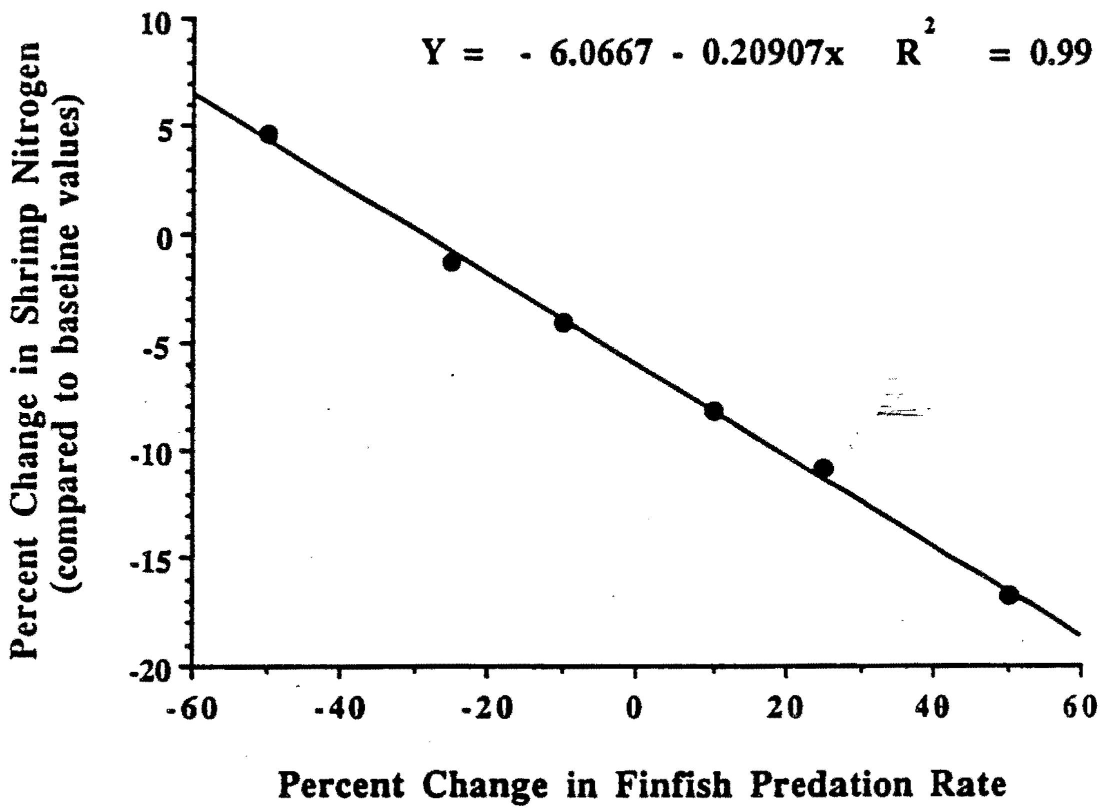


Figure 7. Effects of predation rate on shrimp nitrogen. Data reflect results from simulation Scenarios 3 and 4 which utilized sensitivity analyses in the model to examine the impacts of increasing or decreasing predation rates on the shrimp nitrogen stock.

APPENDIX C

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DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
[I.D. 060995B]
Endangered and Threatened Wildlife; Revised Sea Turtle/Shrimp Fishery Emergency Response Plan
AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.
ACTION: General statement of policy; request for comments.
SUMMARY: NMFS has revised, and is publishing herein, the Sea Turtle/Shrimp Fishery Emergency Response Plan (ERP) that describes NMFS' policy to ensure compliance with the sea turtle conservation regulations promulgated under the Endangered Species Act (ESA) and provides guidance for the use of future rulemaking in response to elevated sea turtle strandings associated with shrimping in the southeastern United States. The ERP has been revised in response to comments on the ERP and the receipt of new technical information. This notice contains a revised ERP in its entirety and invites public review and comment.
DATES: Comments will be accepted through [insert date 60 days after date of publication in the Federal Register]. The revised ERP describes NMFS' policy as of [insert date of filing for public inspection at the Office of the Federal Register].
ADDRESSES: Comments on this notice should be addressed to the Chief, Endangered Species Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910.
FOR FURTHER INFORMATION CONTACT: Charles A. Oravetz, 813-570-5312, or Phil Williams, 301-713-1401.
SUPPLEMENTARY INFORMATION:
Background

NMFS consults on shrimp fishing operations in the southeastern United States that may affect sea turtles listed as threatened or endangered, pursuant to section 7 of the ESA, 16 U.S.C. 1531 et seq. These shrimp fishing operations are managed, in part, under the Gulf of Mexico Shrimp Fishery Management Plan and the South Atlantic Shrimp Fishery Management Plan, both implemented pursuant to the Magnuson Fisheries Management and Conservation Act, 16 U.S.C. 1801 et seq., and the Sea Turtle Conservation Regulations at 50 CFR part 227, subpart D, implemented under the ESA.

Unprecedented sea turtle stranding levels in Texas, Louisiana, and Georgia associated with shrimp fishing during 1994 resulted in a reinitiation of consultation pursuant to 50 CFR 402.16 on shrimp fishing in the southeast United States. The resulting Biological Opinion (Opinion), issued on November 14, 1994, concluded that continued long-term operation of the fishery under the existing management regime was likely to jeopardize the continued existence of the Kemp's ridley population and prevent the recovery of loggerheads, but identified a reasonable and prudent alternative to allow the fishery to continue while avoiding jeopardy. One of the components of the alternative was to develop an ERP by March 14, 1995, to identify actions NMFS would take to ensure compliance with sea turtle conservation regulations. The ERP also provides internal guidance for the use of future rulemaking in response to elevated sea turtle strandings associated with shrimping in the southeastern United States.

On March 17, 1995, NMFS distributed the ERP widely among all concerned parties, including shrimp industry and environmental organizations for their information and comment. In addition, formal notice of availability for the ERP was published on April 21, 1995 (60 FR 19885).

ERP Implementation and Recent Events

The guidelines in the ERP have been used by NMFS throughout the 1995 shrimping season for its stranding reporting and public notification procedures, for its enforcement efforts, and for the scope, timing and structure of its temporary restrictions on shrimp fishing. While the ERP has served to guide NMFS and apprise the public of when and how restrictions may be imposed by NMFS, justification for these restrictions and changes thereto have been provided concurrently with the restrictions themselves. Any deviations from the ERP guidelines, and the relationship to the ERP, have also been explained with the restrictions.

Temporary requirements were placed on shrimp trawling in nearshore waters along two sections of the Texas and Louisiana coast on April 30, 1995 (60 FR 21741, May 3, 1995), on the Georgia coast on June 21, 1995 (60 FR 32121, June 20, 1995), and on the Georgia and the southern portion of the South Carolina coast on August 11, 1995 (60 FR 42809, August 17, 1995) to conserve sea turtles, especially the endangered Kemp's ridley. These requirements were necessitated by the continued high rates of sea turtle strandings occurring in these areas along with documented shrimping effort. A complete description of the sea turtle stranding events, temporary requirements, and the areas in which they have applied is provided in the temporary requirements (60 FR 21741, May 3, 1995, 60 FR 32121, June 20, 1995, 60 FR 42809, August 17, 1995), and is not repeated here.

In all cases, strandings decreased in those areas where temporary requirements were imposed, indicating that the measures identified in the ERP have been successful at reducing high stranding levels. This is further evidenced by the contrast in the number of Kemp's ridley strandings that occurred on Texas offshore beaches in 1994 and 1995. In the entire state, 48 Kemp's ridleys stranded in April 1995 prior to the implementation of emergency rulemaking, corresponding closely with the 50 ridley strandings reported in Texas during April in 1994. The emergency gear restrictions effective April 30, 1995 were implemented in areas where 42 of these strandings occurred. Although ridley strandings increased drastically to 71 sea turtles during May of 1994, during May of 1995 there were only 17 ridley strandings, despite the slightly later start to the Texas closure (May 15, 1995 versus May 13, 1994). This contrast between years illustrates the effectiveness of the emergency restriction in arresting ridley mortalities. The decline in mortalities, whether due to the gear modifications and improved turtle exclusion, or to reduced shrimping effort in areas of ridley abundance due to shrimpers leaving the affected areas, was consistent with the intent of the ERP. Implementation of restrictions at other times and in other zones have similarly reduced sea turtle strandings, demonstrating the effectiveness of certain gear restrictions. Cumulative strandings of Kemp's ridleys are considerably lower than 1994. While overall cumulative strandings of all species of sea turtles have been relatively high in 1995, not all of these strandings appear to be the result of shrimp fishing, and further appear to occur over the course of the season rather than episodically. These issues are being considered in additional rulemaking as announced in the Advance Notice of Proposed Rulemaking (ANPR) published on September 13 (60 FR 47544). Through the ANPR, NMFS announced that it is considering proposing regulations that would identify special sea turtle management areas in the southeastern Atlantic and Gulf of Mexico and impose additional conservation measures to protect sea turtles in these areas. Comments received on the ANPR and the revised ERP will be considered in future rulemaking.

Comments on the March 14, 1995 ERP and Temporary Requirements

Since the publication of the ERP and the implementation of temporary requirements referenced above, NMFS has received numerous written comments and has also met with interested constituents to receive oral comments. Some comments were addressed through the temporary requirements cited in the previous section, but are again discussed here in order to present a complete record for decisions relating to the ERP.

Comment Individual shrimpers and the Texas Seafood Processors Association stated that the prohibition on all try nets without turtle excluder devices (TEDs) is unreasonable for those using small try nets.

Response NMFS determined that an alternative existed to the try net prohibition that would allow fishermen to work efficiently, while reducing the likelihood of turtle entrapment. Accordingly, NMFS modified the temporary requirements to allow the use of try nets without TEDs installed if the try nets were smaller than 12 feet (3.6 m) in headrope length and 15 feet (4.6 m) in footrope length, effective May 12, 1995 (60 FR 26691, May 18, 1995). While this modification has been made in all temporary restrictions, the ERP is now being revised as well to reflect this change.

Comment The requirement to use a shortened flap over the escape opening results in excessive shrimp loss.

Response NMFS gear experts conducted underwater investigations on a top-opening hard TED with a shortened webbing flap and determined that it would not result in any significant shrimp loss. Furthermore, shrimp retention in TED-equipped nets can be maximized by use of an accelerator funnel which helps propel shrimp through TED grids and away from the turtle escape opening. However, NMFS has received numerous complaints from the shrimp industry about perceived loss of shrimp. Further, unlike 1994, NMFS has documented a high compliance rate with gear requirements, and therefore, believes that the shortened flap requirement should be re-evaluated on a case by case basis, but retains the shortened webbing flap requirement as part of the potential restrictive measures under the ERP.

Comment The Texas Shrimp Association (TSA) and the National Fisheries Institute (NFI) objected to the manner in which NMFS prepared and implemented the ERP. NFI and TSA asserted that the process of preparation precluded meaningful industry participation, circumvented requirements under the Administrative Procedure Act, and imposed TED use restrictions without adequate time for shrimpers to adjust. TSA proposed an alternative to the ERP to limit inshore and nearshore fishing activity, with the stated objective of relieving pressure from incidental capture in areas where turtles are concentrated.

Response The ERP was required by the November 14, 1994 Opinion in order to ensure that sea turtle mortalities attributable to shrimp fishing were not likely to jeopardize the species. The Opinion required that the ERP be developed by March 14, 1995, in order that NMFS have time to compile and analyze historic stranding data and still have a plan prior to the start of the 1995 shrimping season. The ERP does not modify the existing sea turtle conservation regulations nor does it have any binding effect on the public. The existing regulations already provide authority for emergency temporary action (such as TED use restrictions) to prevent unauthorized takings of sea turtles. The temporary restrictions implemented this seasons were based on the authority of 50 CFR 227.72(e)(6), and justification for these actions were contained in the record for each one. The ERP simply provides guidance on when and how NMFS will exercise its discretion in implementing such temporary measures under this existing regulatory authority. The ERP was widely distributed upon its completion in March and is published herein in its entirety for public review and comment. The TSA alternative proposal to limit inshore and nearshore fishing activity to protect turtles, if implemented, would involve major changes to current conservation measures and would be subject to the rulemaking process. TSA has submitted its proposal as a petition for rulemaking under the APA, and NMFS is reviewing this petition in the context of an ANPR (60 FR 47544, September 13, 1995).

Comment The Georgia Fisherman's Association (GFA) objected to the temporary restrictions in Georgia, particularly the prohibition on the use of bottom-shooting, hard TEDs and requested NMFS to rescind this restriction. The Sea Turtle Restoration Project of Earth Island Institute (EII) and NFI also urged NMFS to modify its temporary restriction as requested by GFA. GFA asserted that shrimpers were having problems with top-shooting hard TEDs because they lose shrimp, gather debris, are less effective at excluding turtles, and they twist and roll when installed with floats.

NMFS has also received verbal reports from Georgia fishermen that debris accumulates in the top-opening TEDs, thus hindering the release of turtles. GFA agreed that the banning of soft TEDs was warranted as they are not as effective as hard TEDs, but GFA stated that the simultaneous ban on soft TEDs and bottom-opening hard TEDs would make analysis of the relative contributions of the two gear types to sea turtle mortality and strandings impossible.

Response Fishermen in the Atlantic have generally not used top-opening hard TEDs in recent years and may be having particular difficulty adapting to a new gear type. NMFS has investigated shrimpers' complaints and has had gear specialists working with Georgia shrimpers during the imposition of the temporary restrictions.

Gear specialists have been able to resolve problems associated with switching hard TEDs from bottom-opening to top-opening and in the installation of flotation devices to prevent nets from twisting. No problems with clogged top-opening TEDs which would trap sea turtles have been observed. NMFS specialists have also noted that as shrimpers become familiar with the gear changes they can fish effectively. In spite of the ability of NMFS gear specialists to resolve the alleged problems with top-opening hard TEDs experienced by individual shrimp fishermen in Georgia, NMFS has continued to receive complaints on the temporary prohibition of the use of bottom-opening hard TEDs, the strongly preferred gear choice for many Georgia fishermen.

A preliminary analysis of recent strandings and compliance rates following the July 15, 1995 opening of Texas offshore waters to shrimping indicates that strandings were highest in areas where the use of soft TEDs was prevalent. In two areas in Texas where strandings were low, no difference in stranding rates could be distinguished based on the differing proportions of the fleet using top- versus bottom-opening hard TEDs. Although other factors, particularly the distribution of shrimping effort, may have contributed to the observed stranding patterns in Texas, the data suggested that prohibiting the use of soft TEDs would provide more effective protection for sea turtles than prohibiting the use of bottom-opening hard TEDs. Therefore, NMFS implemented only the soft TED and try net restrictions described in the ERP in Georgia and South Carolina in response to elevated sea turtle strandings (60 FR 42809, August 17, 1995). This approach was intended to protect sea turtles and to help determine the effectiveness of each restriction. However, strandings in waters off Georgia and South Carolina in the week following the implementation of these restrictions, met or exceeded the indicated incidental take levels (ITLs) established for those areas. Consequently, NMFS is re-evaluating its recent restrictions and may prohibit the use of bottom-opening hard TEDs and require the use of shortened webbing flaps over escape openings should high levels of strandings continue in these areas.

Comment The National Biological Survey (NBS), U.S. Department of the Interior, recommended that shrimp statistical Zone 21 be included in the interim special management area. NBS stated that a review of the stranding database shows that this area documents larger than average Kemp's ridley strandings when compared to the upper Texas Coast or Louisiana. NBS also asserted that Zone 21 was difficult to survey and therefore, strandings may go undocumented. NBS felt that the additional two weeks that would be required to implement restrictions in Zone 21 may jeopardize the survival of the Kemp's ridley.

Response NMFS is investigating, as a requirement of the November 14, 1994 Opinion, which areas should require special management considerations, due to high turtle abundance or important nesting or foraging habitats. Upon identification of such areas, NMFS will propose management measures to mitigate the effects of intensive shrimping pulses.

Comment The Center for Marine Conservation (CMC), EII, and the Houston Audubon Society and Help Endangered Animals-Ridley Turtles (HEART) supported in general the temporary conservation requirements to reduce turtle strandings as a reasonable compromise that allows shrimping to continue in a manner that is compatible with turtle conservation. However, EII felt that the ERP, in general, was too weak to provide for strong and clear trigger mechanisms that would prevent 1994's high level of strandings. EII asserted that the accuracy of the indicated take levels (ITLs) established in the ERP were questionable. While recognizing the difficulty of accurately determining stranding levels in inshore waters, CMC noted that these waters are very important to turtles and urged that the temporary restrictions be imposed as necessary. HEART urged that the temporary restrictions be made permanent, describing a number of gear problems associated with soft TEDs, bottom-shooting TEDs and try nets. CMC and EII noted (as did NBS in the previous comment) that a 3-4 week waiting period to implement area closures is unacceptable for the Kemp's ridley; that it cannot tolerate another mass mortality event such as occurred in 1994. EII urged that NMFS issue a regulation that automatically implements gear restrictions or closures. Finally, CMC and EII urged that sufficient resources be devoted to monitor strandings, especially in Louisiana, where monitoring has been inadequate, but where fishing activity may have shifted with area gear restrictions in Texas.

Response NMFS recently published an ANPR (60 FR 47544, September 13, 1995) to consider rulemaking identifying which areas should require special management considerations, due to high turtle abundance or important nesting or foraging habitats. Upon identification of such areas, NMFS will propose permanent management measures to mitigate the effects of intensive shrimping pulses. This action could also include bays and estuaries that are important to turtles and shrimping. Also, NMFS is considering, as a separate rulemaking, whether to propose severe restrictions on the use of soft TEDs, which have been repeatedly implicated as being ineffective at excluding turtles, often because of poor installation or maintenance.

The ERP was designed to, among other things, identify NMFS plans to respond to high sea turtle strandings during 1995 through emergency rulemaking. A permanent management regime will be put forth as a proposed rule and the public provided ample opportunity for comment. Many elements of the ERP may be superseded once permanent rules are in place, by the 1996 shrimping season. The ERP is based on the best available scientific information gained through recent gear trials, the scientific literature on sea turtle biology and extensive discussions with gear and turtle scientists. In addition, the ERP (including the identified restrictions, and the indicated take levels) was presented at meetings with scientists and industry and comments were received.

However, the NMFS Opinion issued on November 14, 1994 calls for an Expert Working Group (EWG) to be convened to identify the level of mortality that can be sustained by sea turtle populations, to determine the level of mortality reflected by strandings, and to identify an acceptable stranding level. NMFS convened the EWG in Miami June 26-28, 1995 to review the Opinion and available data bases including those upon which the Opinion and the ERP are based. This expert working group consisted of sea turtle population biologists and life history experts including experts nominated by the shrimp industry and environmental community. As a result of this initial meeting, NMFS is completing additional data analyses which will be reviewed by the EWG in the next scheduled meeting in November.

In addition, because of concerns expressed by some in industry and the environmental community, NMFS has undertaken an extensive technical review of the stranding triggers in the ERP. This review is planned to be completed in the next several weeks and NMFS plans to review its results with representatives of the shrimp industry and environmental community. If these analyses result in new trigger numbers, they will be included in subsequent publications of the revised ERP for public review.

NMFS is also concerned that strandings be monitored accurately and comprehensively both on inshore and offshore facing beaches. NMFS increased its support for the monitoring of strandings, including in Louisiana, where there had previously been little or no coverage.

Revision of the Emergency Response Plan

NMFS continues to review the ERP and has revised it as a result of public comments received and new technical information obtained. The ITLs, which were not available when the ERP was adopted in March, are published as part of the revised ERP. This ERP is NMFS' policy to ensure compliance with sea turtle conservation regulations and to respond to sea turtle stranding events. The revised ERP, in its entirety, follows.

The Sea Turtle/Shrimp Fishery Emergency Response Plan

In developing this ERP, NMFS reviewed stranding data, as well as other information, that resulted in identification of certain areas that NMFS believes provide important habitat for Kemp's ridleys, and that, as part of the ERP, will be subject to continuous elevated scrutiny. These areas are identified in the ERP, and will allow NMFS to more efficiently conduct its enforcement operations under this plan. Identification of these areas in the ERP does not foreclose nor prejudge the identification of areas requiring special sea turtle management considerations, required as one of the components of the reasonable and prudent alternative within one year of the date of issuance of the Opinion, which will be subject to rulemaking procedures, including prior notice and opportunity to comment. Other activities within the special management areas, including hopper dredging, oil and gas activities, permitted power boat races, military operations and federally managed fisheries, are reviewed via the section 7 process of the ESA, but may also be reviewed during these rulemaking procedures, as necessary.

Indicated Take Levels

The Opinion is accompanied by an incidental take statement, pursuant to section 7(b)(4)(i) of the ESA, that specifies the impact of incidental taking on the species. The incidental take statement provides two levels to identify the expected incidental take of sea turtles by shrimp fishing. The incidental take levels are based upon either documented takes or indicated takes measured by stranding data. Stranding data are considered an indicator of lethal take in the shrimp fishery during periods in which intensive shrimping effort occurs and there are no significant or intervening natural or human sources of mortality other than shrimping conclusively identified as the cause of strandings. While actual strandings in any zone in any week may meet or exceed the levels identified as the indicated take levels, this does not necessarily mean that the incidental take level for the shrimp fishery has been met or exceeded for purposes of section 7 of the ESA and that consultation is required to be reinstated pursuant to 50 CFR 402.16. Rather, NMFS must consider whether there are other natural or human sources of mortality other than shrimping that can be conclusively identified; strandings as a result of such sources will not be used in calculating whether the incidental take level for the shrimp fishery has been met or exceeded.

NMFS has established ITLs by identifying the weekly average number of sea turtle strandings documented in each NMFS statistical zone for the last 3 years, 1992-4, while special consideration was given for anomalous years. In Texas, Louisiana, and Georgia, where strandings were anomalously high in 1994, the years 1991-3 were used to determine historical levels. In addition, the 1993 strandings of over 100 small Kemp's ridleys in a small section of Louisiana have been excluded from the averages due to the anomalous nature of that event. The weekly average was computed as a 5-week running average (2 weeks before and after the week in question) to reflect seasonally fluctuating events such as fishery openings and closures and turtle migrations. The ITL for each zone was set at 2 times the weekly 3-year stranding average. For weeks and zones where the historical average is less than one, the ITL has been set at two strandings. Table 1 contains the ITLs for each week and statistical zone, except for Zones 1-3, 6-17, 21, and 24, because the ITL is 2 for all weeks in these zones (note: there is no Zone 22 or 23).

Stranding Notification Procedures

Sea Turtle stranding information is reported to the NMFS National Stranding Coordinator by the Sea Turtle Stranding and Salvage Network (STSSN). During 1995, STSSN State Coordinators submit weekly reports and contact the STSSN National Coordinator immediately if strandings approach or exceed historical averages. The STSSN National Coordinator will contact NMFS Southeast Regional Office, Protected Species Branch, and the NMFS National Sea Turtle Coordinator (NSTC) upon receipt and evaluation of information suggesting that strandings are elevated to near historical levels. The STSSN National Coordinator will be responsible for forwarding information regarding the strandings to the NMFS Southeast Regional Office.

This early notification by STSSN State Coordinators will not necessarily initiate management actions, but will serve as notification that stranding levels are approaching levels that may require implementation of management measures in the ERP. Implementation of the ERP is defined below under A for interim special management areas and B for areas outside of the interim special management areas.

Public Notification Procedures

Summaries of stranding reports, enforcement activities and other activities implementing the requirements of the November 14, 1994 BO will continue to be forwarded regularly via fax to NMFS laboratories, port samplers and enforcement agents, Coast Guard Districts, state fishery agencies, STSSN State Coordinators, Sea Grant agents, and industry and environmental organizations. Additionally, any emergency rulemaking will be announced through press releases and will be broadcast on the NOAA Weather Radio, immediately upon filing of the regulation for public inspection at the office of the Federal Register.

Emergency Response Plan (ERP) Procedures

A. Interim Special Management Areas

Data collected by the STSSN provide information regarding the species composition, nearshore distribution, and mortality of sea turtles. Stranding data illustrated by statistical zones identify two areas of historically high Kemp's ridley strandings including much of Texas and Louisiana, and the coast of Georgia and northeast Florida. Although few strandings have been reported in statistical zones of low STSSN effort in Louisiana, in-water research, including telemetry and mark/recapture efforts, and historical data, have illustrated the importance of Louisiana waters (as well as those of Texas) as Kemp's ridley habitat.

Historical stranding levels indicate that NMFS can anticipate elevated Kemp's ridley strandings within these two areas. These areas therefore require elevated scrutiny and protection under this Plan to reduce the impacts of the shrimp fishery on Kemp's ridleys. The Northern Gulf Interim Special Management Area includes waters off Louisiana and Texas seaward of the COLREGS line within NMFS statistical zones from (and including) Zone 13 through Zone 20 out to 10 nautical miles (nm) (18.5 km). The Atlantic Interim Special Management Area includes waters off Georgia and northeast Florida seaward of the COLREGS line within NMFS statistical Zones 30 and 31 out to 10 nm (18.5 km).

Through the section 7 consultation process, other activities within the special management areas are also being reviewed, including hopper dredging, oil and gas activities, permitted power boat races, military operations and federally managed fisheries. During 1995, observers will be deployed during these activities as needed.

Elevated Enforcement Within the Interim Special Management Areas

In 1995, from April 1 through November 30, members of a trained TED law enforcement team will coordinate with the Coast Guard, local NMFS and state enforcement agents to investigate compliance with TED regulations in the Interim Special Management Areas. Throughout this period, members of the TED law enforcement team (in addition to local NMFS enforcement personnel) will be deployed in the Interim Special Management Areas, including at least one in the Atlantic Interim Special Management area.

Implementation of Emergency Rules Within the Special Management Areas

Reports of elevated stranding levels, as described below, in any statistical zone within the Interim Special Management Areas may result in implementation of emergency rulemaking for the NMFS statistical zone of elevated strandings, and contiguous statistical zones or portions of contiguous statistical zones, as necessary. The precise geographic scope of the area requiring such measures will be defined in the rule. Within the Interim Special Management Areas, regulations restricting shrimping will be implemented when 75 percent or more of the weekly ITL is reached for 2 consecutive weeks, or when the Assistant Administrator for Fisheries, NOAA (AA), in consultation with the Director, Southeast Region, NMFS (Regional Director), the Southeast Enforcement Division Special Agent in Charge (SAC), the Southeast General Counsel Senior Enforcement Attorney (SEA) and the Protected Resources Office Director (OD), determines that other factors including noncompliance or high nearshore shrimping effort require additional management measures. Any restrictions necessary within the Interim Special Management Areas will result in emergency rulemaking pursuant to the regulations under 50 CFR 227.72(e)(6). Justification for the rulemaking will be included in the Federal Register notice, and will include the best readily available information on:

a. Affected area;

b. Current and historical strandings, shrimp landings and shrimping effort (if available). Any unusual aspect of the strandings will be identified (e.g., species composition, size classes, and carcass anomalies);

c. Enforcement efforts with emphasis on boardings and compliance;

d. Other mortality factors if any, and unusual environmental conditions, with an evaluation of their significance; and

e. Any fishing practices or gear types that may be contributing to the strandings (e.g., percent soft TEDs as determined from enforcement boardings)

Restrictions on the fishery will include any or all of the following:

1. The use of soft TEDs described in 50 CFR is prohibited.
2. The use of hard TEDs with bottom escape openings and special hard TEDs with bottom escape openings is prohibited. Approved hard TEDs and special hard TEDs must be configured with the slope of the deflector bars upward from forward to aft and with the escape opening at the top of the trawl.
3. The use of try nets with a headrope length greater than 12 ft (3.6 m) or a footrope length greater than 15 ft (4.6 m) is prohibited unless a NMFS-approved top-opening, hard TED or special hard TED is installed when the try nets are rigged for fishing. Try nets with a headrope length 12 ft (3.6 m) or less and a footrope length 15 ft (4.6 m) or less would be exempt from the TED-use requirement in accordance with 50 CFR 227.72 (e)(2)(ii)(B)(1).
4. The use of a webbing flap that completely covers the escape opening in the trawl is prohibited. Any webbing that is attached to the trawl, forward of the escape opening, be cut to such a length that the trailing edge of such webbing does not approach to within 2 inches (5.1 cm) of the posterior edge of the TED grid. The requirements for the size of the escape opening would be unchanged.

These restrictions will be implemented through emergency rulemaking pursuant to the regulations under 50 CFR 227.72(e)(6), and will remain in effect for 30 days. Changes to the restrictions, or to the size and extent of the area covered by the restrictions, and any extension of the restrictions may be required through additional 30-day rules. All restrictions will be predicated on ensuring protection to sea turtles.

Area Closures Within the Special Management Areas

Two consecutive weeks of elevated strandings, at 75 percent or more of the ITL after implementation of an emergency rule restricting shrimp fishing, will result in area closures from the COLREGS line, out to 10 nm (18.5 km) within the statistical zone of elevated strandings, and contiguous statistical zones or portions of contiguous zones, as necessary. Area closures will be implemented through emergency rulemaking notices pursuant to 50 CFR 227.72(e)(6), and will remain in effect for 30 days.

Changes to the size and extent of the area closure, and any extension of the closure, may be required through additional 30-day rules.

Decision Not to Implement Restriction or Closures Within Special Management Areas

The Regional Director, in consultation with the SAC, SEA, and the OD, may make a determination that emergency rulemaking is not necessary despite stranding levels reaching or exceeding 75 percent of the ITL for 2 consecutive weeks within the Interim Special Management Areas. This determination will be summarized in a Memorandum for the Record, and must receive the concurrence of the AA. The Memorandum for the Record will include the information listed in a. through e., above, must demonstrate that sea turtle mortalities appear to be due to sources other then shrimping, and must identify actions that can be taken immediately to reduce nearshore mortalities.

B. Areas Outside of the Interim Special Management Areas (Zones 1 through 11, 21 through 29, and 32 through 36):

The STSSN National Coordinator, with assistance from PSB staff and the NSTC as requested, will be responsible for communicating with the STSSN State Coordinators to evaluate local conditions and mortality factors present in the statistical zones of elevated strandings. The best available information will be solicited and reviewed through communication with appropriate NMFS laboratories as well as state and local marine scientists and managers. The local NMFS enforcement agent, Coast Guard and state enforcement agency may also be asked to increase enforcement efforts within statistical zones of elevated strandings.

A consensus Decision Memorandum to the RD will be prepared by PSB staff, the STSSN National Coordinator, and the NSTC regarding whether further action is warranted in any statistical zone within which strandings remain elevated above historical levels for 1 month. The Decision Memorandum must be timely and contain the following best readily available information:

a. Affected area;

b. Current and historical strandings, shrimp landings and shrimping effort (if available). Any unusual aspect of the strandings will be identified (e.g., species composition, size classes, and carcass anomalies);

c. Enforcement efforts with emphasis on boardings and compliance;

d. Other mortality factors if any, and unusual environmental conditions, with an evaluation of their significance;

e. Identification of any fishing practices or gear types that may be contributing to the strandings (for e.g., percent soft TEDs as determined from enforcement boardings); and

f. Recommended further actions, if any, which may include continued investigation, elevated enforcement, or implementation of emergency regulations restricting shrimping or closing areas.

Restrictions if necessary, will be consistent with those described within the discussion of the interim special management areas under A., above.

The Regional Director, in consultation with the SAC, SEA, and the OD, will make a determination regarding further action within 48 hours of receipt of the Decision Memorandum. Actions contrary to those recommended in the Decision Memorandum must be summarized in a Memorandum for the Record, and receive the concurrence of the AA. Continued elevated strandings reaching or exceeding 75 percent of the ITL for more than 2 consecutive weeks after restrictions are taken, as noted in item f. under B. and listed in A., may result in area closures from the COLREGS line, out to 10 nm (18.5 km) within the statistical zone of elevated strandings, and contiguous zones or portions of contiguous zones, as necessary.

Request for Comments

Any emergency rulemaking that may be necessary to implement the ERP will be implemented pursuant to 50 CFR 227.72(e)(6) and the Administrative Procedure Act, 5 U.S.C. 551 et seq. Since NMFS received comments on the rule establishing 50 CFR 227.72(e)(6) in 1992, and since full opportunity for public comment may not exist if temporary restrictions must be implemented on an emergency basis, NMFS is requesting comments on this revised ERP. NMFS will evaluate all comments received and will consider making additional revisions to the ERP to incorporate public comments.

Furthermore, the Opinion requires a number of other management initiatives. In fulfilling one of these requirements, a rule is being be prepared to establish special sea turtle management areas and/or contingency restrictions to the shrimp fishery (60 FR 47544, September 13, 1995). Such rulemaking will be done through normal rulemaking procedures, including publication of a proposed rule with a public comment period and, as appropriate, public hearings, prior to publication of a final rule with a delayed effective date. Public comments which provide alternative management measures for ensuring successful operation of the shrimp trawl fishery while promoting recovery of sea turtle populations may be used in the development of a proposed rule. Such comments are therefore specifically solicited. All comments received on this ERP will also be considered during that rulemaking.

Dated:

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Table 1. Sea Turtle Indicated Take Level (ITL) for Shrimp Fishery Statistical Zones. Zones 1-3, 6-17, 21, and 24 are not included in the table because the ITL is 2 for all weeks in these Zones. There is no Zone 22 or 23.

GULF OF MEXICO		ZONE 4	ZONE 5	ZONE 18	ZONE 19	ZONE 20	ZONE 25	ZONE 26	ZONE 27	ZONE 28
Week	Week Period	ITL	ITL	ITL	ITL	ITL	ITL	ITL	ITL	ITL
1	1/1 - 1/7	2	2	2	2	2	2	2	3	2
2	1/8 - 1/14	2	2	2	2	2	2	2	4	2
3	1/15 - 1/21	2	2	2	2	2	2	2	4	2
4	1/22 - 1/28	2	2	2	2	2	2	2	5	2
5	1/29 - 2/4	2	2	2	2	2	2	2	5	2
6	2/5 - 2/11	2	2	2	2	2	2	2	8	3
7	2/12 - 2/18	2	2	2	2	2	2	2	5	3
8	2/19 - 2/25	2	2	2	2	2	2	2	4	3
9	2/26 - 3/4	2	2	2	2	2	2	3	5	2
10	3/5 - 3/11	2	2	2	2	2	2	3	5	3
11	3/12 - 3/18	2	2	2	2	2	2	3	4	3
12	3/19 - 3/25	2	3	2	2	3	2	3	5	3
13	3/26 - 4/1	2	2	2	2	3	2	3	6	5
14	4/2 - 4/8	2	2	2	2	3	2	3	5	6
15	4/9 - 4/15	2	2	2	2	4	2	2	5	6
16	4/16 - 4/22	2	2	3	2	4	2	3	6	6
17	4/23 - 4/29	2	3	3	2	4	2	4	7	6
18	4/30 - 5/6	3	3	4	2	3	2	4	7	5
19	5/7 - 5/13	3	3	3	2	3	2	4	7	6
20	5/14 - 5/20	3	4	2	2	2	2	5	7	6
21	5/21 - 5/27	3	3	2	2	2	2	6	7	5
22	5/28 - 6/3	3	2	2	2	2	3	5	6	7
23	6/4 - 6/10	2	2	2	2	2	2	5	5	7
24	6/11 - 6/17	3	2	2	2	2	2	5	5	6
25	6/18 - 6/24	3	2	2	2	2	2	5	5	5
26	6/25 - 7/1	2	2	3	2	2	2	5	4	5
27	7/2 - 7/8	2	2	3	3	2	2	5	4	4
28	7/9 - 7/15	2	2	3	3	2	2	5	4	3
29	7/16 - 7/22	2	2	3	3	2	2	5	5	4
30	7/23 - 7/29	2	2	4	4	2	2	4	4	5
31	7/30 - 8/5	2	2	3	2	2	2	3	4	5
32	8/6 - 8/12	2	2	2	2	2	2	4	4	4
33	8/13 - 8/19	2	2	2	2	2	2	3	4	4
34	8/20 - 8/26	2	2	3	2	2	2	3	3	4
35	8/27 - 9/2	2	2	3	2	2	2	3	4	4
36	9/3 - 9/9	2	2	3	2	2	2	3	4	4
37	9/10 - 9/16	2	2	4	2	2	2	2	4	4
38	9/17 - 9/23	2	2	4	2	2	2	2	4	4
39	9/24 - 9/30	2	2	4	2	2	2	2	4	4
40	10/1 - 10/7	2	2	4	2	2	2	2	3	3
41	10/8 - 10/14	2	2	3	2	2	2	2	2	3
42	10/15 - 10/21	2	2	2	2	2	2	2	2	3
43	10/22 - 10/28	2	2	2	2	2	2	2	2	3
44	10/29 - 11/4	2	2	2	2	2	2	2	2	2
45	11/5 - 11/11	2	2	2	2	2	2	2	2	2
46	11/12 - 11/18	2	2	2	2	2	2	2	2	2
47	11/19 - 11/25	2	2	2	2	2	2	2	2	2
48	11/26 - 12/2	2	2	2	2	2	2	2	2	2
49	12/3 - 12/9	2	2	2	2	2	2	2	2	2
50	12/10 - 12/16	2	2	2	2	2	2	2	2	2
51	12/17 - 12/23	2	2	2	2	2	2	2	2	2
52	12/24 - 12/31	2	2	2	2	2	2	2	3	2

Table 1. (Continued) Sea Turtle Indicated Take Level (ITL) for Shrimp Fishery Statistical Zones. Zones 1-3, 6-17, 21, and 24 are not included in the table because the ITL is 2 for all weeks in these Zones. There is no Zone 22 or 23.

SOUTHEAST ATLANTIC		ZONE 29	ZONE 30	ZONE 31	ZONE 32	ZONE 33	ZONE 34	ZONE 35	ZONE 36
Week	Week Period	ITL	ITL	ITL	ITL	ITL	ITL	ITL	ITL
1	1/1 - 1/7	2	2	2	2	2	2	2	2
2	1/8 - 1/14	2	2	2	2	2	2	2	2
3	1/15 - 1/21	2	2	2	2	2	2	2	2
4	1/22 - 1/28	2	2	2	2	2	2	2	2
5	1/29 - 2/4	2	2	2	2	2	2	2	2
6	2/5 - 2/11	2	2	2	2	2	2	2	2
7	2/12 - 2/18	2	2	2	2	2	2	2	2
8	2/19 - 2/25	2	2	2	2	2	2	2	2
9	2/26 - 3/4	2	2	2	2	2	2	2	2
10	3/5 - 3/11	2	2	2	2	2	2	2	2
11	3/12 - 3/18	2	2	2	2	2	2	2	2
12	3/19 - 3/25	2	2	2	2	2	2	2	2
13	3/26 - 4/1	4	2	2	2	2	2	2	2
14	4/2 - 4/8	5	3	2	2	2	2	2	2
15	4/9 - 4/15	5	5	2	2	2	2	2	2
16	4/16 - 4/22	5	5	2	2	2	2	2	2
17	4/23 - 4/29	5	6	3	3	2	3	2	2
18	4/30 - 5/6	5	9	5	3	3	3	2	2
19	5/7 - 5/13	4	11	7	5	4	3	2	2
20	5/14 - 5/20	4	11	7	6	4	5	3	2
21	5/21 - 5/27	4	11	8	8	4	5	4	2
22	5/28 - 6/3	4	11	8	8	4	5	4	2
23	6/4 - 6/10	4	9	7	9	4	7	5	2
24	6/11 - 6/17	3	8	6	8	4	7	5	2
25	6/18 - 6/24	2	7	6	7	5	6	3	2
26	6/25 - 7/1	2	6	6	6	6	6	2	2
27	7/2 - 7/8	2	7	5	5	7	6	2	2
28	7/9 - 7/15	2	8	6	4	9	4	2	2
29	7/16 - 7/22	2	7	5	4	9	4	2	2
30	7/23 - 7/29	3	8	5	4	8	3	2	2
31	7/30 - 8/5	3	9	4	3	7	2	2	2
32	8/6 - 8/12	4	7	4	3	5	2	2	2
33	8/13 - 8/19	4	6	5	3	4	2	2	2
34	8/20 - 8/26	3	7	6	3	3	2	2	2
35	8/27 - 9/2	3	7	5	4	3	2	2	2
36	9/3 - 9/9	2	6	5	4	3	2	2	2
37	9/10 - 9/16	2	5	5	3	4	2	2	2
38	9/17 - 9/23	2	4	3	2	3	2	2	2
39	9/24 - 9/30	2	2	2	2	3	2	2	2
40	10/1 - 10/7	2	2	2	2	2	2	2	2
41	10/8 - 10/14	2	2	2	2	2	2	2	2
42	10/15 - 10/21	2	2	2	2	2	3	4	4
43	10/22 - 10/28	2	2	2	2	2	4	5	4
44	10/29 - 11/4	3	2	2	2	2	4	7	4
45	11/5 - 11/11	3	2	2	2	2	4	11	4
46	11/12 - 11/18	3	2	2	2	2	4	11	4
47	11/19 - 11/25	2	2	2	2	2	3	10	2
48	11/26 - 12/2	2	2	2	2	2	2	9	2
49	12/3 - 12/9	2	2	2	2	2	2	6	2
50	12/10 - 12/16	2	2	2	2	2	2	2	2
51	12/17 - 12/23	2	2	2	2	2	2	2	2
52	12/24 - 12/31	2	2	2	2	2	2	2	2

APPENDIX D

TAB D, NO. 6(a)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Key West, Florida
October 7, 1996

In Attendance:

Karl Lessard
Steven Atran
Debbie McNair

8 members of the public

Douglas Gregory - Sea Grant Extension Agent
Mr. Gregory supported the position that, if BRDs are required for purposes of reducing red snapper bycatch, they should be required west of Cape San Blas only, since red snapper are not caught in this area. However, that does not mean that he is an advocate for BRDs west of Cape San Blas. Mr. Gregory's remaining comments were directed toward the possibility of BRDs being eventually required in this area for reduction of other bycatch. He stated that the animals caught in the Tortugas shrimp fishery are different than those caught in the northern Gulf, and he presented handouts (attached) to substantiate that statement. He noted that pinfish is the primary species in the finfish bycatch in the Tortugas area, and that crabs, sea lice and mantis shrimp make up the primary bycatch in shrimp trawls. He felt that the finfish bycatch in this area was comprised mostly of forage species of no concern to recreational fishermen. Mr. Gregory's handouts also indicated that the finfish to shrimp ratio in the Florida Keys was 1.1 to 1. He felt that before a future amendment to require BRDs in this area is produced, a BRD that will work in this area needs to be developed.

Mr. Gregory also questioned the graphs in Figure 2 of the amendment which show finfish bycatch in Florida shrimp trawls at 50% of the total catch. His data shows finfish at about 1/3 of the catch, and he would like to work with Rick Leard to resolve this discrepancy. He also stated that west of Cape San Blas shrimp fishing can be productive both day and night, but east of Cape San Blas, only at night.

Arthur Ireland - Commercial Fisherman
Mr. Ireland supported the requirement that BRDs, for the purpose of reducing red snapper bycatch, be required west of Cape San Blas only. He agreed with the comments from Douglas Gregory and stated that the shrimp species, bycatch, and bottom are all different in this area from Louisiana. He stated that more fish are caught inside of 10 fathoms, and questioned why that area would be left out of the BRD requirement. He also noted that none of the species listed in Table 2 are caught in the Tortugas.

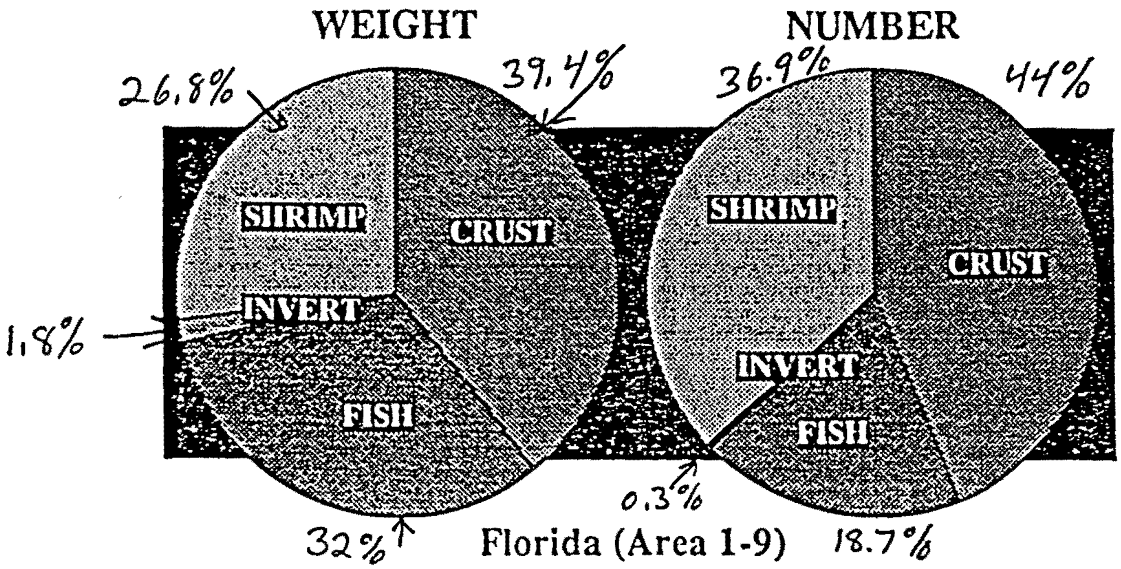
Ralph Brady, Jr. - Commercial Fisherman
Mr. Brady noted that Table 2 on page 6 of the amendment is from 1989 data, and he questioned why more recent data isn't used.

An unidentified individual from the audience stated that he has caught red snapper west of the Tortugas, but in over 600 feet of water and using handlines.

Mayhew Paul Norman - Commercial Fisherman
Mr. Norman stated that he has never seen a red snaspper in a shrimp net. When he fished in North Carolina he used fisheye BRDs, but he doesn't like them. He felt that this area has a very clean shrimp fishery, but noted that bycatch of lane snapper can be cut down by not fishing past daylight.

Attachments

NMFS BYCATCH CHARACTERIZATION STUDY OF SHRIMP TRAWL CATCHES



Florida (Area 1-9)

SHR1

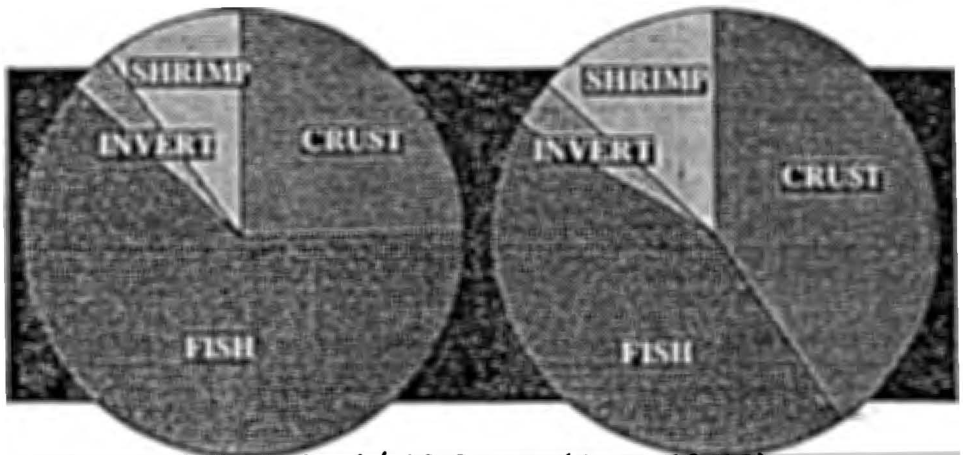
Species Ranks of Bycatch for Florida (May 92 through April 93)

Species	WPCUE Weight	Species	NCPUE Number
Pin Fish	26 %	Sugar Shrimp	37 %
Inshore Lizardfish	17	Mantis Shrimp	16
Mantis Shrimp	13	Longspine Swimming Crab	8
Iridescent Swimming Crab	10	Pin Fish	7
Blackedge Cusk-eel	7	Blackedge Cusk-eel	7
Sugar Shrimp	6	Iridescent Swimming Crab	6
Longspine Swimming Crab	3	Atlantic Midshipman	6
Atlantic Midshipman	3	Inshore Lizardfish	5
Cobia	3	Pancake Batfish	2
Flame Box Crab	2	Longfin Squid	1
TOTAL	91 %	TOTAL	96 %

Misc. Bycatch 9%
Total Bycatch 100%

For more information on how you can participate in an industry program to test bycatch reduction devices (fish eyes, humming line, etc.) call Doug Gregory, Monroe County Cooperative Extension Service, Stock Island at 292-4501. HELP DEVELOP A PIECE OF GEAR YOU CAN LIVE WITH AND AVOID ANOTHER TED FIASCO!!!

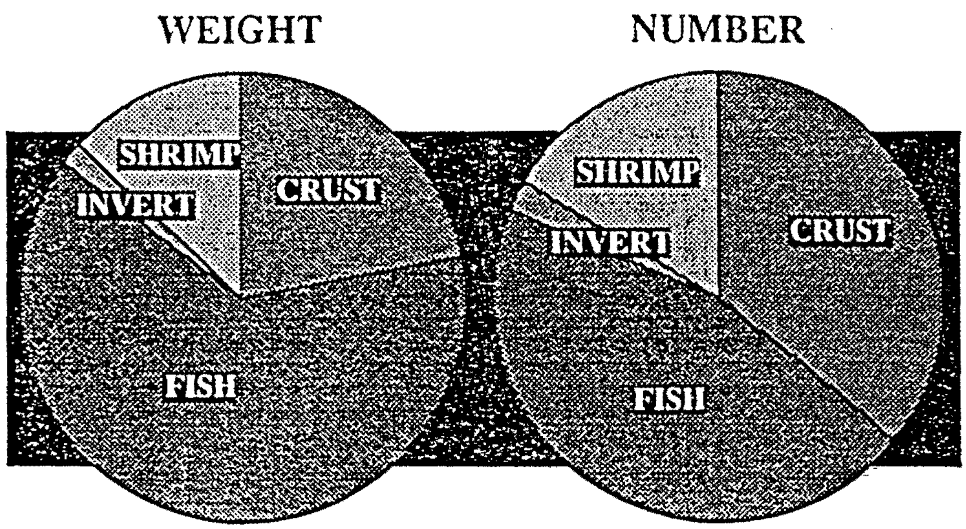
WEIGHT NUMBER



Mississippi / Alabama (Area 10-12)

Species Ranks of Bycatch for Mississippi / Alabama (May 92 through April 93)

Species	WPCUE Weight	Species	NCPUE Number
Atlantic Croaker	27 %	Atlantic Croaker	15 %
Sand Seatrout	11	Mantis Shrimp	14
Lesser Blue Crab	8	Lesser Blue Crab	11
Mantis Shrimp	7	Sand Seatrout	8
Spot	6	Sugar Shrimp	6
Inshore Lizardfish	5	Iridescent Swimming Crab	6
Northern Kingfish	4	Fringed Flounder	5
Rock Seabass	3	Blackear Seabass	5
Fringed Flounder	3	Atlantic Brief Squid	3
Bluespotted Searobin	3	Bluespotted Searobin	3
Sub TOTAL	76	Sub TOTAL	75
Misc Bycatch	24%		25%

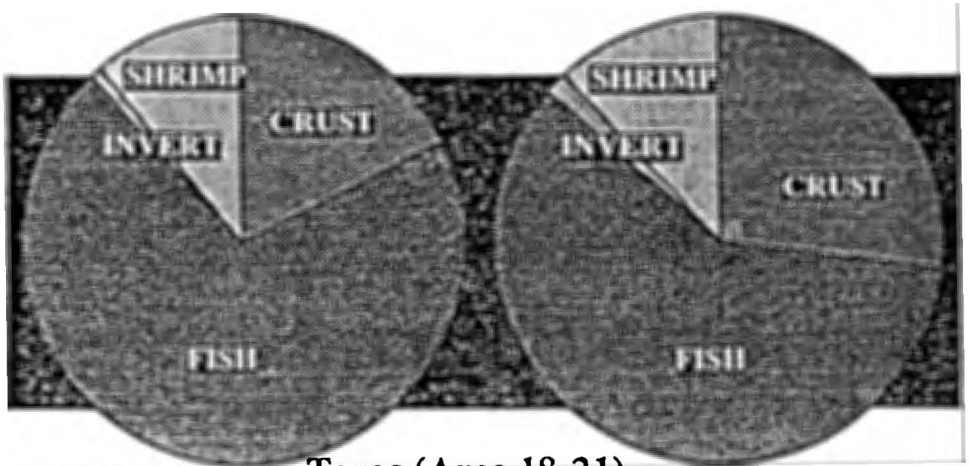


Louisiana (Area 13-17)

Species Ranks of Bycatch for Louisiana (May 92 through April 93)

Species	WPCUE weight %	Species	NCPUE Number %
Atlantic Croaker	26 %	Atlantic Croaker	22 %
Longspine Porgy	14	Longspine Porgy	17
Hardhead Catfish	7	Seabob Shrimp	9
Gulf Menhaden	7	Sugar Shrimp	5
Inshore Lizardfish	4	Longspine Swimming Crab	4
Cutlass Fish	3	Iridescent Swimming Crab	3
Blue Crab	3	Hardhead Catfish	3
Sand Seatrout	3	Lesser Blue Crab	3
Gulf Butterfish	3	Gulf Menhaden	3
Lesser Blue Crab	3	Bluespotted Searobin	2
Sub TOTAL	72	Sub TOTAL	72
Misc Bycatch	25%		28%

WEIGHT NUMBER

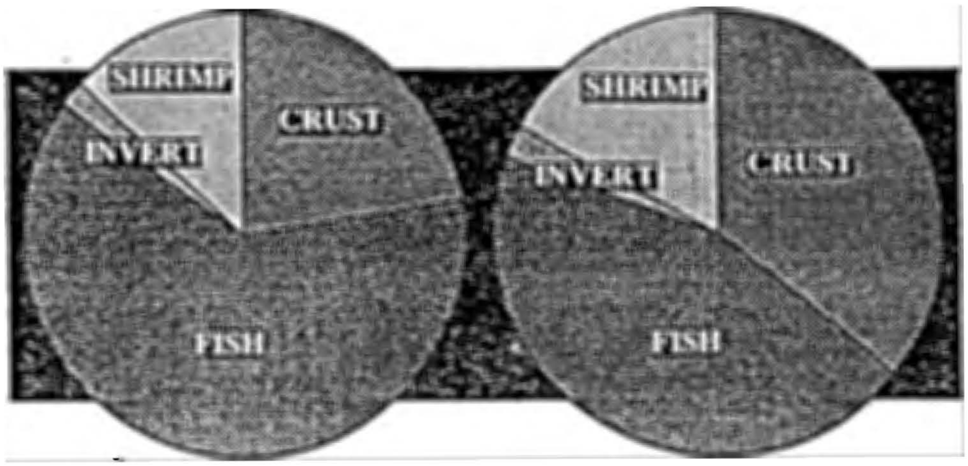


Texas (Area 18-21)

Species Ranks of Bycatch for Texas (May 92 through April 93)

Species	WPCUE weight	Species	NCPUE Number
Atlantic Croaker	23 %	Atlantic Croaker	18 %
Longspine Porgy	14	Longspine Porgy	16
Gulf Butterfish	10	Gulf Butterfish	14
Spot	7	Rock Shrimp	5
Inshore Lizardfish	5	Longspine Swimming Crab	4
Cutlass Fish	4	Cutlass Fish	4
Atlantic Bumper	4	Iridescent Swimming Crab	3
Rock Shrimp	3	Atlantic Bumper	3
Hardhead Catfish	3	Mantis Shrimp	3
Sand Seatrout	2	Lesser Blue Crab	2
Sub TOTAL	75	Sub TOTAL	73
Misc. bycatch	25%		27%

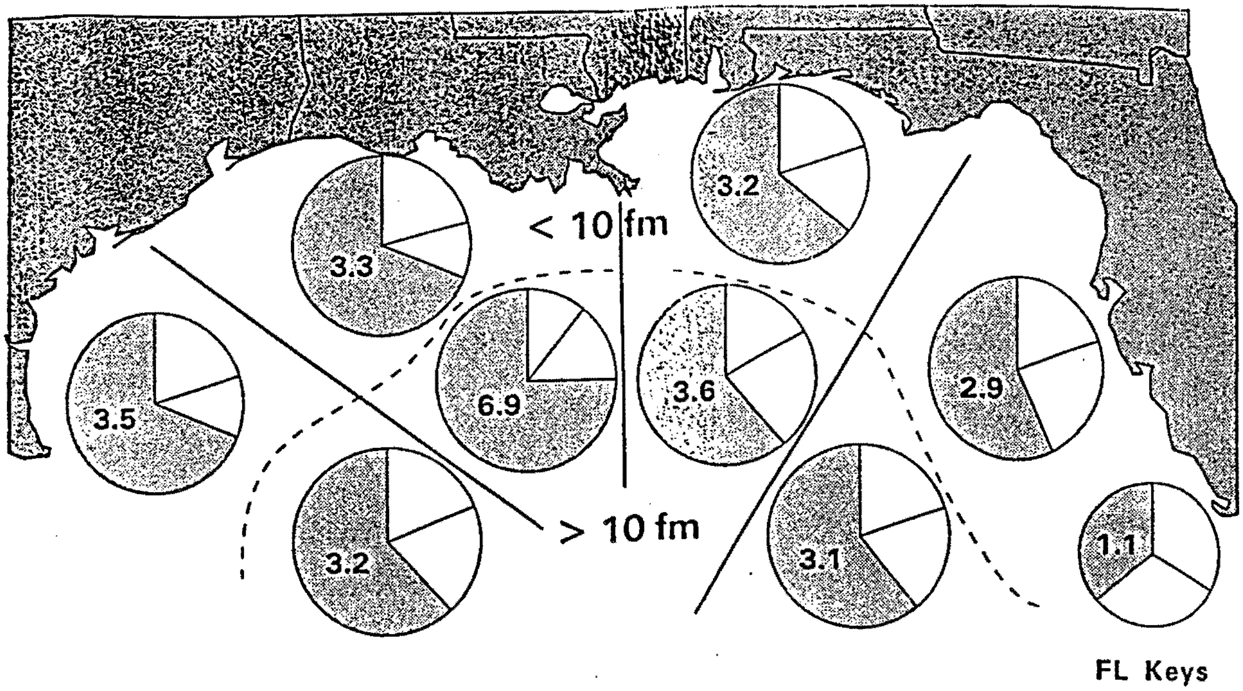
WEIGHT NUMBER



May 1992 through April 1993

Species Ranks of Bycatch for Gulf of Mexico (May 92 through April 93)

Species	WPCUE (weight)	Species	NCPUE (number)
Atlantic Croaker	25 %	Atlantic Croaker	21 %
Longspine Porgy	13	Longspine Porgy	16
Hardhead Catfish	6	Seabob Shrimp	7
Gulf Menhaden	5	Sugar Shrimp	5
Inshore Lizardfish	4	Longspine Swimming Crab	4
Gulf Butterfish	4	Lesser Blue Crab	4
Spot	3	Iridescent Swimming Crab	3
Sand Seatrout	3	Mantis Shrimp	3
Cutlass Fish	3	Gulf Butterfish	3
Lesser Blue Crab	3	Hardhead Catfish	3
Sub TOTAL	71	Sub TOTAL	68
Misc. Bycatch	29%		32%



number denotes fish : shrimp RATIO

	shrimp
	inverts
	fish

Gulf of Mexico Shrimp Trawls Catch by Weight (kg/hr)

2083 tows 1992-1994

data from NMFS Galveston

Gulf & South Atlantic Fisheries Development Foundation

Fish Eye BRD Tows

Eastern Gulf of Mexico (as of ~~3/95~~)

12/94

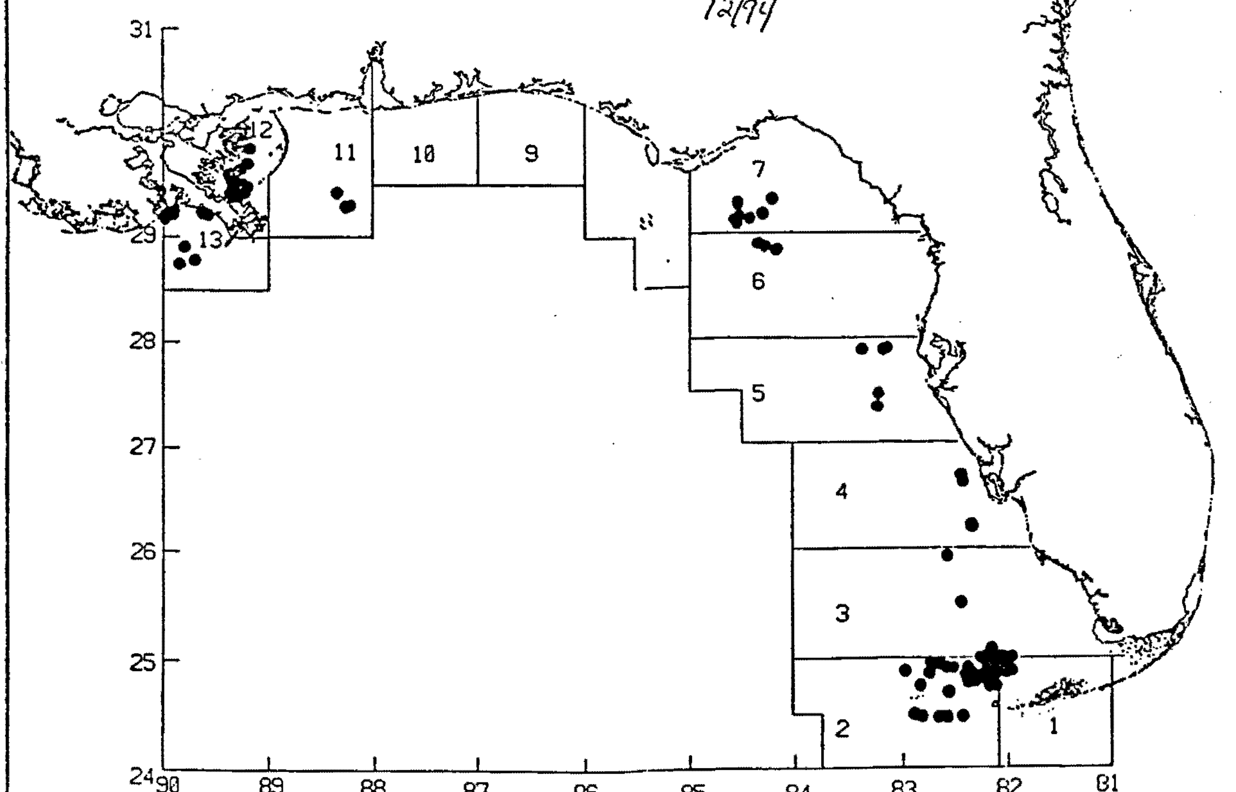


Table 4. Results of evaluations for various bycatch reduction devices (BRDs) tested during the award period according to region. Only one trip was recorded in the South Atlantic area off Cape Canaveral. All EE code results are the combination of several trips, and the ED code under the Florida Keys includes two consecutive trips. All other BRDs were evaluated on one trip. Descriptions of the BRD codes are listed in the text. Numbers in parentheses by the BRD codes represent the maximum number of tows under consideration; for individual species or species-groups the sample size may be different as evaluations only incude those tows where the species or group occurred in one or both nets. A tow which did not catch the species or group in either net was excluded from that specific analysis.

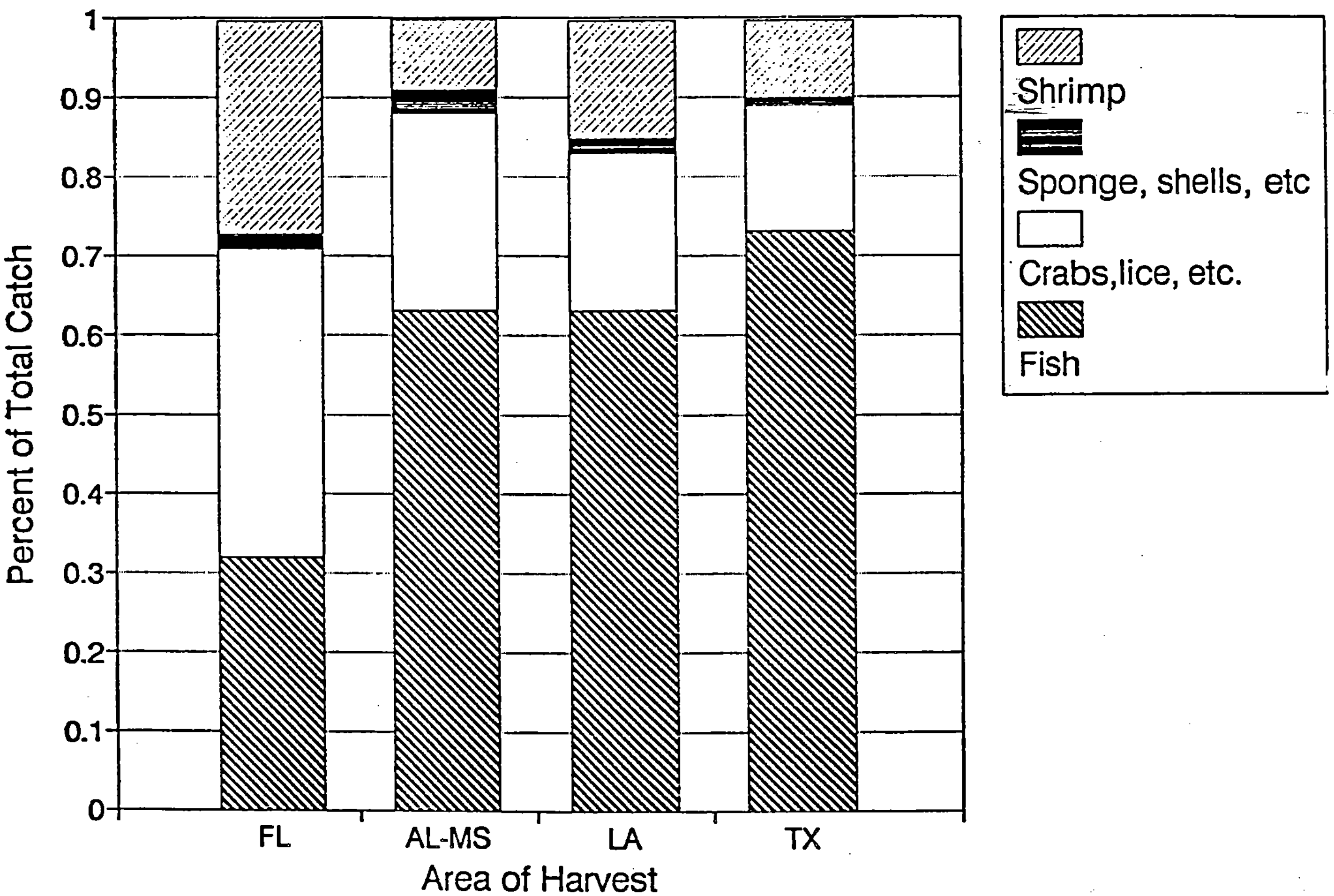
	S. Atl.	Gulf			FL Keys			
	EE (8)	EE (63)	IA (35)	AE (14)	EE (35)	ED (21)	LA (9)	HC (8)
(kg/hr)								
Biomass	4	23	15	14	14	+1	32	+1
non-crust. Inverts	+54	na	6	5	1	+24	27	15
Shrimp	+2	4	3	1	9	0	14	2
(no./hr)								
Red Snapper	na	47	6	75	44*	29*	40*	47*
Atl. Croaker	+84	+1	69	12	na	na	na	na
Spot	31	8	58	69	na	na	na	na
Lngsp. Porgy	na	31	13	29	na	na	na	na
Cynoscion spp.	na	13	21	32	na	na	na	na
Whiting *spp.*	+7	67	49	80	na	na	na	na
Hardhead Catfish	na	75	55	96	na	na	na	na
Butterfish	na	+23	43	42	na	na	na	na
Bumper	na	13	75	62	na	10	na	na
Cutlassfish	na	10	27	+47	na	na	na	na
King mackerel	na	+114 (3 tows)	na	na	100 (1 tow)	na	0	na
Spanish mackerel	na	+57 (9 tows)	na	na	100 (2 tows)	na	na	na
misc. fish (kg/hr)	+115	21	18	17	38	4	15	16

* reductions for the more common lane snapper are reported here; red snapper did not occur in these samples

NMFS Bycatch Characterization of Shrimp Trawl Catches In the Gulf of Mexico (May 1992-April 1993).					
	Percent of Catch (In Weight)				
Catch\Area	FL	AL-MS	LA	TX	All Areas
Shrimp	27%	9%	15%	10%	16%
Fish	32%	63%	63%	73%	60%
Crabs, lice, etc.	39%	25%	20%	16%	22%
Sponges, shells, etc.	2%	3%	2%	1%	2%
Total Catch	100%	100%	100%	100%	100%

SHRIMP TRAWL CATCHES IN GULF OF MEXICO

As Percent of Catch In Weight (NMFS)



Top Fish Bycatch Species In Weight (Percent of Total Bycatch)			
Florida	Miss. - Alabama	Louisiana	Texas
Pinfish (26%)	Croaker (27%)	Croaker (26%)	Croaker (23%)
Lizardfish (17%)	Seatrout (11%)	Porgy (14%)	Porgy (14%)
Mantis Shrimp (13%)	Blue crab (8%)	Catfish (7%)	Butterfish (10%)
Crabs (13%)	Mantis Shrimp (7%)	Menhaden (7%)	Spot (7%)
Cusk eel (7%)	Spot (6%)	Lizardfish (4%)	Lizardfish (5%)

TAB D, NO. 6(b)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Lake Charles, Louisiana
October 7, 1996

ATTENDANCE:

Council Members and Staff
Karen Foote
Irby Basco
Richard Leard
Patricia Bear

Others:
Pam Basco
Harry Blanchet
C. J. Kiffe
Adley Dyson
Franklin Price
Randy Roach

C. J. Kiffe - Commercial shrimp fisherman
Mr. Kiffe questioned the need for the amendment and stated that bycatch had already been reduced by 60 to 80%. He also asked why the red snapper TAC had been increased if the stock was in such bad shape. He stated that red snapper are not found in state waters or in waters less than 10 fathoms. He asked that the industry be allowed to develop BRD designs if BRDs are required.

Adley Dyson - Commercial shrimp fisherman
Mr. Dyson stated that there was a need for comparisons of BRDs with naked nets (no TED). He also believed that there were no red snapper in inside waters. He asked if the Council had considered the mortality on red snapper from recreational and head boats after the season closes. Mr. Dyson stated that BRDs, if required, would not be needed all the time. He noted that since red snapper were caught offshore the Council should consider establishing a net size or horsepower limit for using BRDs. He also noted that red snapper permits were not evenly distributed with Florida residents holding about 90% of the permits.

TAB D, NO. 6(c)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Fort Myers, Florida
October 8, 1996

In Attendance:

Joe Kimmel
Steven Atran
Debbie McNair

6 members of the public

Ralph Andrew, Jr. - Commercial Fisherman
Mr. Andrew supports Alternative B-2. He does not see any need for BRDs in this area. The only red snapper he's seen are big ones in more than 200 feet of water. He feels that longlines and fish traps are the major problems with grouper and snapper depletions, not shrimp trawls. He would like to keep the Andrews TED as an option for use; but it works better when moved forward a bit. It reduces finfish; it doesn't clog; and it's clean. When BRDs are used in rough seas, you lose a lot of shrimp.

John Drew - Commercial Fisherman
Mr. Drew felt there would have been more participation but some fishermen were unable to get to the hearing because of Tropical Storm Josephine. He felt that requiring BRDs only west of Cape San Blas would be sufficient. He would like to be able to continue to use the Andrews TED, noting that at certain times of the year, grass and jellyfish move in. He felt that if a TED can reduce finfish, he should not be required to install something else. He also would like to have the amendment studied by a group like SEA, and would like the amendment simplified so that the fishermen can understand it. He felt that there has not been enough study to determine that BRDs work.

Clyde D. Jones. - Commercial Fisherman and Shrimp Vessel Owner/Operator for Over 30 Years
Mr. Jones Felt that the current TEDs are cutting bycatch by over 50 percent, and that fisheye BRDs will let shrimp out of the net. With the TEDs, he feels he is already losing 20-30 percent of his shrimp. A BRD will result in another 10-15 percent loss.

TAB D, NO. 6 (d)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Thibodeaux, Louisiana
October 8, 1996

ATTENDANCE:

Council Members and Staff:
Karen Foote
Richard Leard
Patricia Bear

Others:
George Barisich
James Blanchard
Judy Bourg
Murry Gaspard
Pete Gerica
Alan Gibson
Judith Gibson
Buvens LeBoeuf
Mervin Ledet, Jr.
Shirley Ledet
Michael Robichaux
Marilyn Rotolo
Gerard Thomassie
Walter Thomassie
Ricardo Virga

Mike Robichaux - State legislator
Mr. Robichaux questioned why shrimpers were being penalized for red snapper which is a commercial and recreational finfish. He stated that the red snapper stock was recovering and that shrimpers were not responsible for any problems. He also noted that BRDs should be referred to as fish excluder devices (FEDs).

Pete Gerica - President, Lake Pontchartrain Fishermen's Association and Vice President, Louisiana Seafood Management Council
Mr. Gerica noted that it was impossible to know how many fish were in the Gulf of Mexico. He felt that there were more red snapper because the seasons were shorter and larger quotas were being filled quicker. He also stated that the TED requirement was enough.

George Barisich - President, United Commercial Fishermen's Association
Mr. Barisich stated that he was speaking for approximately 20,000 commercial shrimp fishermen. He noted that red snapper are attracted to nets; and even if they are excluded, they will swim back to the nets. However, he stated that there was no problem with red snapper bycatch. He observed that red snapper were once in trouble, but noted changes from requiring TEDs, reduced numbers of licenses, and other factors. He also noted that the directed fishery was having a negative effect on red snapper, particularly the recreational fishery which was taking approximately twice its quota. Mr. Barisich stated that the shrimp loss from BRDs would be higher than that

presented, and coupled with the loss from TEDs it would be more like 12%. He also noted that escapement of more finfish would increase the population of finfish predators and cause an even greater loss of shrimp. He stated that because of these losses, the effects of amendment 9 would be inconsistent with its purpose, i.e. prevent unnecessary harm to the industry. He asked the Council to look at the overall effects BRDs would have on the industry, and if the requirement for TEDs were removed, he would take BRDs.

Marilyn Rotolo - Louisiana Seafood Management Council, Delta Commercial Fisheries Association
Mrs. Rotolo noted that the low attendance was due to the perception that regulations were being forced on the industry no matter what. She asked why TEDs could not be used seasonally because there were no turtles in the winter months. She also stated that more testing of BRDs should have been done on the mud bottoms in Louisiana.

Mervin Ledet, Jr. - Commercial Shrimp Fisherman
Mr. Ledet observed that BRDs were not needed because there were more red snapper in the Gulf now than before Columbus. He also noted that earlier bad weather and the present need to fish reduced the attendance at the hearing.

TAB D, NO. 6(e)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Tampa, Florida
October 9, 1996

In Attendance:

Scott Green
Steven Atran
Debbie McNair

0 members of the public

Only Judy Jamison from GSAFDF and the area NMFS port agent showed up to observe the public testimony. Since no fishermen or members of the public appeared, the hearing was not held.

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TAB D, NO. 6(f)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
New Orleans, Louisiana
October 9, 1996

ATTENDANCE:

Council Members and Staff:
Andrew Kemmerer
Richard Leard
Patricia Bear

Others:
David Bankston
George Barisich
Robert Barnett
Diane Buras
Robert Campo
Albert Darda, Jr.
Brad Friloux
Pete Gerica
Tracy Kuhns
Felix Rotolo
Marilyn Rotolo
Brant Savoie
Lester Schellinger

George Barisich - President, United Commercial Fishermen's Association
Mr. Barisich stated that he was speaking for approximately 20,000 commercial shrimp fishermen. He noted that red snapper are attracted to nets; and even if they are excluded, they will swim back to the nets. However, he stated that there was no problem with red snapper bycatch. He observed that red snapper were once in trouble, but noted changes from requiring TEDs, reduced numbers of licenses, and other factors. He also noted that the directed fishery was having a negative effect on red snapper, particularly the recreational fishery which was taking approximately twice its quota. Mr. Barisich stated that the shrimp loss from BRDs would be higher than that presented, and coupled with the loss from TEDs it would be more like 12%. He also noted that escapement of more finfish would increase the population of finfish predators and cause an even greater loss of shrimp. He stated that because of these losses, the effects of amendment 9 would be inconsistent with its purpose, i.e. prevent unnecessary harm to the industry. He asked the Council to look at the overall effects BRDs would have on the industry, and if the requirement for TEDs were removed, he would take BRDs. He also asked why the red snapper TAC was increased if the stock is so overfished.

Robert Barnett - Attorney for gill net fishermen in Louisiana
Mr. Barnett believed that Amendment 9 was an attack on the commercial shrimp industry and that there was no problem with red snapper. He stated that the Council was not objective, but politically motivated without adequate representation from the industry. He also stated that there were enforcement problems that had not been addressed. Mr. Barnett believed that Amendment 9 would result in a loss of investment for much of the industry; and if approved, the industry should be compensated through vessel and net buy-back programs, re training, or

other compensation. He stated that Louisiana had a peculiar shoreline that was unique and could not be fairly compared with Mississippi, Alabama, Florida, or Texas, and he asked that the Council consider this fact. He also asked that the Council provide documentation on how and why it arrived at its decision, and consider the regulatory impacts. He questioned whether the industry had been afforded due process and equal protection. He asked what the Council would do if the goal of Amendment 9 is not reached, and what will happen when (assuming it occurs) the goal is reached, i.e., would BRDs no longer be required.

Marilyn Rotolo - Louisiana Seafood Management Council, Delta Commercial Fisheries Association
Ms. Rotolo noted that the low attendance was due to the perception that regulations were being forced on the industry no matter what. She asked why TEDs could not be used seasonally because there were no turtles in the winter months; furthermore, they were not needed in Louisiana because there were no turtles in state waters. She also stated that more testing of BRDs should have been done on the mud bottoms in Louisiana. Ms. Rotolo stated that she was against the requirement for BRDs and that BRDs and TEDs were no longer needed. She felt that Mexico should help manage turtle populations, and the red snapper industry should be managed to protect red snapper. She stated that shrimp were being lost through predation from fish, and the fish bycatch was needed for birds, porpoises, and other animals.

Brad Friloux - Member, United Commercial Fishermen's Association
Mr. Friloux stated that he does not believe the data. He noted that no cameras were on vessels tested. Also, costs for TEDs was higher than previously stated.

Pete Gerica - President, Lake Pontchartrain Fishermen's Association and Vice President, Louisiana Seafood Management Council
Mr. Gerica believed that the Council was political and recreationally motivated. He noted that it was impossible to know how many fish were in the Gulf of Mexico, and he felt that there were more red snapper because the seasons were shorter and larger quotas were being filled quicker. He believed that, if approved, BRDs would subsequently be required in state waters. He also stated that the TED requirement was enough and opposed BRDs.

Albert Darda,Jr. - Commercial Shrimp Fisherman
Mr. Darda stated that Louisiana's coastline was unique, and there were no red snapper in state waters. He also noted that shallow waters with no snapper occurred outside Louisiana state waters.

Tracy Kuhns - Gulf Coast Commercial Fisherman's Association
Ms. Kuhns stated that the Council has not considered the professional advice from commercial fishermen. She noted that fishermen were not scientists and needed the assistance of consultants to properly review and report their information. She asked for a 90-day extension of the comment period and for final action in order for them to acquire a technical expert to review data and possibly provide additional alternatives. She also stated that the economic impacts had not been adequately addressed. She asked when red snapper stock assessments are done and wondered if and if so, how the industry would be notified that BRDs would no longer be required.

Robert Campo - Campo's Marina
Mr. Campo stated that the Council needed to further regulate the sport fishing industry which had many violations including multiple trips and bag limits per day. He also stated that TEDs lose about 20% of the shrimp.

Miscellaneous comments:
1. Cannot use BRDs all the time especially when "jelly water" is present because catch is forced out the BRDs. Regulations, if approved, should account for this to prevent violations.
2. Andrews TED should be allowed.

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TAB D NO. 6(g)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Brownsville, Texas
October 14, 1996

ATTENDANCE:

Council Members and Staff	Others	
Hal Osburn	Julius Collins	Arturo Bodden
Richard Leard	Charles Burnell	Margie Smith
Jeanne Johnson	Nita Burnell	Carlton Reyes
	Tony Reisinger	David Harrington
	Hazel Collins	Frank Lasseigne
	Jorge Gonzales, Jr.	Gary Graham
	Ray Wolf	Kit Doncaster
	Jack Collins	Jack Carinhas, Jr.
	Harley Londric	Sam Snodgras
	W. J. Boudreaux	Ronald Boudreaux
	Harris Lasseigne, Jr.	Robert Hymel
	Henry Wolf, Jr.	Deyaun Boudreaux

Julius Collins - President, Texas Shrimp Association/vessel owner
Mr. Collins presented testimony in the form of the attached written statement.

Charles Burnell - Vessel owner
Mr. Burnell indicated that his captains had tested the fisheye and extended funnel BRDs, and they did not work. He believed that fishermen could develop more workable devices given time; however, he did not feel that they were necessary because there was no problem with red snapper. He stated that TEDs were excluding about 98% of large snapper, and there were more red snapper now than in the past.

Margie Smith - Vessel owner/dealer
Ms. Smith stated that she agrees with and supports the statement presented by Julius Collins and previous testimony before the Council by Wilma Anderson, Executive Director of Texas Shrimp Association (TSA). She noted that the hearings were a waste of time, and recently approved Magnuson-Stevens Fishery Conservation and Management Act would force hearings to be rescheduled. She believed that data were not available to support the requirement of BRDs and recommended that Amendment 9 be tabled.

Gary Graham - Texas A&M Sea Grant, Marine Advisory Service
Mr. Graham stated that he is seeing more red snapper now than ever before, and he believes that the SPR estimates are not indicative of what is being seen. He also stated that the damage to red snapper stocks from longline fishing in the early 1980's was probably underestimated (approximately 68 boats were operating in 1983). He believed that bag limits have had a significant effect on recovery of red snapper stocks. Although data show a juvenile bycatch of about 30 million red snapper, he noted that the total number of fish in the stock was unknown, and he did not believe estimates of about 80% harvest. He stated that the effects of shell ridges (where shrimp abundance is very low and juvenile red snapper abundance is high) had not been fully evaluated as habitat for juvenile red snapper. Mr. Graham supported a credit for bycatch reduction by TEDs, particularly for large red snapper. He noted that both the Andrews and Morrison TEDs showed significant reductions in red snapper bycatch. He was concerned with Amendment 9's provisions for NMFS to certify future BRDs. He also supported

Alternative C.2 (d) which is to not specify a shrimp retention rate for BRDs. He was also concerned with the expected loss of shrimp biomass from BRDs.

David Harrington - University of Georgia Sea Grant
Mr. Harrington noted that BRDs were required in North Carolina, South Carolina, Georgia, and the east coast of Florida. He stated that shrimp loss varies based on vessel size, towing speed, tides, and other factors including jellyfish. He also stated that shrimp loss varied from 0 to 50% and that shrimpers in Georgia have filed a law suit based on high shrimp loss. He noted that the soft TEDs were good BRDs; however, he believed that NMFS did not want to deal with soft TEDs. He also believed that there were problems with NMFS' description and evaluation of soft TEDs. He noted that the major problem was with NMFS' statistical design of the small turtle protocol.

Harris Lasseigne - Commercial shrimp fisherman
Mr. Lasseigne presented the attached written comments.

Jack Collins - Commercial shrimp fisherman
Mr. Collins opposed Amendment 9 and noted that the economic studies were insufficient. He stated that the shrimp loss from BRDs could be as much as 30% which was unacceptable.

Deyaun Boudreaux - Texas Shrimp Association
Ms. Boudreaux presented the attached written statement.

Jack Carinhas, Jr. - Shrimp fisherman and attorney
Mr. Carinhas stated that he was opposed to Amendment 9 for the same reasons expressed by Julius Collins and Harris Lasseigne. He noted that the industry, particularly TSA, has been environmentally active and concerned with management; however, the federal government was a force of overregulation of private industry (Amendment 9 was an example). He believed that Amendment 9 could destroy the shrimp industry; thus its economic impact was great. He observed that marine turtles were found mostly in state waters; however, TEDs were required everywhere. Also, Mexican fishermen were not using TEDs. Mr. Carinhas stated that red snapper stocks were not declining but increasing, and Mexico should also manage snapper. He believed that few red snapper were caught because of changes in gear, particularly TEDS, and the effects of untrawlable bottoms. He felt that any reductions in red snapper populations was the result of the directed commercial and recreational fisheries, and the recreational catch, in particular, could not be quantified or enforced. He stated that the shrimp industry should be credited for reductions from TEDs and other factors, i.e., the industry only fishes about 6 months out of the year. He recommended tabling Amendment 9.

Nita Burnell
Ms. Burnell stated that she has heard that there will not be a future in shrimp fishing and wondered where this was coming from. She was concerned that her children and others would not have an opportunity to fish for a living. She believed that Amendment 9 was unfair and the industry was being required to defend itself.

First in Fisheries

Texas Shrimp Association

P.O. Box 1020 • 126 West Cleveland • Aransas Pass, Texas ~~78735~~ 78335
Telephone (512) 758-5024 • FAX (512) 758-5853

**TESTIMONY
ON
DRAFT AMENDMENT 9
TO THE
GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN
Gulf of Mexico Fishery Management Council
Public Hearing
October 14, 1996 - Brownsville, Texas**

Mr. Chairman, I am Julius Collins, I reside at 163 Creekbend Drive, Brownsville, Texas.

First, I would like to say why I believe these public hearings are being held throughout the Gulf and the origination of Amendment 9. In the late eighties, National Marine Fisheries Service (NMFS) reported that shrimp trawl bycatch was responsible for the collapse of the red snapper fishery. The bycatch myth of the shrimp fishery received the highest publicity, that instilled a perceived impression in the minds of the general public that the most valuable fishery of the United States was the most "wasteful fishery in the nation with a bycatch ratio of -- ten pounds of finfish to one pound of shrimp." Reaction to this myth instigated Amendment 9

Mr. Chairman, as President of Texas Shrimp Association and as a vessel owner, I present this statement in opposition to the shrimp fishery bycatch proposal contained in Amendment 9 as drafted to the Gulf of Mexico Fishery Management Plan (FMP).

Purpose, Objectives and Intent of Amendment 9

The stated purpose of Amendment 9 is to reduce substantially the amount of bycatch in the shrimp fishery to avoid what has been alleged as "high levels of juvenile mortality" of red snapper. The basis for the Council's objective and plan is derived from past stock assessments of red snapper and related analyses about the interaction between the shrimp fishery and juvenile red snapper. These assessments and analyses were prepared by the NMFS.

If Amendment 9 is approved by the Council, NMFS would issue regulations requiring the use of bycatch reduction devices (BRDs) on all shrimp vessels operating under the Shrimp Fishery FMP in certain specified waters. NMFS would also start a program of certifying BRDs for use in shrimp trawls.

TSA Requested Council to Table Amendment 9 and Cancel Public Hearings

At the New Orleans Council meeting TSA stated opposition in detail why Amendment 9 did not conform to the existing Magnuson Act nor would it conform to new shrimp trawl bycatch language in the Sustainable Fisheries Act Amendments to the Magnuson Act that were pending before the Senate and House and that Amendment 9 should be tabled by the Council for further consideration. Upon passage of the amendments to the Magnuson Act by the Senate and House, TSA questioned the holding of public hearings on Amendment 9 that is now obsolete and does not conform with the new bycatch requirements nor the regulatory impact on economies of fishing communities.

Since the Council decided not table the amendment and proceed with the public hearing on Amendment 9, we will state opposition with recommendations in general and not on the Alternatives as outlined. We reserve the right to comment on new alternatives when Amendment 9 conforms with the amended language of the Magnuson Act and public hearings are again rescheduled.

Magnuson Act Requires New Studies for Shrimp Trawl Bycatch

In the new Magnuson Act, Congress has required new studies of shrimp bycatch measures (section 405) and red snapper information (section 407). As presently drafted Amendment 9 does not comply with the new bycatch requirements. Therefore, the proposal should be returned to the Council for further consideration to ensure full compliance with the Sustainable Fisheries Act Amendments to the Magnuson Act.

Fundamental Flaws - Scientific Basis and Mathematical Model

There are fundamental flaws in the scientific basis and the mathematical model on which Amendment 9 is based. In particular, the bycatch of red snapper in the shrimp fishery has been significantly overestimated.

These issues must be clarified before any action can be taken. Because of these fundamental flaws, we believe that Amendment 9 does not even conform to the requirements of the existing Magnuson Act.

No Recognition of Shrimp Fishery Contribution to Bycatch Reduction

Over the years, the shrimp fishery has reduced bycatch through fishing gear change and modification, regulatory mandates, reduction in fishing effort as vessel declined in the fishery, area closures, loss of trawlable bottom and research studies -

1. In the late seventies and early eighties vessels replaced double-rigged trawls for a more efficient designed net for quad-rigged trawls. This gear change and modification reduced bycatch significantly and increased shrimp productivity.

2. A regulatory mandate under the Endangered Species Act required that all trawls were to be equipped with a NMFS certified TED to reduce the incidental capture of sea turtle; and according to NMFS figures these certified TEDs also reduced finfish bycatch by 17.5%. But, the installation of TEDs also reduced the efficiency of the trawls and the industry begin experiencing a shrimp loss of 10% - 13% per drag and gear expenses doubled.

At the Tampa Council meeting, Dave Harrington from the University of Georgia, who tested and certified the TED's for NMFS, advised the Council of his study of bycatch reduction by various TEDs. The study reflects that 65% of the shrimp fishermen are using the Georgia 4" hard grid TED without the funnel are excluding 16% of bycatch and that 35% of the shrimp fishermen are using the 3 to 4 panel Andrews soft TED are excluding 54% and 43% bycatch respectively - see Figure 1. Add and divide all this there is a reduction in bycatch by 27%.

3. The shrimp fishery has continually advised the Council and NMFS that since 1990 the offshore shrimp fleet fishing nearshore and offshore waters had been reduced by over 40%. Just recently NMFS finally admitted that there was a vessel reduction of 5.8% in 1993, a 10% reduction in 1994 and another 10% reduction in 1995. Again this is another 25.8% reduction in fishing effort that correlates to bycatch reduction.

4. The shrimp advisory panel requested NMFS to assess all of the untrawlable bottom inaccessible to shrimp trawling -- natural and artificial reefs, pipelines, oil and gas platforms, sanctuaries, area closures such as the Texas Closure that provides sixty (60) days of no fishing effort within 200 miles of the Texas coast. These inaccessible bottoms provides protective measures for sea turtles, red snapper and other finfish species from interaction with shrimp trawls -- resulting in bycatch reduction.

5. In 1994 a bycatch characterization study was conducted with observers on board shrimp trawlers to record specie composition and poundage during normal shrimp trawl operations. This study reflects that shrimp trawl bycatch ratio is approximately 3.5 pounds of finfish (edible and non-edible species) to 1 pound of shrimp -- in lieu of the highly publicized perceived concept of 10 pounds of finfish to 1 pound of shrimp.

This is a prime example of what flawed data can create. In the case of the bycatch myth an overestimation of bycatch by 60% derived an irrational public perception, projection and regulatory measures that would seriously impact a fishery and livelihoods of many americans trying to make an honest living.

All of the above bycatch reductions has taken place prior to and during the time the Council has been considering and preparing Amendment 9 to the Shrimp Fishery Management Plan.

Yet, no credit for industry contribution to bycatch reduction has been recognized by the Council or NMFS, as an offset factor to the predicated requirement of a 50% reduction in shrimp trawl bycatch, in order, to rebuild the red snapper population. In our opinion the shrimp fishery has already achieved and exceeded the 50% bycatch reduction.

Shrimp Fishery Questions - Amendment 9 Purpose and Need

"In 1990 NMFS estimated that a reduction in bycatch of red snapper by the shrimp industry of about 60 percent was needed in order to allow a directed harvest of only 1 million pounds." In 1991 NMFS and the Council still claimed that the red snapper fishery was "significantly overfished." Yet, in 1991 the directed harvest TAC was set at 4 million pounds, in 1993 the TAC was increased to 6 million pounds and in 1996 the TAC was increased to 9.12 million pounds.

In addition to the increase in TAC, NMFS and the Council allowed for the last 3 years the recreational component of the fishery to exceed its quota by nearly double of spawning age fish 4 years and older. Not only did the recreational component exceed it quota over the last 3 years, they exceeded the statutory allocation TAC reversing the 51% commercial and 49% recreational to 59% recreational to 41% commercial.

If in 1990 a reduction of 60% in shrimp trawl bycatch was necessary for only 1 million pound TAC for the directed harvest -- how in 5 years (1991-1995) with no shrimp trawl bycatch regulations in place did the directed red snapper fishery harvest 35 million pounds, in addition, increased the 1996 TAC from 6 million pounds to 9.12 millions pounds?

	Directed TAC	Recreational Excess
1991 TAC	4 million pounds	
1992 TAC	4 million pounds	
1993 TAC	6 million pounds	3 million pounds
1994 TAC	6 million pounds	3 million pounds
1995 TAC	6 million pounds	3 million pounds
	26 million pounds	9 million pounds
1991-1995	35.00 million pounds	

-- without the 1990 60% percent shrimp trawl bycatch reduction in place for just a 1 million directed harvest - where did all this surplus of red snapper originate from? Apparently the solution to this surplus of snapper availability is that the shrimp fishery has underestimated its contribution to bycatch reduction of juvenile red snapper age 0 - 1 and NMFS has overestimated bycatch of this age group in shrimp trawls.

The Magnuson Act requires that management measures must be fair and equitable to all those regulated in the fishery and must be reasonably calculated to promote conservation. Therefore, under this management measure by the council placing strict bycatch limits on the shrimp fishery, would also require the council to enforcement strict catch limits and statutory allocation TAC limits on the recreational fishery, whereby, reinstating the equitable share to the commercial component of the red snapper fishery.

Ecological Research Model - Bycatch Reduction Impact on Marine Species

The Model projects that BRDs would increase the finfish biomass, and the shrimp fishery would experience a shrimp biomass reduction to the ever increasing finfish biomass as a "food source." A 25% percent bycatch reduction in shrimp trawls is a 5% percent loss in shrimp biomass, a 50% percent bycatch reduction is a 11% percent loss in shrimp biomass.

Predator/prey imbalance not only affects the shrimp biomass as a food source, but the smaller finfish biomass (including juvenile red snapper) becomes the alternative "food source" when shrimp have migrated from the feeding grounds of the larger fish.

The predator/prey projected results are an important factor relating to short-term and long-term effects on specie composition and economic impact on all vessel landings and value within the respective fisheries.

Economic Studies of Adverse Impact on the Fishery

The Council and NMFS has not done adequate economic studies on the adverse impact of mandating BRDs on the shrimp fishery and the reciprocating impact on the direct and indirect segments of the shrimp fishery. In particular, approximately 31 or more coastal communities in the Gulf of Mexico qualify as "fishing communities" under the new Magnuson Act. As a consequence, the impact of Amendment 9 on these communities must be assessed in detail, an evaluation which has not been done.

It would be naive of the Council to consider that the adverse economic impact would only apply to vessel shrimp loss (BRDs/Predator-Prey) reducing the dockside landing value of the fishery and not the reciprocating impact on the fishery direct and indirect land-based infrastructures, municipality budget revenue and loan portfolios of the lending institutions.

Utilization and Benefits of Shrimp Trawl Bycatch to Marine Life

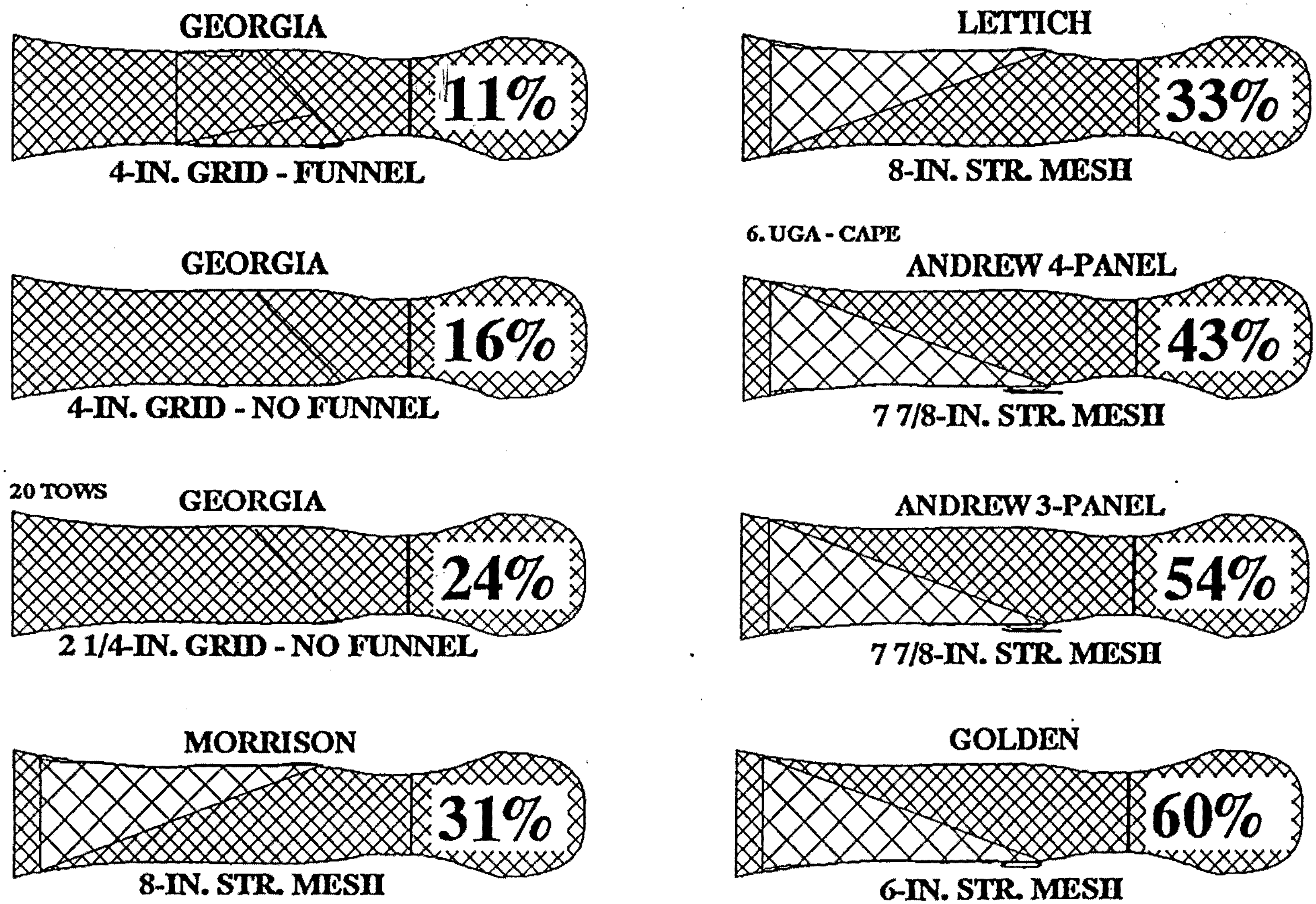
There is a perception that all bycatch is a "waste," but in reality it is not wasted, but utilized as a "food source" for sea turtles, marine mammals, birds and other finfish.

In Summary

We recommend, that the Council take Amendment 9 back to the table and reevaluate this management measure: 1) take into consideration the new Magnuson Act amendments on bycatch requirements; 2) clarification of the fundamental flaws in the scientific basis and mathematical model; 3) shrimp fishery contribution to bycatch reduction; 4) fair and equitable measures to all those regulated in the fishery; 5) predator/prey impact on all fisheries; 6) economic impacts on fishing communities; 7) utilization of bycatch; and 8) consider the shrimp fishery plan for protecting sea turtles by reducing fishing effort in near-shore areas of high sea turtle concentration and its added benefits in further reduction of finfish bycatch.

Thank you Mr. Chairman for the opportunity to comment on draft Amendment 9 and ask that my statement be entered into the record.

FIG. 1. BY-CATCH REDUCTION OF CERTAIN TEDs.



TESTIMONY
ON
DRAFT AMENDMENT 9
GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN
Gulf of Mexico Fishery Management Council
Public Hearing
October 14, 1996 - Brownsville, Texas

My name is Harris Lasseigne. I am a second generation Shrimper who has 36 years experience in the Shrimp Industry.

I am opposed to Amendment 9 to the Shrimp Management Plan. It is a by catch plan that is not warranted against the Shrimp Industry. This is an issue that is driven by special interest groups that are malicious and capricious towards the Shrimp Industry. Let's get the politics out of the picture and look at the facts.

No industry, I repeat, no industry has done so much and gotten so little credit for by catch Reduction.

The Shrimp Industry is using Turtle Excluder Devices that reduce the by catch of turtles, fish, as well as shrimp. No credit given for by catch Reduction

There are fewer shrimp boats yet the number of sports anglers and sports fishermen increase each year. Shrimpers - No credit given for by Catch Reduction

Texas has a 45-60 day closure out to 200 miles. No credit. given for by Catch Reduction.

Commercial bay fishing industry closed down in Florida. No credit for by Catch Reduction.

Texas and Louisiana are using the Gulf of Mexico as a dumping ground for U. S. tanks, fly ash blocks, oil rigs, ships, and miles and miles of pipe in the name of artificial reefs. Shrimpers have lost and are losing fishing ground every year. No credit.

The Economical impact will be extremely costly to the most valuable fisheries in the U. S. No consideration has been given to economic lost.

National Marine Fisheries Service and conservative groups, as well as sports fishermen portray us as mass murderers and as the major culprit of the demise of the fish population. Cheap propaganda to punish the Shrimp industry.

Nothing is mentioned about the balance of Nature. Do we increase and protect one species (fish) and destroy another (shrimp)? Remember, fish eat shrimp. Are we deliberately increasing the fish population without any regard to how it will effect the shrimp population? Good question, but it falls on deaf ears at the National Marine Fisheries Service.

Is National Marine Fisheries Service playing politics and favoring one group (recreational fishermen) over shrimpers? The answer is yes. Hasn't the recreational and sports fishermen gone over their quotas 6 million pounds in 2 years? What is being done about this? Nothing. Nothing at all. Selective enforcement on ONLY shrimpers + Commercial Red Snapper industry.

Aren't we restocking bays with red fish and trout at record numbers? Yet we don't restock shrimp. Why? Because we forget that shrimp is the most valuable fisheries in the U. S. We forget it provides jobs that produce much needed income for the U. S. We forget that it helps Texas, the Gulf States, and the U. S. economy tremendously. Most important, it provides food to help feed the U. S. with a seafood product that is the best in the World. No other shrimp product can compare to our quality, taste, and safety in marketing to the consumers.

Finally, are we going to favor one group over another group in the NAME of Good Management? The sports fishermen stated over and over again that shrimpers catch 100 pounds of by catch for every pound of shrimp. National Marine Fisheries Service stated we catch 10 pounds of fish for every pound of shrimp we catch. However, the actual facts from fishing trips on shrimp boats that were monitored by Texas A. & M. and the National Marine Fisheries Service proved and showed that shrimp boats actually caught only 3.5 pounds of by catch for every pound of shrimp caught.

The Commercial Red Snapper Industry reached their quota in 2 months. They had no problem to reach this quota. What happened to the stressed Red Snapper? Why is National Marine Fisheries Service taking a fast track approach on a situation that is not that serious

We have more than met the 50% decline of by catch in our trawls and have done more than any other group or industry and what is our just reward? (Answer) More cheap propaganda, accusations, bad science, and bad management. That is why we say NO to Amendment 9 to the Shrimp Management Plan, and ask what are the sports fishermen doing about the 6 million pounds taken over their quotas in the last 2 years.

TEXAS SHRIMP ASSOCIATION
DEYAUN BOUDREAUX, ENVIRONMENTAL DIRECTOR

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(210) 943-3932 ~ Business
(210) 943-1743 ~ Fax No.

October 14, 1996

BROWNSVILLE, TEXAS

STATEMENT OF THE

ENVIRONMENTAL DIRECTOR

TEXAS SHRIMP ASSOCIATION

ON THE

AMENDMENT NUMBER 9

TO

FISHERY MANAGEMENT PLAN FOR THE SHRIMP FISHERY

OF THE GULF OF MEXICO

U.S. WATERS

Distinguished Officials of the U.S. Department of Commerce:

My name is Deyaun Boudreaux, and I am employed by Texas Shrimp Association in the capacity of staff charged with the protection of the habitat of shrimp of the Gulf of Mexico. I reside at 825 Beach Boulevard, Laguna Vista, Cameron County, Texas, where I maintain a satellite office of Texas Shrimp Association, "TSA," and I work under the direction of Mrs. Wilma Anderson, Executive Director and Agent of the Board of Directors. Policy is set by the Board of Directors, and both Mrs. Anderson and I serve at their pleasure.

Our elected president of the board is making the comprehensive statement for the record on this proposed amendment; therefore my remarks will be brief. I state for the record that I am opposed to the implementation of this amendment, for recent action of the U.S. Congress has made this process obsolete and redundant. I urge you to defer all action until the implications and directives of Congress are applied to this issue. Thank you very much for this opportunity to comment.

TAB D NO. 6(h)

10 persons in attendance

SUMMARY OF APALACHICOLA PUBLIC HEARING

Steve Davis, Vice President, Florida Shrimpers Association, indicated he was a shallow-water fisherman usually fishing within state waters. He felt that the decision had been made that bycatch reduction devices (BRDs) would be required. He felt that, if BRDs are required, the fishermen should have the latitude to determine where in the net a fisheye (BRD) should be placed. That way, the fisherman could adjust the placement so that the gear worked best for them. He pointed out the 30 mesh position differed significantly depending on whether the mesh was 2-1/2 inches or 2 inches.

Bill Teehan, Florida Marine Fisheries Commission (FMFC), added that the South Atlantic Fishery Management Council (SAFMC), in their bycatch amendment, had provided guidelines allowing fisheyes to be placed anywhere in the net within certain distances from top and end of codend.

Ralph Richard agreed with Mr. Davis on the need to allow flexibility in the placement of the fisheyes. He pointed out he did not use mesh counts, but instead measured 6 feet down the codend.

SAFMC

One side of the funnel is extended vertically to provide passage for shrimp to the codend and to create an area of reduced water flow to allow for fish escapement through the larger mesh outer netting. A legal description and instructions for installation of large mesh extended funnel BRDs are included in Appendix D.

The second BRD type is the fisheye (Figure 33). The fisheye BRD is an industry developed design which consists of a football or round shaped frame inserted into a trawl extension or cod-end to provide an opening for fish to escape (Figure 34). The fisheye is extensively used in North Carolina to meet existing regulations requiring bycatch reduction devices in shrimp trawls in state waters. Placement is vital to the success of the fisheye and NMFS recommends the fisheye be installed in the top of the codend either in the center or 15 meshes to the side of the center and no further than 11 feet forward of the codend tie-off rings. State researchers determined that to meet the weakfish reduction target the fisheye must be placed in a manner in which the BRD length to tail bag ratio does not exceed 0.7. A legal description and instructions for installation of the fisheye BRD are included in Appendix D.

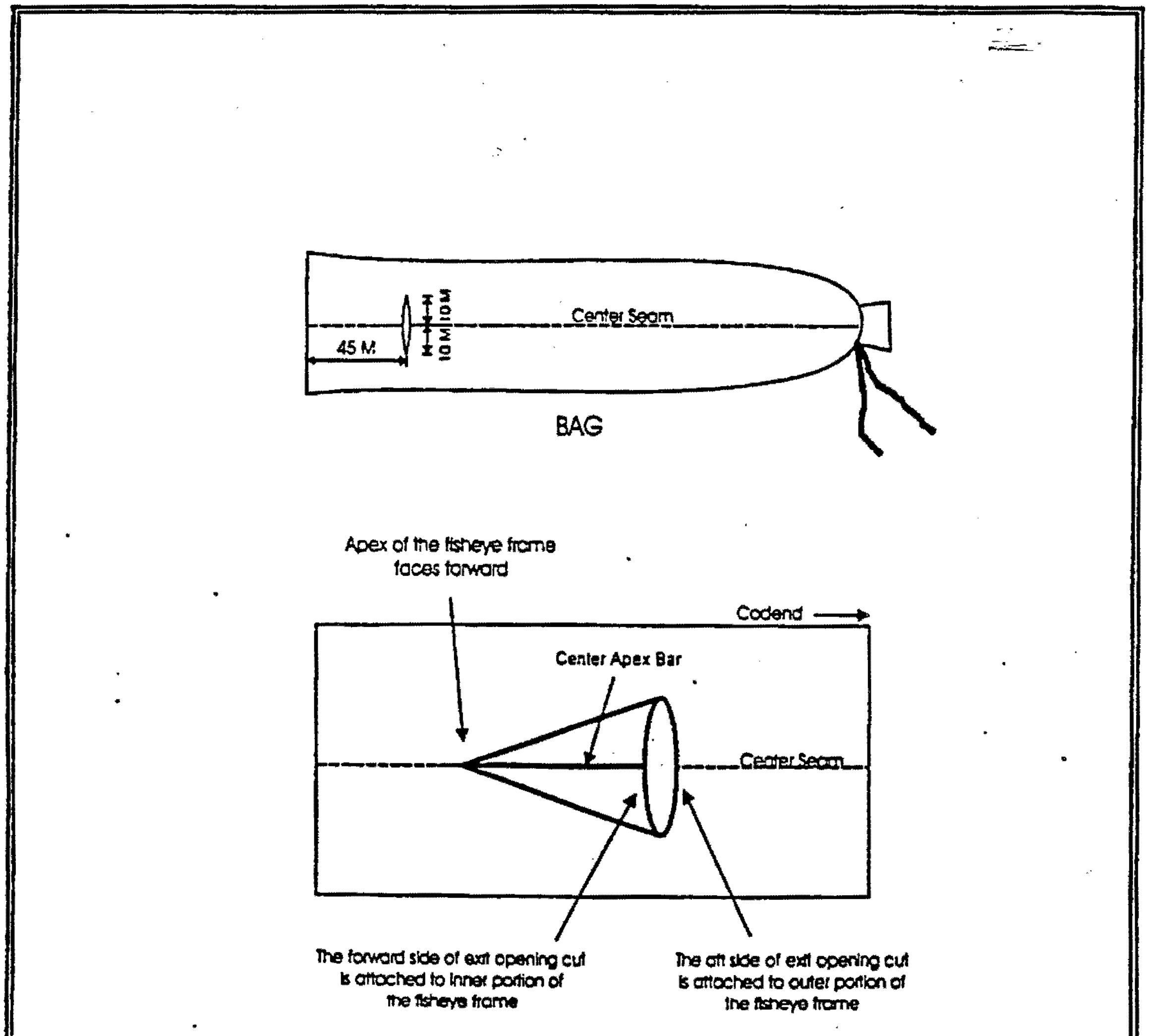

Figure 33. Fisheye bycatch reduction device (Source: Watson 1995).

TAB D NO. 6(i)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Port Aransas, Texas
October 15, 1996

ATTENDANCE:

Council Members and Staff	Others
Irby Basco	Sydney Herndon
Richard Leard	Joseph Villers
Jeanne Johnson	Dennis Boddison
	Wilma Anderson
	David Johnson
	Neil Yeoman
	Tony Ricks
	(3 illegible attendees)

David Johnson - Shrimp fishermen/dealer
Mr. Johnson recommended adoption of Alternative A.1 - Status Quo with no change ~~to~~ regulations to further regulate bycatch. He quoted from page 21 of Amendment 9 wherein its is stated that the entire industry may benefit from attrition of vessels from the fishery as a result of requiring BRDs. He failed to see the benefit of people going out of business. He stated that many fishermen only know how to make a living fishing, and if forced out of fishing they would have no alternative employment.

Sydney Herndon - Shrimp fisherman/dealer
Mr. Herndon stated that he was opposed to Amendment 9. He also stated that the industry had been hurt by inaccurate publicity of shrimp trawl bycatch, and that the ratio of finfish to shrimp was not 10:1 but only about 1:1. He noted that about 60% of the vessels have left the industry causing bycatch to be reduced significantly. Based on Aransas Pass tax roles, he stated that the number of vessels has decreased by 35% from a 1984 level of 5,900 boats. He also noted that bycatch was not wasted; it was redistributed, and most bycatch species (like croaker) did not have a stock problem. He observed that a Texas Parks and Wildlife study indicated that bycatch may increase recreational fishing opportunities with unknown effects to bycatch species. Mr. Herndon observed that when the Council was created, Assistant Administrator, Terry Leitzel asked the Council to manage shrimp without undo damage to the industry; however, under Bill Fox the industry had been harmed through political appointments. He also stated that increased regulations such as Amendment 9 increased the cost of seafood. He believed that if managed properly, the nations fisheries could realize an increase of 300,000 jobs and $3 billion in revenues.

Wilma Anderson - Executive Director, Texas Shrimp Association
In addition to previous testimony presented to the Council, Ms. Anderson presented the attached written testimony. She also indicated that the low attendance at the hearing was the result of boats having to fish at this time.

Joe Villers - Shrimp fisherman/dealer
Mr. Villers stated that he did not believe the data on shrimp loss. He referred to the law suit in Georgia over shrimp loss and noted that shrimpers were losing a great deal more shrimp than previously expected. He also stated that shrimpers were being forced to bear the brunt of responsibility for red snapper. He also did not believe that new BRDs could be certified by NMFS and cited current efforts by NMFS to decertify soft TEDs. He also did not believe that the industry had been given credit for past reductions in bycatch.

Texas Shrimp Association

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First in Fisheries

TESTIMONY ON DRAFT AMENDMENT 9 TO THE GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN

Public Hearing
October 15, 1996 - Port Aransas, Texas

Mr. Chairman, I am Wilma Anderson, Executive Director of the Texas Shrimp Association (TSA), Box 1020, Aransas Pass, Texas.

TSA presented testimony in opposition with recommendations to Amendment 9 at the September 11th Council Meeting in New Orleans and Julius Collins, President of TSA presented additional testimony at the October 14th Public Hearing in Brownsville, Texas. I feel it is not necessary for me to reiterate TSA's previous testimonies that have already been entered into the record.

TSA presents an additional comment for the record, as to why the shrimp fishery questions the supporting science of Amendment 9:

--Omissions and Errors --
The Consequences of Donated Science without Peer Review

The evidence is clear that the Dead Zone has expanded in the 1990's as compared to the 1980's. While not as well documented, it seems likely that the Dead Zone was larger in the 1970's than in the 1960's. Not one NMFS stock assessment has even attempted to consider the effects of this phenomena on shrimp, fish, sea turtles, or marine mammal abundance and distribution. When a factor of this magnitude is ignored, we wonder first, how many other factors of consequence are being ignored; and second, how NMFS can purport that their proposed management actions restricting the directed and shrimp fisheries will rebuild populations? Unlike NEPA, there seems to be no mandate that stock assessments must be comprehensive and address all the pertinent issues affecting the populations of interest. Is this why the Council and NMFS have never encouraged outside peer review by providing funding to pay for such review?

The shrimp industry, has provided funding for independent outside reviews of the sea turtle and red snapper bycatch issues. In both cases, we have uncovered serious statistical flaws. NMFS has recognized and addressed the sea turtle statistical problems, but has not resolved the red snapper analysis flaws affecting the bycatch estimates. This latter flaw is at the fundamental level and renders all analyses (including not only bycatch estimates but also all catch comparisons of trawls with and without BRDs and trawls with and without TEDs) suspect if not invalid.

How can problems of such consequence be overlooked? Well, first there is not even one statistician or oceanographer represented on the Red Snapper Science and Statistical Committee or on the Stock Assessment Panel. Why? One reason may be that positions on these key committees are voluntary; i.e., the members are not paid for their work. This restricts involvement to only those who can afford to contribute their time for personal or prestige reasons, or those who work directly for NMFS. This is not intended to be a slam on any member of these committees. Our point is that committee composition predicated on the ability to serve on a non-paid basis has not resulted in the disciplinary breadth of expertise required to conduct comprehensive and scientifically sound assessments. Thus, the resulting assessments reflect the unchallenged views of the NMFS scientists; views developed without the benefit of any outside peer review, except on an unpaid basis. Whether the views are right or wrong is almost irrelevant, the process is not scientific and provides a bridge leading unequivocally to management and economic disaster.

Thank you Mr Chairman for the opportunity to comment on Amendment 9 and ask that my comment be entered into the record.

TAB D NO. 6(j)

Four persons in attendance

SUMMARY OF PENSACOLA PUBLIC HEARING

Johnnie Clopton, Director N.W. Florida Chapter of OFF, indicated only about 8 to 9 large offshore boats were based in Pensacola. He previously had a Gulf trawler, but sold it when turtle excluder devices (TEDs) were required and now fished largely in state waters.

He felt it was unnecessary to require bycatch reduction devices (BRDs) in the area from Cape San Blas to Perdido Bay (statistical areas 8-10) because less than 5 percent of these bottoms in the exclusive economic zone (EEZ) were trawlable. Therefore, there should be adequate escapement of juvenile red snapper from that area. He suggested the Council's preferred alternative be modified to provide for BRDs from the Alabama/Florida state boundary west.

He indicated when he had his Gulf vessel that he routinely installed fisheyes (BRDs) in ~~his~~ nets when fishing off Louisiana and Texas. He indicated fishermen must be able to adjust BRDs in their nets so it does not weaken the net and so it works well. He pointed out fishermen would accept the gear if it worked well. He indicated Gulf shrimpers would work with the Council to solve this problem if the Council would work with the fishermen.

He indicated that there seemed to be plenty of red snapper as the charter vessels always took limits for their customers. They also discarded smaller fish as larger fish were caught.

As far as use of BRDs in state waters, he felt that the area of net where TEDs and BRDs were installed should not be counted in determining legal trawls. The Florida net ban has already significantly reduced the size of nets to a point where it would be difficult to install BRDs.

Elmer Boynton indicated he usually caught shrimp for bait from inshore waters. He indicated during certain times of the year he used fisheyes, but they were not necessary during the entire year.

Albert King indicated he had talked with several fishermen who asked he relay their comments. He indicated the fishermen should be aware, even though the amendment would affect only EEZ waters, that the Council always requested the states to implement compatible rules, and staff should have made fishermen aware of this.

He pointed out that, for TEDs, NMFS has indicated almost no shrimp loss occurs. That represents the ideal situation and does not take into account fouling of the nets. Typically, nets with TEDs foul with trash on 5 to 8 percent of tows, usually resulting in complete loss of shrimp from that net. He pointed out his nephew had tried out several of the BRD designs and had concluded that he preferred use of the Andrews' TED, despite the shrimp loss. That was because loss of shrimp from other BRD designs due to fouling and losses during "wash down" from fisheyes and extended mesh was typically higher.

Johnny Clopton indicated that, in state waters, fouling by crab traps typically reduced operating time by about 15 percent.

TAB D NO. 6(k)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Port Lavaca, Texas
October 16, 1996

ATTENDANCE:

Council Members and Staff
Pete Aparicio
Richard Leard
Jeanne Johnson

Others:
Norman Boyd
Edward Lambright
Dennis Raby

None of the three attendees indicated a desire to present testimony. A discussion ensued on the types of BRDs and their location in trawls. Mr. Dennis Raby offered that the industry should have options with regard to BRDs.

shrimp\am9phplv.96

TAB D NO. 6(2)

29 persons in attendance

SUMMARY OF MOBILE PUBLIC HEARING

Joseph Rodriguez, representing Sprinkle's Net Shop and Fishermen's Marine Products, criticized the Council's proposed action to require bycatch reduction devices (BRDs). He felt there were other alternatives to restore red snapper, such as creation of artificial reefs and hatcheries to produce juvenile red snapper. He pointed out that, according to the news media, there was no impact on the industry from use of TEDs. One of his customers had a $13,000 loss in one year.

Pete Barber, President of Alabama Seafood Association and member of NFI, objected strongly to the current amendment and supported the industry proposal for status quo. The Magnuson Act amendment provides opportunities to collect the information needed to address this issue. Section 407 directs the Secretary to revisit the stock assessment information and model to determine if these are appropriately estimating the status of the red snapper stock. The Council should do this before proceeding with the amendment. The Act provides one year to conduct a peer-group review of these issues. All of these actions are necessary in order to proceed with the best scientific information available.

He was concerned that the issue was creating a division between commercial red snapper and commercial shrimp fishermen, whereas, he and his organization represented all commercial fishermen.

He reported that fishermen in South Carolina had evaluated shrimp loss from fisheyes (BRDs), which had been estimated at around 10 percent. The evaluation indicated that actual loss was usually greater than 20 percent. The use of a TED with a "hard grate" before a fisheye decreases the water pressure holding shrimp in the bag. Because of this, fisheyes will fall short of the Council's goal to reduce bycatch by 50 percent.

The Council has identified red snapper as an overfished resource, but has increased TAC by 228 percent over 4 years from 4 million pounds (MP) in 1993 to 9.12 MP in 1996.

Chris Nelson, Bon Secour Fisheries, Inc., and member of the Shrimp Advisory Panel (AP), indicated about 30 Gulf vessels docked at their plant. Three of these captains were planning to attend and indicate to the Council what they thought would be practical solutions. Because Hurricane Josephine improved shrimping, all of these persons were fishing.

He indicated he was disappointed in the Council"s approach to this issue. What is needed is a process whereby the managers and the managed get together to work out the details for solving this problem. What has happened is a quick set of hearings and inadequate time for the industry to review the material in the amendment documents.

He emphasized the following points. He was the fourth generation in the fishing business and strongly believed in use of science and in fisheries management. He did not believe that red snapper are being managed using good science. For this reason, Congress has singled out red snapper as the only fishery nationally where peer-group review of the science is needed. This should be done before proceeding. The Council should adopt status quo until the actions set forth by Congress are completed.

The industry has already done a lot to reduce bycatch. Just shifting to "quad rigs" reduced bycatch by 25 percent.

The industry developed most of the gear for their use in reducing bycatch, such as fisheyes, snake eyes and shooters. Turtle excluder devices (TEDs) were originally sold to the industry by NMFS as trawling efficiency devices because they reduced bycatch of finfish. The industry has made tremendous strides in reducing bycatch. Now we need to decide where we are going. Congress feels the peer-group review and other actions are needed. The Council should not take action until this is completed.

All fishermen are concerned over the accuracy of the red snapper assessment; commercial and recreational red snapper fishermen, charter fishermen, and shrimp fishermen.

All shrimp fishermen are concerned over fishing with holes in their nets. There needs to be further evaluation of total shrimp loss via TEDs with BRDs. Fishermen will not accept loss estimates for BRDs tested against nets with TEDs. What is needed is to go back to tests using "naked" nets as the control. We all need better data and more data. The industry has been helping obtain these data since 1991. To leap forward with regulation at this time is a mistake.

Sidney Schwartz indicated he had only one day's notice before the meeting. He indicated that bycatch is the same as it was 30 years ago. There is no problem; the data is wrong.

shrimp\mobile.am9 ccm

TAB D NO. 6(m)

PUBLIC HEARING SUMMARY
SHRIMP AMENDMENT 9
Galveston, Texas
October 17, 1996

ATTENDANCE:

Council Members and Staff
Irby Basco
Richard Leard
Jeanne Johnson

Others
Gilbert Zamora, Jr.
James Ryan, Sr.
Ann Ryan
Harold Von Harten
Daryl Ryan
Keith Roberts
Donald Merwin
Michael Coyne
Debbie DeVore
Chris Montagne
William Erans
Catherine Raparoti
Michael Minnig
Laura Payne
Christine Burgess
Marsha Lampton
Cori Kretzschman
Greg Stunz
Ben Boren
William Dailey
Carolyn Willis
Cristina Heibel
Pam Basco

Gilbert Zamora - NMFS (retired)
Mr. Zamora asked if the hearings were advertised and where. Dr. Leard advised of public notices, direct mailings, and the Federal Register.

Daryl Ryan - Shrimp fisherman
Mr. Ryan believed that the number of vessels has not decreased and cited the Caterpillar, Inc. funding that has financed the construction of additional vessels. He stated that NMFS was creating a facade of the need for BRDs. He noted that he had tried to work with NMFS on TEDs; but when the industry was able to get TEDs to work, NMFS changed the criteria. He also did not think that the Council would work with the industry to develop something that would work; however, a collective effort was needed.

Harold Von Harten - Shrimp fisherman/dealer
Mr. Von Harten believed that the industry was hamstrung by bureaucracy. He stated that strict enforcement of regulations on the grid angle of TEDs was crippling the industry that was trying to comply. He also indicated that the costs associated with putting TEDs in nets was greater than the cost of the net. Mr. Von Harten also believed that a large portion of the bycatch mortality from shrimping would die as natural mortality if not caught.

Ann Ryan
Ms. Ryan stated that the implementation schedule for Amendment 9 was absurdly short for the magnitude of the amendment. She also believed that the data in the amendment was to old to be valid. She asserted that regulations are sometimes adopted so quickly that the industry does not have time to comply, and the Coast Guard considers fishermen as criminals that are assumed to be guilty and have to prove their innocence.

TAB D NO. 6(n)

15 persons in attendance

SUMMARY OF BILOXI PUBLIC HEARING

Chris Swetman, President of the Peoples Bank, read a prepared statement (attached).

Kay Williams, Vice President of Save America's Seafood Industry, read a prepared statement (attached).

David Burrage, Sea Grant Extension Agent, indicated the shrimp industry should be credited for bycatch reduction already achieved by turtle excluder devices (TEDs). He described research in inshore waters evaluating bycatch for TEDs versus naked nets (see attached statement).

Melvin Taylor indicated he had fished for shrimp for 10 to 12 years. He indicated the use of TEDs had adversely affected him and now you are proposing use of bycatch reduction devices (BRDs). He pointed out TEDs work okay only if you catch no trash. He felt the proposal to require BRDs was senseless as everyone was catching their quota of red snapper easily.

Chris Lagarde, Assistant for Congressman Gene Taylor, presented a statement (attached) on behalf of Congressman Taylor. In addition, he pointed out that Congress had just reauthorized the Magnuson Act which had requirements that may require revisions to the draft amendment. He asked the Council to please work with the industry in solving this problem and stated that the industry would be glad to work with the Council. He pointed out that there has not been an adequate number of tows testing BRDs to understand whether they are effective.

He indicated that at the last Council meeting Dr. Nichols and Dr. Gallaway were still arguing about the statistical methods that should be used. The Council needed to take a hard look at the factors that result in reduction of red snapper mortality, such as oil rigs, wrecks, artificial reefs, etc.

Captain Joe Ross pointed out that sometimes BRDs work and sometimes they do not. He recalled an instance where small jellyfish clogged the net mesh, causing shrimp to "belch out" of the net with the BRD. In comparison of the two nets, overall loss was about 6 baskets of shrimp. In another instance, he was able to catch $1000 worth of shrimp per day with BRDs where other shrimpers stopped fishing because there were too many fish in the catches.

He recalled that during World War II the military closed the first three miles off the barrier islands along the Mississippi and Alabama coast as a gunnery range. That closure resulted in very high landings of white shrimp (about 16 million pounds) during those years, which subsequently declined after the area was reopened to shrimping.

Attachments: (4)

shrimp\biloxi.am9 ccm

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October 17, 1996

Gulf of Mexico Fishery Management Council
Lincoln Center
5401 West Kennedy Blvd.
Tampa, FL 33609-2486

Re: Public Hearing October 17, 1996, Gulf Coast Research Laboratory J. L. Scott Marine Education Center & Aquarium - Biloxi, MS

Gentlemen:

I am president and Chief Executive Officer of The Peoples Bank, Biloxi, MS, and I also represent the Mississippi Gulf Coast Economic Development Council which may be forwarding a resolution to your body after we are able to judge the information presented at this public hearing. If you will notice our bank letterhead, we have utilized the shrimp boat as our bank logo for the last fifty years. Needless to say we have a definite interest in a reasonable resolution of the issue which is now before you. I will attempt to structure my comments to the following two main areas:

1) Social and economic consequences of Fish Excluder Devices (FED's).

2) The bycatch issue.

SOCIAL AND ECONOMIC IMPACT

When I first started looking into this question back at the last public hearing on August 29, 1990, I asked myself two questions, how many people were involved in shrimp harvesting and how many were involved in the processing? Your research in this area, showed that there were approximately 5,187 commercial shrimping vessels in 1988 actively involved in the pursuit of shrimp in the Gulf of Mexico. Four years later the number has decreased to 4,233, a decrease of 18%.

Since 1990 (1987 if you use the Alabama study) there has been a dramatic drop in the income from fishing, a dramatic drop in the value of stock harvested, and a dramatic drop in the vessel price today as compared to five (5) years ago. In essence "LIMITED ENTRY" has been achieved through economics and regulation.

The next question that came to mind was what other type of people might be adversely affected by further restrictions on the domestic shrimp fleet? I thought about the people who make and repair the trawls and the small neighborhood grocery store where the boat owners purchase their grocery supplies for the shrimping trip and after selling their catch pay the grocer. I began to also ask myself what does the fisherman do for his car and mortgage payment? What happens to the fuel and ice sales when fewer and fewer boats go out?

I then asked myself what does the seafood processor do? The seafood processors will accelerate their use of imported shrimp. Currently in our existing U. S. Market, imports already account for 80% of our shrimp processing. Our local processing plants will purchase more products from foreign sources in an effort to keep their plant operational which will in turn aggravate and drive down the price paid for the domestic product further promoting limited entry.

These Fish Excluder Devices will reduce profitability of an already marginally profitable segment of the industry. Furthermore, it brings to mind a question as to what is the U.S. State Department doing with the Mexican Government concerning the possible use of FED's by the Mexican shrimpers? The question I have is, will the U. S. Government insist that the Mexican Government participate in this effort to protect the snapper or is this another total American effort?

My final comment on the economic impact concerns the dollar value comparison of the shrimp industry compared to the dollar value of the snapper industry. The shrimp industry in the Gulf is approximately $400,000,000.00 per year as compared to $10,000,000.00 per year for the snapper.

I would like to commend the Gulf of Mexico Fish Management Council for the thoroughness of the report this time as compared to six (6) years ago and especially for the inclusion of the social impact assessment. I do feel that the hardworking shrimper is an important part of this process, but please do not send this domestic industry to Mexico and South America as we did the garment industry.

<u>BYCATCH</u>

It is my understanding that the biological juvenile red snappers are often associated with waters over sandy or muddy bottom, but older fish appear to favor areas of hard limestone bottoms or irregular bottom formations. Adults are thought to be relatively sedentary. Red Snapper definitely show specific reef residency based on their seasonal returns to summer forage areas and distinct congregation at reefs in deeper water. Red snapper tagged and recovered in deeper water (25-35 fm) display little movement. Recaptures of fish tagged in shallower water suggest that the fish moved off the reef after being tagged, but returned to the same reef a year later. Inshore-offshore movements are widely reported and are apparently related to seasonal weather patterns. This data suggests that red snapper are not migratory, and that dispersal may rely primarily on the transport of the very early larvae.

If this is the case, why are not more artificial reefs or sanctuaries proposed to help increase the population, and for a given period of time no red snapper could be caught in these sanctuaries to accelerate the desired spawn ratio.

Red snapper tend to aggregate around reefs and other structures which can be located easily with LORAN. This characteristic for aggregating near locatable structures makes red snapper particularly vulnerable to exploitation, since fishermen targeting red snapper can maintain their catch rates even with reduced stock abundance. In other words the catchability of red snapper would be expected to increase or remain constant with declining population size, and the lack of change in catchability can mask declines in the stock.

I would like to offer the following additional solutions:

1) Establish a hatcheries program for impacted finfish species (primarily red snapper).

2) Establish an artificial reef and sanctuary program for red snapper where no harvesting would be allowed of any species of shrimp or fish within a well defined area.

I hope that I have provided you with some basic information for your files, and I hope this will be of some benefit to you.

Sincerely yours,

Chevis C. Swetman
President

CCS:jj

S. A. S. I.

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OCT. 17, 1996

TESTIMONY ON DRAFT AMENDMENT 9 TO THE GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN

MR. CHAIRMAN, I AM KAY WILLIAMS, I RESIDE AT 4206 ROBINHOOD DR., PASCAGOULA, MISSISSIPPI. I AM VICE-PRESIDENT OF ~~S.~~A.S.I.

THE STATED PURPOSE OF AMENDMENT 9 IS TO REDUCE SUBSTANTIALLY THE AMOUNT OF BYCATCH IN THE SHRIMP FISHERY TO AVOID WHAT HAS BEEN ALLEGED AS HIGH LEVELS OF JUVENILE MORTALITY OF RED SNAPPER. THE BASIS FOR THE COUNCIL'S OBJECTIVE AND PLAN IS DERIVED FROM PAST STOCK ASSESSMENTS OF RED SNAPPER AND RELATED ANALYSES ABOUT THE INTERACTION BETWEEN THE SHRIMP FISHERY AND JUVENILE RED SNAPPER. THESE ASSESSMENTS AND ANALYSES WERE PREPARED BY THE NMFS.

WE FEEL THERE ARE FUNDAMENTAL FLAWS IN THE SCIENTIFIC BASIS AND THE MATHEMATICAL MODEL ON WHICH AMENDMENT 9 IS BASED.

IN THE NEW MAGNUSON ACT, CONGRESS HAS REQUIRED NEW STUDIES OF SHRIMP BYCATCH MEASURES AND RED SNAPPER INFORMATION. "OUR QUESTION IS DOES AMENDMENT 9 AS PRESENTLY DRAFTED ENSURE FULL COMPLIANCE WITH THE MAGNUSON ACT ?

THE SHRIMP ADVISORY PANEL REQUESTED NMFS TO ASSESS ALL OF THE UNTRAWLABLE BOTTOM INACCESSIBLE TO SHRIMP TRAWLING -- NATURAL AND ARTIFICIAL REEFS, PIPELINES, OIL AND GAS PLATFORMS, SANCTUARIES, AND AREA CLOSURES SUCH AS THE TEXAS CLOSURE.

IN 1990 NMFS ESTIMATED THAT A REDUCTION IN BYCATCH OF RED SNAPPER BY THE SHRIMP INDUSTRY OF ABOUT 60 PERCENT WAS NEEDED IN ORDER TO ALLOW A DIRECTED HARVEST OF ONLY 1 MILLION POUNDS. THE DIRECTED TAC WAS 4 MILLION IN 1991 AND 1992. THE DIRECTED TAC WAS 6 MILLION POUNDS IN 1993, 1994 AND 1995. THE DIRECTED TAC IN 1996 WAS 9.12.

DR. GOODYEAR STATED IN 1995 AT A COUNCIL MEETING IN BILOXI THAT IF THE TAC WAS REDUCED TO 0 FOR RED SNAPPER AND THE SHRIMP INDUSTRY DID NOT REACH THEIR 50 PERCENT BYCATCH REDUCTION OF RED SNAPPER, THAT THE RED SNAPPER STOCK WOULD NOT REACH THE 20 PERCENT SPR GOAL.

SEPTEMBER 30, 1996, DR. GOODYEAR STATED IN HIS REPORT THAT THE COMMERCIAL HARVEST HAS BEEN CONSTRAINED BY SIZE LIMITS AND QUOTAS SINCE 1991 WHILE THE RECREATIONAL HARVEST HAS BEEN CONSTRAINED BY CREEL AND SIZE LIMITS. IN THE MOST RECENT YEARS THE TOTAL COMMERCIAL HARVEST HAS BEEN NEAR THE COMMERCIAL ALLOCATION BUT THE RECREATIONAL HARVEST HAS BEEN SUBSTANTIALLY LARGER THAN ITS ALLOCATION.

OUR QUESTION IS WHERE DID ALL THIS SURPLUS OF RED SNAPPER ORIGINATE FROM , WHERE IS THE PROBLEM AND WHO OR WHAT IS CAUSING THE PERCEIVED PROBLEM ?

THE RED SNAPPER FISHERY KNOWS THAT THEY HAVE BEEN PENALIZED UNJUSTLY. THE SHRIMP FISHERY KNOWS THAT THEY HAVE NOT BEEN GIVEN CREDIT FOR THEIR BYCATCH REDUCTION OF RED SNAPPER AND THAT AMENDMENT 9 WILL PENALIZE THEM UNJUSTLY.

THERE ARE TOO MANY UNANSWERED QUESTIONS. WE ALL FEEL THAT THE RED SNAPPER STOCKS ARE HEALTHY AND THAT NMFS AND THE COUNCIL NEEDS TO REEVALUATE THEIR SCIENTIFIC DATA, ESPECIALLY THE DATA THAT IS MISSING, BEFORE THEY PLACE REGULATORY MEASURES ON A FISHERY.

WE RESERVE THE RIGHT TO COMMENT ON AMENDMENT 9 WHEN ALL OF OUR QUESTIONS HAVE BEEN ANSWERED.

THANK YOU MR. CHAIRMAN .

Mississippi State University

Coastal Research and Extension Center
2710 Beach Blvd., Suite 1-E, Biloxi, MS 39531
Phone: (601) 388-4710 Fax: (601) 388-1375

Wayne Swingle
Gulf of Mexico Fishery Management Council
Lincoln Center, Suite 331
5401 West Kennedy Blvd.
Tampa, Florida 33609

October 18, 1996

Wayne,

This is a summary of my comments presented at the Biloxi hearing regarding Draft Amendment 9 to the Shrimp Plan. My remarks spoke primarily to the inshore fishery in the northern Gulf, and I wish to make two points: 1) fishermen should be given credit for the bycatch reduction they are already achieving by using TEDs; 2) the geographic coverage of BRD regulations should start seaward of the COLREGS demarcation line in the northern Gulf (perhaps west of Cape San Blas).

I was principal investigator on a MARFIN-funded research project examining the shrimp retention rates and bycatch exclusion rates of the most popular models of hard-grid TEDs currently in use in the inshore fishery. See the attached abstract, table and charts for pertinent details.

The likelihood of capturing red snapper in the waters shoreward of the COLREGS demarcation line in the northern Gulf is minimal. In twelve years of conducting research in this area I have never encountered red snapper as a component of bycatch in inshore waters. Also, there is precedent for using the COLREGS line as a boundary due to early TED regulations--fishermen and enforcement agencies are familiar with this boundary.

Kindest regards,

Dave Burrage

Dave Burrage
Marine Resources Specialist

Abstract

Inshore TED Evaluation and Technology Transfer
MARFIN Grant No. NA57FF0282

Dave Burrage

Mississippi State University
Coastal Research and Extension Center
2710 Beach Boulevard, Suite 1-E
Biloxi, Mississippi 39531

Study Objective(s): To evaluate the shrimp retention and bycatch reduction characteristics of TEDs designed for use in small inshore shrimp trawls, and train inshore fishermen in choosing, installing and using TEDs correctly.

Methods and Materials: Comparison testing using experimental and control nets was conducted on inshore commercial shrimping grounds near Biloxi, Mississippi during October 23--November 9, 1995. Five TED designs were evaluated by comparing catch rates with control nets in twin-trawl configurations using 25-foot headrope nets. These are the most common nets used in the inshore fishery in the northern Gulf due to gear restrictions imposed by the various state resource management agencies. The control nets used were "naked nets" which were identical in all respects to the experimental nets except for the presence of a TED. This required an experimental gear permit from NMFS and the Mississippi Department of Marine Resources and a concomitant reduction in tow duration to a maximum of 55 minutes. To help compensate the cooperating vessel owner for the reduction in production associated with abbreviated tow times, as well as downtime during gear changes, he was paid $150 for each 24-hour period the P.I. was on the boat conducting the tests.

The methodology and forms developed by the NMFS Pascagoula/Galveston Laboratories for evaluation of bycatch reduction devices (BRDs) were used. After each tow, the control and experimental catch was weighed for total biomass and shrimp. Every other tow (tows 1,3,5, etc.) was subsampled by taking one basket (approximately 65-70 pounds) from the control and experimental net. These samples were separated into the 20 species of interest outlined in the BRD protocol and number/weight data was obtained for each species. A clean data set was provided to the NMFS Galveston Laboratory at the completion of the field work.

All TEDs used for this study met the certification criteria for turtle exclusion outlined in the TED regulations. The project emphasized hard-grid TEDs because they are the predominant gear being used by inshore shrimpers in the northern Gulf. The five TEDs tested included the inshore and mid-size super shooters, the square-bottom Anthony weedless TED, and the "Tide Marine" (Seymour) TED in both bottom-shooting and top-shooting configurations. Personnel from the NMFS-SEFC Pascagoula Facility Harvesting Technology Branch installed the various TEDs used in the study in order to ensure they were working at optimum levels prior to actual on-the-water testing.

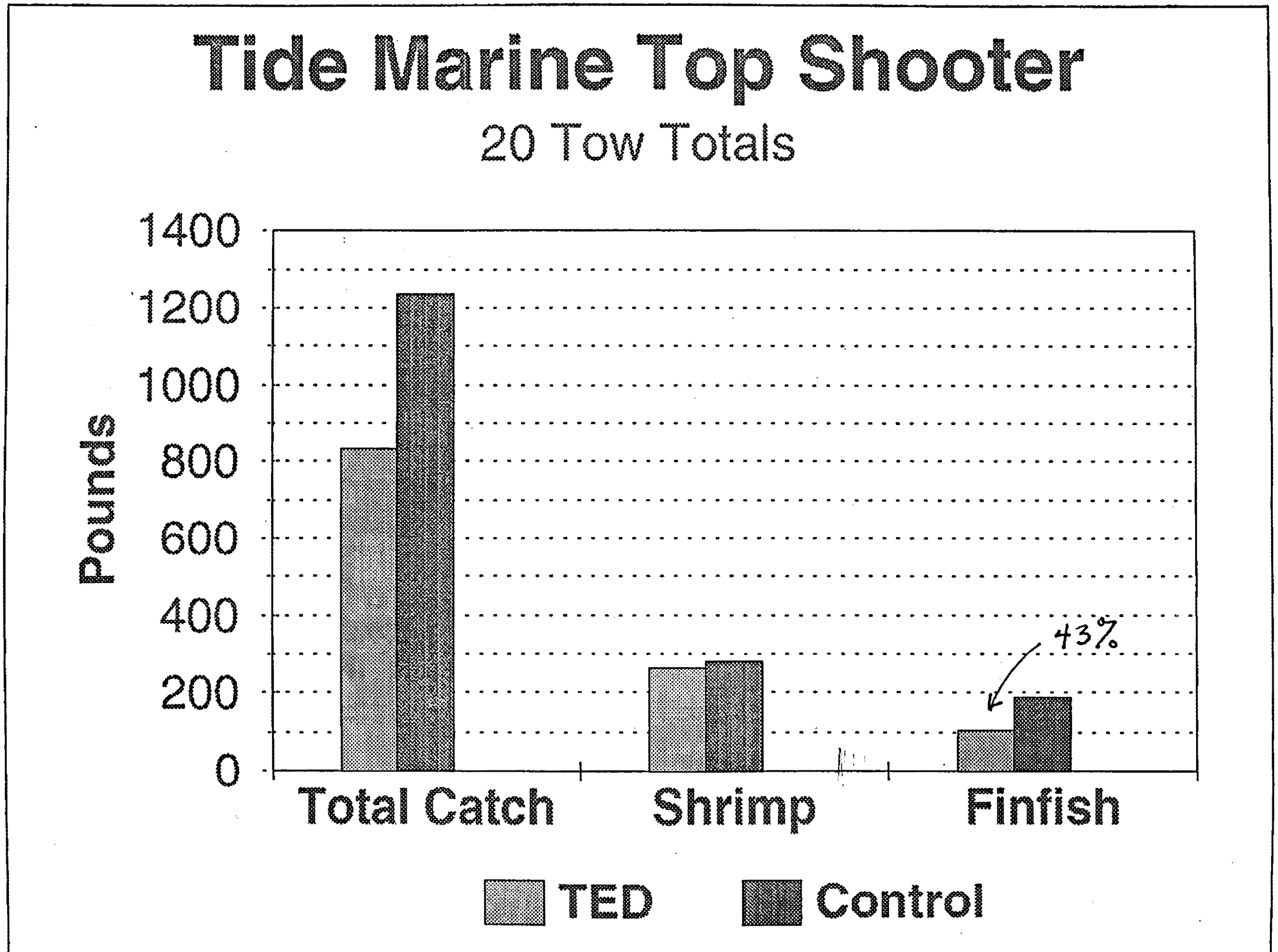
Each TED used in the experiments was pulled for 20 usable tows in order to generate enough data to be used for statistical analyses. The experimental and control nets were pulled from both sides of the vessel (positions swapped after 10 tows) in order to minimize any variations in door settings, bridle arrangements, try net influences and operational tendencies (for example, some captains always turn to starboard). Gear measurements and descriptions were performed following the protocol developed by NMFS for the bycatch observer program and a log was kept on water depth, bottom composition, weather conditions, tow duration, time of day, time of year, etc.. Any gear failures such as fouled tickler chains, clogged TEDs, or hangs were noted but not included in statistical analyses. Statistical evaluation included the Wilcoxon Matched-Pairs Signed-Ranks Test and the paired "T" test (two sample for means).

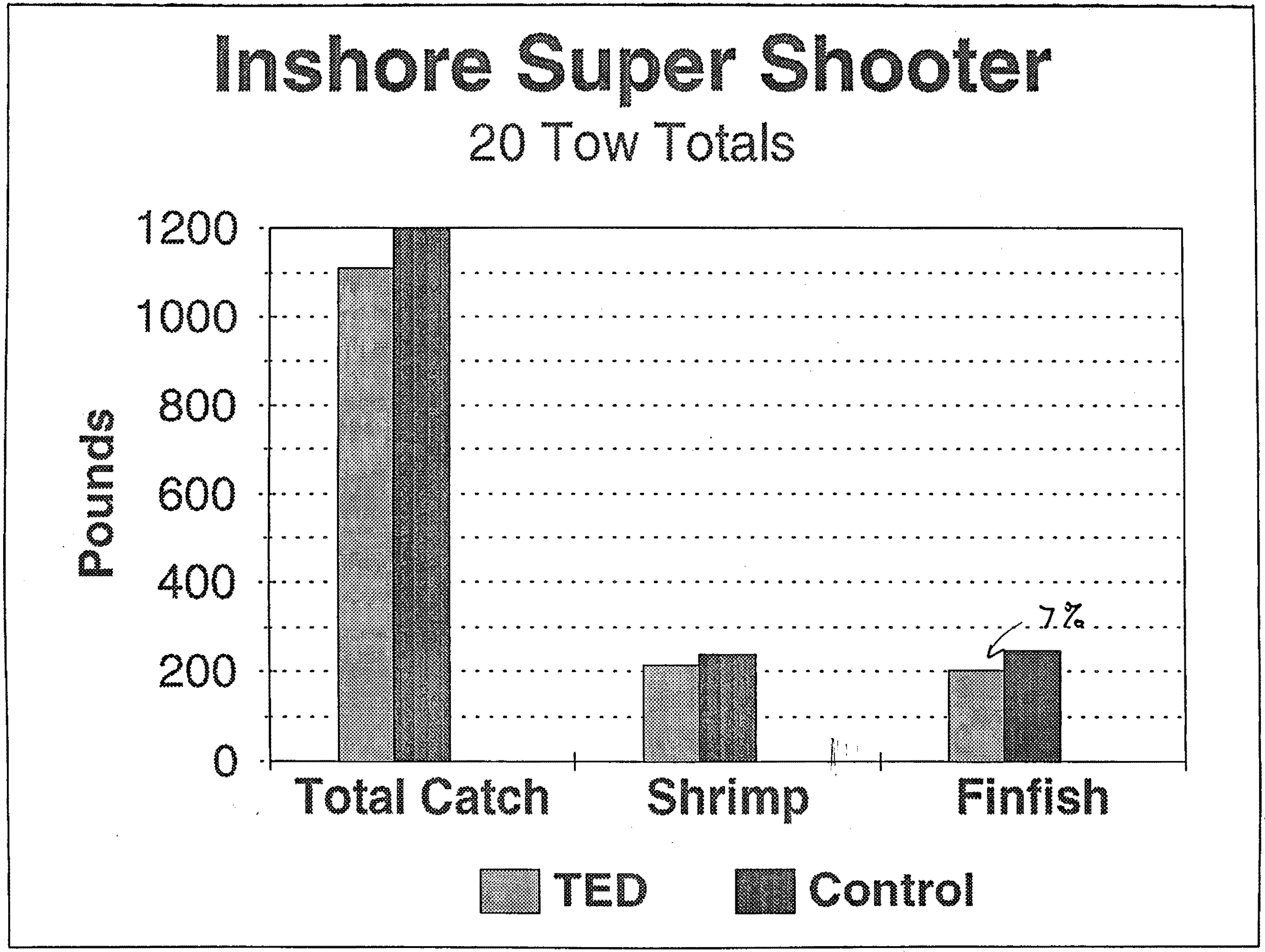
Conclusions and Recommendations: The five TED designs/configurations evaluated exhibited a broad range of differences in performance. Regarding total catch and finfish bycatch, only one TED design failed to exclude statistically significant quantities on a catch per hour basis. Mean finfish bycatch exclusion rates ranged from a gain of 7.33 percent to a reduction of 43.56 percent. Reductions in total catch ranged from 5.03 percent to 30.3 percent. Two of the five designs evaluated exhibited statistically significant shrimp loss. Mean shrimp retention rates ranged from a gain of 7.08 percent (not significant at $\propto = .05$) to a loss of 9.4 percent (significant at $\propto = .05$). General observations and recommendations made during technology transfer activities to inshore fishermen were as follows: 1) It is advantageous to use the largest dimensioned grid which can be installed in a particular net design; 2) Hard-grid TEDs installed as bottom-shooters should have an accelerator funnel to help prevent shrimp loss; and 3) The best results as far as shrimp retention and finfish exclusion for hard-grid TEDs can be obtained by installing the device as a top-shooter without a funnel.

TED Performance Comparisons

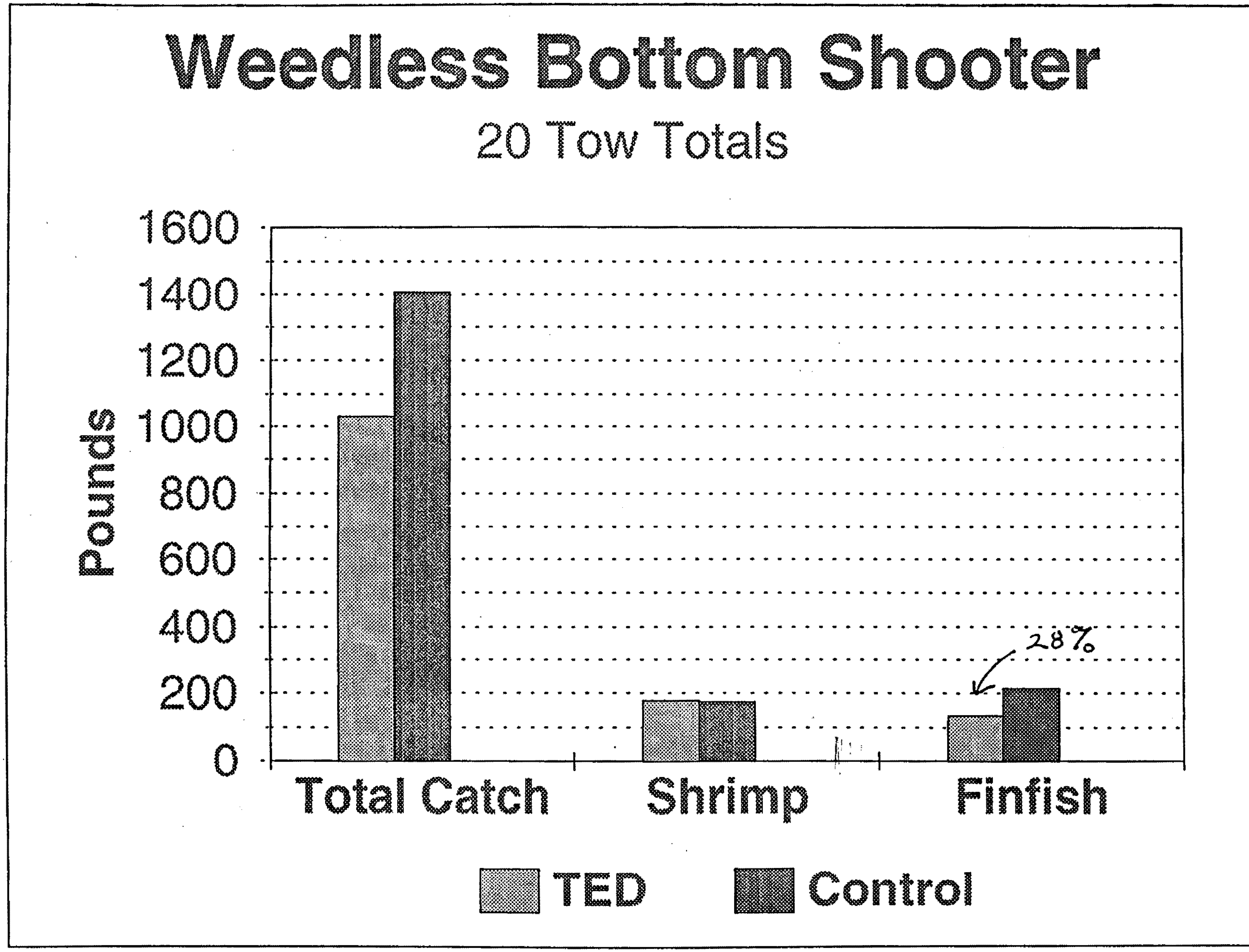
	Mid-Size Super Shooter			Tide Marine Bottom Shooter			Inshore Super Shooter			Tide Marine Top Shooter			Weedless Bottom Shooter		
Tow	PDTC	PDS	PDFF	PDTC	PDS	PDFF	PDTC	PDS	PDFF	PDTC	PDS	PDFF	PDTC	PDS	PDFF
1	-20.55	-18.18		-18.60	-11.54		44.23	-25.00		-36.36	-7.89	-53.45	-32.43	14.29	-32.77
2	3.23	25.00	90.00	-17.65	-23.33	-33.23	0.00	8.70		-22.22	0.00		-41.67	42.86	
3	-30.00	-23.08		-16.42	46.67		-43.24	-6.25		-23.08	10.91	-54.15	-14.29	133.33	
4	-9.09	-33.33	-20.07	-9.68	-21.43	-51.39	-10.34	0.00	-37.40	-16.67	-6.59	-36.97	-40.43	-14.29	-30.80
5	-14.81	80.00		-30.95	-21.87		-18.18	-11.11		-14.29	0.00	-34.17	-7.37	-9.37	
6	-22.92	-40.00	-42.91	-20.59	0.00	-22.16	-8.70	-45.45	-9.59	-23.44	-6.25		-19.23	8.33	
7	-5.26	0.00		-16.28	-21.43		0.00	0.00		-54.55	-15.38		-12.50	-16.67	35.59
8		33.33		-18.60	-36.36	-15.79	-55.07	29.41	-86.80	-58.82	-25.00		-12.90	57.14	
9	-13.51	25.00		-8.00	-27.27		0.00	0.00	31.91	-40.00	14.29	-56.19	-4.35	-10.00	-11.38
10	-8.82	-20.00	-24.83	-28.13	-23.53	-51.38	0.00	0.00	84.52	0.00	13.58	-34.02	-20.00	-37.14	-5.08
11	-33.33	-7.14	-46.51	-37.68	-17.07		0.00	-23.08		-24.19	-14.04		-30.91	-4.76	
12	-23.81	17.31		-16.00	100.00		-3.57	-17.65		-21.43	0.00		-34.52	11.76	
13	-4.26	11.11	-15.63	-27.78	15.38	-54.68	-12.00	-30.00	-12.42	-41.82	7.14		-43.86	-16.67	
14	33.33	-33.33		-35.19	-13.04		-8.70	0.00		-48.53	-37.50		-21.43	-29.03	-82.31
15	-30.43	0.00	-52.94	-27.27	10.00	-3.32	4.76	0.00	34.92	-14.29	-20.00	-33.47	-35.71	-54.78	-48.31
16	0.00	-28.00		-29.41	-14.29	-50.00	-18.75	0.00	1.33	-14.29	-25.14	-39.70	9.52	14.29	
17	-13.95	-8.70		-50.00	-23.08		-7.14	-37.50		-38.46	-28.57	-50.54	-18.18	0.00	-38.04
18	-15.63	-23.08	-25.75	-28.26	-20.89	-38.95	23.08	-10.00	18.47	-45.65	4.76		-9.68	48.15	
19	-13.16	-25.00		-4.00	-16.67		-9.68	-20.00		-30.49	20.00		-46.67	25.00	-29.78
20	-3.13	0.00	-19.72	0.00	16.67	-15.87	22.73	0.00	48.36	-37.50	18.18	-42.97	-33.33	-20.83	-40.23
Mean	-11.90	-3.40	-17.60	-22.02	-5.15	-33.68	-5.03	-9.40	7.33	-30.30	-4.88	-43.56	-23.50	7.08	-28.31
Var	228.48	847.68	1804.56	146.13	993.02	339.35	456.16	298.87	2300.61	237.12	278.66	84.24	229.46	1687.60	943.39

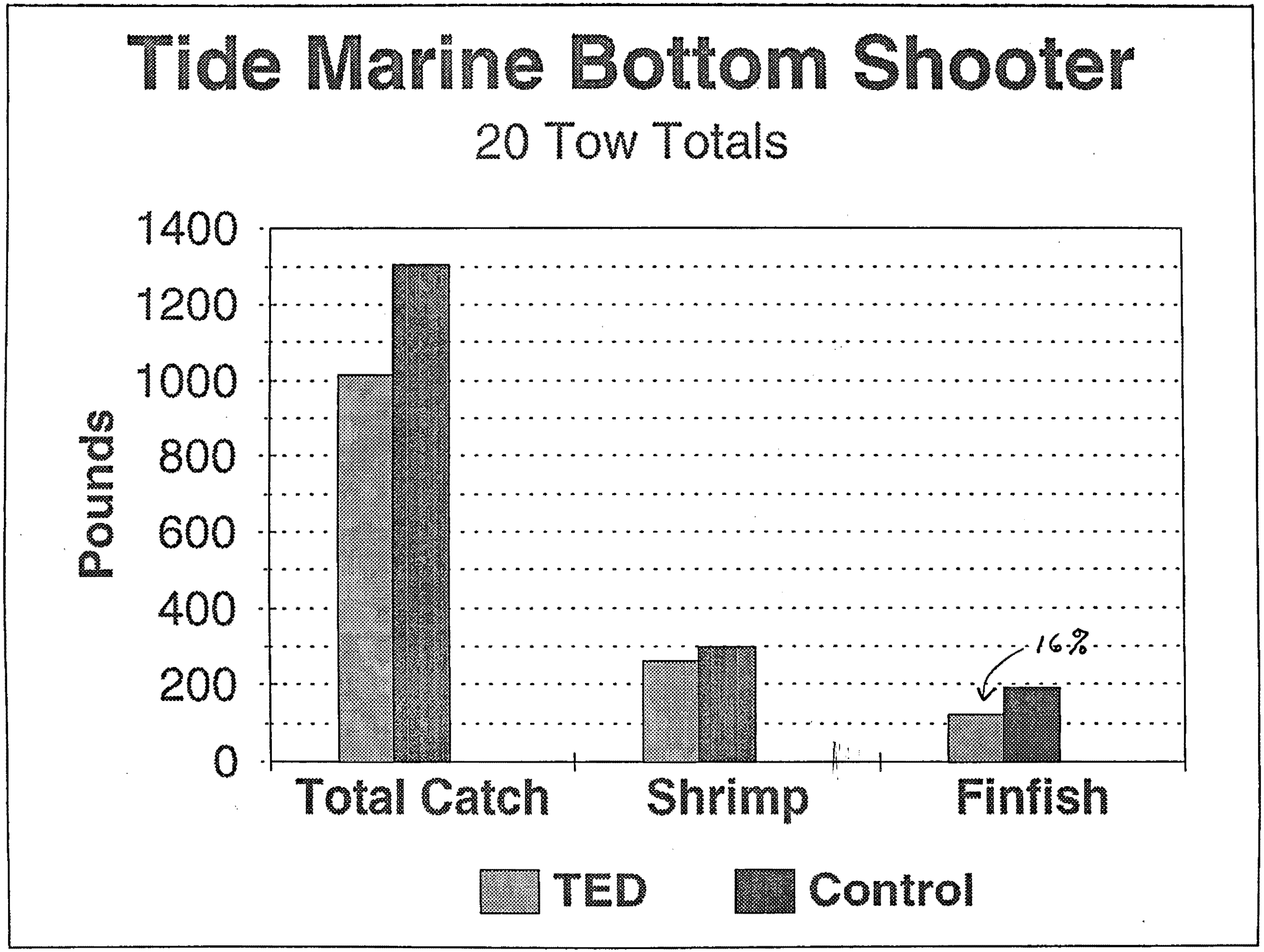
PTDC = Percentage Difference In Total Catch
PDS = Percentage Difference In Shrimp Catch
PDFF = Percentage Difference In Finfish Catch

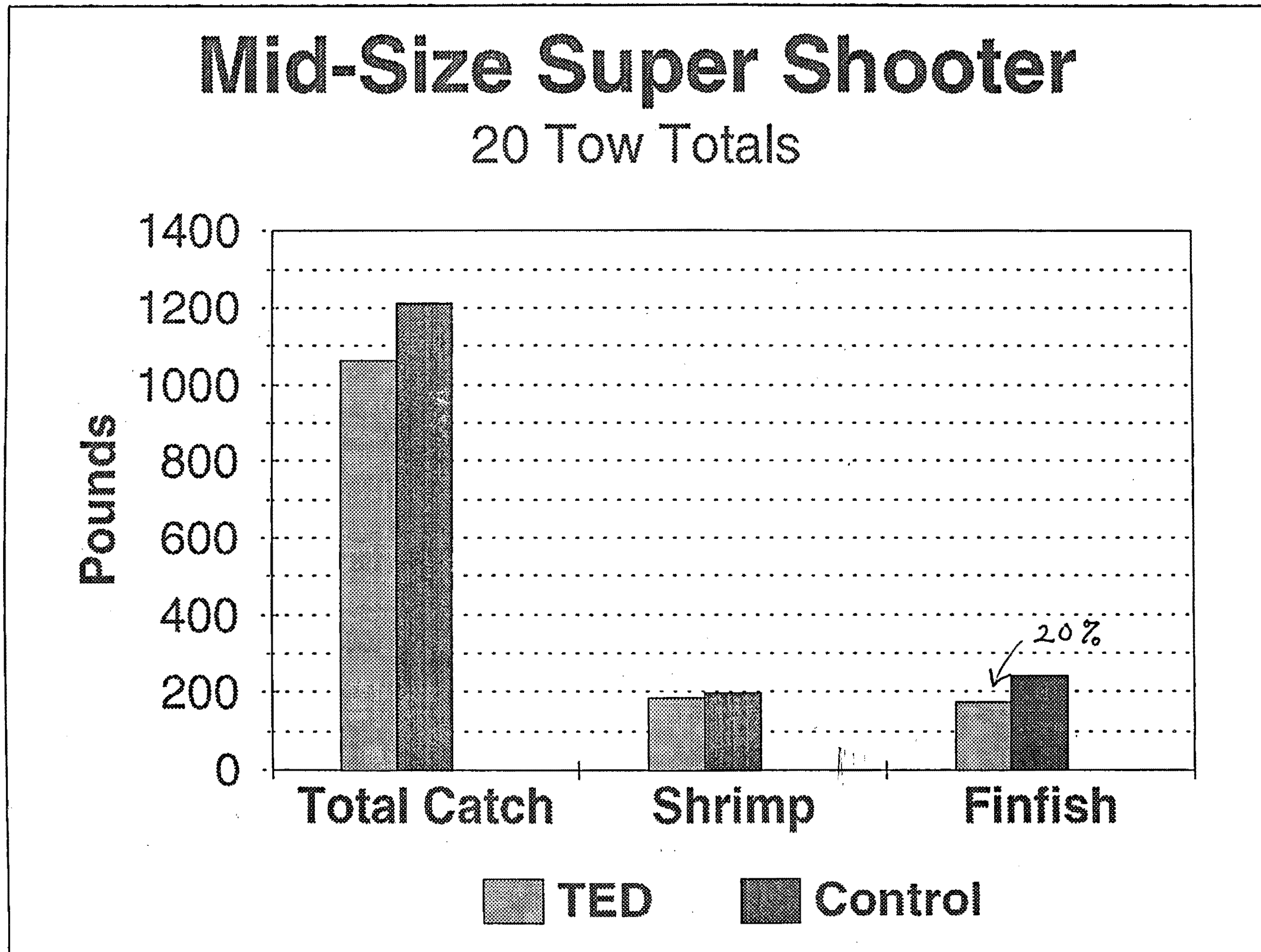

Tide Marine Top Shooter
20 Tow Totals
Pounds
1400
1200
1000
800
600
400
200
0
Total Catch
Shrimp
Finfish
43%
TED
Control



Inshore Super Shooter
20 Tow Totals
Pounds
1200
1000
800
600
400
200
0
7%
Total Catch
Shrimp
Finfish
TED
Control


Weedless Bottom Shooter
20 Tow Totals
Pounds
1600
1400
1200
1000
800
600
400
200
0
Total Catch
Shrimp
Finfish
28%
TED
Control


Tide Marine Bottom Shooter
20 Tow Totals
1400
1200
1000
800
600
400
200
0
Pounds
Total Catch
Shrimp
Finfish
16%
TED
Control


Mid-Size Super Shooter
20 Tow Totals
Pounds
1400
1200
1000
800
600
400
200
0
Total Catch
Shrimp
Finfish
20%
TED
Control

GENE TAYLOR
5TH DISTRICT, MISSISSIPPI

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706 WATTS AVE.
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(601) 762–1770

October 17, 1996

Dear Mr. Chairman:

Based on the following concerns, I would ask that the Gulf of Mexico Fishery Management Council consider the following before enacting Amendment Number 9 to the Fishery Management Plan for the shrimp fishery in the Gulf of Mexico.

Due to the language in the recent reauthorization of the Magnuson Act the whole issue of bycatch reduction devices may need to be revisited and this whole process may have to be repeated. It appears that when one considers factors such as TEDS and their effect on bycatch, artificial reef building activities, structures such as oil and gas rigs that prevent trawling, area closures, reduction in effort all of which must have an effect on the red snapper population.

It also appears that since the Council raised the total allowance catch (TAC) for the red snapper directed fishery, the stocks must not be in the dire shape that some people have suggested in the past.

There are questions about the statistical methods used and there is much discussion about what is the status of the stocks? Finally why should the shrimp industry bear the full burden of trying to reduce red snapper mortality, when at best we are only estimating these numbers.

So, I would ask that you as council members consider that the sense of urgency to enact this amendment is premature. We need to do more with industry to insure that if we must reduce bycatch the industry has been given ample opportunity to be involved in the design and testing, and not end up in same situation as we did with the turtle excluder devices. I believe we can do a better job if we try to work together on this issue.

Thank you for your consideration in this matter.

Sincerely,

Chris Lagarde
Special Assistant for
Fisheries and Natural Resources

APPENDIX E

ccm: 7/22/96

MINUTES

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

ONE HUNDRED AND FORTY-SEVENTH MEETING

TAMPA, FLORIDA

JULY 17-18, 1996

The one hundred and forty-seventh meeting of the Gulf of Mexico Fishery Management Council was called to order by Chairman Kenneth Roberts at 8:32 a.m., Wednesday, July 17, 1996. Council members in attendance were:

VOTING MEMBERS

Irby Basco .... Texas
Julius Collins .... Texas
Frank Fisher .... Texas
J. Scott Green .... Florida
Philip Horn .... Mississippi
Andrew Kemmerer .... National Marine Fisheries Service
Albert King .... Alabama
Karl Lessard .... Florida
Andy Martin .... Louisiana
R. Vernon Minton .... Alabama
Hal Osburn (designee for Andrew Sansom) .... Texas
Karen Foote (designee for James Jenkins) .... Louisiana
Kenneth Roberts .... Louisiana
Robert Shipp .... Alabama
Thomas Wallin .... Florida
Roy Williams (designee for Russell Nelson) .... Florida
Glade Woods .... Mississippi

NONVOTING MEMBERS

Larry Simpson .... Gulf States Marine Fisheries Commission
Doug Frugé .... U.S. Fish and Wildlife Service
LCDR Mark Johnson (designee for Timothy W. Josiah) .... Eighth Coast Guard District

Management Committee/Red Snapper Advisory Panel meeting prior to the November Council meeting. There was no discussion of this motion. **Motion carried by a vote of 12 to 3.**

Mr. Swingle pointed out that, although the motion specified that the Red Snapper AP review the options paper, the intent was that the commercial sector should review the options paper. Since there were only 6 commercial persons serving on that panel, it was necessary for Council to appoint an Ad Hoc Red Snapper AP. Mr. Horn advised that there were other issues related to the status of a number of reef fish amendments that had been deferred to the Council. He turned over the discussion of these matters to Dr. Kemmerer.

Red Grouper Size Limits Regulatory Amendment

Dr. Kemmerer referenced a letter from him to Dr. Roberts dated July 17, that pertained to a regulatory amendment to reduce the commercial size limit on red grouper from 20 inches to 18 inches. He explained that, when the Council submitted a regulatory amendment to NMFS they must review that action and decide whether or not the measure violated standards or policies of the agency. If it was decided that these standards and policies had been upheld, NMFS would finish writing up the regulatory amendment and submit the document for publication in the Federal Register and ask for public comments (~~comment~~ period was generally open for 15 to 30 days). Following public comments, a final determination was made by NMFS on whether the rule should subsequently be approved and published as a final rule. There were, therefore, two points at which a part of a proposed action amendment by Council could be rejected. A great many written comments from both commercial and recreational fishermen and environmental groups (about 400) were received on the reduction of size limits for the commercial red grouper fishery. A minority report was also submitted by members of the Council. There were two principal concerns that were considered by NMFS:

1. Overfishing of red grouper could occur since the quota was applied to all the grouper species; therefore, this action could potentially cause fishermen to shift their effort toward red grouper. Presently, red grouper only comprised about 65 percent of the total grouper catch.

2. An objective of the fishery management plan (FMP) was to avoid user conflicts. Based on public comments, it was clear that a differential size limit would create a major conflict between recreational and commercial fishermen. A great many of the comments from commercial fishermen expressed this concern.

For the above-stated reasons, this framework amendment was rejected by NMFS.

Red Snapper Regulatory Amendment

Dr. Kemmerer advised that NMFS would place this regulatory amendment in the Federal Register for public comment, with the exception of the reduction in the commercial size limit from 15 inches to 14 inches. The increase in TAC and the size limit reduction submitted by Council assumed that there would be a 50 percent reduction in red snapper bycatch by 1997. NMFS was concerned that this might not occur; therefore, they had rejected a size limit reduction for red snapper.

- **Shrimp Management Committee Report**

Mr. Collins presented the committee report. Dr. Leard reviewed the comments of the Shrimp Advisory Panel and noted that the panel recommended approval of Alternative A.1 (Status Quo). This recommendation was made because various aspects of the shrimp fishery, including the use of TEDs, the reduction in vessels, the increase in untrawlable bottoms, the effects of seasonal closures, the impacts of other users (recreational red snapper fishery), and a comparison of red snapper habitat and trawled bottom have not been addressed or adequately credited for their contributions to the reduction of red snapper bycatch. The AP also felt that the Council should examine further management of the recreational red snapper fishery.

Mr. Bob Palmer presented the Socioeconomic Assessment Panel report. The SEP noted that the objective of the amendment was unclear. He asked if the Council intend to address all finfish or just red snapper. The SEP also believed that the use of BRDs would have a lesser economic impact than the other alternatives presented; however, if red snapper was the target of the amendment, further explanation was needed regarding why BRDs should be required in areas where red snapper were not present. The SEP also felt that the economic models used in the RIR were good, and the analyses were thorough. However, the Economic Assessment should be better integrated with the Social Assessment.

Dr. Leard reviewed the comments of the SSC. He stated that the SSC did not endorse the "Status Quo" alternative, but believed that the purpose and objectives should be clarified. Although the SSC recognized the importance of bycatch reduction, it did not endorse Alternative A.2 (requiring BRDs) because of conflicting economic data and the need for clarification of objectives. Consequently, the SSC did not address Alternatives B dealing with areas for BRD use. The SSC endorsed Alternatives C.2(d), D.1, and F.2 and made various other recommendations for revisions prior to further consideration.

Mr. Rod Dalton reviewed comments from the NMFS namely: (1) clarify Council's intent; (2) review of nonBRD analysis; (3) review of framework actions and BRD criteria; (4) clarify terminology on juveniles, percent reduction, and how it will be measured; (5) possible updating of the DEIS and Regulatory Impacts; and (6) other structural and editorial comments. Mr. McLemore also described various legal considerations regarding the amendment.

Mr. George Barasich also addressed the committee regarding the amendment. Mr. Swingle noted that the review of the red snapper stock assessment by Dr. Ben Gallaway should be available in July. Once received, it will be forwarded to the SEFSC of NMFS and the RFSAP for review prior to review by the SSC. He stated that Council's consideration might occur in September. Mr. Swingle will contact Dr. Gallaway regarding the status of the report and invite him to the September Council meeting if appropriate.

In discussing a motion to consider preferred alternatives to Amendment 9, the motion failed by a vote of 3 to 3.

On behalf of the committee Mr. Collins moved **that the goal of Shrimp Amendment 9 is to reduce the bycatch of red snapper in the Gulf of Mexico with consideration of ancillary benefits to other species, and the reduction refers to age 0 and age 1 red snapper.** There was no discussion of this motion. **Motion carried unanimously.**

Dr. Kemmerer moved **that Council staff be instructed to incorporate comments in Draft Shrimp Amendment 9 so the document will be ready for final action at the next Council meeting prior to public hearings.** His rationale was that, due to time constraints, it was important to move forward with this amendment and that the schedule proposed by the Council be adhered to. Mr. Williams asked if it would be useful for the Shrimp Management Committee to meet and review the amendment prior to the next Council meeting. Dr. Kemmerer felt this was a good suggestion, noting that the original schedule called for the staff to finish the amendment and present it for Council review at the September meeting, prior to presentation at public hearings. Mr. Osburn requested that Dr. Kemmerer's comments be incorporated into the committee motion. Dr. Kemmerer felt that the motion, as stated, conveyed the intent of the Council. He was concerned that the lack of action at this Council meeting on this amendment would be perceived by some as a delaying action. Mr. King remarked that one reason he had not wanted a preferred alternative to be selected at this meeting was that he felt there was other information that should be considered. He cited Dr. Benny Gallaway's report, due to be completed in early August to be reviewed by the stock assessment panel (SAP) and Scientific and Statistical Committee (SSC). He felt this report should be part of the document presented at public hearings. <u>Motion</u> <u>carried</u> <u>unanimously</u> **that Council staff be instructed to incorporate comments in Draft Shrimp Amendment 9 so the document will be ready for final action at the next Council meeting prior to public hearings..**

Dr. Kemmerer recommended that the Council convene a special meeting of the Shrimp Management Committee to address Shrimp Amendment 9 prior to the next Council meeting in order to allow them to select preferred alternatives. Mr. Minton asked if Mr. Collins would be participating in such a meeting. Mr. Swingle replied that Mr. Collins would remain a Council member until August 10. Dr. Roberts noted that Dr. Gallaway's report would not be available until early in August. Mr. Swingle remarked that the report would first be sent to the Southeast Fisheries Science Center (SEFC), then to the SAP and the SSC. Dr. Roberts suggested convening the Special Shrimp Management Committee for an all-day session just prior to the start of the Council meeting. Dr. Kemmerer stressed that this amendment required that time be dedicated to addressing the issues therein. He expressed concern that time had not been available at this meeting for the committee and Council to fully review the amendment. Mr. Osburn inquired if the intent was that Dr. Gallaway's report would be presented to the Shrimp Management Committee. He felt that this should be done and that the committee have adequate time to review this material. Dr. Roberts responded that he appreciated this concern, but cited time constraints. Possibly, Dr. Gallaway could address the committee prior to the submission of the SAP report on this document. Mr. Swingle stressed that an especially critical concern was allowing time for staff to redraft the document.

- <u>Budget Committee</u>

Mr. Collins presented the Budget Committee report. Ms. Bear referred to Tab L, No. 3 (revised 7/12/96) and **Tab L, No. 3a (revised 7/12/96)** and explained that there was considerable savings in meeting costs since the last meeting of the budget committee in May, 1996. In May there was a cost savings of $11,381 and $39,382 in June. An additional savings of $10,172 was noted for the first four meetings held so far in July.

The total of the Projected FY 1996 expenditures, actual expenses, and meeting projections reflected a unexpended balance of $19,424. Mr. Swingle related that this figure included two habitat meetings previously eliminated and a new meeting scheduled in Silver Springs with NMFS and the Council chairmen.

On behalf of the committee, Mr. Collins <u>moved</u> **to approve the purchase of a digitized projection system.** There was no discussion of this motion. <u>**Motion carried.**</u>

Mr. Swingle related the Councils were granted 10.2 million dollars in 1996 and NMFS used that for the basis of the FY 1997 funding level. The Council had submitted a budget based on projected costs of 1.395 million; however, NMFS responded that the Council could only submit a budget based on the FY 1996 allocation equalling 1.3 million. In February 1995 the Council submitted (at NMFS' request) the projected funding needs for FY 1997 which also was not taken into consideration. Mr. Swingle raised the issue at the Council Chairmen's meeting that this was not the intent of the Councils. Mr. Schmitten related the Council should submit a letter to his attention outlining their additional funding needs. Mr. Swingle directed the

Attachment No. 2

Texas Shrimp Association

First in Fisheries

P.O. Box 1020 • 126 West Cleveland • Aransas Pass, Texas 78735
Telephone (512) 758-5024 • FAX (512) 758-5853

STATEMENT OF

TEXAS SHRIMP ASSOCIATION

ON

AMENDMENT 9
GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN

Gulf of Mexico Fishery Management Council
New Orleans, Louisiana
September 11, 1996

Introduction and Summary

The Texas Shrimp Association ("TSA") presents this statement in opposition to the shrimp fishery bycatch proposals contained in Amendment 9 to the Gulf of Mexico Shrimp Fishery Management Plan ("FMP"). The stated purpose of Amendment 9 is to reduce substantially the amount of bycatch in the shrimp fishery to avoid what has been alleged as "high levels of juvenile morality" of red snapper. The basis for the Council's objective and plan is derived from past stock assessments of red snapper and related analyses about the interaction between the shrimp fishery and juvenile red snapper. These assessments and analyses were prepared by the National Marine Fisheries Service ("NMFS").

If Amendment 9 is approved by the Council, NMFS would issue regulations requiring the use of bycatch reduction devices ("BRDs") on all shrimp vessels operating under the Shrimp Fishery

FMP in certain specified waters. NMFS would also start a program of certifying BRDs for use in shrimp fishing.

As more fully explained in this statement, TSA is strongly opposed to approval of Amendment 9 by this Council:

First, NMFS' scientific calculations about the impact of bycatch of red snapper in shrimp trawls are fundamentally flawed. Not only has the agency significantly overestimated the amount of red snapper bycatch in the shrimp fishery, we question whether there is adequate information demonstrating that Amendment 9 will actually achieve meaningful growth in the red snapper population. Moreover, bycatch of red snapper in the shrimp fishery has already declined by at least 33 percent in 1994 alone. Moreover, the impact of bycatch on red snapper has been exaggerated because natural mortality for red snapper ages 0 to 1 is likely higher than projected by NMFS.

Second, the red snapper population is healthy and growing at the present time. This stock of fish is not threatened or endangered within the meaning of the Endangered Species Act. While red snapper has been overfished in the past, there are clear indications that the population is on its way to recovery even without specific shrimp bycatch measures.

Third, the Red Snapper FMP does not limit the total harvest of adult red snapper by the recreational sector, even though the commercial harvest must cease when it reaches a certain level. This disparity in conservation measures--where one sector is fixed in its quota and the other exceeds its quota regularly--

raises serious doubt as to whether the Amendment 9, as integrated into the Red Snapper FMP, satisfies the basic fairness and conservation requirements of the Magnuson Act. Even if Amendment 9 is approved by the Council, it must be accompanied by an amendment to the Red Snapper FMP that places a fixed annual quota on recreational fishing capture and a lower total allowable catch ("TAC"). Otherwise any conservation benefits of restricting shrimp bycatch are lost by continued overfishing of the stock. Without such a limit, Amendment 9 is a pure allocation measure and not a conservation measure.

Fourth, Congress will soon amend the Magnuson Fishery Conservation and Management Act ("Magnuson Act") to address more directly the issue of bycatch. In those amendments, Congress has included three bycatch provisions that are directly applicable to what the Council is considering here today. Until the Council satisfies those new bycatch provisions, which will be enacted shortly, no action should be taken on Amendment 9.

Therefore, we ask that the Council vote to table Amendment 9 pending further study and analysis. TSA supports responsible and practical measures to reduce and minimize bycatch that cannot be avoided. Furthermore, Congress will soon also require that bycatch measures in the Gulf of Mexico be based on "the need to avoid any serious adverse environmental impacts" on the bycatch species or the ecology of the affected area. Amendment 9 does not meet these basic fishery management principles.

Doubts About the Scientific Basis for Amendment 9

TSA has undertaken a thorough technical evaluation of the scientific data and conclusions on which the Council's Amendment 9 proposal is based. That evaluation was conducted by Dr. Benny Gallaway of LGL Ecological Research Associates, Inc. of Bryan, Texas ("LGL") and William Gazey of W.J. Gazey Associates and was presented to the Council's Reef Fish Stock Assessment Panel and the Scientific and Statistical Committee in August and has been discussed at length in Committee meetings these last three days.

Based on these evaluations, we have come to the conclusion that Amendment 9 rests on several fundamental scientific flaws that have not been resolved at this time. One of the basic issues that cannot now be explained is the essential question of whether NMFS' estimates of the size of the shrimp bycatch are reasonably accurate. It makes no sense to proceed further with Amendment 9 until this issue is resolved to everyone's satisfaction.

Therefore TSA believes approval of Amendment 9 as presently proposed would violate the Magnuson Act and the Administrative Procedure Act. While TSA agrees with the need to find ways to reduce bycatch of unwanted species in the shrimp fishery, including sea turtles and finfish, we do not believe that the data demonstrates that restriction of shrimp bycatch through the use of BRDs will have the hoped for positive impact on red snapper stock abundance.

As a general matter, the bycatch in the shrimp fishery is largely composed of fish that have a short life cycle comparable to the targeted shrimp--one to two years. These species--such as Atlantic croaker and longspine porgy--have high rates of reproduction and high rates of natural mortality in one to two years. The bycatch of these short-lived but highly productive fish creates no serious adverse environmental impact to either the species or the surrounding ecology. In fact, the evidence suggests that the discarding of these bycatch species creates at least two ecological benefits. First, the discards are fed upon quickly by other fish, sea turtles, marine mammals, and birds. And, second, predation by these species on the shrimp stocks is kept in check. Consequently, we not believe that shrimp bycatch in this fishery is the great urgent conservation problem that has been claimed. Moreover, except for red snapper, nearly all of the finfish bycatch are species with little or no economic value.

The Red Snapper Population Is Growing

We all agree that more must be done to increase the red snapper population in the Gulf of Mexico. The stock is substantially below the levels known to exist in past years. While we believe that habitat changes have played a major role in the decline, overfishing is also a cause.

Nonetheless, the currently available information suggests that red snapper are on the road to recovery. The standing stock is growing, as is the young-of-the-year index of abundance. Since 1990, the year the Council adopted the bycatch reduction objectives we are discussing, the number of age 2 and older fish have increased from 6 to 15.6 million fish in 1994 (Goodyear 1995; Table 98). If these trends are correct, then we are debating the pace at which recovery is achieved, not whether recovery will occur.

The Red Snapper FMP Fails to Achieve Conservation

TSA must challenge the entire management concept underpinning the red snapper management plan as reflected in the Red Snapper FMP Amendment 9--strict bycatch restrictions on the commercial shrimp fishery, a fixed quota enforced by a closure on the commercial red snapper fleet, and essentially unlimited fishing of red snapper by the recreational community subject only to bag and trip limits. In the last three years, the recreational component of the fishery has exceeded its quota by nearly double. The only conclusion we can draw is that the management measures imposed on the commercial sector--and proposed for restricting bycatch in the shrimp fishery--are intended primarily to allocate fishing opportunities to the recreational sector, not for the purpose of biological conservation of the red snapper stock.

NMFS is presently considering a regulatory amendment submitted by this Council to increase the TAC of red snapper for 1996 to 9.12 million pounds. In 1991, after the Council claimed that this fishery was "significantly overfished," the TAC was set at 4 million pounds. For 1993, the TAC was increased, this time to 6 million pounds. Now the directed commercial and recreational fishery will be allowed to take even more of a fish stock for which the Council professes great conservation concern. It is very difficult for us to understand why a fish stock that is said to be "seriously overfished" can withstand such an increasing TAC. This same conservation concern is also the reason given for strict bycatch limits on the shrimp fishery.

As this Council knows, the Magnuson Act requires that management measures must be fair and equitable to all those regulated in the fishery and must be reasonably calculated to promote conservation. We are convinced that Amendment 9 does not satisfy either of these basic requirements of the Act. Nor is Amendment 9 based on the best available scientific information and analysis. Consequently, we must oppose Amendment 9 as both ineffective and merely an allocation measure clothed in the guise of conservation.

New Magnuson Act Amendments Will Guide Bycatch Regulation

The new Magnuson Act amendments now before the Congress contain several provisions that address the bycatch of non-targeted species of fish. TSA supports the Senate version of these amendments as reflected in the manager's amendment to S. 39, the Sustainable Fisheries Act. Bycatch has been an important focus of these amendments.

Under the amendments, Councils must address bycatch concerns in a more deliberative manner than was the case under existing law. Bycatch measures must be practicable, focussing in the first instance on minimizing bycatch and then on minimizing the mortality of bycatch that cannot be avoided. However, prior to formulating shrimp fishery bycatch measures for the Gulf of Mexico, NMFS and this Council are obligated to complete two Congressionally mandated directives.

The first requires the collection of data on the bycatch problem in the fishery, the identification of those stocks of fish that should receive priority treatment, and the development of a bycatch reduction program (section 206 of S. 39, as amended). A report on these issues is due one year after the Magnuson Act amendments become law. The value of this additional study has already been demonstrated by the unresolved questions pointed out by the LGL Report. The second directive is for NMFS to complete a peer review of the red snapper fishery statistics and management system now in place, due also in one year. It would not be appropriate for the Council to proceed further on the shrimp bycatch issue until these tasks are completed.

We also wish to highlight a new standard that, in addition to the general bycatch provisions included in the new amendments, will be applicable specifically to measures to reduce bycatch in the shrimp trawl fishery. That standard limits bycatch restrictions to only those necessary to "avoid any serious adverse environmental impacts on such bycatch species or the ecology of the affected area." We support this new standard and which we believe it sets the proper priority for new bycatch regulations. Congress has clearly decided not to regulate all shrimp fishery bycatch problems--only those that create serious adverse environmental impacts. In this era of limited government and regulation, the Council cannot and should not regulate every conceivable alleged bycatch problem. Thus, an affirmative finding of "serious environmental impact is required before any action can be take on Amendment 9 after S. 39 becomes law.

<u>Conclusion</u>

For several years now, TSA has heard growing complaints about bycatch in the shrimp fishery, particularly of red snapper, a very popular commercial and recreational reef fish species. Although all acknowledge that the size of the shrimp fleet has declined over the last several years and that the amount of bycatch in the shrimp fishery is much less than previously reported, this Council still obviously considers the red snapper bycatch issue a high priority. However, TSA has always had doubts about whether this great concern over bycatch is truly based on sound science and fundamental principles of balanced ecological management or some other objective.

In summary, we do not believe that the Council and NMFS are proceeding in the right direction with respect to finfish bycatch in the shrimp fishery. Technological solutions--more gear, more shrimp loss--should not be the only solution under consideration. The LGL Report has shown that the scientific basis for Amendment 9 is questionable. When reconsidering bycatch measures after completing the Congressionally mandated analyses, we recommend that the Council look closely at our plan for protecting sea turtles in near-shore areas. You will see that reducing shrimping effort in areas of high turtle concentration has the added benefit of reducing finfish bycatch. The Council needs to go back and reconsider entirely the framework for managing red snapper and reducing bycatch in the shrimp fishery.

Thank you for the opportunity to present TSA's views to the Council.

jrj: 9/16/96

MINUTES

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

ONE HUNDRED AND FORTY-EIGHTH MEETING

NEW ORLEANS, LA

SEPTEMBER 9 - 13, 1996

The one hundred and forty-eighth meeting of the Gulf of Mexico Fishery Management Council was called to order by Vice-Chairman Albert King at 3:00 p.m., Wednesday, September 11, 1996. Council members in attendance were:

VOTING MEMBERS

Pete Aparicio .... Texas
Irby Basco .... Texas
Maumus Claverie .... Louisiana
Felicia Coleman .... Florida
Frank Fisher .... Texas
J. Scott Green .... Florida
Philip Horn .... Mississippi
Andrew Kemmerer .... National Marine Fisheries Service
Albert King .... Alabama
Karl Lessard .... Florida
Andy Martin .... Louisiana
R. Vernon Minton .... Alabama
Hal Osburn (designee for Gene McCarty) .... Texas
Karen Foote (designee for James Jenkins) .... Louisiana
Robert Shipp .... Alabama
Roy Williams (designee for Russell Nelson) .... Florida
Glade Woods .... Mississippi

NONVOTING MEMBERS

Larry Simpson .... Gulf States Marine Fisheries Commission
Doug Frugé (designee for Noreen Clough) .... U.S. Fish and Wildlife Service
LCDR Mark Johnson (designee for Timothy W. Josiah) .... Eighth Coast Guard District
Conrad Fjetland (designee for Noreen Clough) .... U.S. Fish and Wildlife Service
William Perret (designee for Glade Woods) .... Mississippi Department of Marine Resources
RADM Timothy Josiah .... Eighth Coast Guard District

Mr. McLemore indicated there might be a conflict of ethics with the employment of Dr. Goodyear after his retirement. He suggested the Council contact the ethics office to get an answer regarding Dr. Goodyear's clearance. Mr. Swingle stated that Dr. Goodyear was going to become a consultant after his retirement and inquired as to what entities he would be excluded from working for, just the Council or others. Mr. McLemore responded that the rule for lawyers was that they could not work on any document or project they worked on during active employment. He suggested that the Council contact the Ethics office for a specific answer. Mr. Williams asked if Dr. Goodyear's services were required if the statistical review committee said that the NMFS treatment of the data was correct. Mr. Swingle responded he had envisioned that both would take some time to convene and to reach an agreement on the data. Mr. Swingle wondered if the conflict of interest actually applied to someone in Dr. Goodyear's position. Dr. Kemmerer emphatically responded that it definitely did apply. Mr. Swingle asked if you were a NMFS employee who were you excluded from working with. Dr. Kemmerer stated that a person would not be excluded from working with someone but they were excluded from negotiating for that work prior to retirement. He indicated there would be a decision regarding the possible employment of Dr. Goodyear within 2 weeks. Mr. Woods offered that the government avoided contact with a past employee for up to 3 years and even then used caution. Mr. King pointed out the Council was not a government agency. Mr. Woods stressed that Dr. Goodyear was a federal employee. Dr. Kemmerer indicated, in any event, that different levels of bycatch needed to be looked at.

Mr. Minton offered the following motion: **To authorize the Council to contract with a qualified individual to rerun the model.** Motion **carried with Dr. Kemmerer abstaining.**

Shrimp Management Committee

Mr. Woods presented the Shrimp Management Committee report:

The agenda was adopted as written, and the minutes were approved by consensus with editorial changes submitted by Larry Simpson and the notation that J. Scott Green was also present at the meeting.

Dr. Leard reviewed the changes that had been incorporated into Draft Amendment 9 based on the Council's clarification that the major goal of the amendment was to achieve a 50 percent reduction in juvenile red snapper bycatch mortality on age 0 and age 1 fish in shrimp trawls from the average level of mortality on those age groups during the years 1984 - 1989 (prior to requirements for TEDs). He also reviewed changes resulting from comments of the Socioeconomic Panel (SEP), the Shrimp Advisory Panel (AP), Scientific and Statistical Committee (SSC), and National Marine Fisheries Service (NMFS). He noted that the joint shrimp/reef management committee previously reviewed factors affecting bycatch, and he described staff and NMFS activities to address bycatch reduction resulting from changes in untrawlable bottoms, reduction in shrimping effort, the effects of turtle excluder devices (TEDs), and seasonal usage of bycatch reduction devices (BRDs).

In reviewing the alternatives of Draft Amendment 9, Dr. Leard noted the following:

- 1. Alternative A.2 - the try or test net exemption could be applied to nets with a headrope length of 16 feet or less (the size most frequently in use), or all nets that required TEDs would require BRDs.
- 2. Alternative B.4 - was added combining Alternatives B.2 and B.3, thereby offering an alternative to require BRDs only in areas between 10 and 100 fathoms and west of Cape San Blas, Florida.

- 3. Alternative F.2 - was changed to provide framework procedures to modify bycatch reduction criteria, establish certification criteria and testing protocol, and modify certification criteria and testing protocol.
- 4. Alternative G - addressed limited access considerations.

Dr. Lamberte reviewed the following modifications to the regulatory impact review (RIR) based on additional analysis as well as comments from the SEP, AP, and SSC:

> Discussions on the impacts of area closures and area exemptions to BRD requirement were now included in the document. In addition, discussions on the impacts of bycatch reduction on finfish industries had been expanded. More importantly, the simulation model had been revised such that the base case scenario reflected the use of TEDs in shrimp trawls. Updating of data used in the simulation model was not possible. Finally, the RIR now included a subsection entitled "Initial Regulatory Flexibility Analysis."

Committee Recommendations

Mr. Woods asked if the Council wanted to hear all the recommendations before voting ~~or~~ vote on each one as they were presented. Mr. King asked what the will of the Council was. Council indicated to hear each one individually and vote or discuss as necessary.

> Mr. Woods moved on behalf of the committee: **that Alternatives E (Area Closure) and G (Limited Access Considerations) be removed from the alternatives being considered and incorporated into the history or overview in the front of the document. Motion carried with no objection.**

> Mr. Woods moved on behalf of the Committee: **the adoption of the Preferred Alternative A.2. - Require the installation of NMFS - certified BRDs in each net used aboard vessels trawling for shrimp in specified areas of the Gulf on Mexico Exclusive Economic Zone (EEZ). Exempted were vessels trawling for royal red shrimp beyond the 100-fathom contour and vessels trawling for groundfish or butterfish, with inclusion of Option (a) - A single try or test net with a headrope length of 16 feet or less per vessel is also exempted. Motion carried with no objection.**

> Mr. Woods moved on behalf of the committee: **the adoption of Preferred Alternative B.2 - Require the use of NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida.**

> Mr. Green indicated that as a representative from Florida there a bycatch problem in Florida, too. While red snapper may not be a predominant species in Florida the bycatch issue still existed. The State of Florida had adopted certain BRD requirements in designated areas and he believed that they would be expanded over the balance of time. He offered a substitute motion **to adopt Alternative B.1 - Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour - as the Preferred Alternative.**

Council Discussion

Mr. Horn advised, in relation to Florida there had been a discussion by the committee with regard to species that were beneficial to their fishermen and it was discovered that king mackerel was not as prevalent as they once were in light of the stock assessment review recently done. As for Spanish mackerel, that fishery was not overfished nor had the quotas ever become close to being harvested. Currently bycatch may be a problem in that area, but he felt there was no reason to implement BRDs nor did he feel they would prove beneficial. Mr. Lessard indicated that the Dry Tortugas pink shrimp industry had currently caught zero red snapper in the last decade and felt the amendment was aimed at red snapper. He felt it would be very difficult during public hearings to convince the fishermen in south Florida that they needed BRDS. He stated he would support an additional amendment at a later time for BRDs off Florida.

Mr. Williams concurred with Mr. Lessard to a degree. He pointed out that there was a 3 to 1 fish to shrimp ratio off Florida and those finfish fit into the ecological system somehow. They are consumed by a higher order of predator and stressed Florida would be better off if BRDs were required. He emphasized that Florida was in the process of requiring bycatch devices, they are already required in the northeast area of Florida in an attempt to restore weakfish. The Marine Fisheries Commission made a policy decision that BRDs would be required off the panhandle and in the southwest Florida state waters. He stated they would not be required in the Big Bend area where the fishery was mostly a roller trawl fishery. He felt it would be appropriate to extend the same type of protection into the EEZ and would vote in favor of the motion.

Mr. Green pointed out that the red snapper issue in a large portion of the Gulf was intrinsic to what the Council was trying to do. The Council had chosen red snapper exclusion as one of the keys to evaluate and monitor the effectiveness of the BRD. He indicated he would make a motion later to reinstall as part of the purpose of the amendment the fact that other finfish should also be considered. Mr. King interrupted Mr. Green and advised him that he was going to rule his discussion out of order and the he could bring it up at a later time because what was being dealt with was the extension of the line for BRD use. Mr. Green indicated the point of the matter related to what Mr. Williams had discussed and emphasized that Mr. King had not been ruled that discussion out of order. He stressed the central flaw of the issues was the gear itself and what it did. The Council needed to exclude all types of that gear. He spoke in favor of Alternative B.1.

Mr. Osburn asked if the intent of the recovery plan, with regard to red snapper, that the stocks would be improved off the state of Florida, so that as the recovery plan works there would be an increase of red snapper juveniles as spawning stock returns.

Mr. Lessard reiterated that when reading the purpose of Amendment 9 it states that "The purpose of amendment 9 was to provide additional management of the shrimp fishery to reduce the unwanted bycatch of juvenile red snapper without adversely affecting the $400 million shrimp industry." He stated he was not against the motion but felt the placement of the amendment was wrong. He stressed he would support that amendment at a later time or if a new amendment were created.

Mr. Aparicio felt, in his opinion, that the effort taken needed to be looked at to see if the industry had met its goal of reducing bycatch. He was apprehensive with regard to the need for additional devices on the nets to meet the stated goal of the amendment. He suggested the Council take a look at what the industry had done before putting additional burdens on the fishermen.

> Mr. Horn made the following <u>substitute</u> <u>motion</u>: **The Council go forward without a preferred alternative B.**

Mr. Minton asked as a point of clarification if that particular alternative was the only one being discussed. Mr. King responded affirmative. Dr. Claverie asked as a point of clarification of the "B's" which would be forwarded for public comment. Mr. King responded that all the "B's" without a preferred alternative would be presented for public comment.

Mr. King stressed the Council needed to be concerned with the perception that it was giving to the public as to which direction the Council was taking, that was what a preferred alternative was. If the Council wanted to look at BRDs for all species in all areas then the objective of the amendment did, indeed, need to be changed to clarify that red snapper was not a targeted species. The objective the Council established at the last meeting was the reduction of juvenile red snapper was supposed to be the primary function of the amendment. If the objective of the amendment was to be changed, the Council would need to move forward without preferred options. If the objectives so stated in the amendment as being that of juvenile red snapper, then the Council needed to confine the amendment to the area where the characterization data and observer data showed juvenile red snapper in shrimp gear. He indicated there had been studies done that had to be discarded because they were conducted in non-U.S. waters. He asked Dr. Kemmerer if that was one of the purposes that had been discussed. Dr. Kemmerer responded that was one of the key points of the purpose of the intent.

Dr. Claverie was concerned that all four "B" alternatives would be presented for public comment. He indicated that Alternatives B.1 and B.2 were the same as B.3 and B.4 respectively, except B.3 and B.4 include the inside boundary of the prohibited area on the 10-fathom line. He mentioned the committee had discussed that and had discarded the 10-fathom line was the interior dimension which was for enforcement reasons. Therefore, he suggested the removal of B.3 and B.4.

Mr. Horn was concerned with the development of the bycatch devices. He indicated his understanding of the BRDs was for the exclusion of red snapper and the effort had been directed toward that species. He was unsure whether the options presented would be as useful if action was taken in South Florida, panhandle or Big Bend areas. Before making a decision he would like to receive information from the gear specialist as to what they had been doing and why. The percentages had been presented with regard to red snapper and shrimp, but he had not seen published results on any other species.

Mr. King asked Dr. Branstetter how much observer data was included in the observer study done between Cape San Blas to Key West, Florida. Dr. Branstetter stated there was a substantial quantity of data, especially in the Key West pink shrimp fishery. There was little information on species composition as far as bycatch reduction because of the limited number of identified species. He suggested the Council consider some shrimp catch rates for BRDs because shrimp losses are highly influenced by area of fishing.

Dr. Kemmerer indicated that as an attachment to the amendment there were some reduction rates associated with other species. He felt the public needed to know how the Council felt with regard to preferred options.

Mr. Green stressed that his intent was to not interrupt the process or have a cessation of the process.

Mr. Lessard asked if NMFS intended to eliminate Andrews turtle exclusion devices (TEDs) in the Dry Tortugas fishery. Dr. Kemmerer replied the proposed regulation was to prohibit the use of soft TEDs Gulf wide and in the south Atlantic and added the Andrews TED was a soft TED. The final regulations were expected to be published soon and that would be very definitive as to which types would be allowed.

Mr. Aparicio believed that 20 percent of the fleet in the Gulf already used the Andrews TED, that excluded up to 70 percent of juvenile red snapper. If the TED excluded over 70 percent of the targeted bycatch then why should it be eliminated.

Mr. Basco asked whether the line to where the BRDs would or would not be used was due to an enforcement problem. LCDR Johnson responded that if the Council adopted the 10-fathom curve that would create a significant problem because it would create in effect a boundary of a management area that would extend the length of the coastline along which would include shrimping activities, yet there would be gear restrictions on one side only. So, in effect the same activity would be occurring on both sides but would be illegal on one side which would sufficiently eliminate effective enforcement. There would be a similar problem if the in-shore boundary was along the EEZ state waters but it would be less of a problem because it was already an established boundary used to distinguish between state and Magnuson Act regulations. Mr. Horn inquired if the 10-fathom curve would be more difficult to enforce than the 15-fathom fish trap boundary, the 20-fathom longline boundary, the 50- fathom longline boundary, and the special management zone (SMZ) boundary off the Gulf of Alabama. LCDR Johnson responded in his opinion it would be. The SMZ boundary was a definite boundary and could be controlled by a radar sweep, the 50-fathom boundary did not have the same amount of activity occurring although long-liner for reef fish were not allowed, longliners for shark were.

Substitute motion: to go forward without a preferred alternative B. Motion failed by an 8 to 8 vote.

Substitute motion: to adopt Alternative B.1 - Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour - as the Preferred Alternative. Motion failed by a 5 to 11 vote.

Motion: The Committee approved, and I so moved the adoption of Preferred Alternative B.2 - Require the use of NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida. Motion carried be a 13 to 2 vote.

Mr. Green moved **to remove B.3 and B.4 as alternatives because of enforcement problems and inherent problems with the science.**

Mr. Horn spoke against the motion stating that the public should be allowed to hear all alternatives presented. Mr. King agreed with Mr. Horn and spoke against the motion. Mr. McLemore asked if by the use of the term "remove" the alternatives would be identified as rejected. The National Environmental Policy Act (NEPA required Council to inform the public of what alternative(s) were being considered during the decision making process. Ultimately they would have to be recorded as "rejected alternatives".

Mr. Green amended his motion to reject **B.3 and B.4 as alternatives because of enforcement problems and inherent problems with science.**

Mr. King stressed the fact that the Council was choosing preferred alternatives. Mr. Green withdrew his motion.

Mr. Williams raised the question of the removal of Alternative E and G and wondered why they were being treated differently than Mr. Green's motion. Mr. King explained that Alternative E and G would still be in the document, they were not being rejected or removed but were being moved to a different section of the document. Mr. Swingle pointed out once the Council chose their preferred alternatives the others were listed as rejected. Mr. Minton indicated he had not seen that happen before until the document had been finalized and asked if the document was presented to the public stating the alternatives as rejected or preferred. Mr. Swingle stated when the document was presented to the public it was with preferred alternatives but frequently the other alternatives were listed as alternatives not considered and not adopted. Mr. McLemore strongly advised that even though an alternative might be rejected at a later date, it had to appear in the document being presented to the public, so that the public would be able to make informed decisions and/or comments.

Mr. Osburn asked if the stock assessment and the 50 percent bycatch reduction goal was achieved by any of these four alternatives, in a sense that scientists identified that by not requiring BRDs within the 10-fathom line accounted for approximately 20 percent or more take of juvenile red snapper. He inquired if Dr. Goodyear's projections of the 50 percent needed in the future was achievable with the 10-fathom line being included. He believed that B.3 and B.4 did not actually achieve that needed effect because they only represented about four-fifths of the savings of B1 and B2. Mr. Swingle indicated that Dr. Goodyear, in preparing the stock assessment, only used information from 5-fathoms out including that there was almost none in the 0 - 5-fathoms. He believed the 80/20 split was incorrect.

Mr. Osburn wanted to identify that the numbers being dealt with, whether they were 80 percent or 100 percent, the same discussion would be applicable when trying to achieve the 50 percent reduction range. Mr. Williams indicated that Figures 9 and 10 in the document indicated that most of the king and Spanish mackerel taken were taken from less than 10-fathoms.

Mr. Woods moved **on behalf of the committee that Alternatives C.1 and C.2 - Establishing criteria for BRDs, including certification of BRDs that had been tested and determined to meet the established bycatch reduction criteria - be taken forward to public hearings without a preferred alternative. Motion passed with no objection.**

Mr. Woods moved **on behalf of the committee the adoption of Preferred Alternative D.1 - Status Quo - No change in seasonal closures. Motion carried with no objection.**

Mr. Woods moved **on behalf of the committee the adoption of Preferred Alternative F.2 - Establish the following framework procedures for modifying bycatch reduction criteria and establishing BRD certification criteria. The committee reviewed the framework in the document and noted procedural and legal problems. The handout Modified Framework Procedure, F.2 [Tab D, No. 5] incorporates the suggested committee changes to the framework procedures. Motion carried with no objection.**

The schedule for shrimp bycatch public hearings, AP, and SSC meetings was reviewed by Mr. Woods with the proposed public hearing schedule as follows:

10/07/96	Key West, FL and Lake Charles, LA
10/08/96	Ft. Myers, FL and Thibodaux, LA
10/09/96	Tampa, FL and New Orleans, LA
10/14/96	Appalachicola, FL and Brownsville, TX
10/15/96	Pensacola, FL and Port Aransas, TX
10/16/96	Mobile, AL and Port Lavaca, TX
10/17/96	Biloxi, MS and Galveston, TX

He noted that meetings of the Shrimp Advisory Panel (AP) and the Scientific and Statistical Committee (SSC) to review the public hearing draft were scheduled for October 28, 1996 and October 29, 1996, respectively.

Mr. Minton indicated the Gulf States Marine Fish Commission (GSMFC) was to hold a meeting from October 14 - 18, 1996 and felt there could be a time conflict for the public. Mr. Woods asked if the public meetings would start at 6:00 p.m. or 7:00 p.m. Mr. Swingle responded they would start at 7:00 p.m. Dr. Kemmerer inquired if the locations were selected were agreeable to all parties concerned. Mr. King stated the meetings in Texas would be held in Brownsville, Port Aransas, Port Lavaca, and Galveston. Ms. Wilma Anderson, TSA, asked if one of the meetings could be moved to Palacios, Texas. Mr. Osburn explained that would only be a 30 mile difference and suggested that if the arrangements had already been made and finalized for Port Lavaca, they should not be changed.

Mr. King moved to **approve the public hearing locations. Motion carried.**

Dr. Kemmerer moved **to send Draft Shrimp Amendment 9 as revised to public hearings.**

Mr. Williams stressed the Purpose and Needs section should be revisited because it only addressed juvenile red snapper, and since the king and Spanish mackerel stock assessment was completed there had always been a presumption there would be a reduction in bycatch associated with juvenile king and Spanish mackerel and the Figures 9 and 10 indicated that most of the bycatch came from within 10-fathoms. He felt it was important, in solving the overfishing problems in the mackerel fishery, that the line be held and the BRDs be required throughout the Gulf not just outside 10-fathoms. He offered a motion to table **Dr. Kemmerer's motion. Motion to table carried.**

Mr. Williams moved **to add king and Spanish mackerel after juvenile red snapper in the Purpose and Needs section of Draft Amendment 9.**

Mr. McLemore asked if the administrative record to date supported the addition of king and Spanish mackerel to that amendment and were the scoping notices and other such notices phrased broadly enough to allow that addition. Mr. Swingle responded that although the Federal Notice filed was related to red snapper there was no reason why the addition could not be added to a future notice. One of the major differences was that one stock assessment stated that in the case of red snapper the stock could not be restored without that reduction. In the case of the mackerel, without a bycatch there would be a higher level of abundance. Mr. McLemore inquired when the scoping hearings were done with mackerel fishermen notified. Mr. Swingle indicated the public-at-large was notified which would have included mackerel fishermen.

Mr. Williams withdrew his motion and offered the motion **to begin another amendment to the shrimp plan to address bycatch of other species under Council management such as king and Spanish mackerel and croaker.**

Dr. Claverie was concerned with the goal of amendment 9 being the provision to additional management to the shrimp fishery to reduce the unwanted bycatch of juvenile red snapper. He wondered if it was possible to fulfill the provisions made for red snapper without adverse affects. Mr. McLemore related that during the committee a suggestion had been made to expand one of the sections in light of the language of the FMP objectives on page 8, number 5 read as follows: "minimize the capture of finfish by shrimpers when appropriate". The term "appropriate" was not defined in the document and he suggested the suggestion be discussed further.

Mr. Aparicio stressed the need to find out if the goal of a 50 percent reduction in bycatch had already been reached. Currently, the losses to the industry had been significant without the introduction of BRDS and to place additional burdens on the industry without examining the bycatch numbers, which at one time were 10 - 1, and currently was 3 - 1. He strongly suggested the Council take a look at where in the process they were with regard to the reduction in bycatch that had been provided by TEDs, the reduced trawling area, and the closed seasons.

Mr. Green responded that the flaw in the industry was the gear. He stressed that the shrimp industry dragged gear that killed valuable fish that could have been available to other industries. In his opinion, that was the problem that needed to be dealt with. The untrawlable bottom, oil rigs etc. were in many ways diverting from what damage the gear did. He was concerned there was no way of not adversely affecting the shrimp industry and the language contained in the document would withhold the Council from doing anything because by pure definition it said "anything the Council did could not adversely affect that industry".

Mr. Osburn suggested a regulatory action that could be used was to require BRDs east of Cape San Blas, Florida, assuming that did not happen in the current amendment. He felt the BRDs currently being used for red snapper should be more effective for the other species. He wondered if the action suggested was not premature given there was an option within the FMP to establish BRDs east of Cape San Blas. Mr. Williams felt it was not premature but could become a moot point at some point in the future. Mr. McLemore indicated that other species would be addressed by plan amendments. Mr. Swingle advised it would be accomplished by the revised framework the Council adopted during that meeting and if other species were identified, a subsequent plan amendment would be needed.

Mr. Osburn suggested any action be tabled until the November Council meeting. Mr. Williams stressed his intent was for action to be taken at a later date. Mr. Aparicio inquired if it took a special excluder device to exclude mackerel. Mr. Williams explained that mackerel were exceptionally strong swimmers. He indicated that the need for a special device rested on the decision taken for the 10-fathom line and pointed out there were many other species that needed to be saved. The industry did kill 5.6 billion croaker per year.

Dr. Kemmerer concurred the motion was valid and believed it would help the research community in developing their reports. He offered a friendly amendment to the motion **to begin another amendment to the Shrimp FMP after completion of Amendment 9 to address bycatch of other species. Amended motion carried with no objection.**

Mr. Williams moved **to remove from the table the motion to send Draft Shrimp Amendment 9 as revised to public hearings. Motion to remove from the table carried.**

Dr. Claverie asked if he would be allowed to discuss the adverse effects mentioned in Amendment 9. Mr. McLemore suggested that if any changes were to be made they needed to be made during the Council session before sending the amendment to public hearings. Dr. Claverie inquired if the Council were locked into the language in the amendment, if the amendment went forward. Mr. McLemore responded that the Council would not be locked into the language, but stressed the Council had more flexibility as to the revisions it could make not than it would at a later date.

Mr. Swingle asked if staff could add the words "to the extent practicable" to clarify the statement "adverse effects." The intent was not to create any more adverse impacts on the industry than necessary. Mr. McLemore believed that would be possible. Dr. Kemmerer moved **to include the phrase "to the extent practicable."** Mr. Minton reminded the Council there was a motion already on the table and moved **to table Dr. Kemmerer's motion. Motion to table carried.**

Dr. Claverie moved **to insert the following words in the Purpose and Needs section of Amendment 9 so that the first sentence would read: The purpose of Amendment 9 was to provide additional management of the shrimp fishery to reduce the unwanted bycatch of juvenile red snapper without, to the extent practicable, adversely effecting the $400 million, (landings value), shrimp industry.**

Mr. Simpson believed the phrase "without adverse effects" had defined parameters and asked if the parameters had been defined in the amendment. Mr. McLemore stressed the language was clear as to what was proposed and reconciled any sense of inconsistency with other sections of the document. Mr. King pointed out the wording in the document justified presenting the amendment for public comment. Mr. Woods questioned if the $400 million shrimp industry figure was a sound figure. Mr. Swingle explained during the committee discussion the figure was a $2.95 billion industry if all the multipliers that applied to the fishery were used. The $400 million figure could be moved to another section of the document or reclassified as ex-vessel value. He explained the figure was derived from a section in the RIR where the economic value of all levels was evaluated down to the retail level which calculated to about $2.95 billion from the Centaur study done in 1989.

Motion to insert the following words in the Purpose and Needs section of Amendment 9 so that the first sentence would read: The purpose of Amendment 9 was to provide additional management of the shrimp fishery to reduce the unwanted bycatch of juvenile red snapper without, to the extent practicable, adversely effecting the $400 million, landings value, shrimp industry. Motion carried with no objection.

Mr. King **moved to remove from the table Dr. Kemmerer's motion to take Amendment 9 forward to public hearings. Motion to remove from the table carried. Motion carried with no objection.**

Red Drum Management Committee

Mr. Woods presented the Red Drum Management Committee report:

> The committee reviewed the framework procedure for specifying TAC under Tab I, No. 3. Mr. Swingle indicated the important provision to keep in mind was that Section 4.a of the procedure required the Council to set TAC within or below the ABC range. He indicated that provision was identical to those for reef fish and mackerel fisheries when the stocks were classified as overfished.
>
> Dr. Goodyear presented the stock assessment under Tab I, No. 4 to the committee. In response to questions related to use of information on shrimp trawl bycatch from the General Linear Model (GLM), he indicated that no information was provided on the size composition of the bycatch; therefore, he assigned the numbers of fish to the Age-0 year class. This bycatch had, therefore, little effect on the analysis result. Most of the bycatch was from waters inside the 5-fathom contour. He concurred that TEDs should have excluded most of the large fish.
>
> He indicated that the assessment appendices contained evaluations of state data on escapement rates. His original perception was that the escapement rates would be much higher than those analyses and his assessment indicated, because of the stringent management restrictions applied by the states. Because of this, he had included under research recommendations (Page 19), that the accuracy of the current methodology should be verified based on life history strategies and management strategies that effect survival patterns and robustness of the assessment analyses. He also indicated that uncertainty about the status of the stock would be reduced by repeating the mark/recapture study and analysis of the age structure of the offshore population.
>
> In response to questions about the different results of state estimates of escapement and those of his analysis, he indicated that likely both were wrong. He indicated that the higher escapement estimate for Florida was more likely to be correct, but if the escapement level for Louisiana was correct then there should have been much larger larval production by the offshore stock which was not the case (as measured by SEAMAP collections). He indicated he had not had the opportunity to review the model methodology used by Louisiana and could not, therefore, comment on what caused the difference in results.

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STATEMENT OF

TEXAS SHRIMP ASSOCIATION

ON

AMENDMENT 9
GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN

Gulf of Mexico Fishery Management Council
New Orleans, Louisiana
September 11, 1996

Introduction and Summary

The Texas Shrimp Association ("TSA") presents this statement in opposition to the shrimp fishery bycatch proposals contained in Amendment 9 to the Gulf of Mexico Shrimp Fishery Management Plan ("FMP"). The stated purpose of Amendment 9 is to reduce substantially the amount of bycatch in the shrimp fishery to avoid what has been alleged as "high levels of juvenile morality" of red snapper. The basis for the Council's objective and plan is derived from past stock assessments of red snapper and related analyses about the interaction between the shrimp fishery and juvenile red snapper. These assessments and analyses were prepared by the National Marine Fisheries Service ("NMFS").

If Amendment 9 is approved by the Council, NMFS would issue regulations requiring the use of bycatch reduction devices ("BRDs") on all shrimp vessels operating under the Shrimp Fishery

FMP in certain specified waters. NMFS would also start a program of certifying BRDs for use in shrimp fishing.

As more fully explained in this statement, TSA is strongly opposed to approval of Amendment 9 by this Council:

First, NMFS' scientific calculations about the impact of bycatch of red snapper in shrimp trawls are fundamentally flawed. Not only has the agency significantly overestimated the amount of red snapper bycatch in the shrimp fishery, we question whether there is adequate information demonstrating that Amendment 9 will actually achieve meaningful growth in the red snapper population. Moreover, bycatch of red snapper in the shrimp fishery has already declined by at least 33 percent in 1994 alone. Moreover, the impact of bycatch on red snapper has been exaggerated because natural mortality for red snapper ages 0 to 1 is likely higher than projected by NMFS.

Second, the red snapper population is healthy and growing at the present time. This stock of fish is not threatened or endangered within the meaning of the Endangered Species Act. While red snapper has been overfished in the past, there are clear indications that the population is on its way to recovery even without specific shrimp bycatch measures.

Third, the Red Snapper FMP does not limit the total harvest of adult red snapper by the recreational sector, even though the commercial harvest must cease when it reaches a certain level. This disparity in conservation measures--where one sector is fixed in its quota and the other exceeds its quota regularly--

raises serious doubt as to whether the Amendment 9, as integrated into the Red Snapper FMP, satisfies the basic fairness and conservation requirements of the Magnuson Act. Even if Amendment 9 is approved by the Council, it must be accompanied by an amendment to the Red Snapper FMP that places a fixed annual quota on recreational fishing capture and a lower total allowable catch ("TAC"). Otherwise any conservation benefits of restricting shrimp bycatch are lost by continued overfishing of the stock. Without such a limit, Amendment 9 is a pure allocation measure and not a conservation measure.

Fourth, Congress will soon amend the Magnuson Fishery Conservation and Management Act ("Magnuson Act") to address more directly the issue of bycatch. In those amendments, Congress has included three bycatch provisions that are directly applicable to what the Council is considering here today. Until the Council satisfies those new bycatch provisions, which will be enacted shortly, no action should be taken on Amendment 9.

Therefore, we ask that the Council vote to table Amendment 9 pending further study and analysis. TSA supports responsible and practical measures to reduce and minimize bycatch that cannot be avoided. Furthermore, Congress will soon also require that bycatch measures in the Gulf of Mexico be based on "the need to avoid any serious adverse environmental impacts" on the bycatch species or the ecology of the affected area. Amendment 9 does not meet these basic fishery management principles.

Doubts About the Scientific Basis for Amendment 9

TSA has undertaken a thorough technical evaluation of the scientific data and conclusions on which the Council's Amendment 9 proposal is based. That evaluation was conducted by Dr. Benny Gallaway of LGL Ecological Research Associates, Inc. of Bryan, Texas ("LGL") and William Gazey of W.J. Gazey Associates and was presented to the Council's Reef Fish Stock Assessment Panel and the Scientific and Statistical Committee in August and has been discussed at length in Committee meetings these last three days.

Based on these evaluations, we have come to the conclusion that Amendment 9 rests on several fundamental scientific flaws that have not been resolved at this time. One of the basic issues that cannot now be explained is the essential question of whether NMFS' estimates of the size of the shrimp bycatch are reasonably accurate. It makes no sense to proceed further with Amendment 9 until this issue is resolved to everyone's satisfaction.

Therefore TSA believes approval of Amendment 9 as presently proposed would violate the Magnuson Act and the Administrative Procedure Act. While TSA agrees with the need to find ways to reduce bycatch of unwanted species in the shrimp fishery, including sea turtles and finfish, we do not believe that the data demonstrates that restriction of shrimp bycatch through the use of BRDs will have the hoped for positive impact on red snapper stock abundance.

As a general matter, the bycatch in the shrimp fishery is largely composed of fish that have a short life cycle comparable to the targeted shrimp--one to two years. These species--such as Atlantic croaker and longspine porgy--have high rates of reproduction and high rates of natural mortality in one to two years. The bycatch of these short-lived but highly productive fish creates no serious adverse environmental impact to either the species or the surrounding ecology. In fact, the evidence suggests that the discarding of these bycatch species creates at least two ecological benefits. First, the discards are fed upon quickly by other fish, sea turtles, marine mammals, and birds. And, second, predation by these species on the shrimp stocks is kept in check. Consequently, we not believe that shrimp bycatch in this fishery is the great urgent conservation problem that has been claimed. Moreover, except for red snapper, nearly all of the finfish bycatch are species with little or no economic value.

The Red Snapper Population Is Growing

We all agree that more must be done to increase the red snapper population in the Gulf of Mexico. The stock is substantially below the levels known to exist in past years. While we believe that habitat changes have played a major role in the decline, overfishing is also a cause.

Nonetheless, the currently available information suggests that red snapper are on the road to recovery. The standing stock is growing, as is the young-of-the-year index of abundance. Since 1990, the year the Council adopted the bycatch reduction objectives we are discussing, the number of age 2 and older fish have increased from 6 to 15.6 million fish in 1994 (Goodyear 1995; Table 98). If these trends are correct, then we are debating the pace at which recovery is achieved, not whether recovery will occur.

The Red Snapper FMP Fails to Achieve Conservation

TSA must challenge the entire management concept underpinning the red snapper management plan as reflected in the Red Snapper FMP Amendment 9--strict bycatch restrictions on the commercial shrimp fishery, a fixed quota enforced by a closure on the commercial red snapper fleet, and essentially unlimited fishing of red snapper by the recreational community subject only to bag and trip limits. In the last three years, the recreational component of the fishery has exceeded its quota by nearly double. The only conclusion we can draw is that the management measures imposed on the commercial sector--and proposed for restricting bycatch in the shrimp fishery--are intended primarily to allocate fishing opportunities to the recreational sector, not for the purpose of biological conservation of the red snapper stock.

NMFS is presently considering a regulatory amendment submitted by this Council to increase the TAC of red snapper for 1996 to 9.12 million pounds. In 1991, after the Council claimed that this fishery was "significantly overfished," the TAC was set at 4 million pounds. For 1993, the TAC was increased, this time to 6 million pounds. Now the directed commercial and recreational fishery will be allowed to take even more of a fish stock for which the Council professes great conservation concern. It is very difficult for us to understand why a fish stock that is said to be "seriously overfished" can withstand such an increasing TAC. This same conservation concern is also the reason given for strict bycatch limits on the shrimp fishery.

As this Council knows, the Magnuson Act requires that management measures must be fair and equitable to all those regulated in the fishery and must be reasonably calculated to promote conservation. We are convinced that Amendment 9 does not satisfy either of these basic requirements of the Act. Nor is Amendment 9 based on the best available scientific information and analysis. Consequently, we must oppose Amendment 9 as both ineffective and merely an allocation measure clothed in the guise of conservation.

New Magnuson Act Amendments Will Guide Bycatch Regulation

The new Magnuson Act amendments now before the Congress contain several provisions that address the bycatch of non-targeted species of fish. TSA supports the Senate version of these amendments as reflected in the manager's amendment to S. 39, the Sustainable Fisheries Act. Bycatch has been an important focus of these amendments.

Under the amendments, Councils must address bycatch concerns in a more deliberative manner than was the case under existing law. Bycatch measures must be practicable, focussing in the first instance on minimizing bycatch and then on minimizing the mortality of bycatch that cannot be avoided. However, prior to formulating shrimp fishery bycatch measures for the Gulf of Mexico, NMFS and this Council are obligated to complete two Congressionally mandated directives.

The first requires the collection of data on the bycatch problem in the fishery, the identification of those stocks of fish that should receive priority treatment, and the development of a bycatch reduction program (section 206 of S. 39, as amended). A report on these issues is due one year after the Magnuson Act amendments become law. The value of this additional study has already been demonstrated by the unresolved questions pointed out by the LGL Report. The second directive is for NMFS to complete a peer review of the red snapper fishery statistics and management system now in place, due also in one year. It would not be appropriate for the Council to proceed further on the shrimp bycatch issue until these tasks are completed.

We also wish to highlight a new standard that, in addition to the general bycatch provisions included in the new amendments, will be applicable specifically to measures to reduce bycatch in the shrimp trawl fishery. That standard limits bycatch restrictions to only those necessary to "avoid any serious adverse environmental impacts on such bycatch species or the ecology of the affected area." We support this new standard and which we believe it sets the proper priority for new bycatch regulations. Congress has clearly decided not to regulate all shrimp fishery bycatch problems--only those that create serious adverse environmental impacts. In this era of limited government and regulation, the Council cannot and should not regulate every conceivable alleged bycatch problem. Thus, an affirmative finding of "serious environmental impact is required before any action can be take on Amendment 9 after S. 39 becomes law.

Conclusion

For several years now, TSA has heard growing complaints about bycatch in the shrimp fishery, particularly of red snapper, a very popular commercial and recreational reef fish species. Although all acknowledge that the size of the shrimp fleet has declined over the last several years and that the amount of bycatch in the shrimp fishery is much less than previously reported, this Council still obviously considers the red snapper bycatch issue a high priority. However, TSA has always had doubts about whether this great concern over bycatch is truly based on sound science and fundamental principles of balanced ecological management or some other objective.

In summary, we do not believe that the Council and NMFS are proceeding in the right direction with respect to finfish bycatch in the shrimp fishery. Technological solutions--more gear, more shrimp loss--should not be the only solution under consideration. The LGL Report has shown that the scientific basis for Amendment 9 is questionable. When reconsidering bycatch measures after completing the Congressionally mandated analyses, we recommend that the Council look closely at our plan for protecting sea turtles in near-shore areas. You will see that reducing shrimping effort in areas of high turtle concentration has the added benefit of reducing finfish bycatch. The Council needs to go back and reconsider entirely the framework for managing red snapper and reducing bycatch in the shrimp fishery.

Thank you for the opportunity to present TSA's views to the Council.

ccm: 11/19/96

DRAFT

MINUTES

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

ONE HUNDRED AND FORTY-NINTH MEETING

POINT CLEAR, ALABAMA

NOVEMBER 13-14, 1996

The one hundred and forty-ninth meeting of the Gulf of Mexico Fishery Management Council was called to order by Chairman Robert Shipp at 8:32 a.m., Wednesday, November 13, 1996. Council members in attendance were:

VOTING MEMBERS

Pete Aparicio .... Texas
Irby Basco .... Texas
Maumus Claverie .... Louisiana
Felicia Coleman .... Florida
Frank Fisher .... Texas
Karen Foote (designee for James Jenkins) .... Louisiana
J. Scott Green .... Florida
Philip Horn .... Mississippi
Andrew Kemmerer .... National Marine Fisheries Service
Albert King .... Alabama
Karl Lessard .... Florida
R. Vernon Minton .... Alabama
Hal Osburn (designee for Andrew Sansom) .... Texas
Robert Shipp .... Alabama
Roy Williams (designee for Russell Nelson) .... Florida
Glade Woods .... Mississippi

NONVOTING MEMBERS

Larry Simpson .... Gulf States Marine Fisheries Commission
Doug Frugé (designee for Noreen Clough) .... U.S. Fish and Wildlife Service
LCDR Mark Johnson (designee for Timothy E. Josiah) .... Eighth Coast Guard District

Kay Williams . . . . Save Our Seafood Industry, Pascagoula, Mississippi
Bob Zales, II . . . . Panama City, Florida

Dr. Shipp read the opening statement and asked for voice identification.

- Adoption of Agenda

The agenda was adopted with the following change: If time permitted, complete as much of Thursday's agenda as possible on Wednesday.

- Approval of Minutes

The minutes were approved with the following changes:
Page 1, remove Timothy Josiah from the voting members list.
Page 5, first bullet, verify the statement.
Page 30, third paragraph from the bottom, change to read ..."was issued to a person, to a vessel, and that vessel was boarded and that particular vessel was not"...
Page 51, second paragraph, substitute the word "attorneys" for "students."
Page 60, sixth paragraph, change "Denton" to "Ditton."
Page 60, seventh paragraph, fourth line, delete ...completed and a report written within a" and insert "started with improvements initially which is an"...
Page 60, seventh paragraph, fourth line from the bottom, insert "Gulf" before RecFin.
Page 60, seventh paragraph, last line, delete "complete" and insert "handle."

- Approval of Committee Membership

Dr. Shipp stated that Mr. King and Mr. Lessard had requested to switch their memberships in the Deep Water Crab and Coastal Migratory Pelagic Management Committees. He recommended assigning Mr. Aparicio as Vice Chairman of the Habitat Protection Committee and remove Andy Martin from the Habitat Protection Committee. Dr. Kemmerer asked to be appointed to the Butterfish Management Committee and Dr. Shipp so recommended. With these changes, committee membership was approved with no objection.

- Public Testimony on Shrimp Amendment 9

Mr. King requested to testify as a public citizen. After a brief discussion, this request was approved. Dr. Shipp noted that there were 13 cards submitted by persons wishing to testify and asked for opinions from Council members on the time period to be allotted to each speaker. Dr. Kemmerer suggested that 10 minutes be allowed for each person testifying on Shrimp Amendment 9. There were no objections to this recommendation by the Council members.

Wilma Anderson, Aransas Pass, Texas, Executive Director of the Texas Shrimp Association (TSA) stated that her organization remained opposed to Shrimp Amendment 9. She read a prepared statement (see attached).

Mr. Osburn noted that Texas recognized that the wild-caught shrimp fishery was the most valuable commercial fishery and that aquaculture, importation of shrimp, as well as utilization of shrimp while in the estuaries, had created a negative affect on the shrimp industry. He asked Ms. Anderson if an important management consideration would be a minimum of gear restrictions or attempts to control overfishing of juvenile shrimp in the bays. Mrs. Anderson responded that TSA acknowledged that overcapitalization in the bays was a serious problem, but had not involved themselves with the bay industry limited entry program, and had left this matter to the discretion of the Texas Parks and Wildlife Department. She pointed out that every time a hole was cut in a net, shrimp were lost. TSA had researched what measures would be feasible and would enhance protection of the turtles, bycatch and shrimp. TSA suggested a closed area 6.2 miles offshore of the majority of the Texas coast and slightly more off the upper Galveston coast. The small inshore fleet were required to pull turtle excluder devices (TEDs). The larger boats fished offshore and the greatest shrimp loss occurred in deep waters.

Kay Williams, Pascagoula, Mississippi, Vice President of Save America's Seafood Industry (SASI), stated that in the newly reauthorized Magnuson-Stevens Act Congress required new studies of shrimp and bycatch measures and new data on red snapper. She questioned whether Shrimp Amendment 9, as presently drafted, ensured full compliance with the Magnuson-Stevens Act. The Shrimp Advisory Panel had requested that National Marine Fisheries Service (NMFS) assess all the untrawlable bottom. In 1990, NMFS had estimated that a reduction in bycatch of red snapper by the shrimp industry by about 60 percent was needed in order to allow a directed harvest of only 1 million pounds of red snapper. The directed total allowable catch (TAC) was 4 million pounds in 1991-1992, 6 million pounds in 1993-1995, and in 1996 9.12 million pounds. She noted Dr. Goodyear had stated in 1995 that, if the TAC was reduced to zero for the red snapper industry and the shrimp industry did not reach their 50 percent red snapper bycatch reduction, then the red snapper stock would not reach the 20 percent spawning potential ratio (SPR) goal. In September 1996, Dr. Goodyear stated in his report that the commercial harvest had been constrained by size limits and quotas. In the most recent years the commercial harvest had been near the commercial allocation; however, the recreational harvest had greatly exceeded its allocation. She felt the red snapper commercial fishery had been unjustly penalized. The Shrimp industry was also aware they had not received sufficient credit for their bycatch reduction of red snapper and Shrimp Amendment 9 would penalize them. The red snapper stocks were healthy; NMFS and the Council should reevaluate their scientific data before placing further regulatory restrictions on this fishery. The red snapper fishery could not afford further reductions in TAC.

George Barisich, Violet, Louisiana, President of the United Commercial Fishermen's Association, served on the Louisiana Seafood Marketing Council, and was a commercial fisherman. He felt that NMFS was indifferent to the needs and recommendations of fishermen. Mr. Barasich noted he had made a "win-win" proposal at a meeting in Washington, D.C. that had been rejected. He questioned why, if red snapper were endangered, recreational fishermen were catching almost twice their quota. Commercial fishermen were filling their quota in nearly one-third of the time this took three years ago, and with less crew. He maintained that the juvenile snapper that were released through a device tended to re-enter the net after escaping. He believed there was no resource problem with any species of the Gulf exclusive economic zone (EEZ) or inshore waters of Louisiana. He contended that shrimp loss using bycatch reduction devices were between 12 to 18 percent, rather than the 3 percent claimed by NMFS. He contended that predation would reduce the biomass by a considerable amount. Most of Louisiana's inshore and nearshore areas were soft mud bottom, a condition that made slow retrieving of the trawls impossible. Slow trawl retrieval was necessary in order for the bycatch reduction devices (BRDs) to operate properly. He maintained that statistics proved that in some areas the very species that had been excluded were now overpopulated and had caused imbalances in aquatic ecosystems. He maintained that sharks and dolphins would follow the BRDs to provide themselves with an easily acquired meal and that they would damage the equipment. The commercial fishing effort had already been reduced by 40 percent since the implementation of TEDs had diminished the number of license holders (32,000 down to 14,900), though NMFS had stated this would not occur. He felt that a new bycatch program was needed, due to the reduction of fishing effort and a 35 percent decrease in bycatch that had resulted. He contended that no bycatch program could be initiated because the language of Shrimp Amendment 9 stated that the program could not be implemented if it adversely affected the $400 million-a-year shrimp industry. The data clearly indicated that a shrimp loss could be as low as 3 percent, but as high as 20 percent. Further, the biomass of the shrimp would be reduced 11 to 18 percent by increased fish predation, stemming from a fish population explosion caused by BRDs. Mr. Barasich felt that if BRDs were to be imposed on fishermen TEDs should be discarded. He maintained that TEDs had caused from 5 to 23 percent of shrimp to be lost from nets, resulting in half of shrimp fishermen leaving the industry. He cited instances where TEDs had caused accidents, such as hitting him on the head while working in rough weather or having a catfish drop out of the 26-inch hole and strike him on the shoulder and back. He stated that stress related to loss of income had caused a friend who was a shrimp fisherman to commit suicide. At this point, Mr. Barasich expressed his belief that two Council members were unfit for their position. Mr. Williams objected, stating these remarks were not pertinent to Shrimp Amendment 9. Dr. Shipp sustained this objection.

Dr. Claverie asked for details of Mr. Barasich's "win-win" proposal. Mr. Barasich replied that he had recommended, in lieu of pulling a TED in inshore waters, a $200.00 permit fee be collected which would have netted the U.S. Government $3.4 million. He contended that no biological evidence existed to prove that there were turtles in the inshore waters of Louisiana. Dr. Claverie commented that his belief was that Louisiana law precluded shrimpers from having to pull a TED in state waters. Mr. Barasich responded that this was not true and that TEDs were required in Louisiana state waters. Mr. King asked if Mr. Barasich felt that if the BRD requirement was passed by the Council it would lead to requiring BRDs in inshore waters. Mr. Barasich responded affirmatively, remarking that for three or four months during the summer there were areas of "jelly water" and, under these conditions, everything escaped through the hole of a fish excluder device. Mr. King asked how much area in the offshore waters (10 fathoms and outward) was not trawlable, either because there were no shrimp there or because of obstructions. Mr. Barasich was unable to reply to questions about offshore waters, but responded that inshore Louisiana waters, from Saint Bernard Parish to Baton Rouge (5 miles wide) was sanctuary and could not be fished.

Dr. Claverie noted that Mr. Barasich had commented on hazards related to pulling TEDs and asked if he considered this gear to be a safety problem and what his thoughts were on adding a BRD. Mr. Barasich replied that a BRD was not as heavy or as bulky as a TED, but in rough weather, and at night, catch could fall out of the device onto fishermen working on deck. Mr. Horn referred to the statement of Mr. Barasich's that Louisiana shrimp licenses had decreased from 32,000 to 14,900 over a period of several years. He asked if Mr. Barasich was aware of a similar depletion in licenses in adjoining states. Mr. Barasich replied he had no knowledge of the number of licenses in other Gulf states. Mr. Horn inquired if the decrease in licenses had enabled shrimp fishermen to redouble their efforts. Mr. Barasich replied that fishermen with boats that were paid for were the only persons who could afford to continue fishing. Mr. Horn restated his question, asking if less competition allowed Mr. Barasich to work for longer periods of time. Mr. Barasich responded that he must work longer hours than he had prior to the implementation of TEDs in order to maintain the same level of income.

Nathan Cox, Orange Beach, Alabama, President, Orange Beach Fishing Association (OBFA), member of the Red Snapper Advisory Panel (AP), and an owner/operator of a charterboat noted that the present red snapper management measures had proved successful in the recreational fishery, including the charter and head boat industries. He had assisted in educating the public in red snapper conservation and he believed the 5-fish bag limit, 15-inch size limit was as low as his industry could afford to go in order to remain economically stable. He felt that the red snapper stock were prospering under present management, but felt bycatch must be further reduced.

Mr. King asked Mr. Cox if he had to make a choice, would he prefer reducing the bag limit or closing for part of the season, given that the recreational fishery consistently overfished their quota, in violation of the requirements of the Magnuson Act. Mr. Cox responded that other options existed, such as reducing bag limits for the crew or limited entry; of the two choices Mr. King had offered, a partial closure would be his selection. Mr. King felt that red snapper issues should be addressed in that fishery, rather than in the shrimp fishery. He asked if Mr. Cox had experienced any difficulties, aside from storms, that would prevent him from catching enough fish to satisfy his parties. Mr. Cox responded negatively. Mr. King asked if Mr. Cox could compare his charterboat catches with those experienced over the past 6-7 years. Mr. Cox replied that his present red snapper catches were the most numerous and the largest sizes that they had ever been. Mr. King asked Mr. Cox what he felt the effect would be if, in the future, there were 10 times more red snapper than there were at present. He explained that the NMFS' model indicated that there was less than a 2 percent SPR level. Scientists who developed this model had informed him that 20 percent SPR was the target goal. Therefore, there should be 10 times more red snapper when this goal was reached than presently existed. Mr. Cox replied he did not know how to respond to this question, but he stated that, over the past 4 years, the recreational fishery had been required to adjust their TAC and bag and size limits and if they did not achieve a 50 percent reduction, at least as perceived, the recreational fishery could be reduced to a zero bag limit. Mr. King replied that this statement reinforced his belief that decisions were being based on a flawed model, rather than on the absence of red snapper in the Gulf of Mexico. Mr. Cox stated that if Shrimp Amendment 9 was not passed, or was altered, the result could be that the shrimp industry could cause the red snapper industry to go out of business. Dr. Kemmerer commented that Mr. Cox had taken him out on his boat and shown him a great number of snapper in the Gulf.

Mr. Woods remarked that none of the regulations would be successful without enforcement. He asked Mr. Cox how often he checked for number of red snapper aboard his boat. Mr. Cox replied that this was closely regulated and it was standard procedure at every fishing spot that the deckhand count the fish. Mr. Woods asked how often enforcement personnel checked his boat. Mr. Cox responded that enfocement officers had not boarded his boat during the present year, but during the preceding two years had twice checked his boat. His boat was often met at the dock by data collectors who measured the fish and did a creel count.

Mr. Simpson asked the opinion of Mr. Cox on limited entry. Mr. Cox replied that he had conflicting feelings about limited entry since he was unsure whether this approach was constitutionally or morally right. If these considerations were satisfied, he felt this might be a viable option. Mr. Simpson inquired how long Mr. Cox had been involved in the fishing industry. Mr. Cox replied he had been a charterboat fisherman for six years, but had been fishing all of his life. Mr. Simpson asked Mr. Cox about how many charterboats had been located in his area in the 1970s as compared to the present time. Mr. Cox did not have this information, but stated that 5 years ago there were about 90 charterboats and there were presently 108. A member of the audience remarked that there had been about 20 charterboats in the Orange Beach area during the 1970s.

Mr. Aparicio commented that Mr. Cox had stated that the recreational sector of the industry had done its share and it was time for the shrimp industry to do their part. He asked how that related to the fact that the recreational sector had exceeded their quota consistently over the last four years. Mr. Cox responded that the commercial fishery quota was tracked more closely than the recreational fishery who were only informed by NMFS of the status of their quota in the following year. At that time adjustments to bag and size limits were set by NMFS. Mr. Aparicio noted that, nevertheless, recreational overfishing had remained a persistent problem over the past four years.

Dr. Claverie asked Mr. Cox if he ever observed shrimping being conducted in the areas where he fished. Mr. Cox replied that in the places he personally fished, he saw very little shrimping activity. He explained that he fished in the artificial reef zone off Alabama and this area was avoided by shrimp fishermen because the reefs created a hazard to their nets.

Mr. Basco stated his faith in the NMFS model as the best available scientific information. He commented that overfishing, such as occurred with mackerel during the 1970s before restrictions on landings were applied, could decimate a fishery rather quickly. He asked if this was Mr. Cox's perception. Mr. Cox replied that red snapper stock seemed to be steadily improving. He felt the measures adopted by the Council and NMFS was responsible for the rebound of the species and that the use of TEDs had also contributed to this improvement. Mr. Basco felt that a continued increase in stocks would allow the TAC to be raised accordingly and would benefit the industry. Mr. Minton commented that the OBFA had demonstrated fairness to other fishing industries, markedly during the gill net controversy, when OBFA had not taken a stand against gill net fishing. He stressed that the same model that had reduced recreational fishing bag and size limits was the identical model that stated bycatch must be reduced by 50 percent in order to successfully restore the red snapper fishery. Mr. Osburn asked if Mr. Cox fished primarily in the Special Management Zone (SMZ) off Alabama that comprised about 1000 square miles. Mr. Cox responded affirmatively. Mr. Osburn inquired whether the artificial reefs that proliferated in this area, preventing shrimp activity, would account for the large numbers of red snapper found in this area. Mr. Cox replied that this might be the case; however, he doubted that spawning activity occurred there. Mr. King asked if Mr. Cox fished near oil rigs, or if any fishermen in the OBFA did so. Mr. Cox responded he did not fish near oil rigs but many members of his association did so. Mr. King expressed doubt that shrimpers were to be found trawling near oil rigs.

Steve Foust, OBFA, a charterboat fisherman from Pensacola, Florida, stated his support for Shrimp Amendment 9.

Pete Barber, Coden, Alabama, President of the Alabama Seafood Association, objected to a situation that caused dissension between fishery groups. He stated that the Magnuson-Stevens Act required an independent peer review prior to taking final action. He felt that, anecdotally, the red snapper population was good and getting better, despite the fact that the environment did not presently include BRDs. He stated that he was a sales representative for the largest shrimp producer in South Carolina and the majority of his business came from that state. To date, his production level, computed over the past 6 years, was down by 47 trailer-loads of shrimp. These trailer loads typically averaged about 27,500 pounds, putting him about $1.3 million pounds short of a normal year. Taking into account a down cycle, this was the first year Georgia and South Carolina had had to pull number 1 hard TEDs in front of the fisheye BRD. The data that was collected last year in the samplings in South Carolina indicated that shrimp loss ran 10 to 20 percent, above the amount that the Council considered acceptable. In actuality, the shrimp loss presently exceeded 20 percent. He emphasized that anything that affected the cable tension, such as rough seas or water currents, caused a mass exodus forward and out the BRD hole.

Mr. Green asked Mr. Barber for further marketing information. Mr. Barber replied that he only shipped fish out of South Carolina when the local markets were filled since the prices they received at the docks were greater than when shipping out of the area. Mr. Green asked how much competition Mr. Barber had experienced in dealing with the New York and Chicago markets. Mr. Barber replied that these markets bought his shrimp indirectly since his sales were to Sea Pearl, Jubilee Foods or Custom Pack, processors who then sold the frozen product to the New York and Chicago markets. Mr. Green asked how many truckloads per year Mr. Barber averaged from all sources. Mr. Barber responded he averaged from 80 to

100 truckloads per year. Mr. Green inquired how many truckloads of shrimp he had shipped this year. Mr. Barber replied that he believed less than 20 truckloads had been shipped this year.

Brian Annan, a charterboat fisherman from Orange Beach, Alabama, supported Shrimp Amendment 9, stating he could not afford to have the red snapper bag limit further reduced.

Mr. King asked if Mr. Annan was fishing prior to the implementation of the 5-fish bag limit. Mr. Annan replied affirmatively. Mr. King asked if charterboat trips declined when the bag limit was changed from 7 fish to 5 fish. Mr. Annan responded that trips did not decrease, but complaints had increased and he believed a further cut in bag limits would be fatal to the industry.

Charles Day, Jr., a charterboat fisherman from Foley, Alabama, supported Shrimp Amendment 9.

Mike Rowell, Orange Beach, Alabama, OBFA, supported Shrimp Amendment 9. He had recently purchased his boat and had charterboat fished for eight years. He felt the stocks were improving and the fish were growing larger. He commented that he had no wish to harm the shrimp fishery, but expressed concern that, if the model was correct, a possibility existed that the recreational bag limit would be impacted and the industry could not survive such action.

Mr. Simpson asked Mr. Rowell if he had fished aboard another person's boat until the recent purchase of his own boat. Mr. Rowell replied affirmatively. Mr. Simpson asked if the boat was new to the fishery. Mr. Rowell responded that the boat had been purchased as used from a person who had recently acquired a new boat. Mr. King commented that he understood Mr. Rowell's position in trying to protect his way of life, but he maintained that the model contained erroneous information.

Maurice Fitzsimons, an owner/operator charterboat fisherman from Daphne, Alabama, who fished out of Orange Beach, Alabama, represented a fleet of 22 boats. He stated that one charterboat fishing trip had generated $6,000 for the local economy. The persons participating were attracted to the area because of the red snapper. He supported Shrimp Amendment 9. Mr. Williams asked what the exvessel value of red snapper was to his business. Mr. Fitzsimons estimated that a $1,000 Saturday trip for 10 people catching 50 snapper equaled $20. Mr. King asked if his parties experienced any difficulty in achieving their red snapper bag limit. Mr. Fitzsimons replied this was not usually a problem. Mr. King inquired what sizes of red snapper were generally caught. Mr. Fitzsimons responded that red snapper fishing had never been better and that there were many juvenile fish as well. Mr. Horn inquired what would be the average number of times the charterboat vessels achieved their bag limit. Mr. Fitzsimons replied that it would be difficult to answer this question for other vessels; he noted that the length of the trips by the individual boats would probably impact how many fish were caught. Mr. Woods asked what was the condition of undersize fish that were returned to the water. Mr. Fitzsimons replied that he believed that the mortality rate was under 5 percent for these fish, though in deeper waters the survival rate was lower. Mr. Simpson asked in what depth of water Mr. Fitzsimons fished. Mr. Fitzsimons responded that he generally fished in waters from 75 to 125 feet.

Chris Nelson, Bon Secour Fisheries, Bon Secour, Alabama, noted he had provided written comments on Shrimp Amendment 9 and comments at the public hearing held in Mobile, Alabama. He felt the majority of the shrimp industry did not favor the status quo. Nevertheless, he did not mean to imply that they felt Amendment 9 provided acceptable answers to the bycatch problem. He acknowledged that this issue was complex. He expressed the belief that interpreting computer models and dictating policy based upon them was a recipe for success as far as convincing the public that these results were legitimate and correct.

People were no longer willing to place their trust in what had been told them by managers, particularly when data had been called into question, even by the United States Congress. He enjoined the Council members to try to understand the frustration of the shrimp fishermen in trying to deal with one more piece of gear.

Mr. King asked Mr. Nelson to explain the background of a videotaped interview that he had received from Mr. Nelson. Mr. Nelson advised that his company had worked cooperatively with the Gulf and South Atlantic Fishery Development Foundation (G&SAFDF) in the characterization of the bycatch and testing of experimental BRDs. Mr. Charles King had taken observers aboard his boat over the past 2-1/2 years testing various types of BRDs for proof of concept and design. The interview consisted of Mr. King's comments on the BRDs tested. When Mr. Charles King was asked if a bycatch excluder had been developed that he felt was acceptable. Mr. Charles King's response was that the expanded mesh excluder was the best and that he had used this BRD extensively; however, it still needed a good deal of modification since, under certain circumstances, a lot of shrimp were lost. One of Mr. Charles King's comments was that, in certain parts of the Gulf a great deal of skates were caught, and these could create real problems. Overall, Mr. Charles King was very supportive of the efforts of G&SAFDF and Texas A&M.

Mr. Minton asked if he, or Mr. Charles King, believed the BRDs could be improved. Mr. Nelson replied that Mr. Charles King felt, and hoped, that both the expanded mesh and the fisheye BRDs could be improved. Mr. Aparicio noted that, during the interview, Mr. Charles King had mentioned that in using a hard TED he had caught two turtles, but in using the soft TED he had not caught any turtles. Mr. Aparicio asked if both trips had encompassed about the same length of time. Mr. Nelson replied that he was not aware of how long either of the trips had been, but they had been taken on consecutive days in the same area and with an observer on board. Mr. Charles King had stated a preference for the Andrews soft TED, and for using this device in lieu of a BRD. He felt that using one device, as opposed to two devices, would be advantageous in retarding shrimp loss. Mr. Aparicio asked if Mr. Charles King had mentioned which TED most successfully excluded bycatch. Mr. Nelson replied that Mr. Charles King believed the Andrews TED (both soft and hard) produced the most significant reduction in bycatch; his personal preference was the Andrews soft TED. Mr. Basco inquired if Mr. Nelson felt that an improved BRD would eventually be developed. Mr. Nelson replied that he felt this to be possible, noting that the fisheye BRD had been in use by fishermen for many years since they did not want the bycatch in their nets either. Mr. Basco remarked that this was his understanding also. He noted that Shrimp Amendment 9 had a provision for the adoption of newly developed NMFS-certified gear. Mr. Nelson commented that this was a good feature of the amendment; however, development was difficult and expensive. Mr. Horn asked how extensively the fisheye BRD had been utilized by shrimp fishermen. Mr. Nelson responded that, in his conversations with boat captains, it appeared that, under certain circumstances, the fisheye BRD had been used by most vessels. These conditions included when fishing in an area that contained large numbers of fish. The quad-rig trawl, with its sled, had excluded a great deal of bycatch, because of the way it fished. The ability to use plotters allowed shrimp fishermen to avoid areas heavily populated with other species.

Russell Smith, a charterboat owner/operator from Orange Beach, Alabama supported Shrimp Amendment 9. He stated that he had lost a few customers when the red snapper bag limit was reduced to 7 fish and a few more when the bag limit was reduced to 5 fish. He felt the stock was improving, though he believed bycatch was a problem.

Malcolm Miller, an owner/operator of a charterboat based in Orange Beach, Alabama, supported Shrimp Amendment 9. The NMFS model seemed to be working for the recreational fishery and he felt the charterboat industry would not be able to sustain a further reduction in red snapper bag limits. Mr. Woods asked the survival rate of the fish on his boat that were caught and released. Mr. Miller replied that it depended on how the fish were hooked. When a bleeding fish was returned to the water it was eaten by triggerfish even though they might swim down. If their bladder was punctured and they were returned to the water they had a good change to survive. Mr. Woods asked for an estimated mortality rate. Mr. Miller replied that it was difficult to make a determination; about 90 percent swam down but might be attacked by other fish on the bottom.

Debra Evans, Gulf Shores, Alabama, Administrator of the OBFA, supported Shrimp Amendment 9 and all efforts by the Council to reduce shrimp trawl bycatch and enhance the red snapper fishery and management of the natural resources. She commented that, if future information proved these management measures to be incorrect, adjustments should be made at that time.

William Perret, Mississippi Department of Marine Resources, Biloxi, Mississippi, noted that the issue under discussion had first been addressed by the Council in 1989-1990 when they passed a motion to require a 50 percent reduction in red snapper bycatch, based on an average through 1984-1989, and prior to implementation of TEDs. Mr. Perret questioned what was the goal for Shrimp Amendment 9. He quoted from the minutes of the Shrimp Management Committee meeting held in September in New Orleans, Louisiana. "Dr. Leard believed the Council's goal was to reduce mortality of age 0 and age 1 fish." (Later in the paragraph) "Mr. Swingle recalled the goal was to restore the red snapper stock." (Next paragraph) "Dr. Kemmerer responded the goal always was the reduction of bycatch mortality by 50 percent and he did not understand why that goal was being limited only to juvenile fish." Mr. Perret commented that these statements had been made two months ago and no one seemed to agree on the goal. (Last sentence) "Dr. Kemmerer suggested his staff and Dr. Leard work together to revise the language of the goal." He stressed that Council members needed to make a decision on what was the goal of Shrimp Amendment 9. He emphasized that, while the Council utilized the best scientific data, there was reason to question this data. In 1986, he had been asked to speak about the United States shrimp production at a world shrimp conference. In preparation for this presentation, Mr. Perret had requested landings information from NMFS' New Orleans office, Galveston office, the Southeast Science Center, and the Washington, DC Headquarters office. He stated that the statistical data he received from each of the various NMFS' offices was contradictory. Attempts to acquire efforts data met with a similar result. Mr. Perret noted that a well-respected statistician, who had performed work for the Council, had stated in a letter to the Louisiana Department of Wildlife and Fisheries that he had seen better effort data prepared by third-world countries. He stressed he had no objection to the NMFS' model, but seriously questioned the data being inputted into the model. He commented that hit-or-miss sampling efforts and storms impacted data-gathering results. He felt that the fisheries were being forced into opposing each other and emphasized the necessity of maintaining a balance in the ecosystem. He noted that the Magnuson-Stevens Act mandated a NMFS report to be peer-reviewed, and he counseled delaying action on Shrimp Amendment 9 until this had been accomplished.

Mr. Osburn inquired if Mr. Perret was inferring that implementing a management measure that would reduce the incidental take of literally billions of organisms, primarily fish, was not assisting ecosystem management. Mr. Perret responded that he felt if habitat was properly managed the fishery would benefit; however, he did not mean to imply that bycatch should not be reduced. He maintained that enforcement of the provisions of Shrimp Amendment 9 would be difficult to attain.

Donald Flournoy, board member of the OBFA, Orange Beach, Alabama, stated that techniques had been developed to prevent high mortality of fish being returned to the water. Most fish could be returned safely if a hook had not become imbedded. About 1 in 20 released fish would swim down, though it was difficult to determine whether a predator intercepted it once it was out of sight. He stated that he had been a charterboat fishermen operating out of Destin prior to the imposition of limits and had witnessed the decline of the industry. Since the setting of limits had occurred, the fish had been rebounding. A technique was used by charterboat fishermen in his area to avoid catching the smaller fish.

Kimberly Davis represented the Center for Marine Conservation, St. Petersburg, Florida. She stated that her organization had previously submitted extensive comments on Shrimp Amendment 9 [Tab D, No. 7(f)]. She quoted from a Council report stating that 20 million juvenile red snapper, 3.2 million Spanish mackerel, 1.3 million king mackerel and 5.6 billion croaker died in shrimp nets each year. The organization supported Shrimp Amendment 9.

Joseph Nash, Orange Beach Fishermen's Association, Orange Beach, Alabama, was an owner/operator of a charterboat. He spoke in support of Shrimp Amendment 9 and careful management of the fishery. He noted that there had been some economic impact caused by customer objections to the smaller bag limit.

Mr. Woods inquired how many trips per year Mr. Nash made with his charterboat. Mr. Nash replied he made about 180 trips per year. Mr. Woods asked Mr. Nash for an estimate of the percentage of undersize fish that were released on an average fishing trip. Mr. Nash replied that this was determined by how well deckhands were trained; however, most fish swam down. He avoided areas where most of the fish appeared to be juveniles. Mr. Woods asked if Mr. Nash found it difficult to achieve a quota on the charterboat trips. Mr. Nash replied that this was a situation that varied, depending on the trip length, type, and species targeted by customers. At one time, more triggerfish and mingos were caught than snappers; now it was easier to catch snapper. The experienced fishermen tended to catch more fish than novice fishermen. Mr. Simpson asked Mr. Nash how long he had been operating his charterboat. Mr. Nash replied he had been charterboat fishing for about eight years. Mr. Simpson inquired if Mr. Nash's boat was new. Mr. Nash responded that he recently purchased another boat, not new to the fishery. The previous owner was having a new boat built. Mr. Aparicio asked the average number of customers Mr. Nash took fishing per trip. Mr. Nash replied a typical charterboat trip averaged between 8 to 12 customers. Mr. Aparicio inquired how many of the approximate 180 fishing trips Mr. Nash took each year specifically targeted snapper. Mr. Nash estimated that about 50 percent of his charterboat customers targeted snapper.

Bob Zales, II, a charterboat fisherman from Panama City, Florida, and a member of the Ad Hoc Red Snapper AP, questioned the validity of the Marine Recreational Fishery Statistical Survey (MRFSS) data. He supported Shrimp Amendment 9, stating that the snapper fishery was dependent upon the 50 percent reduction in bycatch. He felt that the models developed and used by NMFS were good, but believed information input into the models was flawed. He commented that both the human population and the charterboat industry had increased dramatically since the 1970s. This was, in large part, due to the promotion of the industry by the state of Alabama and the creation of vast numbers of artificial reefs along their coastline. He specifically questioned what he perceived as inflated snapper recreational harvest levels for 1979 (Figure 3 of Shrimp Amendment 9). He pointed out that, at that time, the numbers of boats were far fewer than at the present time. He felt the question as to whether charterboat fishermen would prefer a reduced bag limit or a seasonal closure was unfair. The Magnuson-Stevens Act specifically stated that when a harvest level was achieved the fishery would be closed. When persons stated they would prefer a seasonal closure to a reduced bag limit he suspected it was because they believed the closure would occur during their off season. The only way a closure could be effective was if it occurred during prime fishing conditions. He noted that persons living in Orange Beach and in most other areas of the Gulf had not experienced a closure; however, Florida had. Business had expanded in Orange Beach in 1986 due to the king mackerel closure in Florida state and federal waters which drew fishermen northward into other fisheries. He felt that both commercial and recreational fishermen should exhort NMFS to obtain better, more reliable data on the red snapper fishery.

Mr. Horn asked Mr. Zales if he believed mandatory logbooks on all for-hire vessels would be beneficial. Mr. Zales felt that a logbook requirement was very necessary in order to achieve reliable data. He noted that a request by the Council to NMFS to implement such a system was passed on by Dr. Kemmerer to the Miami Laboratory. Mr. Zales felt that this effectively extinguished any hopes that a logbook system would be activated since the Miami Laboratory was already overburdened with a backlog of assignments. He believed permit renewal should be contingent upon the submission of a logbook. Mr. King asked if, during a closure, Mr. Zales had taken fishing parties on a tag and release trip. Mr. Zales responded negatively. He remarked that customers might not catch any red snapper on a trip, but if they knew that even if they did catch a red snapper they could not keep it, they tended not to go fishing. Mr. King stated that logbooks had been discussed at the Socioeconomic Recreational Demand Fisheries Workshop that he had attended during the previous week He noted that it was stated at this workshop that NOAA was being required to considerably reduce its workforce. Information received at this gathering indicated that the 1994 survey data had not yet been completed and released and probably would not be available until 1999. Mr. King commented that it would soon be 1997. Mr. Zales commented that this survey was being conducted from the Panama City Laboratory and that understaffing and lack of funding was creating serious problems for these types of projects. He did not feel, however, that the survey effort underway would be successful. He felt that the states did the best surveys, noting that Alabama, with its smaller coastline, could accomplish this task more easily than, for instance, Florida.

Mr. Simpson asked for Mr. Zales' opinion on limited entry, as separate from an ITQ system. Mr Zales replied that, in his area, they had achieved limited entry through the lack of dock space. He did not anticipate that the state of Florida would be building any new docks, due to their environmental concerns. He pointed out that persons new to the charterboat industry fished less than those well established fishermen, at least until they had built up a clientele. Mr. Williams commented that he had found that charterboat operators favored keeping logbooks since this practice potentially led to better data. Mr. Zales felt that this attitude was typical among charterboat fishermen and that they would be interested and willing to help devise a logbook format.

Neil Trimble, a charterboat fisherman from Orange Beach, Alabama supported Shrimp Amendment 9. He had previously worked on a shrimp boat and felt that he could understand both sides of the issue. He stressed that his shrimp fishing experience in 1981-1983 was that a huge number of bycatch fish had died while being separated (in a salt box) from the targeted shrimp. He felt that an excluder device was necessary in order to save the juvenile fish. He emphasized that the charterboat industry could not survive if the bag limit was further reduced. He commented that he had tagged 200 snapper over one summer. Mr. Aparicio asked where Mr. Trimble had been shrimping during 1981-1983. Mr. Trimble replied that he had been fishing in Mississippi Sound and off the coast of Louisiana. He pointed out that species other than red snapper, such as croaker and mackerel, would benefit from the excluder device. Mr. Aparicio remarked that Texas A&M had recently released a study that explained what had occurred with croakers. Mr. Trimble related that he used to catch croakers for bait during the 1960s, but they seem to have disappeared. Mr. Aparicio asked Mr. Trimble how numerous red snapper appeared to be. Mr. Trimble responded that recent storms had destroyed reefs that he had relied upon, but prior to that occurrence, he had been able to successfully target red snapper. Presently, if he travelled further offshore, he might locate red snapper. Mr. Aparicio asked if Mr. Trimble was aware that an Andrews 5-inch TED presently in use excluded 77 percent of the class 0 and the age 1 red snapper, noting that this was a TED that NMFS wanted to discontinue.

Al Armitt, Daphne, Alabama, a member of the Shrimp AP, represented Emerald Coast Seafood. He maintained that the Council did not seriously consider the testimony from members of the shrimp industry. He cited the closure of the Tortugas area to shrimping that had resulted in extreme economic hardship in the Key West area. He commented that the recreational fishery consistently exceeded their red snapper quota. He noted that members attending the recent scientific and statistical committee (SSC) meeting, though without a quorum present, concluded that sufficient evidence did not exist to support Shrimp Amendment 9. It was his understanding that the Magnuson-Stevens Act prohibited implementing regulations that were not based on sound scientific data. He recommended Alternative A.1 (no action - status quo). He pointed out that red snapper had been considered recovered to the extent that the Council had recently increased the quota.

Michael Salley, charterboat fisherman and member of the Orange Beach Fishing Association from Pensacola, Florida, had been in the industry for 15 years and supported Shrimp Amendment 9.

Albert King, Sr., a Gulf Council member since 1991, from Gulf Shores, Alabama, stated he had made his first trip on a shrimp boat at the age of 7, out of Cameron, Louisiana. By the time he was 21 years old he owned and operated his own shrimp boat and fished throughout the Gulf. He contended that the shrimp trawl bycatch was not the cause of a decrease in landings of red snapper. He maintained that flawed scientific data had received such widespread attention that it had been accepted as fact. Mr. Basco asked if Mr. King believed that shrimp bycatch was wasteful. Mr. King replied negatively, stating that marine animals consumed the discarded bycatch, as they would do in natural circumstances and was a form of recycling. He stressed that if an animal did not have to seek out his own food he attained a higher growth rate. Mr. Basco commented that he had fished since he was in his teens and had observed bycatch floating off that seemed to exceed the amount eaten by fish travelling in the wake of the boat. Mr. King contended that crustaceans on the bottom ate bycatch that reached the bottom; also, seabirds consumed these fish. Mr. Basco asked how seabirds had survived before the advent of shrimp boats. Mr. King replied that he could only address what occurred when shrimp fleets left an area; these birds had nearly starved, and in Key West fed from the town landfill. Dr. Claverie, noted that Mr. King had stated that he did not disagree with NMFS' use of a model, but felt data being inputted to the model was flawed. He asked whether Mr. King agreed with the opinions of some persons who believed the model should be examined further to determine whether it was properly structured. Mr. King stressed that the data-gathering process needed refining in order to produce more accurate information.

- <u>Committee Reports</u>

<u>Budget Committee</u>

Mr. Woods read the committee report. The committee reviewed the activities and administrative costs in the calendar year (CY) 1997 budget (Tab L, No. 3). Mr. Swingle indicated that NMFS had instructed the Council to limit the budget to $1.3 million. If other Councils released some of the funding available for CY 1997, the Council could amend the budget to increase it by that amount. On behalf of the committee, Mr. Woods <u>moved</u> **that the Council accept the $1.3 million budget.** Mr. Swingle advised that instructions from NMFS were to use FY 1996 as a base and that the Gulf Council had experienced a shortfall of $54.5 million. Also, if any of the Councils were not going to utilize their allocation under their ratio for FY 1996 they should advise NMFS that these funds would be available. Thus far, only the Caribbean Council had volunteered to contribute $10 thousand of their FY 1996 funding. Mr. King commented that the budget should probably be accepted, but questioned whether it would meet the Council's needs. Mr. Swingle noted that NMFS had been notified that the $1.3 million allocation would not be sufficient to maintain the

Georgia on September 9. The transfer had not actually taken place until September 30. Regarding other transfers, the state of South Carolina was interested in the McKinney Lake Hatchery and negotiations on that transfer were proceeding. On October 4, the Service had held a Southeast Region Fisheries stakeholders meeting in Hot Springs, Arkansas. The purpose of this meeting was to obtain input from the state agencies, other federal agencies and nongovernmental organizations. Approximately 30 people attended this meeting. The Southeast Region's draft Fisheries Vision document was being reviewed and should be published this winter. The Southwest and Southeast Regions were tentatively planning to hold a Gulf coastal fisheries stakeholders meeting immediately following the Council meeting in Corpus Christi, Texas in January. Invitations would be issued to Council members and other interested entities. Tentative plans were to begin the meeting on the afternoon of January 16 and conclude at noon on the following day.

Regarding the Volusia County, Florida, habitat conservation plan for sea turtles, the Jacksonville field office had recommended that this plan be approved. A decision was expected within two days. The St. Vincent National Wildlife Refuge in Florida reported that this was the second-best year for sea turtle nesting since they began recording this data. As of October 1 of this year, the National Biological Service (NBS) was incorporated as a division of the National Geological Survey (NGS). This included fish and wildlife cooperative research units at various universities throughout the country, and also the regional science centers.

He had been informed that there was expected to be an approximate 18 percent increase nationwide in federal aid funding to the states for this fiscal year, as compared to the previous fiscal year.

Mr. Williams inquired why Volusia County was going to be given an incidental take for sea turtles. Mr. Frugè replied that there had been beach driving or other problems and, under the Endangered Species Act, there was a provision that allowed the Service to issue an incidental take permit (Section 10(a)). The permit was issued with the understanding that the permittee would take certain measures to address these issues. Mr. King commented that his grandfather had homesteaded and he, personally, had grown up in the area under discussion and it was impossible to drive the beach since, at high tide, the car would completely sink.

Mr. Osburn asked why the NBS had been incorporated into the NGS. Mr. Frugè replied that Secretary Babbitt had wanted to make the functions within the Department of the Interior more objective, not subject to political forces that affected regulatory and resource agencies.

THE MEETING RECESSED AT 5:09 P.M. AND RESUMED AT 8:30 A.M. THE FOLLOWING DAY.

8:30 A.M.-9:30 A.M. - CLOSED SESSION to select Ad Hoc Red Snapper Advisory Panel and Chairman.

LCDR Mark Johnson introduced LCDR Ed Pino of the Seventh Coast Guard District office in Miami, Florida.

- Shrimp Management Committee Report

Mr. Woods presented the committee report. Dr. Philip Goodyear presented the results of his analyses of possible bias in bycatch estimates based on adjusting bycatch mortality downward by 14 percent and 33 percent and replicating the 1995 assessment analyses for bias adjustments of 0, 14 percent and 33 percent. Dr. Goodyear showed possible changes in SPR assuming various changes in TAC and bycatch reduction scenarios, including a constant F assumption, from 1985 to 2020. He also noted potential increases in future harvests for a constant F after achieving a 50 percent bycatch reduction in 1997 using the GLM and the general linear model (GLM) with 14 percent and 33 percent bias assumptions. He observed that the 14 percent and 33 percent error scenarios would only slightly improve the current estimated status of the red snapper stock, and they would not be sufficient to have a meaningful effect on the need to reduce bycatch by the shrimp fishery.

Mr. Swingle stated that problems had been encountered with establishing the Statistical Review Panel (SRP) and scheduling a meeting. These problems included legal questions regarding the mail balloting of the SSC to establish the SRP, questions regarding compensation of SRP members or the inability of some potential members to serve, and the inability to provide notice of a SRP meeting in the Federal Register. He noted that General Counsel has advised that not having this SRP review represents a procedural flaw in the approval process of Shrimp Amendment 9. He stated that the SRP could be selected by Council staff and compensated at $50.00 per hour/$400.00 per day; thereby they would be consultants, and a Federal Register notice would not be required.

On behalf of the committee, Mr. Woods moved that the Council convene a SRP to provide recommendations; however, the Council is not precluded from moving forward with final action on Amendment 9.

Mr. Horn inquired by what process the dollar amount for compensation had been chosen. Mr. Swingle replied that this sum represented a typical sum paid to Council consultants. In speaking to Dr. Gallaway, he had been informed that some consultant fees were higher. Mr. Minton asked if Mr. Swingle could provide information on job descriptions for work accomplished and salaries paid to former Council consultants. Mr. Swingle responded that Dr. Goodyear had been paid $50.00 per hour to conduct an assessment for the Council and Dr. Thomas had prepared a social impact analysis of the red snapper fishery at a comparable rate of pay. Mr. Minton expressed concern that a precedent was being set to pay panel members for performing work. Mr. Swingle replied that the Council was precluded under the Magnuson-Stevens Act from paying SSC or AP members. Special groups on fishery-related issues were drawn from some of the universities within the Gulf region that served without compensation. However, most of the theoretical statisticians were far removed from the fisheries and rarely involved in these issues. In order to be assured of participation and to avoid another 20-day waiting period and then filing a Federal Register notice for them to serve as an advisory panel member, it seemed to him that a better way to proceed was to hire them as consultants. He felt this gave a better chance of assuring that those persons that were selected would attend and participate. Mr. Feder asked for clarification that it was planned to hire individual consultants to submit individual recommendations. Mr. Swingle responded that, in discussions on the previous day, Mr. Feder had suggested that issues be presented to them as a group and they produce independent evaluations that staff would then summarize for the Council. He stated that Mr. Feder had believed that if an opinion was expressed jointly by the group a problem might exist under the Federal Advisory Committee Act (FACA). Mr. Swingle noted that he could understand where this could present a problem if Dr. Kemmerer was involved since he represented the Secretary of Commerce; however, the Council was not a federal agency and was not prohibited under Civil Service statutes. Dr. Kemmerer interjected that he saw no hindrance to the group meeting to discuss an issue and then presenting their recommendations. He did not feel they would need to reach a consensus.

Mr. Aparicio asked why the Council would wish to proceed on an issue without having received full and complete data. Mr. Swingle felt this was not the issue; he realized that when LGL did their first analysis of the bycatch data it had differed from Dr. Nichols conclusions. He believed this was because, in their treatment of the data, they had not used all of it. The issue that had surfaced at the Council meeting, and had not been relayed to either the SAP or the SSC, was that the data that had been used by NMFS in the GLM should have been subjected to a logarithmic transformation. Dr. Kemmerer responded that it was the opposite; the way the GLM model worked was there was a logarithmic transformation inherent in it with a constant 1 to the numbers. Their objection was the use of the transformation. Mr. Aparaicio asked for further clarification of the response to his question. Mr. Swingle responded that the General Counsel had identified the issue as a procedural deficiency in that the Council, in September, did request that the group be convened prior to the present Council meeting to resolve the issue. This had not been possible due to further procedural problems, since he had not felt there was sufficient time to file a 20-day Federal Register notice for a conference call meeting of the SSC wherein they would provide a selection of candidates and then file another 20-day in advance Federal Register notice for the SRP to do the review. He also felt that the SSC had the right to conduct a closed session to select candidates. For this reason, he felt it would be acceptable for members to individually recommend persons to serve and providing this information to the SSC Chairman, who would then provide it to the Council staff. General Counsel believed the process should have been done in an open public forum before the SSC or, at the very minimum, through a conference call. Council staff were unable to accomplish all this. Once candidates had been named in order of priority, Dr. Lamberte experienced difficulty in trying to get the top choices to serve on the SRP. He had been forced to move lower down the list in order to find four persons who would be willing to serve. Mr. Aparicio replied that he understood that difficulties were involved in this process; however, the Council had been assured that the data would be available and now were being told they must proceed without it.

Dr. Claverie expressed concern about the language in the motion. His first concern was that the recommendations that were to be provided were not specified and, second, did the final clause in this motion mean that the Council could not decide to delay taking action on Shrimp Amendment 9. Dr. Shipp interpreted the motion as stating that the Council was not precluded from taking action, but also was not required to take action. Mr. King asked what, exactly, was the charge to the SRP. Dr. Claverie remarked that he could not understand, from the language in the motion, what the SRP was being required to do. Dr. Kemmerer replied that his understanding was the SRP was being asked to review the procedure to expand bycatch data, specifically the use of the transformations. If they feel that the current method is not the best way, they would be asked to recommend an alternate approach. Mr. King referenced a letter from NOAA General Counsel that had been read to the committee that stated that if the Council was content with the science, they could move ahead on Shrimp Amendment 9. This also meant to him that the Council should not be forced to move on this issue until they were satisfied they had sufficient data to do so. Mr. Feder recommended that the motion clarify that individual consultants were being hired to give their recommendations and that a panel was not being established to give recommendations to Council. On the surface, it appeared to be another AP, and if that was the case, it should follow the provisions of Section 302(i) of the Magnuson-Stevens Act. Dr. Kemmerer offered a substitute motion that **the Council hire 3-5 applied statisticians on a consulting basis to provide individual recommendations on the use of the transformations of the bycatch data.** Mr. Simpson asked if the consultants would be limited to addressing only what was stated in the motion. Dr. Kemmerer replied affirmatively. Mr. Simpson responded that he realized the focus would be upon what was included in this motion, but felt they should not be precluded from making any other recommendations. Dr. Shipp stated that this motion would not preclude that statisticians from making other suggestions. Substitute motion carried **by a vote of 13 to 2.**

On behalf of the committee, Mr. Woods moved **that with regard to the selection of the SRP, that statistical experts that are independent of the Council, it supporting agencies, and the industry, and should be selected by the SSC.**

Dr. Kemmerer offered a substitute motion that, **with regard to the previous motion, the statistical experts should be independent of the Council, its supporting agencies, and the industry, and be selected by the SSC.** Mr. Green asked if it was appropriate to have the SSC select the candidates, given that they have failed to meet their quorum for their meetings. He felt it might be more expeditious to have Council staff make the selections. Mr. Swingle's concern was that the staff be given the authority to select candidates of a lower priority on the list provided by the SSC in case the higher priority candidates declined to serve. Mr. Green reiterated that the motion should include giving authority to the Council staff to make substitutions in the candidates, when appropriate. Mr. Green offered an amended substitute motion that, **with regard to the previous motion, the statistical experts should be independent of the Council, its supporting agencies, and the industry, and they will be selected by the Council staff from the prioritized list provided by the SSC.** Dr. Kemmerer suggested that Council staff contact each of the prioritized names on the SSC candidate list before the next SSC meeting to determine whether they were willing to serve. Amended substitute motion carried.

Mr. Woods reported that Dr. Leard presented a summary of public hearing comments, public comment letter, the Shrimp AP report, and the SSC report on Amendment 9. Mr. Swingle noted that, in light of legal counsel comments regarding the lack of a quorum at the SSC meeting, ratification of the SSC actions could be taken at the December 9, 1996 meeting.

On behalf of the committee, Mr. Woods moved **that the SSC consider ratification of its actions at the December 9, 1996 meeting.**

Mr. Williams asked if the SSC would also review Dr. Goodyear's report that was presented to the Council the previous day. Dr. Shipp responded that he expected that this would occur. Motion as modified carried **unanimously that the SSC consider ratification of its actions at the December 9, 1996 meeting and report by Dr. Goodyear dated October 30, 1996.**

Mr. Woods reported that during the committee meeting Dr. Kemmerer presented NMFS' comments on Amendment 9, and Mr. Jodie Gay described the experiences of the South Atlantic Council in implementing BRDs. He also stated that Dr. Leard presented data on the percent of bycatch reduction needed to meet the 50 percent reduction goal, assuming that a 10 percent reduction in effort has occurred. He also presented data on percent reductions in bycatch of age 0, age 1 and cumulatrive age 0 and age 1 for various BRDs. Dr. Lamberte explained efforts to address SSC criticisms and further modeling of the economic impacts of Amendment 9. Mr. Woods noted the committee then addressed the specific alternatives of the amendment.

On behalf of the committee, Mr. Woods moved that, **with regard to Alternative A, Alternative A.2, with options (a) and (c) be approved to read as follows: BRD requirements - Require the installation of NMFS-certified BRDs that meet or exceed the bycatch reduction criteria established by the Council in each net used aboard vessels trawling for shrimp in specified areas of the Gulf of Mexico EEZ. Exempted are vessels trawling for royal red shrimp beyond the 100-fathom contour and vessels trawling for groundfish or butterfish. A single try net with a headrope of 16 feet or less per vessel and rigid-frame roller trawls such as those used in the Big Bend area of Florida are also exempted.**

Dr. Claverie inquired whether the rigid-frame roller trawl was 16 feet or less in width. Mr. Swingle replied that he believed the rigid-frame roller trawl was limited to 12 feet in width and that one could be pulled on each side of the vessel. He noted that, at one time, some of the vessels were pulling 5 of these roller trawls. The state later restricted these trawls to 12-foot widths. Dr. Claverie asked, if these trawls were fishing beyond Florida waters, would they still be under these restrictions. Dr. Kemmerer replied that he was unaware of any of these vessel operating in federal waters; however, he felt the language in the motion should be clarified. Dr. Claverie expressed concern that vessels with rigid-frame roller trawls exceeding 16 feet could operate in the EEZ without a BRD. Mr. Feder speculated, if the next committee motion was going to be concerned with the area where the requirement would apply within the 100-fathom contour, what would be the significance of the first exemption. Mr. Horn questioned whether it would be permissible to use more restrictive language in the motion, since discussions of roller trawl size had not been presented at public hearings. He asked if it was certain that no legitimate royal red shrimping was occurring inside the 100-fathom contour. Mr. Swingle replied that the rigid-frame roller trawls had been discussed at public hearings; however, he was not certain whether they had been referred to as being 12 feet or 16 feet in width. Mr. Osburn commented that no one was being precluded from having a royal red fishery inside 100 fathoms, but they would need to carry BRDs. Further, he stated that the motion was more liberal than was presented at public hearings and, therefore, should be acceptable. In a general discussion it was agreed by consensus to <u>amend</u> the <u>motion</u> to read: **To adopt Preferred Alternative A.2: BRD requirement - Require the installation of NMFS-certified BRDs that meet or exceed the bycatch reduction criteria established by the Council in each net used aboard vessels trawling for shrimp in specified areas of the Gulf of Mexico EEZ. Exempted are vessels trawling for royal red shrimp beyond the 100-fathom contour and vessels trawling for groundfish or butterfish. A single try net with a headrope of 16 feet or less per vessel <u>and no more than two</u> rigid-frame roller trawls <u>limited to 16 feet or less</u>, such as those used in the Big Bend area of Florida are also exempted.** <u>Amended motion carried</u> by a vote of 10 to 5, with 1 abstention.

On behalf of the committee, Mr. Woods moved to adopt Preferred Alternative B.2: Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida.

Dr. Claverie questioned the urgency of taking action on Shrimp Amendment 9 at this meeting. Dr. Kemmerer replied that the increase of red snapper TAC was predicated on a 50 percent reduction of the bycatch of juvenile red snapper, beginning in 1997. It would take about 5 to 6 months to implement the amendment, thus would already be well into 1997 and the height of the fishing before this action would become effective. Mr. Minton asked General Counsel to state, for the record, an opinion on proceeding with this amendment when the SSC did not have a quorum. He also noted that the Council had previously requested that a statistical group be convened to review the transformation of the data. He stated that he understood the feeling of urgency, but it seemed to him that Washington could reject the plan due to procedural inadequacies. He agreed with Dr. Claverie that it would be better to delay action on this amendment pending the results of the SRP recommendations. If this issue was not carried forward in a correct manner, the Council would be vulnerable to any legal actions taken against it. Mr. Feder replied that, in his opinion, the failure of the SSC to give a final recommendation would not be disastrous, though it would be beneficial if the SSC met later and confirmed their earlier actions taken without a quorum. The Secretary of Commerce could review the supporting documentation, and even with this procedural flaw, the amendment could be approved. Mr. Aparicio stated he would have preferred that the peer review on the accuracy of the statistics be accomplished before taking action on the amendment. Dr. Shipp asked for Mr. Feder's comments on Mr. Aparicio's concerns. Mr. Feder replied that proceeding on Shrimp Amendment 9 would not be constrained for the reason that the peer review had not taken place. Mr. King asked whether the Council must necessarily take action on the amendment, despite their legitimate concerns. Mr. Feder responded that the Council must be satisfied that the amendment conformed with the Magnuson-Stevens Act and the National Standards and that the action would result in good conservation management. If not, they should act accordingly. Mr. Minton inquired what NMFS' position would be with regard to the red snapper TAC if final action on the amendment was delayed until the January Council meeting. Dr.

Kemmerer replied that the 1997 red snapper TAC had been predicated on the passing of this amendment. He could not predict what action the Secretary would take if the Council did not pass the amendment. He reminded members that this amendment process had begun in 1989-1990. A draft of the amendment had been presented at public hearings and then Congress had insisted that a 3-year study be conducted. Subsequently, they extended the time period for the study to allow for further data collection. The study was completed and an analysis done. He felt the amendment should be adopted by Council.

Mr. Woods asked whether the more relaxed enforcement policy would apply to BRDs, as well as to all other aspects of the Gulf fisheries. Dr. Kemmerer felt that enforcement would be uniform throughout the Gulf fisheries, varying only by the seriousness of the violations. Mr. Horn expressed the belief that there were many questions about the fishery that needed to be resolved before taking final action on this amendment. Dr. Kemmerer reiterated that the 1997 red snapper TAC had been predicated on the passing of this amendment. TAC had been increased from 6.0 million pounds (MP) to 9.12 MP. He asked, if the amendment was not adopted by Council, should TAC be reduced. Mr. Horn noted that many people had testified that long-time red snapper fishermen claimed that red snapper catches were the best they had ever been. He asked how this had been accomplished, even though BRDs had not been implemented. Mr. Aparicio maintained that reductions had already been made by shrimp fishermen that had resulted in increased landings of red snapper. He questioned Dr. Kemmerer's statement that the Council should adopt Shrimp Amendment 9 because Dr. Goodyear had reviewed the numbers. He asked whether Dr. Kemmerer considered that as having been peer-reviewed. Dr. Kemmerer replied negatively, stating that Dr. Goodyear's analysis was in regard to the issue that was raised by LGL (which had never been peer-reviewed) and even at the highest bias level (33 percent) there would be no effect on the fishery. These assessments had been reviewed by the SAP and the SSC and the last review was considered to be the best available science.

Mr. King reiterated his position on flawed information being inputted into the models. He contended that basing decisions on the results of the poor data-collecting procedures of earlier years had skewed the NMFS' study. Mr. Williams maintained that the 50 percent bycatch reduction would only barely solve the overfishing problem in the red snapper fishery. The calculations indicated that 20 percent SPR would only barely be reached by the year 2019. He maintained that if bycatch could be reduced by greater than 50 percent the goal would be reached much sooner. Congress had mandated, through a new standard in the Magnuson-Stevens Act, that Council must minimize bycatch and solve the overfishing problem. He contended that, though red snapper was showing definite signs of rebounding, it could not compare with the amount of stock that existed in Florida waters 50 to 60 years ago. Mr. Osburn noted that the Council had been forbidden by Congress to initiate an ITQ program for red snapper, a management tool that would greatly enhance the rebuilding of stocks in this fishery. However, he quoted from the Magnuson-Stevens Act, Section 405(d)(1): "The Secretary shall develop technological devices and other changes in fishing operations necessary and appropriate to minimize the incidental mortality of the bycatch in the course of shrimp trawl activity to the extent practicable." He emphasized that, based on this statement, Shrimp Amendment 9 should be adopted by the Council. Dr. Claverie stressed that, to him, the science question was paramount, and he felt he was receiving mixed signals from the Regional Administrator. He had gotten the feeling that Dr. Kemmerer did not believe the review was absolutely critical, but that it should be done anyway. It was his impression that the review was intended to determine which methodology should be used in assessing the impact of shrimp bycatch on the red snapper fishery. He emphasized that he did not believe in taking action that would have socioeconomic impacts unless there was a certain biological reason for so doing. Dr. Kemmerer replied that Dr. Goodyear's methodology was the best available and had been reviewed and accepted by a number of entities. Dr. Gallaway's report had shown that further reviews would probably not impact the final outcome. Dr. Claverie asked why the Council should pay $50.00 per hour to each individual in a group to review the analysis when it was not expected to make an important difference in the outcome. He also did not understand why waiting two more months would make a great difference in the long run. Dr. Goodyear had stated that the greater the reduction in red snapper bycatch, the greater would be the results from reducing that bycatch. If, in truth, the bycatch in the fishery was not very high, then a 50 percent reduction would do little, as compared to a situation where bycatch was at a high level. Dr. Kemmerer replied that this was why Dr. Goodyear had done a worst case estimate (33 percent). He reiterated that the analysis had been peer-reviewed many times over. Mr. King commented that the problem with the analysis was, and always had been, associated with the data-collecting process. Mr. King offered a substitute motion **to table Shrimp Amendment 9 until the January Council meeting.** Substitute motion failed **by a vote of 4 to 9.**

Mr. Horn commented that the Council had taken no dramatic action to cause red snapper stock to rebound, yet it undoubtedly had done so. He questioned NMFS' conclusions on management of this fishery. He opposed Shrimp Amendment 9.

A roll call vote was held to **adopt Preferred Alternative B.2: Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida.**

Pete Aparicio - no
Irby Basco - yes
Maumus Claverie - abstain
Felicia Coleman - yes
Frank Fisher - yes
Scott Green - yes
Philip Horn - no
Karen Foote - yes
Andrew Kemmerer - yes
Albert King - no
Karl Lessard - yes
Andy Martin - absent
Vernon Minton - yes
Hal Osburn - yes
Roy Williams - yes
Glade Woods - no
Robert Shipp - yes

Motion carried by a vote of 11 to 4, with one abstention, **to adopt Preferred Alternative B.2: Require the use of the NMFS-certified BRDs in shrimp trawls in the EEZ of the Gulf of Mexico within the 100-fathom contour west of Cape San Blas, Florida.**

On behalf of the committee, Mr. Woods moved **that, with regard to Alternative C, the bycatch reduction criteria be set at 44 percent, which is based on a 10 percent reduction in effort as assumed in the stock assessment. Consequently, the first paragraph of Alternative C.1. would read as follows: It must reduce the bycatch mortality of juvenile red snapper (age 0 and age 1) by a minimum of 44 percent from the average level of mortality on those age groups during the years 1984-1989. Any bycatch reduction contributed by a TED within the net is included as a part of an overall BRD reduction in the bycatch.**

Mr. Horn asked for clarification on why a base year continued to be used to denote reduction; those numbers were irrelevant if a reduction was considered to be a percentage of the overall shrimp landings. Mr. Swingle replied that the Council had asked the SAP to identify what the reductions should be and they selected the base year. They stated there should be a 50 percent reduction in the fishing mortality rate on the age 0 and age 1 red snapper using the base period F as a standard. This was F=2.12 and was subsequently changed to 2.06, which made the F to be achieved equal to 1.03. Dr. Leard, based on Dr. Goodyear's analysis, put in the 10 percent reduction in effort for 24-hour fishing days that had been used in the model and readjusted it to a 44 percent level. These figures only included fishing mortality, as opposed to natural mortality. Dr. Claverie commented that if the intent was that the criteria was based on the time period before TEDs were used, and did not include any part of the year 1989 when TEDs were used, he would like to have language inserted in the motion to indicate this. Mr. Swingle replied that the figures did include all of 1989. Dr. Claverie maintained for part of 1989 the bycatch reduction had already begun, due to the introduction of TEDs. Mr. Swingle stated a difficulty existed in assessing the reduction in finfish, undoubtedly created by the use of TEDs, was in determining any value for the reduction of red snapper. Members of the Council who had served on the bycatch steering committee had suggested that, in that program, naked nets should be compared with nets with TEDs and a BRD. This was prohibited because of concern that the naked net might catch a turtle during those experiments. The focus was on testing TEDs and not on separating and counting species. Dr. Claverie reiterated his concern that the language in the motion be more specific in content. Dr. Kemmerer commented that, only toward the end of 1989 were TEDs used and compliance at that time was quite low.

Mr. Williams raised the question that lowering the standard from 50 percent to 44 percent bycatch reduction might create problems at a later time. He noted that shrimping effort was presently in a decline, but could reverse itself. Mr. Swingle replied that this possibility could not be discounted; however, data in the amendment indicated that the average shrimp boat was 17 years old. Mr. Williams cited newspaper accounts of new, bigger and more highly powered shrimp vessels being built in local shipyards.

Dr. Coleman stated that she had been involved in a bycatch study several years ago. She had tested a naked net against a net with a TED, two other nets were equipped with both TEDs and BRDs. The work was conducted in Florida in inshore waters. It was discovered that the TED reduction of small fish was not significantly different from the naked net. Even though towing did not occur in an area where red snapper occurred, it was unlikely that a TED used offshore worked very effectively to reduce catches of small year classes. Dr. Claverie stressed that his point was not directed at numbers, but in clarification to shrimp fishermen and for giving them credit for the use of TEDs in 1989, for however a short time period.

Mr. Green supported Mr. Williams statements on potential changes in shrimping effort. Mr. Osburn felt that a minimum target (44 percent) seemed fair at the present time; if necessary, the issue could be revisited at a later date. Mr. Aparicio noted that shrimp vessels had decreased by 40 percent over the past several years, thereby justifying the 44 percent goal. Dr. Kemmerer reiterated and supported Mr. Osburn's comments. Mr. Williams, referencing Figure 1 of the amendment, stated that he did not perceive any decline in effort and that effort seemed to have increased in the 1990-1994 time period. Mr. Green noted that one shrimper had testified he was shrimping twice as much. Mr. King asked Dr. Branstetter for his conclusions as a observer on board a vessel that had tested TEDs and BRDs. Dr. Branstetter replied that he had done a limited amount of naked net work with hard TEDs. The tows in these experiments were unsuccessful.. There was bycatch reduction of red snapper that was attributed to the use of soft TEDs. Mr. Williams asked if red snapper bycatch reduction had included all sizes. Dr. Branstetter responded affirmatively. Motion carried by a vote of 12 to 4 that, **with regard to Alternative C, the bycatch reduction criteria be set at 44 percent, which is based on a 10 percent reduction in effort as assumed in the stock assessment. Consequently, the first paragraph of Alternative C.1. would read as follows: It must reduce the bycatch mortality of juvenile red snapper (age 0 and age 1) by a minimum of 44 percent from the average level of mortality on those age groups during the years 1984-1989. Any bycatch reduction contributed by a TED within the net is included as a part of an overall BRD reduction in the bycatch.**

On behalf of the committee, Mr. Woods moved **that the fisheye in the 30 mesh position or an equivalent distance from the top of a 120 -mesh cod end bag of 1-5/8-inch mesh, and the Andrews TED (if not**

prohibited from use by other applicable federal law or regulations) be certified with the implementation of Amendment 9. Consequently, the second paragraph of Alternative C.1. would read as follows: Based on the criteria above, the following gear will be considered as NMFS certified BRDs on implementation of this amendment:

- **fisheye 30-mesh position or an equivalent distance from the top of a 120-mesh cod end bag of 1-5.8-inch mesh**
  5-inch Andrews TED (if not prohibited from use by other applicable federal law or regulation).

Dr. Kemmerer commented that the Council was also charged to use specific language in identifying the fisheye. Mr. Swingle noted that the construction requirements for the device did not indicate that the fisheye should be mounted on top of the cod end. Mr. Watson responded from the audience that he had developed a description of the fisheye BRD and minimum construction and installation requirements that was being handed out (See attached).

Dr. Claverie offered a <u>substitute motion</u> that the fisheye in the 30 mesh position or an equivalent distance from the top of a 120 -mesh cod end bag of 1-5/8-inch mesh, and the Andrews TED (if not prohibited from use by other applicable federal law or regulations) be certified with the implementation of Amendment 9. Consequently, the second paragraph of Alternative C.1. would read as follows: Based on the criteria above, the following gear will be considered as <u>two</u> NMFS certified BRDs on implementation of this amendment:

- **fisheye 30-mesh position or an equivalent distance from the top of a 120-mesh cod end bag of 1-5/8-inch mesh**
  5-inch Andrews TED (if not prohibited from use by other applicable federal law or regulation).

Mr. Swingle asked Dr. Kemmerer if his intent was that language drafted by Dr. Watson replace the description of the fisheye in the motion. Dr. Kemmerer replied affirmatively. Mr. Swingle stated if this was acceptable to the members that the motion description would be redescribed based on a footnote to that effect. Dr. Shipp questioned whether detailed descriptions of BRDs should be included in the plan amendment. He advocated more simple language, such as "devices approved by NMFS." Dr. Kemmerer noted that this had been discussed during the committee meeting. Dr. Shipp replied, that was understood, but expressed doubt that detailed descriptions of gear needed to be included in a plan amendment. Mr. Feder stated that if these devices that were already NMFS-certified were described in the plan amendment it would save processing time when, and if, the amendment was approved. Dr. Kemmerer asked if it was necessary to include extensive details in the description. Dr. Shipp remarked that his concern was that people might read these elaborate descriptions and conclude that this was the only device that would ever be approved. It could discourage the development of alternative devices. Mr. Feder recommended language be used that would explain that these two BRDs had been certified, but other acceptable devices may be developed at a later time. Mr. Osburn cautioned against allowing loopholes to become part of this amendment. Dr. Claverie commented that if a device written into the amendment proved at a later time to be defective, this could cause problems. Mr. Swingle advised that the framework procedure allowed for decertification in such cases. He felt that whoever drafted the regulations would include a good deal of description of the devices. Mr. Feder stated that the level of detail was up to the Council and that they could delegate the wording of the description to the Council staff or to NMFS. His opinion was that the motion did not need to contain a great deal of detail in the description. Dr. Shipp asked if someone would like to offer a more generic motion. Mr. Green suggested that Dr. Kemmerer recommend language for the motion. Dr. Kemmerer stated that he was satisfied with the phrase "equivalent distance" in the motion. He asked if Dr. Shipp objected to that language. Dr. Shipp reiterated his concern that the public would see the description and think it was the only one that would ever be NMFS-certified. He felt that a simple sentence stating the all BRDs in use must be certified by NMFS would be sufficient. Dr. Kemmerer stated that, upon implementation of the rule, they wanted to indicate what two devices had been NMFS-certified. He recommended adding the following sentence: "Other BRDs can be certified according to the framework procedure." Mr. Osburn asked where in the plan was the description of the fisheye.

Mr. Williams offered an <u>amendment</u> to the <u>substitute</u> <u>motion</u> that the fisheye in the 30 mesh position or an equivalent distance from the top of a 120 -mesh cod end bag of 1-5/8-inch mesh, and the Andrews TED (if not prohibited from use by other applicable federal law or regulations) be certified with the implementation of Amendment 9. Consequently, the second paragraph of Alternative C.1. would read as follows: Based on the criteria above, the following gear will be considered as <u>two</u> NMFS certified BRDs on implementation of this amendment:

- fisheye 30-mesh position or an equivalent distance from the top of a 120-mesh cod end bag of 1-5/8-inch mesh <u>(as described in footnote below)</u>
  5-inch Andrews TED (if not prohibited from use by other applicable federal law or regulation).

  [1]<u>Minimum Construction and Installation Requirements</u>

  Fisheyes should be constructed of aluminum or steel rod of at least 1/4" diameter with a minimum opening dimension of 5 inches and a minimum total opening area of 36 square inches. Fisheyes must be installed in the top center of the codend of the trawl to create an opening in the trawl facing in the direction of the mouth of the trawl no further forward than 70 percent of the distance between the codend drawstring (tie off rings) and the beginning of the codend excluding any extension) or 11 feet, whichever is the shorter distance.

Mr. Williams stated, for the record, that the footnote was the technical specifications and minimum requirements for the fisheye BRDs from the document handed out by Mr. John Watson.

<u>Amended</u> <u>substitute</u> <u>motion</u> <u>carried</u> by a vote of 11 to 4 that the fisheye in the 30 mesh position or an equivalent distance from the top of a 120 -mesh cod end bag of 1-5/8-inch mesh, and the Andrews TED (if not prohibited from use by other applicable federal law or regulations) be certified with the implementation of Amendment 9. Consequently, the second paragraph of Alternative C.1. would read as follows: Based on the criteria above, the following gear will be considered as <u>two</u> NMFS certified BRDs on implementation of this amendment:

- fisheye 30-mesh position or an equivalent distance from the top of a 120-mesh cod end bag of 1-5/8-inch mesh <u>(as described in footnote below)</u>
  5-inch Andrews TED (if not prohibited from use by other applicable federal law or regulation).

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On behalf of the committee, Mr. Woods moved that the approval of Alternative C.2.(d): its shrimp retention rate when compared with seemingly identical nets containing only an approved TED is unspecified, i.e., fishermen may use any design that meets the criteria under Alternative C.1.

Mr. Feder asked for clarification on the intent of the motion. Dr. Kemmerer explained that "its" referred to the BRD and that, as long as it was certified, the BRD did not need to retain any set percentage of shrimp. Motion carried.

On behalf of the committee, Mr. Woods moved for the approval of Alternative D.1: Status Quo - No change in seasonal closures. Motion carried.

On behalf of the committee, Mr. Woods moved for the approval of Alternative E.2 (a, b, and c): Establish the following framework procedures for modifying bycatch reduction criteria and establishing BRD certification criteria and a BRD testing protocol for certifying additional BRDs; a: Framework procedure for modifying bycatch reduction criteria; b: Framework measure establishing BRD certification and decertification criteria and a BRD testing protocol; c: Modification of BRD certification criteria, with staff being given considerable latitude in editing and responding to NMFS comments relative to this section. Motion carried.

Dr. Kemmerer advised that new information on royal red shrimp had just been received. He noted that NMFS had no record of royal red shrimp having been landed within 100 fathoms in the Gulf of Mexico.

On behalf of the committee, Mr. Woods moved that Shrimp Amendment 9 be approved by the Council and forwarded to the Secretary of Commerce for implementation.

Dr. Kemmerer offered an substitute motion that Shrimp Amendment 9 be approved by the Council and reviewed by the SSC prior to forwarding to the Secretary of Commerce.

Dr. Shipp asked if this was a recognized procedure and asked what would occur if the SSC should reject the document. Dr. Kemmerer noted that the SSC had not had a quorum and this would given them an opportunity to review and discuss the amendment. Mr. Minton suggested another procedure: approval by Council, forwarded to the Secretary of Commerce upon review and approval of the SSC and SRP review of the model. He felt this might accelerate the implementation process. Mr. Williams asked what would happen if the SSC objected to something in the document; would this be giving them the right to hinder implementation of the amendment. Dr. Kemmerer responded that they would be able to halt the process at least for that point in time. He expected them to vote that the document contained the best available science. Mr. Horn remarked that this sounded contrary to what Dr. Kemmerer had argued earlier on postponing action on Shrimp Amendment 9. If the Council voted to approve this amendment now, why should anyone care about their opinion. Dr. Kemmerer did not feel that he was taking a position that was contrary to his earlier stance. He stated his suggestion was made to ensure that "all the t's were crossed and all the i's were dotted." This was also legal advice from General Counsel that the SSC could review the document after

Council had taken final action. If a major problem should surface, then Council could reconsider their action.

Dr. Claverie commented that he appreciated the thought on this motion since it allayed his concern regarding the validity of the science. However, he did not feel it was at all appropriate to abrogate his right as a Council member to have a final vote on whether the amendment went forward to the Secretary of Commerce. Though legally, it might be an acceptable procedure, it was somewhat offensive to him as a Council member. Dr. Kemmerer emphasized that his suggestion was simply intended to follow the normal procedure of having the SSC review the document prior to submission to the Secretary. Mr. Feder interjected that the amended motion was worded with reference to a review by the SSC, but nevertheless, it would still be forwarded to the Secretary of Commerce. If the SSC should reject the amendment, the Council would be able to return and reconsider their action. Dr. Shipp stressed that the Council had already carried out their function in regard to this document. Mr. Green suggested forwarding the document to the Secretary, but hold it in abeyance until after the SSC had met. He asked if this was a feasible solution. Mr. Swingle stated that the amendment could be submitted to the Secretary of Commerce and, if the SSC found a major deficiency in the scientific information, it could then be withdrawn by the Council. He noted that, upon request by the Regional Administrator, some amendments in the past had been withdrawn for modification and then resubmitted. Mr. Aparicio reiterated the concern of Dr. Claverie that Dr. Kemmerer's substitute motion implied that the Council's decision on the amendment was conditional. Dr. Kemmerer maintained that this was not stated or intended in his substitute motion. Mr. Minton pointed out that Dr. Kemmerer was concerned about delays, but what if the document was returned to Council because the proper procedure had not been followed. Mr. Feder stated that Dr. Kemmerer's substitute motion did not require the amendment to be returned to Council, and would be sent forward to the Secretary of Commerce following the SSC review. Mr. Osburn commented that he was satisfied that the Council had voted this morning that a quorum SSC review and accept or reject the amendment. Also, Mr. Swingle had advised that Council could withdraw and/or modify the document, working through the Regional Administrator. Dr. Kemmerer withdrew his substitute motion.

A roll call vote was held that **Shrimp Amendment 9 be approved by the Council and forwarded to the Secretary of Commerce for implementation.**

Pete Aparicio - no
Irby Basco - yes
Maumus Claverie - abstain
Felicia Coleman - yes
Frank Fisher - yes
Scott Green - yes
Philip Horn - no
Karen Foote - yes
Andrew Kemmerer - yes
Albert King - no
Karl Lessard - yes
Andy Martin - absent
Vernon Minton - yes
Hal Osburn - yes
Roy Williams - yes
Glade Woods - no
Robert Shipp - yes

Motion carried by a vote of 11 to 4, with 1 abstention. Messrs. King, Horn, Aparicio and Woods stated, for the record, that they would be filing a minority report.

On behalf of the committee, Mr. Woods moved **that the Council extend an invitation to a Mexican official to attend the January 1997 Council meeting to discuss closures and what they would like to see the Gulf Council do with regard to closures. Motion carried.**

First in Fisheries

Texas Shrimp Association

78335
P.O. Box 1020 • 126 West Cleveland • Aransas Pass, Texas ~~78735~~
Telephone (512) 758-5024 • FAX (512) 758-5853

TESTIMONY
ON
DRAFT AMENDMENT 9
TO THE
GULF OF MEXICO SHRIMP FISHERY MANAGEMENT PLAN
Gulf of Mexico Fishery Management Council
Public Hearing
November 13, 1996 - Point Clear, Alabama

Mr. Chairman, I am Wilma Anderson, Executive Director, Texas Shrimp Association ("TSA"), Box 1020 (126 W. Cleveland), Aransas Pass, Texas 78335.

Purpose and Intent of Draft Amendment 9

Mr. Chairman and members of the Council the shrimp fishery understands the intent of Amendment 9 is to reduce substantially the amount of bycatch in the shrimp fishery to avoid what has been alleged as "high levels of juvenile mortality" of red snapper. The basis for the Council's objective and plan is derived from past stock assessments of red snapper and related analyses prepared by NMFS to illustrate an interaction between the shrimp fishery and juvenile red snapper.

Opposition

TSA remains in opposition to Amendment 9. Today I will just summarize the issues of opposition, as I believe enough written and oral testimony has been presented that outlines our position.

Obsolete Amendment

It is our opinion that Amendent 9 to the Shrimp Fishery Management Plan, is an obsolete amendment, that does not comply with the new requirements of the Magnuson Act amendments that addresses bycatch within the shrimp fishery.

Council Directive

At the September Council Meeting, the shrimp fishery advised and presented to the Council their concerns with the fundamental flaws in the scientific basis and mathematical model that appears to overestimate red snapper bycatch in shrimp trawls. The Council directed that a Review Panel be established for clarification of any scientific and mathematical irregularities. As of this date, the review directed by the Council has not been implemented, therefore, there has been no clarification of any scientific and mathematical irregularities and the Council directive remains unanswered.

No Credit for the Shrimp Fishery Reduction in Bycatch

The Shrimp fishery contribution to bycatch reduction continues to be ignored by NMFS and the Council.

Fishing gear conversion from double-rig to quad-rig reduced bycatch by 50% (Draft Amendment 9 "Overview" Page 4).

The regulatory mandates for TEDs that has been in effect since 1990 for inshore, nearshore and offshore shrimp trawls has substantially reduced finfish bycatch. The bycatch reduction range of 17.5 percent to 40 percent is dependent upon the TED design, water depth and the geographical area of operation.

Industry advised, that since the late eighties there was a 40% reduction of vessels that had left the offshore fleet. This reduction in vessels has reduced fishing effort substantially in nearshore and offshore waters. Recently NMFS recognized fleet reduction and reduction in fishing effort of 5.8 percent in 1993, 10 percent in 1994 and 10 percent in 1995. TSA believes that 1996 would be similar to 1994-1995 with a corresponding reduction of 10 percent. This reduction in fishing effort would coincide with bycatch reduction in shrimp trawls. Yet, credit for this reduction remains questionable in shrimp trawl bycatch estimates.

The magnitude of untrawlable bottom inaccessible to shrimp trawls -- natural and artificial reefs, hangs, shell ridges, pipelines, oil and gas platforms, sanctuaries, area closures, etc. These are expansive areas that provides protective measures for sea turtles and all finfish species from interaction with shrimp trawls. The fishery questions the fishing effort calculation used within the grid areas that encompass untrawlable bottom that would also add to the overestimation of shrimp trawl bycatch. Yet, these inaccessible areas that provides bycatch protection and fishing effort reduction remains unanswered by the fishery managers.

The bycatch characterization study clarified that the bycatch myth of 10 pounds of finfish to 1 pound of shrimp was an example of premature overestimation and speculation of bycatch in shrimp trawls. The reality was 3.5 pounds of finfish to 1 pound of shrimp. The majority of the discarded 3.5 pounds of finfish consisting of non-edible/non-valuable species were not wasted, but utilized by various species of marine life.

Upward Trend in Red Snapper TAC

The shrimp fishery remains baffled. In 1990 NMFS estimated a 60 percent reduction in red snapper bycatch to allow only a harvest TAC of 1 million pounds to the directed red snapper fishery. Since that period of time there has been no mandate of BRDs in shrimp trawls. The red snapper TAC continues to spiral upward, that allows a combination of an increase to the directed commercial fishery and an adjustment for the overtake by the recreational fishery.

The shrimp fishery is not opposing -- only questioning the rationale to continue to increase the Red Snapper TAC. In 1991 NMFS and the Council claimed, that the red snapper fishery was significantly overfished. In addition, NMFS and the Council claimed the red snapper population was declining because of mortality of juvenile snapper in shrimp trawls. Where did all of these additional red snapper come from to justify this ever increasing TAC -- from 1 million pounds to ~~9.23~~ million pounds??

9.12

Economic Impact on Fishing Communities

Regulatory economic impacts on the "fishing communities" must be thoroughly subjected to review. The loss in production from a decrease in shrimp biomass from predator/prey imbalance, TEDs or BRds will substantially impact throughout the utilization range of the resource from dockside landing value, added-value, reciprocating impacts on dependent direct and indirect land-based infrastructures, municipality budget revenue, lending institution loan portfolios and consumption.

Another serious predator/prey imbalance now looms on the horizon that must be taken into consideration of the potential effects on the Gulf of Mexico shrimp biomass:

> A summary of a Paper on Aquaculture - Submitted to Texas Parks & Wildlife on November 4, 1996 from C. N. Mock: Advised research revealed, that the Taura Virus was exposed to native Gulf of Mexico white shrimp. After some 79 days these shrimp were fed to native Gulf of Mexico brown shrimp, and pink shrimp, which came down with the Taura Virus and died. Thus white shrimp may serve as a host for the Taura Virus, infecting native shrimp species of the Gulf of Mexico and most likely species of the Atlantic Coast.

Alternative Measure for Bycatch Reduction

TSA requests that the Council take under consideration a comprehensive review of the shrimp fishery sea turtle protection measures presented to NMFS as a bycatch reduction measure, in lieu of, additional gear restrictions on the shrimp fishery.

Council Position

What you see

Today the Council has the option to proceed with Draft Amendment 9 in its current form as an appropriate and justifiable conservation measure, eventhough a financial collapse of the most valuable fishery of the U.S. is evident upon implementation of this management measure to the Shrimp Fishery Plan. We estimate that the impact in shrimp loss, predator/prey shrimp biomass loss and gear cost 225 million just using a simple multiplier of 3 for a total impact of 675 million dollars. Texas and Louisiana represents 85% of the shrimp production and value, therefore, these 2 states will take the biggest impact of approximately 575 millions dollars.

The Council must be held responsible that the benefits to be derived from this amendment are equal in economic gain to the directed red snapper fishery -vs- the economic loss to the shrimp fishery on a per state basis, in order, to maintain solvent "fishing communities".

-- or --

The Council can table Amendment 9 for further consideration, that with all the encompassing scientific factors and bycatch reduction by the fishery over a time frame -- that the 50 percent reduction in bycatch has been achieved -- evidenced by the apparent recovery of the red snapper population.

TAB D NO. 7(a)

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
9721 Executive Center Drive N.
St. Petersburg, FL 33702

F/SEO11:RS

OCT 7 1996

Dr. Robert L. Shipp
Chairman
Gulf of Mexico Fishery
Management Council
5401 West Kennedy Boulevard, Suite 331
Tampa, Florida 33609

Dear Dr. Shipp:

Enclosed for your information are comments by Ms. Donna Wieting, Acting Director, Ecology and Environmental Conservation Office regarding the Finding of No Significant Impact for the Council's Environmental Assessment for the 1996 framework adjustment of the Gulf of Mexico red snapper management measures. Her comments advise the Council of the need to achieve the target reduction in shrimp trawl bycatch of juvenile red snapper and thereby achieve recovery of the overfished red snapper resource. Ms. Wieting recommends that, if the specified bycatch goals and other assumptions are not achieved, the Council should begin preparation of a Supplemental Environmental Impact Statement early in 1997 on the red snapper fishery considering a full range of alternatives to rebuild the overfished stock. Thank you for your attention to Ms. Wieting's comments.

Sincerely yours,

Andrew J. Kemmerer
Regional Administrator

Enclosure

cc: F - Schmitten
F/SF - Matlock
F/SEC - Brown
GCSE - McLemore

RECEIVED

OCT 10 1996

GULF FISHERIES COUNCIL

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2. F/SEO?

UNITED STATES DEPARTMENT OF COMMERCE
Office of the Under Secretary for
Oceans and Atmosphere
Washington, D.C. 20230

RECEIVED
1996 SEP 23 AM 12: 30
NMFS-SERO
ST. PETERSBURG, FL.

September 18, 1996

MEMORANDUM FOR: The Record

FROM: Donna S. Wieting Donna Wieting
Acting Director, Ecology and Conservation
National Environmental Policy Act Coordinator

SUBJECT: Environmental Assessment for a Final Rule that Implements Red Snapper Management Measure Adjustments in the Gulf of Mexico

The subject Environmental Assessment (EA) is for a Final Rule to adjust management measures of the Fishery Management Plan for the Reef Fish Resources of the Gulf of Mexico. This final rule: 1) increases the total allowable catch for red snapper from 6.0 million pounds to 9.12 million pounds, a 52% increase; 2) reopens the commercial red snapper fishery on September 15, 1996 to allow harvest of the remainder of the 1996 quota; 3) splits the 1997 commercial quota between two seasons; and 4) extends the target year for red snapper stock rebuilding from 2009 to 2019.

I have signed the concurrence for the Finding of No Significant Impact accompanying this EA based on a number of assumptions, primarily the assumption that bycatch reduction devices will be implemented in the shrimp fishery in 1997.

Since the first red snapper assessment in 1988, the fishery has been identified as being significantly overfished. NMFS stock assessments continue to point out that this fishery is overutilized and the current stock level remains below its long term potential yield. In fact there are strong indications that this fishery is recruitment over-fished and that further decreases in stock size would have a direct negative effect on recruitment. In 1988 the Reef Fish Scientific Advisory Panel (RFSAP) recommended that a 60-70% reduction in the fishing mortality rate was necessary to rebuild the stock to an adequate spawning potential ratio of 20%. Shrimp trawl bycatch was identified as a significant source of mortality on juvenile red snapper.

Despite that recommendation, the Total Allowable Catch (TAC) quota was increased from 4 million pounds in 1991 to 6 million pounds in 1993. This action increases the TAC from 6.0 million pounds to 9.12 million pounds, a 52% increase, and extends the recovery target date to 2019. The action is based on the recommendation of the RFSAP, given new information, that the Allowable Biological Catch (ABC) range can be increased to 6 million to 10 million pounds without negatively affecting the rebuilding schedule. Their recommendation is primarily based on the assumption that bycatch reduction devices will be implemented in the shrimp fishery in 1997 and will result in a 50% reduction in red snapper mortality. The recommendation also assumes:

1) actual shrimp trawl bycatch mortalities will not be higher in 1995 and 1996 than projected;
2) the recreational sector will stay within its allocation; and
3) projected increases in recruitment are realized.

The RFSAP warned that failure to meet these conditions can result in possibly dramatic reductions in future ABC ranges.

If the red snapper bycatch is not reduced by 50% in the shrimp fishery in 1997, or if the other assumptions are not met which support the recommendation to raise the TAC, I recommend that the Gulf of Mexico Fishery Management Council begin an Environmental Impact Statement on the red snapper fishery early in 1997 which considers a full range of alternatives to rebuild this severely overfished stock.

cc: DA - D. Hall
GC - J. Johnson
F/SE - A. Kemmerer
GCF - M. Frailey-Hayes
FX1 - G. Matlock
GCF - J. Feder
SP - S. Fruchter
FS3 - G. Darcy

TAB D NO. 7(b)

OFFICE OF
DOUGLAS H. GREENBURG
DISTRICT ATTORNEY
THIRTY-SECOND JUDICIAL DISTRICT
PARISH OF TERREBONNE
STATE OF LOUISIANA

400 EAST MAIN STREET
2ND FLOOR COURTHOUSE ANNEX
HOUMA, LOUISIANA 70360

PHONE
504-873-6500
FAX 504-873-6510

October 7, 1996

Copy C + TJ

Gulf of Mexico Fishery
Management Council
Via Facsimile: (504) 765-2489

Attention: Karen Foote

Dear Ms. Foote:

I am very concerned and disappointed with the very short notice provided to the public notifying them of this hearing. A previously scheduled 7:00 p.m. meeting has prevented me from being present.

I personally appeared in 1990 to address the Gulf Coast National Marine Fisheries Council regarding implementation of fisheries restriction and closure policies. My position today is the same as it was then. I oppose the enactment of any new federal regulations or laws which will hereafter cause what were previously legal fishing activities of thousands of Terrebonne Parish fishermen to be regarded as criminal acts.

It is my understanding that the biological data is not conclusive nor has it been explained to the public in a meaningful way. To even consider adding additional penal (criminal) statutes and regulations at this time is ill conceived at best, and likely to be regarded as unenforceable if state agents are to be expected to also handle these matters in any significant way.

Our criminal dockets in Terrebonne are already choked with real crime. We have neither the enforcement resources, nor the available judicial system, to process such matters as these. I personally am very opposed to any additional fisheries laws which will convert hard-working fishermen to the status of "criminals" because of what I am told is a red snapper size problem. More thought and consideration is obviously needed before any such new law is enacted.

Sincerely,

Doug Greenburg

Douglas H. Greenburg
District Attorney

DHG/an

Hearing Tuesday for shrimpers

10-4-96

By FREDERIC REINECKE
and JOHN DeSANTIS
The Courier

Local shrimpers will have their chance Tuesday in Thibodaux to speak out about proposed regulations forcing them to add fish-excluder devices to their nets when trawling in federal waters.

The Gulf of Mexico Fishery Management Council proposed the regulations last month to protect dwindling red snapper stocks in the western Gulf of Mexico. The agency will take public comments at a public hearing 7 p.m. at the Thibodaux Civic Center.

Some shrimpers are objecting to the sudden scheduling of the hearing because they say it doesn't give them enough time to raise opposition to the regulation. Many interested shrimpers, they said, are too busy working through the white shrimp season to attend.

The devices, also called "bycatch-reduction devices" are designed to allow immature red snapper to escape the shrimp nets. Their incidental capture in the shrimp nets is seen as the primary reason for the species' decline. The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard.

The agency wants to reduce their rate of capture by half.

Shrimpers argue that other measures, such as the use of turtle excluder devices, have made significant reductions in red snapper bycatch, so the new regulations aren't needed.

If given final approval by the U.S. secretary of commerce, the regulations will go into effect before the spring 1997 shrimping season. In their present form they will require

Rick Leard, an agency biologist. The the management council first proposed steps for saving red snapper stocks in 1990, but were delayed for several years.

The council's initial plan envisions restoring the fish to sustainable levels by the year 2007. But the delays have made the problem worse, he said. If steps are taken in 1997, the red snapper species may be restored by 2017.

Jeff Scott, owner of Scottco, a Dulac shrimp processing company, said anything that will add another hole to a net will cost in the long run. He hopes that despite the short notice, every commercial fisherman who has an interest in the excluder devices will attend the Thibodaux meeting.

"Every fisherman that's going to have to pull one should go. I don't know if a certain one has been approved; that's the dark area," Scott said. "I don't know if there's one they'll approve the fishermen don't mind pulling. This is a public hearing to hear whether they do or don't want to pull a BRD or a FED or whatever they are calling it."

The speed with which meetings were set up, Scott said, was personally disconcerting.

"It was so fast, the fastest I've ever seen them move," he said. "I've never seen them go this fast. I hate to think it but it would be my opinion that they would want to run this down someone's throat. I'm sure they do have a majority of the council that would be on the recreational side. But the thing they don't understand is that this bycatch thing is growing by leaps and bounds, and a lot of this fish are fish the recreationals don't want out there —hardhead catfish and croakers."

What concerns Scott most are rumblings in ...

shrimpers to use the new devices in federal waters up to 100 (or 600 feet) fathoms deep, from Cape San Blas, Fla., west to the Mexican coast.

The agency rushed to schedule its 14 public hearings throughout the Gulf Coast so it can have the regulations in place for the 1997 shrimp season, said gear being used by shrimpers — the conventional trawl — is inadequate. At the same time, shrimpers have not been sticking together, according to Scott, to let their views be known.

"The shrimper is destroying himself by not being as a group," he said. "These people are self-destructing."

TAB D NO. 7(c)

Red White & Blue, Inc.

Rt. 1 - Box 434 Sopchoppy, Florida 32358

(904) 697-4545 • (904) 697-3322 • FAX (904) 697-4326

October 11, 1996

Gulf of Mexico Fishery Management Council
Lincoln Center, Suite 331
5401 W. Kennedy Blvd.
Tampa, FL 33609-2486

Dear Sirs:

RE: Draft Amendment 9 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico

It was my understanding that the Gulf of Mexico Fishery Management Council was formed to help the fisherman. It has become a policeman to hinder the fisherman. If existing laws were enforced, no new laws would be needed to protect our fisheries.

Our livelihood has become the most over-regulated industry in the world. Amendment 9 would only add more regulation to the fishermen. It is my opinion that this amendment should not be approved.

Sincerely,

Clyde W. Truxell, III
President

TAB D NO. 7(d)

the Chamber

P O Box 1462
Larose, LA 70373
(504) 693-6700

RESOLUTION

At a meeting of the Board of Directors of The Chamber of Commerce of Lafourche and the Bayou Region, Inc., held at an office in Larose, Louisiana, on the 16th day of October, 1996, pursuant to due notice, at which a quorum was present, on motion, duly seconded, the following resolution was unanimously adopted:

WHEREAS the shrimping industry in Louisiana and other states has already sustained considerable economic hardship as a result of the mandatory use of Turtle Excluder Devices, and

WHEREAS the Red Snapper is neither a threatened nor an endangered species of fish, and

WHEREAS the decrease in Red Snapper population was largely due to heavy fishing pressure, and

WHEREAS the introduction of quotas and limits on Red Snapper has helped the species to rebound its population, and

WHEREAS the Gulf of Mexico Fishery Management Council, the agency seeking to impose the use of the Fish Excluder Device on the shrimping industry, has increased the quota on the amount of Red Snapper that can be legally caught, 52% since 1993 (representing nearly 2 million pounds of additional harvest), and

WHEREAS the mandatory use of Fish Excluder Devices would have severe and adverse economic impact on the shrimping industry with questionable benefit to the Red Snapper species.

BE IT THEREFORE RESOLVED, that The Chamber of Lafourche and the Bayou Region, its 465 companies/individuals representing 11,800 employees recommends that the Gulf of Mexico Fishery Management Council, and the National Oceanic and Atmospheric Administration in the United States Department of Commerce, to RECONSIDER and WITHDRAW its proposed "Amendment #9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, United States Waters."

BE IT SO RESOLVED on this 16th day of October, 1996, Larose, Louisiana.

Jan Torres
JAN TORRES, PRESIDENT

Chris Allen
CHRIS ALLEN, SECRETARY

C E R T I F I C A T E

This is to certify that the above is a true and correct copy of the resolution unanimously adopted, on motion, duly seconded, at a meeting of the Board of Directors of The Chamber of Commerce of Lafourche and the Bayou Region, Inc., a corporation organized under the laws of the State of Louisiana, held in the Community of Larose, on the 16th day of October, 1996, pursuant to due notice, at which meeting a quorum of the Committee were present, and that said resolution is duly entered upon the minute book of said corporation, and is now in full and force and effect.

Chris Allen

CHRIS ALLEN, SECRETARY
Board of Directors of
The Chamber of Commerce of
Lafourche and the Bayou Region, Inc.

Written Comments in Response to Draft Amendment 9 to the Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters (Proposed by the Gulf of Mexico Fishery Management Council)

November 1, 1996

TAB D NO. 7(e)

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

I appreciate the opportunity to provide comments regarding the Council's proposed actions to control the bycatch of red snapper in Gulf of Mexico shrimp trawls. Although none of the currently proposed alternatives are acceptable, I am confident that an acceptable situation can be achieved through further scientific study and through outside peer review of the red snapper stock assessment.

Bon Secour Fisheries is a fourth generation family-owned and operated shrimp harvesting, packing and distribution company. We operate 11 Gulf shrimp trawl vessels and provide employment for over 150 individuals. Our 1995 payroll, including crew shares, was in excess of $6.6 million.

The Southeast U.S. shrimp trawl fishery has developed and should continue to develop methods to reduce its bycatch of unmarketable living marine organisms. The public perceives that bycatch constitutes waste and that incidental harvests are injurious to the health of the marine ecosystem. Such perception will continue to drive demands for change on the part of the industry. The industry would welcome new and effective bycatch reduction devices given the well documented fact that shrimp fishermen generally wish to avoid unmarketable non-target catch. However, the industry and its management partners have done a poor job of communicating with the public regarding the heroic efforts toward bycatch reduction and what has already been achieved to this point.

Red snapper bycatch in the shrimp industry declined by 50% from 1972 to 1993. Overall finfish bycatch by weight has declined 60% since the 1970's (NMFS, Cooperative Research Program Addressing Finfish Bycatch in the Gulf of Mexico and South Atlantic Shrimp Fisheries - A Report to Congress, April, 1995). This has not been achieved without cost to the industry. For instance, prior to limited entry and restrictive size limits for red snapper, many thousands of pounds of small (8 - 12 inch) red snapper were landed by shrimp boats as "rat snapper". Although never a target species, the revenue generated by these landings was not insignificant to the individual boat. Any catch of this size snapper is currently a regulatory discard, waste mandated by regulation. Fortunately, bycatch characterization data indicate that today's fishery does not significantly impact this size red snapper, probably due to the use of LORAN interfaced plotters and the bycatch exclusion capability of currently available TEDs. With the mandated use of TEDs has also come great cost to industry in economic and sociologic terms.

The entire issue of shrimp loss and TEDs coupled with the BRD characteristics of TEDs is very controversial. The shrimp industry is convinced that all TEDs are BRDs and that this applies to red snapper as well as it does to the other non-target species captured in a shrimp trawl. I have attached, as part of these comments, an edited transcript of an interview with Charles King, Captain of the High Plains Drifter, an 80 ft steel-hulled Gulf shrimp boat which works from our dock. He has taken an observer aboard his boat for more than 2 years during both TED and BRD evaluations and bycatch characterization efforts. Many of his observations do not concur with stated "minimal shrimp loss" claims for either TEDs or the expanded mesh extended funnel BRD. A complete transcript and video tape of the interview are available on request.

All stakeholders would benefit from continued analysis of the bycatch exclusion capability of existing hard and soft TED designs. **The Gulf Council should ask NMFS, in cooperation with the shrimp industry, to immediately begin evaluating the bycatch exclusion rates of currently available TEDs versus unmodified "naked" nets.** This will help to avoid disagreement over TEDs and shrimp loss and will begin to answer questions concerning total shrimp loss and bycatch reduction with TED/BRD combinations. This naked net testing was recommended by the industry in 1991 at the outset of the Foundation Bycatch Research Program and the need for such testing still exists. Without the results of such testing the ability to predict economic loss to the shrimp industry is severely hampered, if not impossible. Furthermore, without knowing red snapper exclusion rates of currently used TEDs it is impossible to determine the extent to which the 50% red snapper bycatch reduction target is already being achieved. **Any action which would mandate BRD use beyond what is currently mandated as TEDs should be contingent upon the findings of such a study.**

There are many problems with the data used in estimating either the magnitude of red snapper bycatch in the shrimp fishery or the extent to which this bycatch must be reduced to achieve SPR targets. The primary difficulty in estimating shrimp trawl bycatch is no longer CPUE, which has been estimated through observers, but rather in the trawling effort estimate currently extrapolated from shrimp landings data. GLM estimates of shrimp trawl bycatch depend on estimates of trawling effort in specific depth and area strata as determined through port agent interviews of boat captains or through port agent "guesstimates" based on available knowledge of fishing patterns during that part of the season or for the vessel or fleet in question. Often port agents must lump landings from an entire trip into a particular statistical area and depth regardless of whether or not even the majority of landings from that trip were harvested in that area and depth. Such practices, although leading to "best available data" may be severely overestimating effort in particular area and depth strata, thereby biasing the results of the GLM estimate. Total shrimping effort may be more accurate, but the accuracy of estimates for effort in a particular area and depth zone may differ significantly from reality. **The Gulf Council should form a Shrimping Effort Data Task Force to evaluate the accuracy of current data collection efforts as well as to make recommendations to NMFS regarding necessary changes to the data collection effort so that the data are of more use in the future. The**

Task Force would be working toward satisfying one of the Congressional Mandates in the Magnuson Act Reauthorization.

The SPR target for Gulf of Mexico red snapper is flawed due to inaccurate historical data on red snapper landings by area caught. There is simply too much anecdotal evidence of red snapper caught in Mexican waters and being improperly documented as from U.S. waters to ignore the effect of such erroneous data on estimates of SPR.

Given all the questions regarding the impact of bycatch on the red snapper stock, the validity of current SPR targets, and the overall status of the red snapper stock, it is not surprising that Congress singled out Gulf of Mexico red snapper, among all U.S. fisheries, for a rigorous program of **outside peer review** for all aspects of data collection and stock assessment. Such a mandate should not go unheeded by the Council.

Efforts to determine the economic impact of the proposed regulations on the shrimp industry are hampered by uncertainty regarding shrimp loss with the currently proposed devices both TED and BRD. There is also only preliminary information regarding ecosystem changes, resulting from a decrease in bycatch, which could adversely impact shrimp production by up to 17% (Martinez, et al., "A Model for Assessment of Ecological Interactions... Implications for Bycatch Management and Shrimp Production., Report to GMFMC, March 1996). Given such questions coupled with the uncertainties regarding the red snapper fishery and the Congressional mandate for peer review of the data on that fishery, it would seem imprudent at this time to begin mandating the use of BRDs beyond those mandated for turtle exclusion.

A more prudent approach would be to begin a 12 month technology transfer effort, Gulf-wide, for the purpose of widely introducing new BRD designs to the industry. During this period it should be expected that peer review of red snapper data and naked net testing of BRDs will be conducted. The results of such efforts should help answer some of the more critical questions surrounding the currently proposed options and probably lead to the formulation of more universally acceptable options. Given the fact that red snapper TACs have increased continually since 1990 with concurrently high CPUE anecdotally in all sectors of the directed fishery (commercial, recreational and charter), there is no reason to put mandatory BRD regulations on a "fast track".

ATTACHMENT

Transcript of Interview of Capt. Charles King
High Plains Drifter 9-20-96
Subject: Bycatch Reduction Devices

We have with us this morning Capt. Charles King of the High Plains Drifter which is one of our company boats.

Q: Charles, how long have you been shrimping?
A: Thirty years.

Charles is a thirty year Captain on boats and has been involved in the shrimp industry all of his life. He is a third generation shrimper. He has been on the High Plains Drifter since we bought the boat about three years ago. Before the High Plains Drifter he was on the Chris-da-Lynn for five years. On both of those boats he has had a National Marine Fisheries Service and Gulf and South Atlantic Fisheries Development Foundation observers and they have been involved in characterizing bycatch and testing Bycatch Reduction Devices (BRDs).

Charles since you have thirty years experience in the industry, this is an effort to get your opinion on tape. Please tell us what has been happening on your boat with reference to bycatch and BRDs and TEDs.

CK: Russell O'Brian from Texas A & M Extension Service started to work with me on the boat two and a half years ago. He has made almost every trip. We started with TEDs then went to the BRDs for bycatch reduction. I feel that if we have to pull BRDs, that of the two that I have experimented with the fisheye and the extended mesh that of the two, the extended mesh would be the best to pull. I am in question as to why we really have to pull a BRD when TEDs have been associated in reducing bycatch. I'm all for conserving our industry but I can't see, with all my years of experience, where the shrimping industry is the culprit for the decline in the fisheries as far as bycatch in our industry.

CN: Let's talk about the different kinds of BRDs that Russell has tested aboard the boat.

CK: In my opinion, Russell is a very good observer. He is fair in all of the data that he puts down. If there was an obstruction or if there was some reason that the data he collected was not fair he would not put it on paper. So, I feel that the data that has been collected is fair for both parties. We, the commercial fisherman, have used their form of the fisheye for years in order to reduce the amount of croakers that we used to catch. When they were real bad and we could not drag, we would install the fisheye in order to get rid of the fish so we were still able to work. The fisheye does work, it will reduce your bycatch, but you do lose shrimp.

CN: How long ago would you have been using the fisheye?

CK: I've used the fisheye at least 15 to 18 years. We used to not do it as the form of fisheye we have today; we would cut a hole in the bag. We would go up seven and one half feet, which is approximately where the fisheye is installed today, and cut a hole in the bag. We did this so we could continue to work. We have had quite an experience with the fisheye and you do lose shrimp under certain conditions with the fisheye. If it's rough when you pick up the backwash from your bag or from the waves or from the tides will wash the shrimp out of the fisheye.

CN: Is that only when the waves are on your stern fairsea or is that also even if you are headed into the sea?

CK: It's not as bad into the sea but you still lose if it's rough because you still have a washback. It has worked in fair sea, you have to be very particular when you pick up if it's rough and you are using the fisheye. The fisheye we have found only excludes or works its best on certain types of fish. It works extremely well on hard head catfish. It works well on croakers if you do not catch the fish to quick. If you catch them to quick, then it just fills the bag up and you have no reduction. There have been a lot of variables with the fisheye and there has been recorded a good bit of shrimp loss.

CN: What causes you to lose shrimp with the fisheye?

CK: I feel they crawl out of the hole or with the washback from it they will crawl out. Shrimp has a tendency to stay on the bottom of the net but when they get in the bag and you have a washback with it, they will work their way back towards the front of the net and when he finds a hole, he's going to go out of it. We do not have much clogging up of a fisheye because it is in the cod end of the net and you don't have much debris that gets down that far to clog the fisheye up. Silver eels will clog a fisheye and they will stop it up to where nothing escapes out of it. It is hard on any type of device that you use because of the different terrains on the Gulf bottom.

CN: You say the fisheye is undesirable because of the shrimp loss?

CK: Right. As far as expenses, and less trouble to work with the fisheye is the least costly. It only costs $15-20 to build a fisheye. There is a great shrimp loss. While Russell was on the boat with me, we were in Key West and we had very little shrimp loss with the fisheye. The only difference that we had was when we went on the southside and we were in the Atlantic and we were in deep water, around 35 fathoms, the tide was running a lot harder than what it did in the Gulf and we had to quit using the fisheye because we were recording a **50** to **75%** loss out of the fisheye.

CN: Where was the tide on the surface at that time? Was against you or with you?

CK: I picked up against the tide to try to eliminate the loss because of the experience I've had with the fisheye I knew that the tide would affect them, that you would have a bigger loss. We picked up headtide to try to minimize the loss. We still had a tremendous loss and contributed it to the tide.

CN: Is it always possible to pick up into the sea or into the tide or are there times when you are forced to pick up fairsea and fairtide?

CK: At times you are forced to pick up. Depending on the real weather conditions. In a real rough sea, you need to pick up fairsea. After your doors come up, your nets get on top, you can turn into the sea and wind your bags in. A lot of times you must pick up fairsea because you cannot control your boat. When you are trying to pick up you have to have enough headway to keep your boat from washing back over the rig. When it's real rough you can't do that, so you have to pick up fairsea and not headsea.

CN: Would that be a circumstance where you would see this problem with stuff getting bagged and surfaced and you would be fairsea and it would be coming out of the fisheye? I've heard people use the term "Belching"; is that what belching is?

CK: It's the same thing.

CN: The fish would be belching out of the hole.

CK: Right.

CN: Anything else on the fisheye that you can think of? You said that the type of fish it works best on are the croakers and catfish. Data has showed that it doesn't seem to do much with red snapper, is that your experience with this?

CK: Yes. We could see very little reduction in the red snapper.

CN: What about the extended mesh?

CK: Of the two evils, if I had to pull one, the extended mesh does work better in my experience than the fisheye. You do have, overall, less reduction in your shrimp out of the extended mesh as you do a fisheye. You still have a loss. I have heard some people say there is no loss at all out of the extended mesh, but under certain conditions you will have a shrimp loss from the extended mesh. We have had skates stop up the extended mesh to where it excludes everything.

CN: How would that happen?

CK: It clogs up the big webbing that is on the outside and when they get in there and hang up in the big mesh webbing, then you have an obstruction that messes the funnel up.

CN: talking about skates creating problems with Expanded Mesh Extended Funnel BRDs. Go over that again, the skates could be either inside or outside of the funnel?

CK: Right. As the skate proceeds down into the extended mesh, the "BRDs", for some reason, because of the water flow, the skates swim back against the current and they get on the outside of the funnel and up against the extended mesh and stop it up. It also either stops the funnel up to where everything goes out of it, shrimp and fish, or it causes change in the water flow, all of this so I understand is based on the current that is produced from the water flow that goes through TEDs and also through the BRDs. So, this would have to disrupt the current or the flow of the water that it goes through and it makes the fish act different and the shrimp also. It is the only conclusion that I can come up with as to why stopping that up with, say a skate, would cause it to react different because you have a different water flow going through it. As I have said, everything is based on the water flow through the webbing in a way that makes the fish react.

CN: Would a plastic bag do the same thing?

CK: A plastic bag, not as much as a skate, but it will affect it. We have had buckets get stuck in it also.

CN: How does a skate get by it?

CK: Possibly the skate is coming through the TED at a certain rate of speed to where when he hits the TED he folds up and goes through it or something of that nature. It still goes back to the terrain that you are fishing. Some areas we have no trouble and no problems with a loss with the extended mesh. Other areas you will still have a loss. I will have to say and I don't like to admit that anything we have to add to a net helps us, and I don't feel the TED helps us, but of the ones that I have tried and the ones that I have used, the extended mesh would be the best to have to pull.

CN: That's OK. I think that no one expects any of us to say we want to catch bycatch. As you have said, you have had to use fisheye in the past to try to shrimp where the fish are thick. So, there may be some devices that would actually improve our efficiency and productivity if they could be used in a way that they would not lose shrimp and create less problems.

CK: It would be an advantage to us. My crew and myself, if we could catch just plain shrimp, we could get a lot more shrimp than we do and it would be a better product all the way around. If you are catching a bunch of garbage along with the shrimp, your shrimp are not in as good condition when you dump them on deck as when they are if it is just plain shrimp. I would be all for anything that could be developed that we could just catch plain shrimp. As I say, I've been in the business for a long time and anytime you have a hole in the net, we have always tried to sew the hole up. We have always found that the least amount of holes you can put in your net the more shrimp you are going to catch.

CN: In principle, the devices, by virtue of the fact that there are holes in the net, there are going to be some sort of circumstances where you are going to lose some shrimp.

CK: Right. I see no way of getting by regardless of what you pull or what is put back there, if you have a hole back there you are going to lose some shrimp. Also, the extended mesh still does not exclude all types of fish. From our experience, there still seems, depending on the species of fish, to be a limit on what they exclude. Same as the fisheye, if you catch too much at one time it does not exclude fast enough. We did see a reduction in the baby snapper from one side to the other when we were pulling the extended mesh excluder in one side and not the other side. I don't remember the exact data or the percentage of reduction, but if I recall correctly it was not as much reduction as they thought it would be. Russell and I talked about this and he and I felt like maybe the baby snapper would swim out of it but they would have a tendency not to swim away from it because of the water flow and they will swim back in it. In fact, if I recall right, Russell told me that they had a film of this. They had seen the baby snappers swim back into the excluder. I would still credit this to water flow.

CK: I feel the more apparatuses that you put into a net the more complications you are going to have. My opinion is that the more the net is cut in different places, and other things are added to it, you have a weaker net.

CN: Why is that?

CK: You have more trouble pulling the net in half. You are going to have more net expense. Since we have started pulling TEDs, we have more trouble pulling the net in half than we ever had before.

CN: I have heard the term "Bogging Up", is that what you are talking about?

CK: With the net bogging up or crossing pipelines. The Gulf is full of pipelines. If we drag at all, sometime during the trip, especially in Louisiana, it is getting real bad off the coast of Alabama now, there are more pipelines being put down every day. The experience we have had with them is, if that pipeline catches that TED as you drag across it and that TED snag on the pipeline you are going to pull the net in half. The TEDs are not strong enough, we have a great tendency of the TEDs bending and the law states now that when you are checked and ~~if you~~ have a bar that is bent, the Coast Guard will make you replace it. They will administer fines and citations for this. That TED can be in perfect shape when ever you put it overboard but if the Coast Guard comes aboard you and it's bent when you pick up then there is a citation because you are pulling an illegal TED. Even though it was legal when you started to drag. We have no way of knowing whether it is going to be illegal when we pick up. It still goes back to me and my way of thinking, the more holes and the more things you put in a net the more complicated it will be.

CN: That is what I wanted to key on. The question I had for you was a similar circumstance with the TED. Studies would show that the TED has negligible shrimp loss. We have similar sets of data that shows negligible shrimp with the expanded mesh extended funnel BRD. My take on it that it was true as long as the conditions were right. If you got into bad conditions where the gear was fouling up, you had real shrimp loss. Does the fact that you have the BRD in your net make it so that you have under bad conditions you have more down time, which costs you shrimp, and it creates a situation where there is a greater chance for the net to be fouled under these bad circumstances? If you discount that then maybe the negligible shrimp loss is true; but if you take under account normal shrimping circumstances you have to say there is some loss. Is that true?

CK: Right. That would be fair to both sides. When you do have a loss, say it's only one or three or five times out of a trip, when you have a loss it's a big loss. I feel that over a year's time if you record all of the losses it going to be unsurmountable. Take the TEDs as an example: a soft TED versus a hard TED. I have heard the argument and people claim you lose all the time from a soft TED. From my experiences, I have not lost all the time from a soft TED. The time I lose with the hard TED, I lose everything because the hard TED clogs up. You have a 100% loss out of that one net. If the soft TED clogs up, you have maybe a 5% percent loss, because with the soft TED you have more holes with the big webbing for the shrimp to go on through into your bags than you do with the hard TED. When that hard TED clogs up it is clogged up completely. We catch tires, drums and buckets all the time and if they get on a hard TED that bag comes up almost nil. The only reason, I think, that you have anything in it is it's what went in the bag before you caught the obstruction with the TED. I feel that after the obstruction is caught you don't catch anything else. The soft TED does not have that problem. Stingrays will escape from a soft TED and will not escape out of a hard TED but I can't say that they will never escape. I have heard that on the east coast that the rock shrimpers pull what is known as a Seymore hard TED which is a real big hard TED. I have heard them say that stingrays will escape from them. The hard TEDs I have pulled in the Gulf, the stingrays stops it up. I feel that that is the same as with the BRD.

CN: If you have a net that does not have a TED in it versus the net that has a TED in it plus the BRD, there is a greater chance for something to go wrong in the net that has the BRD and the TED, is that a fair characterization?

CK: I feel it is.

CN: What is the biggest problem with the expanded mesh BRD, is it clogging?

CK: Clogging would be the biggest problem that I've had.

CN: Maybe you have a firm idea of how much you think you would lose. I have had people ask me and I don't know, I hear figures anywhere from 10-30%. With the TED how much shrimp do you lose taking into account time that you lose and the amount of down time you have trying to resow and maintain them or is there shrimp loss there as well as when it is clogged and you lose 100% sometimes. If you add a BRD to the net, how much additional shrimp loss do you think you will experience overall?

CK: I would be afraid to say on that, I've never thought overall about it. I would say about 20% overall.

CN: Going back to that point about the fact that there will be some that will say the only expense with the TED is the price of installing and maintaining the gear. We feel that it is not true. It will more than likely be said that these bycatch devices that the only expense to the industry is going to be the expense of installing and maintaining. How would you respond to that?

CK: I feel that goes back to the same cliche that anything works in a controlled environment. We are not in a controlled environment. We are going to suffer at some time during the trip, a shrimp loss with the extended mesh excluder. As being able to come up with an exact percentage of what we will lose, to be honest, on both ways for or against, I couldn't come up with an honest opinion as far as percentage. We are still going to have a loss at some time. They claim that there was no loss with the TED. With the data that has been collected, we can see that at times we have 100% loss with the TED. I feel that with the extended mesh excluder, under conditions, you are going to have a loss. There has been recorded shrimp loss. To say actual percentage, I really couldn't say. I would say as I stated before maybe a 20% loss overall. To be real honest with it I couldn't put a percentage on it. You can go to the point of no shrimp loss but only certain conditions under a controlled environment. Out in the wild you will still have a loss.

CN: You wrote a letter that I want to refer to before we end. The letter was addressed to Dale Stephens of the National Marine Fisheries Service and I'm going to include this as part of your testimony. It talks about the problems with TEDs and then your impression of the ability of the soft TEDs to perform overall very well under various conditions but also its ability to exclude bycatch. There have been a number of experiments done on the soft TED versus the hard TED or naked net on how well it excludes fish overall. As far as overall bycatch, what do you think of the soft TED?

CK: Soft TED works great on overall bycatch. I believe Russell will confirm with data that it's right at a 50% reduction in bycatch with the soft TED. I have pulled the Morrison top shooting soft TED and I have pulled an Andrews bottom shooting soft TED and bycatch reduction on both of them is at least 50%. From being told what the law requires for bycatch reduction, I believe that exceeds what we were trying to exclude with the fish excluder. I have had people make the comment that maybe they work too good. Here is a real question in my mind, why outlaw a device that you can put in your net, it's less expensive than a hard TED and a lot easier to maintain, it does the job of a BRD and a TED combined, why outlaw it? Why couldn't we just say everybody go to soft TEDs in the Gulf, you are going to pull it that suffices for all the TED and BRD requirements? I know the Soft TED reduces bycatch because National Marine Fisheries will not allow you t pull a BRD in a net that has a Soft TED in it. They say you do not get a true reduction from the BRD because there is already a big reduction in bycatch because of the Soft TED.

CN: You would go with that? You would go with just the one device?

CK: I would go with just the one device. One reason, you don't have the risk factor from the soft TED of someone being hit in the head with a hard, metal object whenever it is rough. When it is calm you have no problem. We cannot just fish in calm weather, we work under all conditions. I have heard people say that you have a loss all the time with the soft TED. I did not have that experience when I was pulling the soft TEDs versus the hard TEDs.

CN: Let me get you to respond to this. The knock on the soft TED is that it's to hard to get in the net so that you won't catch a turtle with it. Also, the Coast Guard has a hard time determining whether or not that TED installed correctly. Have you noticed a tendency for the TED to catch and not shoot turtles?

CK: No, I have not. As an example, whenever we first purchased the High Plains Drifter, the nets had soft TEDs in them. We pulled them for two trips. After we were told they were illegal, we took the Soft TEDs out. With these two trips, we were pulling these soft TEDs, we did not catch turtle, none whatsoever. Russell can verify this at Texas A & M. The very trip we installed the hard TEDs, we fished in the same identical area and we caught a turtle and the next trip we caught a turtle. What makes it stick out in my mind is that we were in the same geological area working the same place with soft TEDs versus hard TEDs. Pulling the soft TEDs we did not have a sign of any turtles. I can say, with the experience I've had, the soft TED excludes turtles. To the best of my knowledge, we have not caught a turtle with the soft TED. We have caught turtles with the hard TED.

CN: Can some of that be attributed to the fact that when the hard TED is clogged it will catch a turtle?

CK: It could. I don't know why a turtle would hang up in it. This is a mystery to me. We had a turtle caught in the cod end. He was still alive; how did he get past the TED?

CN: This is with the hard TED?

CK: Right, this is with the hard TED. How did he get through the bars and get into the cod end. We dumped him out on the deck. We were able to tag him and release him alive.

CN: You have made the comment that your experience with Texas A & M and their observer program has been real positive and they have appreciated your cooperation and the company's cooperation with the program. It makes a big difference. Can you comment on the overall experience of having an observer aboard the boat?

CK: I have no problem with it. I have had a real good experience with the program. Russell made just about every trip. I would say he made 25-30 trips with me. The program was great. I believe it has to be beneficial to both parties if the data is recorded correctly and is presented to the public correctly. I feel that with

Texas A & M that it would be no problem.

CN: Charles, thank you. I appreciate your time.

CK: Anytime I can help, I would be glad to.

End of interview

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GULF FISHERIES COUNCIL

TAB D NO. 7(F)

November 1, 1996

By Facsimile
Dr. Richard L. Leard
Senior Fishery Biologist
Gulf of Mexico Fishery Management Council
5401 West Kennedy Boulevard
Tampa, FL 33509

Re: Comments on Draft Amendment 9 and the draft Supplemental Environmental Impact Statement proposing to require Bycatch Reduction Devices to reduce red snapper bycatch in the Gulf shrimp trawl fishery.

Dear Dr. Leard:

The Center for Marine Conservation (CMC)[1] submits the following comments regarding proposed Amendment 9 and the related Draft Supplemental Environmental Impact Statement (DSEIS). Our comments are divided into three sections; 1) the need for bycatch reduction devices (BRDs); 2) the DSEIS recommendations, and 3) the impact of the Gulf shrimp trawl fishery on threatened and endangered sea turtles.

(1) BYCATCH REDUCTION DEVICES (BRDs)

CMC strongly supports the Amendment 9 proposal and DSEIS recommendation to require BRDs to reduce bycatch of red snapper in the Gulf shrimp trawl fishery. The use of BRDs will result in significant ecological benefits to snapper and other non-target species and also long-term economic benefits to Gulf fisheries and the Gulf region.

(A) Red Snapper

Each year, approximately 20 million snapper, mostly juveniles which have not yet reproduced, die in shrimp nets. Although snapper represent only a minor component of bycatch in shrimp trawls, this loss significantly affects their abundance and population. The red snapper fishery in the Gulf is already overfished, and it is predicted that the stock would not recover even if the directed fisheries for adult red snapper were closed to all harvest because of excessive loss of red snapper juveniles through bycatch (DSEIS,1.0).

If no action were taken to remedy this situation, the long-term risks to the directed red snapper fishery and to the health of the Gulf ecosystem, of which red snapper and other non-target species are integral components, would be severe. If, instead, bycatch is reduced so that juvenile red

[1] CMC is the nation's leading science-based environmental advocacy organization devoted solely to the conservation of the ocean and living marine resources. With more than 120,000 members nationwide, CMC is headquartered in Washington, D.C. and has offices in St. Petersburg, Florida, Hampton, Virginia, and San Francisco, California.

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snapper are allowed to mature and reproduce, the benefits to the marine ecosystem and the Gulf economy will be tremendous.

The inclusion of BRDs in shrimp trawls will significantly reduce the bycatch of red snapper and facilitate the recovery of the valuable red snapper fishery. Although there is limited species-specific bycatch data for the Gulf, experts have estimated that yields to the directed fishery for red snapper would increase 60 to 90 percent if the shrimp fishery bycatch did not exist (NMFS Miami Stock Assessment Group as cited by Nichols, 1989). Though the BRDs proposed in Amendment 9 will not eliminate bycatch entirely, they will begin to reduce this serious problem.

(B) Other Non-Target Species

The use of BRDs also will have significant benefits for other non-target species including Spanish mackerel and King mackerel which, like red snapper, make up only a minor component of bycatch but are severely affected by that loss. Approximately 3.2 million Spanish mackerel and 1.3 million King mackerel die in shrimp nets each year (DSEIS,1.0). As with red snapper, there are economic as well as ecological incentives to minimize this waste and allow for the recovery. Estimates indicate that yields to the directed Spanish mackerel and King mackerel fisheries would increase 40 to 60 percent and 20 to 30 percent, respectively in the absence of shrimp trawl bycatch (NMFS Miami Stock Assessment Group as cited by Nichols, 1989). Once again, the BRDs proposed in Amendment 9 will not entirely eliminate bycatch, but they will begin to reduce the problem.

Atlantic croaker, the species that comprises the major component of Gulf shrimp bycatch, will benefit tremendously from the use of BRDs. Each year 5.6 billion croaker die in shrimp trawls. Croaker were very abundant in the northern Gulf of Mexico as recently as the early 1950s, but populations have since declined dramatically. The size of individuals and number of year classes in today's catch is markedly reduced. Whereas croaker catches in the 1950s typically contained several year classes of larger fish, average croaker catches in 1991 consisted of a single year class of very small fish (NMFS Pascagoula Laboratory as cited in Gulf & South Atlantic Fisheries Development Foundation, Inc, 1992).

The DSEIS includes mention of ancillary benefits to species other than red snapper in several places. However, an adequate discussion of these benefits is lacking. Section 6.0: Environmental Consequences includes a subsection on fishery resources. However, as discussed below (CMC,1.C.2.), this section focuses on the potential of a decrease in shrimp stocks resulting from bycatch reduction. The discussion indicates that the environmental consequences of the proposed alternatives are considered in Sections 2.0, 3.0 and 4.0, but none of these sections contains a comprehensive analysis of the impacts of the proposed action to many non-target species or to the Gulf ecosystem. Section 2.0 describes the proposed alternatives and Section 4.0 is Regulatory Impact Review, not an environmental impact review. Section 3.0 does not exist, either in the Table of Contents or in the body of the text. The DSEIS should analyze the ecological benefits that will result from the reduction of bycatch of non-target species other than red snapper, and the recovery of potentially important fisheries.

(C) Gulf Ecosystem

(1) Benefits of BRDs

The ecological impacts of bycatch are not fully understood. Bycatch impacts many species directly, usually decreasing abundance and altering population structure. Bycatch also indirectly impacts these and additional species through alterations in trophic level interactions and changes in community structure. These impacts are complex and their long-term impacts on ocean ecosystems are yet unknown. It is known, however, that such impacts are cumulative and that they can be severe.

Although the bycatch problem is only one of the current threats to the health of the Gulf of Mexico and Gulf fisheries, it is the most significant for a great number of species. The reduction of bycatch in the Gulf shrimp fishery will allow for the recovery of impacted populations and the restoration of a more ecologically stable fish community. In this way, the use of BRDs in shrimp trawls will increase the likelihood that economically valuable Gulf fisheries can be sustained into the future.

(2) DSEIS Discussion

The DSEIS includes a discussion of potential ecosystem impacts of reducing bycatch. However, this discussion focuses almost exclusively on the potential decrease of shrimp stock biomass from minimizing bycatch (because of increased predation and decreased cycling of nutrients) and potential impacts to marine mammals and seabirds which feed on bycatch. For example, the DSEIS considers the alleged impacts to marine mammals and sea birds of reducing bycatch because bycatch provides a food source for these animals. This approach ignores the fact that these animals maintained healthy, sustainable populations in the Gulf prior to the existence of the shrimp industry.

CMC strongly cautions against such an approach. What requires analysis in the SEIS is the impact on the Gulf ecosystem of reducing bycatch. The primary focus of the analysis must be the ecosystem benefits of reducing bycatch. Consideration of impacts to the shrimp fishery and animals which might be dependent on bycatch as an unnatural food source should be only a secondary focus. Accordingly, we recommend that this section be significantly revised and expanded in the final SEIS.

(D) Shrimp Fishery

Fortunately, significant ecological and economic benefits of bycatch reduction can be achieved in a manner that will not significantly reduce the effectiveness of shrimp trawls. Three of the four BRDs included in the Amendment have been shown to achieve shrimp retention rates of at least 90% in NMFS testing (DSEIS, 2.0,C.2.). The use of BRDs also will result in economic benefits to the shrimp fishery through decreased workload in culling unwanted bycatch.

(2) DSEIS RECOMMENDATIONS

(A) Gear Requirements

As already discussed, CMC supports Preferred Alternative A.2, which requires the inclusion of BRDs in shrimp nets. Furthermore, CMC supports Option A.2.b which requires each net required to have a turtle excluder device (TED) to have a BRD.

Since TEDs were required in 1990, the size of try nets, and the length of time they are pulled have both increased considerably, resulting in an increase in the number of observed captures, and deaths, of turtles in try nets. For this reason, proposed regulations would require TEDS in try nets down to 12 feet of headrope. Finfish bycatch in try nets has likely increased comparably, for the same reasons over the same time frame. Hence, CMC recommends Option A.2.~~b~~ which requires a BRD in any net that requires a TED. Shrimpers always have the option of using a smaller try net as they usually did before 1990.

Additionally, Option A.2.b is clearly the best option in terms of ease of enforcement of the BRD requirement. Requiring both a TED and a BRD in the same nets will minimize confusion on the part of shrimpers and enforcement officials.

(B) Area Specified for BRD Use

CMC supports Alternative B.1 which requires BRDs in all Gulf waters in the EEZ within the 100-fathom contour, rather than Preferred Alternative B.2 which requires BRDs in only those Gulf waters in the EEZ within the 100-fathom contour which are west of Cape San Blas, Florida.

According to the DSEIS, the area east of Cape San Blas is excluded because most juvenile snapper bycatch occurs west of that point. As noted in the same section, however, there are relic populations of red snapper off Florida's west coast. The existence of these populations, and the likelihood that shrimp trawl bycatch is one of the primary reasons that the populations are relic, are compelling reasons to require BRDs in this area.

Additionally, there are finfish species, including croaker among many others, along Florida's coast that would benefit from BRD use in that area. While the specific focus of this amendment is the reduction of juvenile red snapper mortality, it is necessary to consider this issue from a broader ecosystem perspective, and also to recognize that the need to develop measures to reduce bycatch of other finfish is just a matter of time.

Finally, the BRD requirement should apply to the entire Gulf region for reasons of enforcement. If BRDs are required in all trawl nets out in the Gulf (and in all nets containing TEDS), there will be no confusion on the part of shrimpers or enforcement officials.

(C) Criteria for BRDs

The DSEIS includes two alternatives in Section 2.0.C. Neither of these alternatives is deemed preferable, and the two alternatives are not mutually exclusive.

CMC supports Alternative C.1., which links certification of BRDs to their bycatch mortality reduction effectiveness. Alternative C.1 specifies that BRDs must reduce mortality by 50 (or other) percent. As explained below (CMC, 2.E.), the '(or other)' provision is key to CMC's support of this alternative.

For Alternative C.2., 4 options are presented. None is deemed preferable. CMC has worked on the issue of TEDs for more than 15 years. It has been our experience with respect to TEDS that leaving this value unspecified only delays controversy regarding acceptable values. During early discussions regarding TEDs, when conservationists recommended that TED certification procedures also considered shrimp retention rates, shrimpers objected, requesting freedom to make their own choices regarding shrimp retention. However, in later years, the single most frequent objection to using TEDs put forth by the industry was shrimp loss. Shrimp loss rates have been used repeatedly by shrimpers and Members of Congress as the major reason for opposing TED requirements. Given this recurrent problem, CMC opposes Option C.2.d. and favors either Option C.1.a. or C.1.b.

According to the shrimp retention rate data presented in the DSEIS, the two fisheye BRDs and the extended funnel BRDs would meet Option C.1.a, and may meet Option C.1.b; the Andrews TED would fail to meet the requirements of Options C.1.a,b,c, and d.[2] In order to continually decrease bycatch in shrimp nets and to ensure restoration of impacted stocks in a reasonable time frame, it will be necessary to review and possibly decrease this criteria value at a later time (CMC,2.E.).

(D) Seasonal Closures

CMC supports Preferred Alternative D.1., which recommends no change in seasonal closures.

(E) Framework for Modification of Criteria

CMC supports preferred alternative E.2., which requires the establishment of a framework for modifying bycatch reduction criteria and establishing BRD certification criteria and a BRD testing

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[2] The data presented in Table 4 conflict with the information presented under Alternative C.2. According to Table 4 which is said to represent all the available evaluation information through March 1996, shrimp retention reduction rates range from 0 to 7 percent for the two fisheye and the extended funnel BRDs. According to the text under Alternative C.2., however, the fisheye and the extended funnel BRDs were found to achieve 97 percent retention of shrimp in NMFS testing, which is equivalent to a 3 percent retention reduction.

If the latter is true for both the fisheye BRDS and the extended funnel BRD, then CMC would support Option C.1.b. If the former is true, then CMC would support Option C.1.a.

protocol for certifying additional BRDs. Furthermore, CMC supports Alternative E.2.A with the following changes:

1) The bycatch reduction criteria may be increased (to require a greater rate of bycatch reduction) at any time, but may be decreased only after the red snapper fishery has been officially determined to have recovered from its overfished status.

Increasing the harvest of red snapper, which would be the effect of reducing the bycatch reduction criteria, would be irresponsible until the species has recovered from its overfished status. To increase the harvest of any species which is already overfished is poor and risky management. Alternative E.2.A. should be amended to preclude the possibility of such an increase under this amendment, and to comply with the Magnuson Fishery Conservation and Management Act, including the recent amendments, which charges the Council with preventing overfishing.

2) The bycatch reduction criteria is increased over time according to the schedule below (or some similar schedule) in order to achieve a recovery above the overfishing threshold prior to the year 2019.

	Bycatch Reduction Criteria
1997	50%
2002	60%
2007	65%
2012	70%
2017	75%

CMC urges the Council to revise its goals with respect to Amendment 9. At present, the goal of the Amendment is to reduce juvenile red snapper mortality by 50 percent in order to achieve a recovery above the overfishing threshold by the year 2019. A 23-year recovery period is much too long. The year 2020 is the target date for the recovery of Kemp's Ridley sea turtle from endangered to threatened. This turtle achieves sexual maturity, and reproduces much less quickly than the red snapper. Red snapper are capable of a much quicker recovery.

A 50 percent bycatch reduction must be viewed as a minimum improvement. Reducing bycatch by 50 percent would mean that 10 million pounds rather than 20 million pounds of red snapper would die in shrimp trawls each year. This would be a significant (and necessary) improvement, but 10 million pounds still represents a tremendous and unacceptable loss of biological resources.

Shrimp trawl bycatch must not prevent the timely recovery of red snapper and other finfish which have been so severely impacted by shrimp bycatch over many years. Research on bycatch reduction effectiveness and development of devices with reduction rates significantly greater than 50% must remain a priority. A bycatch reduction criteria improvement schedule like the one presented above would be an effective tool for encouraging improvement within a determined time period. If, however, this improvement is not forthcoming technologically, it may be necessary to amend the shrimp retention rate criteria in order to accomplish the increase in bycatch reduction.

(3) IMPACTS OF THE GULF SHRIMP TRAWL FISHERY ON ENDANGERED AND THREATENED SEA TURTLES

(A) Andrews 5-in TED

With specific regard to the proposed alternatives' impacts on endangered and threatened sea turtles, Alternative C.1. proposes that the Andrews 5-in turtle excluder device (TED) be considered a BRD for the purposes of this Amendment and red snapper exclusion. CMC recognizes the attractiveness of using a single device to address both bycatch problems, and the particular attraction of the apparently high rate of red snapper exclusion from the Andrews 5-in TED. However, it should be noted that NMFS has proposed regulations that would decertify all soft-TEDs, including the Andrews 5-in TED, because of problems with turtle exclusion rates under field conditions, which have proved less satisfactory than under the original certification conditions. In order to achieve adequate turtle exclusion rates, installation by a certified netmaker would have to be required (Gary Graham, TX Sea Grant, personal communication). Furthermore, nets frequently become snagged or otherwise entangled at sea, and would need retuning by a certified net-maker to ensure turtle exclusion was not compromised.

Given the endangered and threatened status of Kemp's ridley and loggerhead sea turtles, those most frequently caught in Gulf shrimp trawls, CMC must oppose the use the Andrews 5-in TED as a BRD because of sea turtle exclusion problems, regardless of its finfish exclusion rate. We also note that the Andrews 5-in TED has relatively high shrimp loss rates (Table 4) and therefore is not likely, in our opinion, to be favored by most shrimpers.

(B) Changes in the shrimp fishery and their impacts on endangered and threatened sea turtles

The DSEIS does not assess the impacts of the Gulf shrimp fishery on endangered and threatened sea turtles. Endangered and threatened sea turtles are not even mentioned in Section 6: Environmental Consequences. The text included under Section 10: Other Applicable Law, regarding the "impacts" on marine turtles, appears to merely be a history of the situation, not an evaluation of the impacts. Furthermore the history ends more than a year ago, omitting a number of crucial events in the intervening period. Bizarrely, this "history" ends with a court-ordered, 40-day preliminary injunction in effect, leaving the impression that that order is still in effect. Of most concern, the narrative makes absolutely no attempt to evaluate the effect changes in shrimp fishing effort have had on sea turtle mortalities. CMC raised this question first in our October 24, 1994, comments on Amendment 7 of the Gulf Shrimp Fishery Management Plan (attached).

The EA for Amendment 7 indicated that Gulf shrimp fishing effort increased some 200 percent since the 1960's. Furthermore, more recent management activities such as the Texas Closure and concurrent closure in federal waters out to 200 miles, as well as changes in general fishing practices, have resulted in intense pulses of fishing effort in localized areas. The current DSEIS notes, "the development and adoption of fishery management plans for shrimp (Texas Closure) and other species since 1980 have resulted in the reallocation of fishing effort between fisheries and fishing grounds (Fonyo et al. 1983)." (page 39, emphasis added) The November 14, 1994 Biological Opinion (BO) (and a series of subsequent BO's) from NMFS on the Southeastern shrimp fishery points to pulses of intense fishing in areas of high sea turtle abundance, coupled with the use of inefficient TEDs, as one of the primary causes of increased turtle mortalities and strandings in recent years. Among the problems the Nov 1994 BO indicates must be remedied are the elimination of inefficient TEDs, which can cause excess stress and even death on their own, and the problem of multiple passes through trawls and TEDs during intense fishing pulses, which can cause exhaustion and death as a result of cumulative impacts.

During the 1995 shrimping season temporary gear restrictions, as outlined in the Revised Sea Turtle/Shrimp Fishery Emergency Response Plan reproduced in Appendix C, were imposed in certain statistical zones several times to alleviate the problem of inefficient TEDs. However, in 1996 the Emergency Response Plan was suspended, and to date, while additional TED testing has been performed, and regulations decertifying several TED-types, including all soft TEDs, have been proposed (61 Fed.Reg. 18102- 18116), no further action has been taken to address this problem. Clearly this fishery has adverse impacts on listed endangered and threatened turtles, and NMFS believes these impacts can be reduced by the measures proposed in the April 24, 1996, regulations, yet no final action has been taken. None of this information, nor the impact of the lack of the regulations is mentioned, much less evaluated, in the DSEIS.

Federal agencies have a continuing duty to gather and consider new information to assess the environmental impacts of their ongoing actions. Portland Audubon Soc'y v. Babbit, 998 F.2d 705, 708 (9th Cir. 1993); Society for Animal Rights v. Schlesinger, 512 F.2d 915, 918 (D.C. Cir. 1975). This is part of the agency's overriding duty under NEPA to take a "hard look" at the environmental effects of their actions, even after initial approval. Marsh v. Oregon Natural Resources Council, 490 U.S. 360, 373-74 (1989). The shrimp fishery is an ongoing activity occurring pursuant to NMFS' authorization under the FMP. Year after year, the shrimping fleet conducts its operations pursuant to the FMP, yet never has NMFS' given full consideration to the environmental impacts that result. In particular, NMFS has never given adequate NEPA consideration to the impacts of this fishery on sea turtles.

This deficiency has been acknowledged by NMFS. In 1991, NMFS admitted that the NEPA documents for previous FMPs "did not address potentially significant adverse fishery effects on marine mammals and endangered species" (Administrative Record, CMC v. Brown G-94-660, 1994, AR-IE6). Similarly, a 1990 NOAA General Counsel's legal opinion also strongly recommended a broader NEPA analysis covering significant fisheries effects on endangered species, and directed such an analysis to be undertaken "in the next major amendment" to an existing FMP (Id). As CMC has repeatedly pointed out, NMFS has not yet adequately addressed under NEPA the impacts of the shrimp fishery on endangered and threatened sea turtles.

In 1981, an EIS was prepared when NMFS developed the FMP for the Gulf of Mexico shrimp fishery. That EIS included only a limited discussion of the impact of the fishery on sea turtles. In the EIS, the analysis of biological impacts of shrimping on sea turtles consisted of only one and one-half pages. TEDs were still in the developmental stage at the time and were not widely available to shrimp trawlers. The FMP noted that "incidental capture of sea turtles" was a problem, but also admitted that NMFS lacked information on the number of sea turtles incidentally captured in the Gulf of Mexico by shrimpers. In effect, NMFS abdicated its duties under NEPA to analyze the impacts of the shrimp fishery on sea turtles.

Since 1981, much has changed in the Gulf of Mexico shrimp fishery and in the understanding of the impacts of the fishery on the marine ecosystem, in general, and sea turtles, in particular. Nevertheless, the FMP's approach to the conservation of the marine environment remains very much the same. NMFS relies on the TED regulations to protect sea turtles from the effects of shrimping, and largely ignores other impacts that shrimping has on the marine ecosystem. The FMP, as informed through the NEPA process, is precisely where many of the most effective measures to limit the impacts of shrimp fishing on sea turtles, other species, and the marine environment should be considered and implemented. Among these measures are limited entry and effort programs, vessel registration requirements, pollution control measures, and bycatch reduction measures.

In 1987, the number of sea turtles taken and killed in the southeastern U.S. shrimp fishery was estimated by NMFS at 47,000 takes and 11,000 deaths. These numbers imply a much bigger impact on sea turtles by the shrimp trawl fishery than considered in the 1981 EIS. In the definitive study on the cause of sea turtle declines commissioned by Congress, the National Academy of Sciences ("NAS") reported in 1990 that NMFS' estimate was low, possibly by a factor of four. It concluded that as many as 55,000 sea turtles may have died annually in the shrimp fishery, and that shrimp trawling killed more sea turtles than all other human activities combined. However, NMFS never has evaluated the effect of sea turtles mortalities caused by its management of the shrimp fishery on the marine ecosystem as a whole. Nor has it factored the NAS Report into any of the NEPA documents for the FMP, other than in the most cursory way.

After completion of the NAS Report, new recovery plans were prepared for all five species of sea turtles inhabiting U.S. waters, using new population data, and setting forth new recovery goals, priorities, and actions needed. These plans should have been used to evaluate, in a new or supplemental EIS, additional measures to mitigate the effects of shrimping on sea turtles in the Gulf. Once again, NMFS failed to consider this information.

In 1994, CMC filed a lawsuit challenging, among other deficiencies, NMFS' failure to address adequately under NEPA the impacts of the shrimp fishery on sea turtles. This litigation successfully resulted in the injunction mentioned in Section 10 of the DSEIS. Ultimately, the court decided to avoid making a final legal determination of the adequacy of NMFS' consideration under NEPA of the impacts of the shrimp fishery on sea turtles. The Court did so only because NMFS argued that it was in the process of preparing a SEIS on FMP Amendment 9 that would address sea turtles. See NMFS Summary Judgement Brief, at 35. Judge Kent relied on this representation in his ruling:

> Assuming without deciding that the Federal Defendants violated NEPA by failing to issue an EIS in connection with the shrimp fishery FMP or its amendments, the relief of the Court would order is the precise action the Federal Defendants have already undertaken. <u>The proposed EIS will include an assessment of "based on currently available information, the impacts of the Gulf Shrimp trawl fisheries on ... protected species (endangered or threatened) in the Gulf of Mexico."</u> AR [.H.]; 60 Fed. Reg. 1769 (1995). By assessing the impacts of the entire shrimp fishery on protected species, rather than focusing only on the impact on protected species of the proposed FMP amendment, <u>the scope of the proposed EIS is broad enough to correct and NEPA violation that may have occurred in the past</u>.

CMC v. Brown, 917 F. Supp. 1128, 1150 (S.D. Tex. 1996) (emphasis added).

Clearly, Judge Kent relied upon NMFS' own representation that its SEIS would consider the impact of the fishery on sea turtles and other protected species. He also anticipated that the SEIS would include a comprehensive analysis of the entire fishery on all listed species. The SEIS does meet these tests. As a result, should it be necessary to challenge this NEPA analysis in court in the context of sea turtle protective actions, the starting point for analysis will be NMFS' failure to meet its own statement of the necessary and intended scope of this NEPA analysis.

To satisfy the NEPA requirements, an EIS must consider all of the impacts of an action. The CEQ NEPA regulations require that an agency consider both the direct and indirect impacts or effects of any action under examination. In other words, the agency must consider both those effects directly caused by an action and those effects which are later in time or farther removed in distance. 40 C.F.R. 1508.8. The regulations also require an agency to consider cumulative impacts. 40 C.F.R. 1508.7 These are the impacts resulting from "the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions." Id.

Clearly, under NEPA, the DSEIS should include an assessment of sea turtle impacts and impacts to other protected species. Any regulation of the shrimp trawl fishery affects the number of sea turtles taken and killed. Despite this, the discussion in the DSEIS makes no attempt to evaluate the effect that the proposed changes will have on sea turtles. The DSEIS focuses narrowly on the amendment proposed and the direct effects on red snapper, the species targeted by the amendment. There are many other direct and indirect effects of the change, however. Important among these is the effect that this amendment will have on sea turtles.

Because of the significance of the omission of this discussion of impacts to protected species, NMFS must proceed with separate NEPA consideration of continued operation of the impacts of this fishery on sea turtles and other protected species, including additional opportunity for public comment. In the meantime, the Gulf Council and NMFS should proceed to finalize Amendment 9 and implement if for purposes of requiring installation of the bycatch reduction devices.

(C) Excess fishing effort and its impacts on endangered and threatened sea turtles

The concluding paragraph of the Bioeconomic Analysis performed by NMFS for the 1996 proposed TED regulations states:

> "... sea turtle bycatch in the Gulf of Mexico shrimp fishery results from the lack of clearly defined property rights for shrimp in the sea. Days fished will always be greater than is optimal for this fishery. That is, days fished are greater than the level at which the greatest number of shrimp are being harvested at the lowest cost to society. Gear technology solutions do not address the common property nature of the fishery and therefore will not resolve the problem of sea turtle bycatch. However, gear modifications should lessen the impact of the shrimp fishery on sea turtle populations until a comprehensive solution can be found." (Ward et al.,1996)

While CMC believes the issue is not that of property rights but fishing access privileges (and we note that this interpretation conforms with NOAA policy - see attached letter from James Baker, NOAA Administrator), nevertheless, we concur that the problem is that of too much fishing effort. As the cited Bioeconomic Analysis concludes, this problem will remain until the unlimited access issue is addressed. This will be true for both sea turtle and finfish bycatch, as is acknowledged on page 39 of the DSEIS. Thus CMC has argued for a number of years that NMFS and the Councils must address the unlimited access issue in the shrimp fishery. Page 9 of the DSEIS states "The Council subsequently diferred [sic] action on limited entry until the industry, the Shrimp AP, or some other appropriate entity requests it, or at some future date when the Council determines that it is appropriate to address the issue." CMC again requests that the Council address limited entry issues, for the benefits to endangered and threatened sea turtles, finfish and society in general.

(D) Mitigating Measures Related to the Proposed Action, page 128.

It is true that the required use of TEDs was intended to reduce the incidental take of listed endangered and threatened sea turtles. However, as the Proposed Action and SEIS are currently formulated, the requirement of TEDs for turtle exclusion is irrelevant. Indeed, on page 14, the SEIS specifically discusses the impacts of TEDs on finfish exclusion and concludes that TED-induced finfish exclusion is either "negligible" or "insufficient to over-ride other factors", with the exception of the Andrews 5-in TED discussed above. Thus, TED requirements neither mitigate for finfish bycatch nor are they related to the proposed action in any way.

CONCLUSION

CMC strongly supports the requirement of BRDs in shrimp nets. However, CMC urges the Council to revise proposed Amendment 9 should be revised as indicated herein in order to address the problem of juvenile red snapper bycatch in the entire Gulf and in order to make possible a more timely recovery of red snapper. We encourage the Council to revise the Amendment and proceed with its finalization and implementation as soon as possible.

CMC has serious concerns about the failure of this amendment to address impacts to threatened and endangered sea turtles. Because of the significance of this omission and for other reasons discussed in these comments, NMFS must proceed with a separate NEPA consideration of the impacts of the Gulf shrimp trawl fishery to sea turtles.

Finally, CMC again requests that the Council address limited entry issues, for the benefits to endangered and threatened sea turtles, finfish and society in general.

Thank you for your consideration of our views. If you have any questions please call Kim Davis at (813) 895-2188.

Sincerely,

for/

Kimberly S. Davis
Fisheries Project Manager
Center for Marine Conservation
One Beach Drive, SE, #304
St. Petersburg, FL 33701

Deborah Crouse, Ph.D.
Senior Conservation Scientist
Center for Marine Conservation
1725 DeSales St., NW, #600
Washington, DC 20036

Literature Cited

Nichols, Scott. 1989. *The Bycatch Issue* in The Mississippi Shrimp Industry: A Management Perspective, Proceedings of the Mississippi Sea Grant Advisory Service Workshop, April 12, 1989. Mississippi Sea Grant.

NMFS Pascagoula Laboratory, personal communication as cited in Gulf & South Atlantic Fisheries Development Foundation, Inc. 1992. *A Research Plan Addressing Finfish Bycatch in the Gulf of Mexico and South Atlantic Shrimp Fisheries.* Tampa, Florida.

Ward, J., W. Griffin and J. Nance. 1996. A Bioeconomic Analysis of Existing and Proposed Fishery Management Alternatives to Control Sea Turtle Mortality in the Gulf of Mexico Shrimp Fishery. July 1996.

TAB D NO. 7(g)

PETE Hills
800 N. FORK RD 8-P
STUART FL 34994

RECEIVED

NOV 4 1996

GULF FISHERIES COUNCIL

TO THE CHAIRMAN
GULF of MEXICO
FISHERY MANAGEMENT COUNCIL

DEAR SIR

PLEASE REQUIRE EVERY GULF SHRIMPER to USE A BRD DEVICE TO REDUCE the BYCATCH. At the COST of 100^{00} FOR the BRD, SEEMS like VERY little to ASK FOR. PLEASE CONSIDDER this AND HELP SAVE millions of FISH

THANK YOU
PETE Hills

BRIEFING BOOK ADDITIC

TAB D NO. 7(h)

BRIEFING BOOK ADDITION

NOV 4 1996

GULF FISHERIES COUNCIL

31 Oct, 96

Dear Chairman:
Gulf of Mexico Fishery Management Council,

I would really like to bring to your attention the billions of croakers & juvenile red snappers that the shrimp industry kills each year. Commercial shrimp boats shovel mind boggling tons of bycatch/bykill over their gunwales back into the Gulf every year. During the 1980s, biologists figured 10 lbs. of bycatch/bykill were killed for every pound of shrimp kept. Research showed up to 90% of juvenile red snapper in the Gulf were dying in shrimp nets.

The shrimp industry has proclaimed that the required use of turtle excluder devices have reduced fish bycatch/bykill so much that no further reductions are needed... At a rate of 4 lbs. of fish killed for every pound of shrimp, Gulf shrimpers have killed & wasted at least 800 million lbs. of fish annually in recent years. A couple dozen small snapper, croaker, mackerel & others are dying for that pound of shrimp...

The Gulf of Mexico Fishery Management Council has offered an amendment that calls for reducing the juvenile red snapper bycatch/bykill by 50%.

This has become possible & pretty easy with new BRDs/ Bycatch Reduction Devices - called birds! Use of a BRD will cut bycatch/ bykill by a good 50% while reducing the shrimp catch just 2 to 6%. One of the shrimpers fears if they use BRDs is that as bycath/bykill dwindles, more fish in the Gulf will mean more predation on shrimp. So, from that argument, the more bycatch carnage, the better! The cost of requiring every Gulf shrimper to add a BRD is about $100.^00 per boat. The industry has recently created the Shrimp Council whose stated goal is reducing bycatch/ bykill. Its newsletter seems much more concerned with promoting commercial shrimpings image than protecting ecology.

Thank you
Eagerly awaiting your response.
Expressly,

Chandler, John Ed.
CMHI # 79
1600 West 24th Str.
Pueblo, Colorado
81003

TAB D NO. 7(i)

Chairman
Gulf of Mexico Fishery Management Council
5401 W. Kennedy Blvd.
Lincoln Center, Suite 331
Tampa, Fl 33609

10/25/96

RECEIVED

NOV. 4 1996

GULF FISHERIES COUNCIL

Dear Sir,

I am writing to you in support of reduced by-catch regulations for the commercial shrimp industry. Having lived in the coastal Gulf South much of my adult life I can honestly say that the depletion of Red Snapper stocks has been dramatic. I hope that some actions can be taken to reverse this trend and restore both commercial and recreational snapper and other bottom species back to their fullest potential.

Very sincerely,

Mark J. Malizia

BRIEFING BOOK ADDITION

November 11, 1996

Chairman
Gulf Of Mexico Fishery Management Council
5401 W. Tampa Bay Blvd.
Tampa Fl 33609

Transmitte via Fax No. (813)228-2815

Dear Sir:

I have been fishing the upper Texas coast for over 30 years and I am appalled by the amount of juvenile fish killed in the Gulf as a bycatch of Shrimp boats. I have been in the Gulf and seen the masses of baby snapper, redfish and others culled overboard by the Shrimpers...they are like vacuum cleaners in the Gulf.

I love to eat shrimp as much as anyone but I am willing to pay more for them to get the shrimpers to use other means to handle their catch.

Ours is not an unlimited resource...please do something about it NOW!.

Sincerely

Fred Sklar
5931 Rutherglen
Houston, Tx 77096

RESOLUTION

At a meeting of the Board of Directors of The Chamber of Commerce of Lafourche and the Bayou Region, Inc., held at an office in Larose, Louisiana, on the 16th day of October, 1996, pursuant to due notice, at which a quorum was present, on motion, duly seconded, the following resolution was unanimously adopted:

WHEREAS the shrimping industry in Louisiana and other states has already sustained considerable economic hardship as a result of the mandatory use of Turtle Excluder Devices, and

WHEREAS the Red Snapper is neither a threatened nor an endangered species of fish, and

WHEREAS the decrease in Red Snapper population was largely due to heavy fishing pressure, and

WHEREAS the introduction of quotas and limits on Red Snapper has helped the species to rebound its population, and

WHEREAS the Gulf of Mexico Fishery Management Council, the agency seeking to impose the use of the Fish Excluder Device on the shrimping industry, has increased the quota on the amount of Red Snapper that can be legally caught, 52% since 1993 (representing nearly 2 million pounds of additional harvest), and

WHEREAS the mandatory use of Fish Excluder Devices would have severe and adverse economic impact on the shrimping industry with questionable benefit to the Red Snapper species.

BE IT THEREFORE RESOLVED, that The Chamber of Lafourche and the Bayou Region, its 465 companies/individuals representing 11,800 employees recommends that the Gulf of Mexico Fishery Management Council, and the National Oceanic and Atmospheric Administration in the United States Department of Commerce, to RECONSIDER and WITHDRAW its proposed "Amendment #9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, United States Waters."

BE IT SO RESOLVED on this 16th day of October, 1996, Larose, Louisiana.

Jan Torres
JAN TORRES, PRESIDENT

Chris Allen
CHRIS ALLEN, SECRETARY

UNITED HOUMA NATION

20986 Hwy. 1
Golden Meadow, LA 70357
(504)475-6640
Fax: (504)475-7109

Laura N. Billiot, Chairwoman

October 29, 1996

Gulf of Mexico Fisheries Management Council
5401 West Kennedy Blvd., Suite 331
Tampa, FL 33609

Re: Fish Excluder Devices

Dear Sirs:

The United Houma Nation is a 17,000 member Tribe of Native Americans located in South Louisiana. Many of our Tribal members are fishermen who have relied on shrimp trawling for their existence for generations. In recent years our people have been severely impacted by state and federal regulations which have made it difficult for us to make a living and our Tribal members are struggling for survival.

We realize that the proposed regulations involving the use of Fish Excluder Devices to protect juvenile red snapper are only the prelude to further regulations which will result in the destruction of our livelihoods and the death of our culture. The history of Native American treatment by the federal government is one of bias and prejudice which predates the earliest days of the formation of our republic. While we realize that user groups who possess greater wealth and political influence will always be favored over minorities, we would hope that your department would have the pride and integrity to overcome these prejudices. After reading the proposed regulations, however, we see history repeating itself in an all to familiar pattern. While the form of bias is often changed, the results are always the same. Minorities and people of little means are always neglected at the expense of the wealthy and influential.

The federal government forced Turtle Excluder Devices on our fishermen in 1989, but did nothing to stop the rampant destruction of these same turtles by foreign countries. The sports and commercial fishing industries have depleted the red snapper population and quotas imposed by the government have resulted in a remarkable increase in this fisheries stock. According to data available to us, the quotas allocated to these industry groups have increased each year since 1993, and logic would dictate that the red snapper stock is healthy. Yet, your agency, by some weird twist of logic and even more bizarre biology, has decided that the shrimp trawlers are responsible for a problem which apparently exists only in your own minds. It is obvious that your efforts to satisfy the sports industry is compelling you to become intellectual prostitutes and make absurd decisions which should be an embarrassment to you all. While history has shown us that pride has no place when pitted against greed, we would hope that you are at least shamed by your absurd proposals.

The United Houma Nation would like to go on record as being adamantly opposed to the requirement that our fishermen be required to install Fish Excluder Devices into their trawls and we would also like to recommend that if the red snapper stock is truly threatened, all sports and commercial fishing activities involving this resource be stopped in its entirety.

Sincerely,

Laura N. Billiot
UHN Chairwoman

cc: Media

LB:lc

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NOV 12 1996

GULF FISHERIES COUNCIL

J. B. BREAUX, CHAIRMAN

RAY BOUDREAUX, VICE-CHAIRMAN

DISTRICT 1
PERCY GABRIEL, SR.

DISTRICT 2
WAYNE THIBODEAUX

DISTRICT 3
RAY BOUDREAUX

DISTRICT 4
CHRISTA M. DUPLANTIS, R.N.

CITY OF HOUMA
TERREBONNE
PARISH COUNCIL
PARISH OF TERREBONNE
POST OFFICE BOX 2768
HOUMA, LOUISIANA 70361
(504) 873-6519
FAX (504) 873-6521
COUNCIL
CONSOLIDATED GOVERNMENT

PAUL A. LABAT, CLERK

DISTRICT 5
J. B. BREAUX

DISTRICT 6
HAROLD LAPEYRE

DISTRICT 7
CINDY ROGERS

DISTRICT 8
CARL CHAUVIN

DISTRICT 9
DANIEL DAVID HENRY

November 8, 1996

Gulf of Mexico Fisheries Management Council
5401 W. Kennedy Blvd., Suite 331
Tampa, FL 33609

Re: Proposed F.E.D. Regulations

To Whom It May Concern:

The members of the Terrebonne Parish Council were just informed of proposed regulations by GOMFMC to require commercial shrimp fishermen to place Fish Excluder Devices (FED) onto their nets to protect the juvenile red snappers from being caught.. Claims were made by GOMFMC charge that nearly 80% of the juvenile red snapper population is caught by shrimp trawlers in the Gulf of Mexico. Not meaning any disrespect to individual members of the Fishery Management Council, but, this statement is just plain **ludicrous**. Nearly all members of the Parish Council are native to our coastal community and we all know, either through personal experience or through stories from family members, that the snapper population was tremendous years ago, declined during the period of unlimited commercial harvest, and has been on a steady rise over the last few years.

At least two recent studies (one conducted by Louisiana State University under a grant from the U.S. Department of Commerce) showed that of all the "by catch" of the commercial shrimpers, red snappers were one of the marine life least affected. Why then place additional hardships on the commercial shrimpers who are already unfairly burdened by Turtle Excluder Devices?

Being close to the Gulf of Mexico has taught all of our residents to respect and appreciate the many forms of marine life. The abundant varieties of fish have given Terrebonne Parish citizens numerous hours of recreational activities, a good appreciation of what "eating right" is all about, and, maybe most importantly, a source of livelihood for generations of honest, hard-working people who have supported their families from the bounty of the gulf. None of us are going to knowingly do anything to jeopardize the Gulf of Mexico or any of its inhabitants.

The members of the Terrebonne Parish Council are unanimously opposed to the forced use of Fish Excluder Devices and see no need for unneeded, unnecessary regulation which will do nothing more than harass honest people attempting to work for a living. This Council is scheduled to adopt a formal resolution at its November 20 meeting expressing additional reasons for our opposition to the proposed regulations.

By copy of this letter, Louisiana's entire Congressional Delegation is being informed of this Council's position of this important issue and requested to assist us with this fight against your proposal.

Sincerely,

J.B. Beaux

J.B. Beaux, Chairman
Terrebonne Parish Council

cc: Hon. John Beaux, Senator
Hon. J. Bennett Johnston, Senator
Hon. Mary Landrieu, Senator-elect
Hon. Billy Tauzin, Congressman
Hon. Robert Livingston, Congressman
Hon. William Jefferson, Congressman
Hon. Cleo Fields, Congressman
Hon. Jim McCrery, Congressman
Hon. Richard Baker, Congressman
Hon. James Hayes, Congressman
Terrebonne Parish Legislative Delegation

SENATE
STATE OF LOUISIANA

MICHAEL R. ROBICHAUX, M.D.
State Senator
District 20

P. O. BOX 45
MATHEWS, LA 70375
DISTRICT OFFICE:
(504) 537-7064
(504) 537-3803 FAX
CAPITOL OFFICE:
(504) 342-2040

November 5, 1996

RECEIVED
NOV 12 1996
GULF FISHERIES COUNCIL

Gulf of Mexico Fishery Management Council
5401 W. Kennedy Blvd.
Suite 331
Tampa, FL 33609

Dear Sirs:

On October 8, 1996, a public hearing was held on "Amendment #9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters." The meeting was held by the Gulf of Mexico Fishery Management Council (GOMFMC) in Thibodaux, Louisiana and involved the recommendations of the GOMFMC to require the use of Fish Excluder Devices on shrimp trawls in federal waters because of the damage that the trawlers were inflicting on the juvenile red snapper stock in federal waters.

As a state senator whose district covers the southern halves of Lafourche and Terrebonne Parishes, I have the privilege of representing the most productive estuarian complex in the world and some of the most wonderful people on earth. One of my sons is a commercial fisherman as is the father of my legislative aide. Their existence and the fate of their families, along with the fate of thousands of other fishermen in my district, relies on their ability to earn a living through shrimp trawling. When they cannot fish, they do without and their families suffer. They have seen their margin of profit steadily reduced and their livelihoods threatened by regulations imposed by faceless and nameless individuals who control their destinies. As a youngster, I fished the waters of the Gulf of Mexico with my father and enjoyed the large catches of red snapper prior to the commercial and recreational exploitation of this species. I have viewed this industry from both vantage points for over forty five years and feel qualified to comment on your proposals.

The essence of this proposed rule change is that shrimp bycatch is injuring the red snapper population and that reducing bycatch is the only way to reverse that trend. In making this decision you have accepted the rather preposterous proposition that 80% of juvenile red snapper in the Gulf of Mexico are caught by shrimp trawls. Such a blanket statement that a non targeted reef fish whose offspring are also structure orientated is being caught by a fishery which must avoid structures to survive is ludicrous, at best. Additionally, your statement that the red snapper population is threatened and that the only way to revive the fishery stock is to penalize shrimp trawlers flies in the face of your own data which shows that since the impositions of quotas on snapper the commercial harvest is being caught in approximately half the time by fewer boats, and that since 1993, you have increased the yearly quota on red snapper by two million pounds!

For a supposedly scientifically orientated organization to practice such biased policy in support of a user group is despicable. While greed has no pride and minorities no stature in political considerations, the scientific community should at least give the appearance of objectivity in their decision making.

I would like to go on record as being adamantly opposed to this amendment and I would like to further recommend that if the Gulf Council feels it must do something about the fishery, then the closure of the recreation and commercial harvest of red snapper would be the appropriate thing to do.

Sincerely,

Michael R. Robichaux, M.D.
State Senator, District 20

MRR/br

Louisiana shrimpers should not be blamed for decline of red snapper

By MICHAEL R. ROBICHAUX, M.D.
Contributing columnist

On Oct. 8, a public hearing was held on "Amendment No. 9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, U. S. Waters." The meeting was held by the Gulf of Mexico Fishery Management Council (GOMFMC) in Thibodaux.

There were approximately 20 fishermen and concerned citizens at the meeting along with assorted state and federal employees. The stated purpose of the meeting was to obtain public comment on the use of fish excluder devices (FEDs), which have been proposed to increase the concentration of red snapper in the Gulf of Mexico.


Robichaux

Two things were immediately apparent from the meeting. The first was that there is a feeling of hopelessness among the fishermen as the result of their experiences with turtle excluder devices. The second thing that was obvious was that these meetings are a perfunctory nature, in that the council has already made its decision and these meetings are but formality required by some federal statute.

The essence of this proposed rule change is that shrimp bycatch is injuring the red snapper population and that reducing bycatch is the only way to reverse that trend. Several points need to be understood at this junction. The first is that there are hundreds of species of fish and crustaceans in the Gulf of Mexico and only the red snapper is being targeted at this time! This is neither a threatened nor endangered species of fish and we probably could not eliminate the red snapper population in the Gulf of Mexico if we wished to. So why are we concerned about this fish and not the hundreds of other bycatch species in the gulf? The answer is quite simple. The red snapper is a "money" fish of both the commercial and recreational fishing industries.

The GOMFMC would have us believe that the destruction of immature red snapper in shrimp trawls is the cause of this problem and this is simply not true. Forty-five years ago I fished red snapper in the Gulf of Mexico with my father and they were plentiful at the time. Soon, strange looking boats with a center sail type structure and large, wheeled cranks appeared on the scene and in short order the snapper were no more. Heavy fishing pressure had reduced the population of this species overnight.

Since the introduction of quotas and limits on snapper, the resource has rebounded in an amazing fashion. This has resulted in the commercial harvest being increased significantly in terms of tonnage and the amount of time required to harvest the fish by fewer boats, to be cut in almost half between 1993 and 1995! The amount of red snapper that can be legally caught has increased by 52 percent since 1993 and this represents an almost 2 million pound additional harvest of this fish stock! How can the same agency that regulates snapper fishing increase quotas and then decide that shrimp trawlers are causing problems in the industry? Incidentally, there are only 31 commercial fishermen from the state of Louisiana who have red snapper licenses.

Thus, we have an industry that has over-fished red snapper for years and depleted the population. The imposition of quotas and limits on the fish has resulted in a remarkable rebound of the snapper population. According to the GOMFMC, the logical thing to do at this point is force FEDs on the shrimping industry! It makes no sense. The Louisiana shrimper is being penalized for the past abuses of another industry. This is ludicrous and this travesty needs to be exposed and stopped in its tracks!

The commercial fisherman has every reason to fear that as soon as the ink dries on regulations for federal waters, we will see the same restrictions imposed on state waters as well. The state of Louisiana has 30 years of data collected on bycatch, and none of that data shows any harmful effects on the finfish or crab population. Similar studies in other areas have reached the same conclusion. Out of approximately 100 species of fish identified in a federally financed study on bycatch performed by state biologists, not a single red snapper was cataloged as being caught! In another study on bycatch, performed by Louisiana State University under a grant from the U.S. Department of Commerce, not a single red snapper was identified! In spite of these data, federal authorities claim that 78 percent of the immature red snapper in the Gulf of Mexico are caught in shrimp trawls.

If the groups that are encouraging this activity want to destroy the shrimping industry, they should be up front about their motives and not use our tax dollars to produce skewed data and disseminate illogical propaganda. Turtle excluder devices were forced on our fishermen as the result of the destruction of the turtle population by Mexico and other Caribbean Nations. For every turtle caught in a net in the Gulf of Mexico by an American fishermen, hundreds are destroyed by the Mexicans and other nations each year. Who gets punished for their sins? The gulf shrimpers. The red snapper population was reduced by over-fishing and who gets penalized? The gulf shrimpers. Numerous articles have been written on the nightmare of ecological damages resulting from shrimp farming throughout the world. Where is the pressure to curtail these activities? Why hasn't the GOMFMC intervened on behalf of the fishermen to prevent seafood imports from foreign countries that do not have ecological safeguards for turtles and finfish. To date, the only people being penalized for these alleged problems are the American fishermen.

In 1989, federal legislation was passed that would essentially require foreign fishing fleets to either use turtle excluder devices or be prevented from exporting shrimp to the United States. While I was writing this column, a federal court in New York ruled that this law must be enforced. This enforcement ruling came approximately seven years after the fact and was brought to trial as the result of a suit filed by an environmental group in California. Where was our Legislature during those years? Where was the mandate by the federal bureaucrats to protect sea turtles from destruction by other countries while our own fishermen were forced to utilize these devices?

How can we allow this to happen to our people? How could our legislators allow this to happen? The reason for this problem is not as important as the solutions and this is where we need to focus our attention. Please understand that if these absurd regulations are allowed to continue, we will not only lose an industry, but we will lose one of the unique cultures in the world. The real question is, can we do anything about this dilemma? Having studied the plight of the Native Americans and other minorities throughout history, the answer is probably no. However, this is the time for us to draw the line in the sand and make a stand for what we know is right.

If there has been one thing I have learned from my years of working for governmental reforms, it is that democracy is a participatory type of government. Those who do not care to become involved cannot expect to see their interests protected. I would like to propose that the citizens of our community make a project out of protecting the interests of our citizens and our culture. We can start by contacting members of our state and federal legislative delegation and insist that they stop these proposed regulations immediately. Next, we can demand that countries such as Mexico, which destroy large number of turtles each year, are not allowed to export shrimp and fish to the United States until they undergo the same stringent environmental requirements required of our own citizens. If the environmentalists truly believe in their cause, they should be the first ones to support this type of legislation. If our legislators believe in this cause, they should be burning with indignation at the abuses being reaped on our people by our own government.

Remember always that "the squeaking wheel gets oiled." Please make every effort to call your state and federal legislators and inform them of your desire to protect the most precious and endangered species of them all, the Louisiana fisherman. Anyone wishing to assist with this project can call my office at 537-7546 and we will try to coordinate efforts to prevent these regulations from being implemented.

State Sen. Michael R. Robichaux, M.D., represents District 20.

Hearing Tuesday for shrimpers

10/9/96 HdC

By FREDERIC REINECKE
and JOHN DeSANTIS

The Courier

Local shrimpers will have their chance Tuesday in Thibodaux to speak out about proposed regulations forcing them to add fish-excluder devices to their nets when trawling in federal waters.

The Gulf of Mexico Fishery Management Council proposed the regulations last month to protect dwindling red snapper stocks in the western Gulf of Mexico. The agency will take public comments at a public hearing 7 p.m. at the Thibodaux Civic Center.

Some shrimpers are objecting to the sudden scheduling of the hearing because they say it doesn't give them enough time to raise opposition to the regulation. Many interested shrimpers, they said, are too busy working through the white shrimp season to attend.

The devices, also called "bycatch-reduction devices" are designed to allow immature red snapper to escape the shrimp nets. Their incidental capture in the shrimp nets is seen as the primary reason for the species' decline. The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard.

The agency wants to reduce their rate of capture by half.

Shrimpers argue that other measures, such as the use of turtle excluder devices, have made significant reductions in red snapper bycatch, so the new regulations aren't needed.

If given final approval by the U.S. secretary of commerce, the regulations will go into effect before the spring 1997 shrimping season. In their present form they will require shrimpers to use the new devices in federal waters up to 100 (or 600 feet) fathoms deep, from Cape San Blas, Fla., west to the Mexican coast.

The agency rushed to schedule its 14 public hearings throughout the Gulf Coast so it can have the regulations in place for the 1997 shrimp season, said Rick Leard, an agency biologist. The the management council first proposed steps for saving red snapper stocks in 1990, but were delayed for several years.

The council's initial plan envisions restoring the fish to sustainable levels by the year 2007. But the delays have made the problem worse, he said. If steps are taken in 1997, the red snapper species may be restored by 2017.

Jeff Scott, owner of Scottco, a Dulac shrimp processing company, said anything that will add another hole to a net will cost in the long run. He hopes that despite the short notice, every commercial fisherman who has an interest in the excluder devices will attend the Thibodaux meeting.

"Every fisherman that's going to have to pull one should go. I don't know if a certain one has been approved; that's the dark area," Scott said. "I don't know if there's one they'll approve the fishermen don't mind pulling. This is a public hearing to hear whether they do or don't want to pull a BRD or a FED or whatever they are calling it."

The speed with which meetings were set up, Scott said, was personally disconcerting.

"It was so fast, the fastest I've ever seen them move," he said. "I've never seen them go this fast. I hate to think it but it would be my opinion that they would want to run this down someone's throat. I'm sure they do have a majority of the council that would be on the recreational side. But the thing they don't understand is that this bycatch thing is growing by leaps and bounds, and a lot of this fish are fish the recreationals don't want out there —hardhead catfish and croakers."

What concerns Scott most are rumblings in regulatory circles that the gear being used by shrimpers — the conventional trawl — is inadequate. At the same time, shrimpers have not been sticking together, according to Scott, to let their views be known.

"The shrimper is destroying himself by not being as a group," he said. "These people are self-destructing."

1/19/96 DC

Soft TED ban delayed

By Frederic Reinecke
NYT Regional Newspapers

HOUMA — Louisiana congressmen sneaked in wording into a federal budget bill that will delay a ban on forms of turtle-excluder devices preferred by shrimpers.

The National Marine Fisheries Service expected to ban "soft" TEDs after Dec. 31, forcing shrimpers to use a more-cumbersome, rigid form of the excluder device. But wording placed in the Omnibus Budget Act by representatives Billy Tauzin, R-Chackbay, and Bob Livingston, R-Metairie, will delay the ban indefinitely, said Ken Johnson, a Tauzin spokesman.

The budget act was approved earlier this week by Congress and President Bill Clinton.

The National Marine Fisheries Service requires most shrimpers to attach the devices to the back ends of their shrimp nets to eject endangered sea turtles, particularly the endangered Kemp's ridley turtles. The agency blames shrimp nets for large numbers of turtle deaths off of the Texas and Louisiana coasts because the sea-dwelling reptiles can get tangled in the nets and drown.

In April, the agency decided to abandon soft versions of the devices after Dec. 31 because studies showed the devices, made of net materials, were probably responsible for numbers of turtle deaths. The studies showed that imperfections, incorrect installation and other factors can prevent the devices from working as intended.

Tauzin, who was a staunch opponent of initial requirements to use the original metal cage TEDs, called the soft TED ban a "mean spirited" proposal that unfairly restricted shrimpers without a scientific foundation for the ban.

"Billy went to Congressman Bob Livingston to ask for his support in an effort to slow down the regulatory process," Johnson said. "Our fishermen were literally having these new regulations rammed down their thoats without the beneifit of good scientific review." National Marine Fisheries Service officials rejected the claim and cited more than 500 turtle deaths in Texas in 1994 as proof of the soft TEDs' ineffectiveness.

Livingston added wording to the

See TED, 7A

FED rules to be aired at hearing

By Frederic Reinecke
and John DeSantis
NYT Regional Newspapers

HOUMA — Local shrimpers will have their chance Tuesday in Thibodaux to speak out about proposed regulations forcing them to add fish-excluder devices to their nets when trawling in federal waters.

The Gulf of Mexico Fishery Management Council proposed the regulations last month to protect dwindling red snapper stocks in the western Gulf of Mexico. The agency will take public comments about it at a public hearing 7 p.m. at the Thibodaux Civic Center.

Some shrimpers are objecting to the sudden scheduling of the

See FED, 7A

TED

Continued from 1A

budget bill which directs NMFS and its parent agency, the National Oceanic and Atmospheric Administration, "not to decertify any turtle excluder device until every effort has been made, working with industry and others to improve or modify the existing devices to increase turtle escapement." It also reiterated a 1994 directive for the agencies to provide an independent scientific review of their biological opinions on sea turtle conservation.

"We're getting fed up with NMFS dragging its feet on this issue," Johnson said. "The practical effect is to buy our shrimpers some time before these unreasonable new regulations are initiated."

Johnson said he couldn't predict how long the measure will actually delay the ban on soft TEDs but he thinks it may be a while.

"It's going to take a while for them to come up with an independent peer review. You don't pull that

FED

Continued from 1A

hearing because they say it doesn't give them enough time to raise opposition to the regulation. Many interested shrimpers are too busy working through the white shrimp season to attend, they said.

The devices, also called "bycatch-reduction devices" are designed to allow immature red snapper to escape from shrimp nets. Their incidental capture in shrimp nets is seen as the primary reason for the species' decline. The fish and other species accidentally caught in shrimpers' nets often die during capture and are thrown overboard.

The agency wants to reduce their rate of capture by half.

Shrimpers argue that other measures, such as the use of turtle excluder devices, have made significant reductions in red snapper bycatch, so the new regulations aren't needed.

The council's initial plan envisions restoring the fish to sustain-

Ban on 'soft' TEDs delayed

10/4/96 HRC

By FREDERIC REINECKE
The Courier

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Related story, Page 3A

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The Fisheries Service requires large-scale shrimpers to attach the devices to the back ends of their nets to eject endangered sea turtles, particularly the endangered Kemp's ridley variety. The agency blames shrimp nets for large numbers of turtle deaths off of the Texas and Louisiana coasts because the sea-dwelling reptiles can get tangled in the nets and drown.

In April, the agency decided to abandon soft versions of the devices after Dec. 31 because studies showed the contraptions, made of net materials, were probably responsible for numbers of turtle deaths.

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Tauzin, who was a staunch opponent of initial requirements to use the original metal-cage or "hard" TEDs. He also called the soft TED ban a "mean-spirited" proposal that lacks a scientific foundation and unfairly restricts shrimpers.

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National Marine Fisheries Service officials rejected the claim and cited more than 500 turtle deaths in Texas in 1994 as proof of the soft TEDs' ineffectiveness.

Livingston added wording to the budget bill that directs the Fisheries Service and its parent agency, the National Oceanic and Atmospheric Administration, "not to decertify any turtle excluder device until every effort has been made, working with with industry and others, to improve or modify the existing devices to increase turtle escapement."

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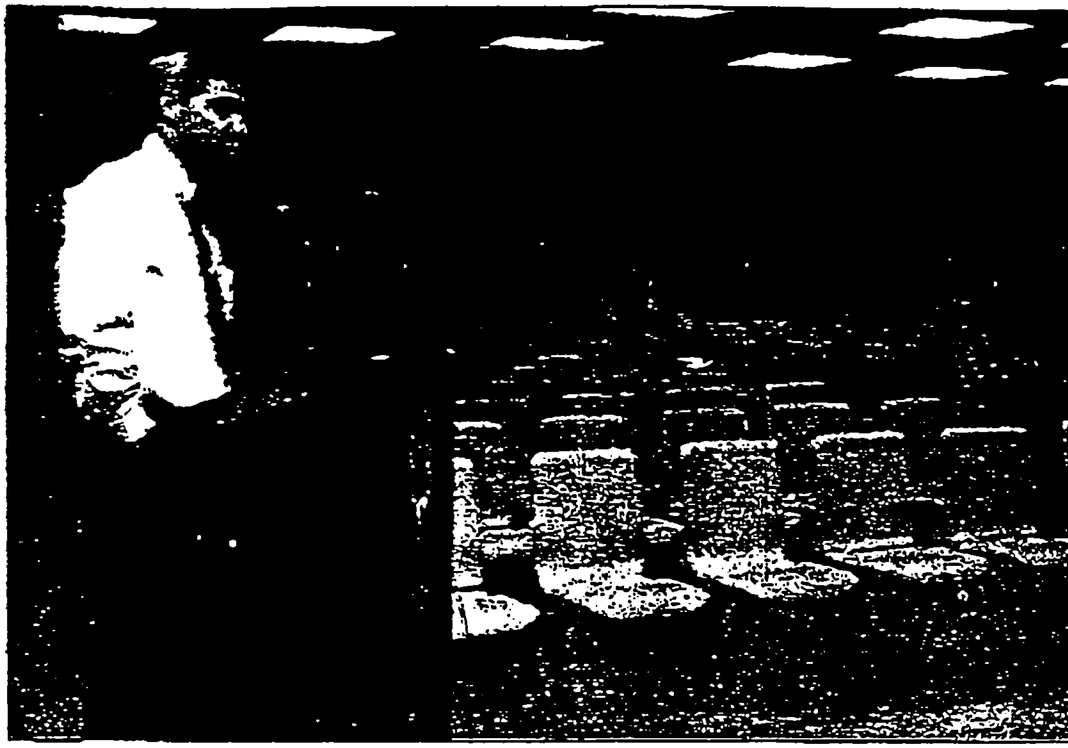
Johnson said he couldn't predict how long the measure will actually delay the ban on soft TEDs, but he thinks it may be a while.

Keeping the soft TEDs could have important implications for shrimpers if another federal agency forces them to begin using bycatch reduction devices next year, said Rick Leard, a biologist for the Gulf of Mexico Fishery Management Council. The agency is considering regulations to require shrimpers to use the bycatch reduction devices next year. But soft TEDs have been found to do the same job, allowing shrimpers to pull one exclusion device on their nets instead of two.

Efforts to reach a Fisheries Service spokesman this morning were unsuccessful.

Shrimpers oppose bycatch devices

By Frederic Reinecke 10/9/96 DC
NYT Regional Newspapers



Staff photo by Abby Tabor

State Sen. Mike Robichaux, D-Raceland, speaks against proposed rules forcing shrimpers to place bycatch-reduction devices on their nets Tuesday.

Forcing shrimpers to protect young red snapper fish by adding a new exclusion device to their nets is unfairly placing the burden of one fishing industry on another, shrimpers and a state senator said Tuesday.

They were speaking out about proposed regulations to force shrimpers to use "bycatch-reduction devices," also known as "fish-excluder devices" while trawling in federal waters of the Gulf of Mexico. The Gulf of Mexico Fishery Management Council, which is proposing the rules, sponsored the hearing at the Thibodaux Civic Center to hear public comments before the measure is sent to the U.S. Secretary of Commerce for final approval later this year. If approved, the rules will go into effect before the spring 1997 shrimping season.

The devices are designed to allow immature red snapper to escape shrimp nets. Their incidental capture in the nets is seen by the fishery council as the primary reason for the species' decline. The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard. The agency wants to reduce their capture rate by half of 1984 levels — before shrimpers were required to use turtle-excluder devices on their nets.

State Sen. Mike Robichaux, D-Raceland, who represents the southern portions of Terrebonne and Lafourche parishes, objected to the bycatch device regulations because they're designed to protect the interests of red snapper fishermen at the expense of shrimpers.

"There are thousands of species of fish involved in bycatch in the gulf," Robichaux said. "Why is the snapper (protected)? why not jellyfish? You talk about environmental impacts and are worried about losing something — why not save jellyfish? I have to assume that we're dealing with snapper because snapper have a commercial and recreational interest."

Commercial and recreational fishing of red snapper are the main impacts on the red snapper species in the gulf — not shrimping, Robichaux said. Despite the agency's claims, the species is doing well since it placed limits on commercial and recreational fishing of it. He sees no need for restrictions on shrimpers because the same agency saw fit to increase commercial red snapper quotas this year from 3 million pounds to more than 4 million pounds. Fishermen are in-

See BYCATCH, 8A

Bycatch

Continued from 1A

creased gulfwide quotas in half the time it formerly took to reach the quotas.

"We're penalizing shrimpers once again for something they're not responsible for," Robichaux said.

Rick Leard, a Gulf council biologist, later said the agency increased the fishing quota for adult fish because the increase was seen to have only a miniscule effect on the snapper's spawning ability.

Larose shrimper Mervin Ledet Jr. called on the Gulf Council to make a new study of bycatch-reduction devices. The devices were studied in 1990.

"I just wanted to go on the record that I was against it," Ledet said.

Ricardo Vega, an Ashland trawl board shop owner, criticized the Gulf Council for imposing strict limitations on fishermen, such as the ban on commercial redfish fishing, and never removing them. Too often, shrimpers are blamed.

"Anything that goes wrong or is wrong, it's the trawlers' fault," Vega said.

Some of the shrimpers who spoke out at the forum referred to the bycatch-reduction device as the income-reduction device No. 2 because agency studies that show the devices will reduce shrimp catches. Turtle-excluder devices are also blamed for some shrimp loss. One fisherman referred to the Gulf Council's sister agency, the National Marine Fisheries Service as the "Nazi Marine Fisheries Service."

Less than 30 shrimpers and supporters attended the forum, attendees said, because they were taking advantage of favorable tide shifts for shrimping.

"They've been tied up for over a week, so they all left," said Chauvin shrimper Dean Neal, who attended the meeting with his brother, father and deckhand because they're concerned about the new devices.

Tuesday's tides swelled lakes and bayous past their banks. When it began to fall late in the afternoon, shrimp boats large and small headed out to try their luck.

HDC 10/9/96

Shrimpers protest bycatch rules

By FREDERIC REINECKE
The Courier

> "We're penalizing shrimpers once again for something they're not responsible for."
> STATE SEN. MIKE ROBICHAUX, D-RACELAND

THIBODAUX — Forcing shrimpers to protect young red snapper fish by adding a new exclusion device to their nets is unfairly placing the burden of one fishing industry on another, shrimpers and a state senator said Tuesday.

They were speaking out about proposed regulations to force shrimpers to use "bycatch-reduction devices," also known as "fish-excluder devices" while trawling in federal waters of the Gulf of Mexico. The Gulf of Mexico Fishery Management Council, which is proposing the rules, sponsored the hearing at the Thibodaux Civic Center to hear public comments before the measure is sent to the U.S. secretary of commerce for final approval later this year. If approved, the rules will go into effect before the spring 1997 shrimping season.

The devices are designed to allow immature red snapper to escape shrimp nets. Their incidental capture in the nets is seen by the fishery council as the primary reason for the species' decline. The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard. The agency wants to reduce their capture rate by half of 1984 levels — before shrimpers were required to use turtle-excluder devices on their nets.

State Sen. Mike Robichaux, D-Raceland, who represents the southern portions of Terrebonne and Lafourche parishes, objected to the bycatch device regulations because they're designed to protect the interests of red snapper fishermen at the expense of shrimpers.

"There are thousands of species of fish involved in bycatch in the gulf," Robichaux said. "Why is the snapper (protected)? Why not jellyfish? You talk about environmental impacts and are worried about losing something — why not save jellyfish? I have to assume that we're dealing with snapper because snapper have a commercial and recreational interest."

Commercial and recreational fishing of red snapper cause the greatest impacts on the red snapper species in the gulf — not shrimping, Robichaux said. Despite the agency's claims, the species is doing well since it placed limits on commercial and recreational fishing. He sees no need for restrictions on shrimpers because the same agency saw fit to increase commercial red snapper quotas this year from 3 mil-

BYCATCH, continue on 11A

ABBY TABOR/NYTRNG

State Sen. Mike Robichaux, D-Raceland, speaks out Tuesday against proposed rules forcing shrimpers to place bycatch-reduction devices on their nets. About 30 shrimpers and their supporters attended the hearing in Thibodaux.

BYCATCH

Continued from 1A

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Tuesday's tides swelled lakes and bayous past their banks. When it began to fall late in the afternoon, shrimp boats large and small headed out to try their luck in a season where the catch has been sparse and small.

In Chauvin, some operators of smaller boats expressed little concern about the devices, since they are not required to carry them when they trawl in inshore waters and offshore waters within the state's 3-mile limit

4B ☐ The Advocate, Baton Rouge, La. ☐ Thursday, October 10, 1996

Shrimpers assail new excluder rule as unfair burden

By The Associated Press

THIBODAUX — Forcing shrimpers to protect young red snapper fish by adding a new exclusion device to their nets would unfairly place the burden of one fishing industry on another, a state senator said at a hearing on the issue.

The hearing was on proposed regulations to require shrimpers to use "bycatch-reduction devices," also known as "fish-excluder devices" while trawling in federal waters of the Gulf of Mexico.

The Gulf of Mexico Fishery Management Council, which is proposing the rules, sponsored the hearing Tuesday at the Thibodaux Civic Center to hear public comments before the measure is sent to the U.S. secretary of commerce for final approval later this year. If approved, the rules will go into effect before the spring 1997 shrimping season.

The devices are designed to allow immature red snapper to escape shrimp nets. Their incidental capture in the nets is seen by the fishery council as the primary reason for the species' decline.

The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard.

The agency wants to reduce their capture rate by half of 1984 levels, before shrimpers were required to use turtle-excluder devices on their nets.

State Sen. Mike Robichaux, D-Raceland, who represents the southern portions of Terrebonne and Lafourche parishes, objected to the bycatch device regulations on the grounds they're designed to protect the interests of red snapper fishermen at the expense of shrimpers.

"There are thousands of species of fish involved in bycatch in the Gulf," Robichaux said. "Why is the snapper (protected)? Why not jellyfish? You talk about environmental impacts and are worried about losing something; why not save jellyfish? I have to assume that we're dealing with snapper because snapper have a commercial and recreational interest."

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He said the same agency saw fit to increase commercial red snapper quotas this year from 3 million pounds to more than 4 million pounds.

"We're penalizing shrimpers once again for something they're not responsible for," Robichaux said.

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STATE NEWS

'Fish-excluder devices' opposed

Proposed rules are unfair to shrimpers, state senator says

By The Associated Press

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The hearing was on proposed regulations to force shrimpers to use "bycatch-reduction devices," also known as "fish-excluder devices" while trawling in federal waters of the Gulf of Mexico.

The Gulf of Mexico Fishery Management Council, which is proposing the rules, sponsored the hearing Tuesday at the Thibodaux Civic Center and another meeting Wednesday in Metairie to hear public comments before the measure is sent to the U.S. secretary of Commerce for final approval later this year. If approved, the rules will go into effect before the spring 1997 shrimping season.

The devices are designed to allow immature red snapper to escape shrimp nets. Their incidental capture in the nets is seen by the fishery council as the primary reason for the species' decline. The fish and other species accidentally caught in the shrimpers' nets often die during capture and are thrown overboard. The agency wants to reduce their capture rate by half of 1984 levels — before shrimpers were required to use turtle-excluder devices on their nets.

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Turtle ruling curbs import shrimp

By ROBERT GREENE
The Associated Press

WASHINGTON — Fewer imported shrimp will be allowed in this country because of a court ruling designed to protect sea turtles, but industry and government officials can't say whether shoppers will have to shell out more for scampi.

A judge of the U.S. Court of International Trade last week tightened a ban on shrimp caught by countries without national programs to safeguard the endangered turtles. The ruling excludes farm-raised shrimp.

The ruling will not affect imports from Thailand, the leading U.S. supplier. Thailand sends just under $1 billion worth of shrimp to the United States annually, almost all of it farm raised, said Rob Rosenberry, San Diego-based publisher of an annual report on worldwide shrimp farming.

Rosenberry said the ruling would have the biggest impact on China and India, the fourth and fifth largest U.S. suppliers and which rely on a mixture of shrimp farms, commercial fleets and primitive hand-netting.

Because the market is global, he said, it's tough to gauge the impact of the ruling.

"There's just really no way of telling the effect this ruling is going to have on shrimp prices in the United States," he said.

Still, one industry official says that some smaller import companies will be put out of business because of supply disruptions and that small, inexpensive shrimp sold in some restaurants could drop from the menu.

"This is the shrimp that can be priced at a price that an ordinary working family can afford," said Richard Gutting, vice president of the National Fisheries Institute, an Arlington, Va., based trade association.

Shrimp are big business. Americans gobbled 2.5 pounds of shrimp last year, up from 1.4 pounds two decades earlier, according to the National Marine Fisheries Service. Imports, worth about $2.6 billion, accounted for 80 percent of the U.S. supply last year.

Environmentalists say the growing demand for shrimp by the United States, the world's largest consumer, has raised the threat to sea turtles.

Judge Thomas Aquilino of the U.S. Court of International Trade agreed. In his ruling, he said the State Department may no longer allow shipment-by-shipment certification of imports from countries that lacked a blanket program but had some trawlers outfitted to protect turtles. Those include China and Brazil.

The policy was to encourage compliance by rewarding the individual do-gooders rather than disrupting trade and economic development in countries such as India and Bangladesh, which would lose U.S. sales under the ban.

The Earth Island Institute's Sea Turtle Restoration Project, based in Forest Knolls, Calif., led the challenge.

The group said the 1989 U.S. law to protect turtles intended for national embargoes as a prod for countries to impose turtle protections. Unless shrimp nets have an escape hatch for turtles, they are caught along with the shrimp and drown.

United States shrimpers use the turtle exclusion devices, as the escape hatches are known. So do Ecuador and Mexico, the second and third largest suppliers.

10/16/96 HAC

4B ☐ The Advocate, Baton Rouge, La. ☐ Thursday, October 10, 1996

Shrimpers assail new excluder rule as unfair burden

By The Associated Press

THIBODAUX — Forcing shrimpers to protect young red snapper fish by adding a new exclusion device to their nets would unfairly place the burden of one fishing industry on another, a state senator said at a hearing on the issue.

The hearing was on proposed regulations to require shrimpers to use "bycatch-reduction devices," also known as "fish-excluder devices" while trawling in federal waters of the Gulf of Mexico.

The Gulf of Mexico Fishery Management Council, which is proposing the rules, sponsored the hearing Tuesday at the Thibodaux Civic Center to hear public comments before the measure is sent to the U.S. secretary of commerce for final approval later this year. If approved, the rules will go into effect before the spring 1997 shrimping season.

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The agency wants to reduce their capture rate by half of 1984 levels, before shrimpers were required to use turtle-excluder devices on their nets.

State Sen. Mike Robichaux, D-Raceland, who represents the southern portions of Terrebonne and Lafourche parishes, objected to the bycatch device regulations on the grounds they're designed to protect the interests of red snapper fishermen at the expense of shrimpers.

"There are thousands of species of fish involved in bycatch in the Gulf," Robichaux said. "Why is the snapper (protected)? Why not jellyfish? You talk about environmental impacts and are worried about losing something; why not save jellyfish? I have to assume that we're dealing with snapper because snapper have a commercial and recreational interest."

If approved, the rules will go into effect before the spring 1997 shrimping season.

Commercial and recreational fishing of red snapper cause the greatest impacts on the red snapper species in the Gulf, not shrimping, Robichaux said. Despite the agency's claims, Robichaux said, the species is doing well since limits were placed on commercial and recreational fishing.

He said the same agency saw fit to increase commercial red snapper quotas this year from 3 million pounds to more than 4 million pounds.

"We're penalizing shrimpers once again for something they're not responsible for," Robichaux said.

Rick Leard, a Gulf Council biologist, later said the agency increased the fishing quota for adult fish because the increase was seen to have only a minuscule effect on the snapper's spawning ability.

Larose shrimper Mervin Ledet Jr. called on the Gulf Council to make a new study of bycatch-reduction devices. The devices were studied in 1990.

"I just wanted to go on the record that I was against it," Ledet said.

Ricardo Vega, an Ashland trawl board shop owner, criticized the Gulf Council for imposing strict limitations on fishermen, such as the ban on commercial redfish fishing, and never removing them.

"Anything that goes wrong or is wrong, it's the trawlers' fault," Vega said.

Fewer than 30 shrimpers and supporters attended the forum, reportedly because they were taking advantage of favorable tide shifts for shrimping.

"They've been tied up for over a week, so they all left," said Chauvin shrimper Dean Neal, who attended the meeting with his brother, father and deckhand because they're concerned about the new devices.

10/17/96 mA

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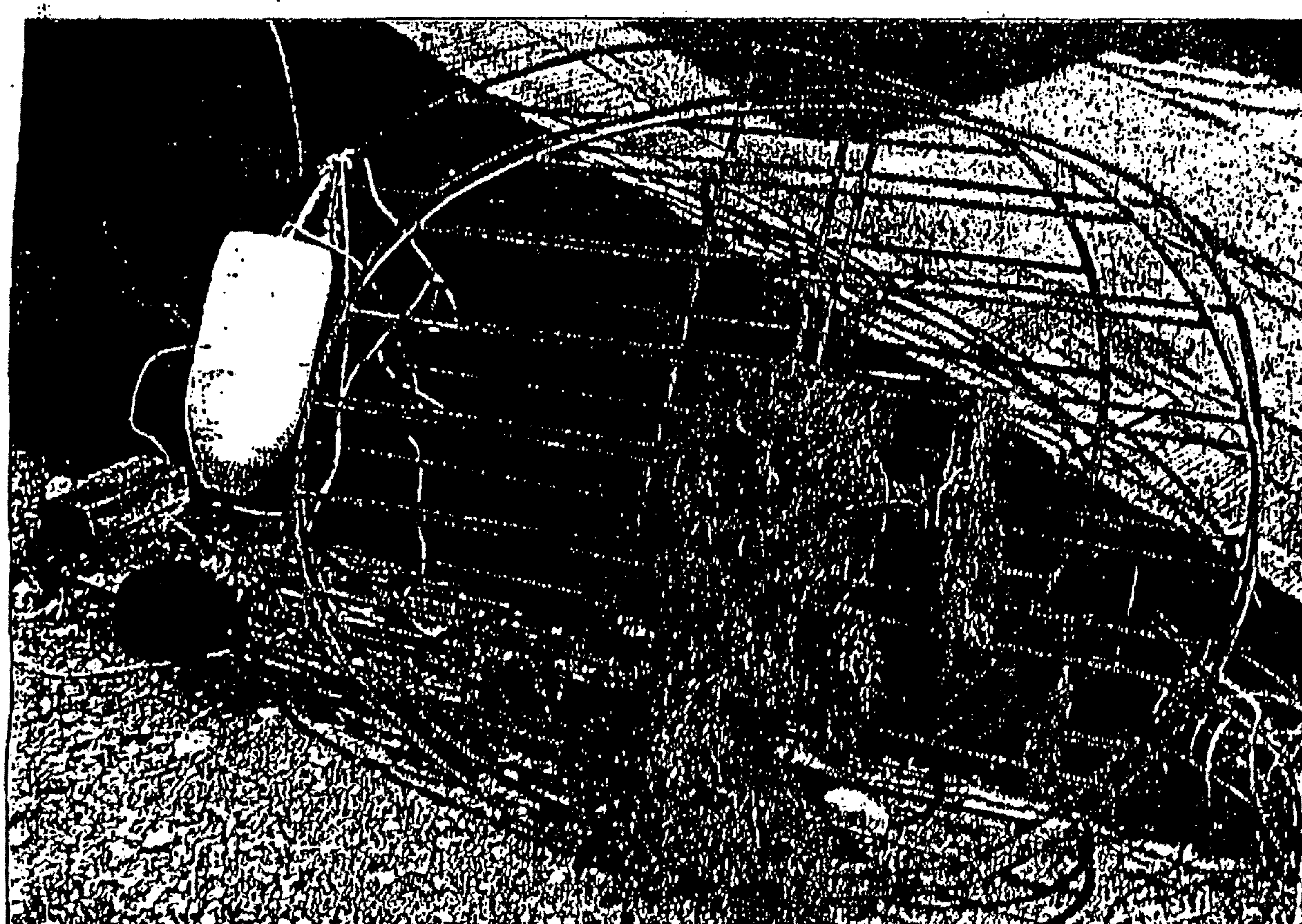

Advocate file photo

A court ruling will reduce shrimp imports to the United States from countries that do not require fishermen to use devices that release turtles from shrimp nets. The turtle excluder devices, such as this one, are used in the United States and by top export countries.

10/17/96 FA

NATIONAL NEWS

Ruling to slow shrimp imports

By ROBERT GREENE
Associated Press writer

WASHINGTON — A court ruling protecting sea turtles from shrimp nets will force American importers to bring in less shrimp, but no one can say for certain what will happen to prices or supplies.

The market changed last week when a judge of the U.S. Court of International Trade tightened a ban on shrimp caught by fishermen from countries lacking programs to safeguard the endangered turtles. The ruling excludes farm-raised shrimp.

U.S. shrimpers use turtle exclusion devices, the term for escape hatches in shrimp nets. So do Ecuador and Mexico, the second and third largest suppliers behind Thailand.

Imports from Thailand, which sends almost $1 billion worth of shrimp to the United States annually, will not be affected. Almost all Thai shrimp is farm-raised, said Rob Rosenberry, a San Diego publisher of an annual report on worldwide shrimp farming.

Rosenberry said the ruling would have the biggest impacts on China and India, the fourth- and fifth-largest U.S. suppliers, both of which rely on a mixture of shrimp farms, commercial fleets and primitive hand-netting.

Because shrimp come from everywhere, Rosenberry said, it's tough to gauge the ruling's impact on the U.S. market, the largest customer for the world's shrimp.

Still, one industry official said some smaller import companies will be put out of business by supply disruptions and that small, inexpensive shrimp sold in some restaurants might drop from the menu.

"This is the shrimp that can be priced at a price that an ordinary working family can afford," said Richard Gutting, vice president of the National Fisheries Institute, a trade association in Arlington, Va.

Shrimp are big business. Each American devoured 2.5 pounds of shrimp on average last year, up from 1.4 pounds two decades earlier, the National Marine Fisheries Service said. Imports, worth about $2.6 billion, accounted for 80 percent of the U.S. supply last year.

The Gulf of Mexico region supplies almost all of the domestically produced shrimp, and much of that is taken by boats operating out of Louisiana. The industry produced about $470 million worth of shrimp in 1994.

Environmentalists say the growing demand for shrimp by the U.S. market has raised the threat to sea turtles.

Judge Thomas Aquilino of the U.S. Court of International Trade agreed. In his ruling, he said the State Department must stop allowing shipment-by-shipment certification of imports from countries lacking national protection programs but with some trawlers outfitted to protect turtles. Both China and Brazil are in that category.

The shipment-by-shipment policy was to encourage compliance by rewarding individual shrimpers who complied with net restrictions rather than disrupting trade and economic development in countries such as India and Bangladesh, which would lose U.S. sales under the ban.

3 Nov 96
B.R. Sunday Advocate

SHRIMP BYCATCH: The Gulf of Mexico Fishery Management Council has set a Nov. 11-15 meeting at the Marriott Grand Hotel in Point Clear, Ala., to take "final action on an amendment addressing shrimp trawl bycatch." According to GMFMC spokesman Wayne Swingle, the council will begin taking public comment at 8:30 a.m. Wednesday, Nov. 13.

The council's shrimp committee will begin a review of public comment from the 14 public hearings held across the Gulf in October. That review begins at 9:30 a.m. Tuesday, Nov. 12.

For the complete agenda, contact the GMFMC, 813-228-2815, in Tampa, Fla.

Ruling on turtles curbs shrimp imports

By ROBERT GREENE
Associated Press writer

WASHINGTON — A court ruling protecting sea turtles from shrimp nets will force American importers to bring in fewer shrimp, but no one can say for certain what will happen to prices or supplies.

The market changed last week when a judge of the U.S. Court of International Trade tightened a ban on shrimp caught by fishermen from countries lacking programs to safeguard the endangered turtles. The ruling excludes farm-raised shrimp.

U.S. shrimpers use turtle exclusion devices, the term for escape hatches in shrimp nets. So do Ecuador and Mexico, the second- and third-largest suppliers behind Thailand.

Imports from Thailand also will not be affected. Almost all Thai shrimp, just under $1 billion shipped to the United States annually, is farm-raised, said Rob Rosenberry, San Diego-based publisher of an annual report on worldwide shrimp farming.

Rosenberry said the ruling would have the biggest impacts on China and India, the fourth- and fifth-largest U.S. suppliers, both of which rely on a mixture of shrimp farms, commercial fleets and primitive hand-netting.

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The shipment-by-shipment policy was to encourage compliance by rewarding individual shrimpers who complied with net restrictions rather than disrupting trade and economic development in countries such as India and Bangladesh, which would lose U.S. sales under the ban.

The Earth Island Institute's Sea Turtle Restoration Project, based in Forest Knolls, Calif., led the challenge.

"The judge properly elevated concerns about severely endangered marine life over trade dollars, as Congress contemplated," said Josh Floum, a San Francisco lawyer representing the institute, the Humane Society of the United States and the Sierra Club. "We expect this decision to save hundreds of thousands of endangered sea turtles and ... several species poised on the brink of extinction."

The group said the 1989 U.S. law to protect turtles intended for the United States to use embargoes to prod countries to impose turtle protections, such as escape hatches, to prevent their being snared in nets to drown.

Copy C+TS

Lafourche Parish Council

P.O. Drawer 5548 · Thibodaux, LA 70302 · Phone (504) 446-8427
Thibodaux (800) 834-8832 · Raceland (800) 794-3160

"Progress Through Unity"

Aaron Caillouet, *Parish President*

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NOV 21 1996

GULF FISHERIES COUNCIL

November 15, 1996

Gulf of Mexico Fisheries Management Council
5401 West Kennedy Boulevard, Suite 331
Tampa, Florida 33609

RE: RESOLUTION NO. 96-128

Dear Sir:

The Lafourche Parish Council, convened in regular session on November 12, 1996, adopted Resolution No. 96-128, recommending that the Gulf of Mexico Fishery Management Council and the National Oceanic and Atmospheric Administration in the United States Department of Commerce reconsider and withdraw its proposed "Amendment No. 9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, United States Waters."

If you have any questions concerning the above, please do not hesitate to call.

Sincerely,

LAFOURCHE PARISH COUNCIL

Sheila B. Boudreaux

Sheila B. Boudreaux
Secretary to the Council

amt

Attachment

Copy of resolution: Federal Delegation

On motion by Kenneth "Matt" Matherne, and with a unanimous second, the following resolution was introduced and adopted:

RESOLUTION NO. 96-128

RESOLUTION RECOMMENDING THAT THE GULF OF MEXICO FISHERY MANAGEMENT COUNCIL AND THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION IN THE UNITED STATES DEPARTMENT OF COMMERCE RECONSIDER AND WITHDRAW ITS PROPOSED "AMENDMENT NO. 9 TO FISHERY MANAGEMENT PLAN FOR THE SHRIMP FISHERY OF THE GULF OF MEXICO, UNITED STATES WATERS."

WHEREAS, the shrimping industry in Louisiana and other states has already sustained considerable economic hardship as a result of the mandatory use of Turtle Excluder Devices; and

WHEREAS, the Red Snapper is neither a threatened nor an endangered species of fish; and

WHEREAS, the decrease in Red Snapper population was largely due to heavy fishing pressure; and

WHEREAS, the introduction of quotas and limits on Red Snapper has helped the species to rebound its population; and

WHEREAS, the Gulf of Mexico Fishery Management Council, the agency seeking to impose the use of the Fish Excluder Device on the shrimping industry, has increased the quota on the amount of Red Snapper that can be legally caught, 52% since 1993 (representing nearly two million pounds of additional harvest); and

WHEREAS, the mandatory use of Fish Excluder Devices would have a severe and adverse economic impact on the shrimping industry with questionable benefit to the Red Snapper species;

NOW, THEREFORE, BE IT RESOLVED, by the Lafourche Parish Council, convened in regular session on November 12, 1996, that it does recommend that the Gulf of Mexico Fishery Management Council and the National Oceanic and Atmospheric Administration in the United States Department of Commerce, reconsider and withdraw its proposed "Amendment No. 9 to Fishery Management Plan for the Shrimp Fishery of the Gulf of Mexico, United States Waters."

BE IT FURTHER RESOLVED, that a certified copy of this Resolution be forwarded to the Gulf of Mexico Fisheries Management Council, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609; and the Federal delegation.

AARON CAILLOUET, PRESIDENT
LAFOURCHE PARISH COUNCIL

SHEILA B. BOUDREAUX, SECRETARY
LAFOURCHE PARISH COUNCIL

NOV 18 1996

GULF FISHERIES COUNCIL

7

13 Novem. 96

Dear Chairman Robert L. Shipp
Gulf of Mexico Fishery Management Council,

This letter is in regard to bycatch from shrimp trawls in the Gulf of Mexico. Your Council is considering the amendment for shrimp trawlers in the Gulf to reduce bycatch of juvenile red snapper. I hope you set your target of reducing the mortality of juvenile red snapper by 50% by requiring Bycatch Reduction Devices in shrimp trawls, etc.

You have informed me that the Council will take final action on the amendment on Novem. 14. I would like very much to know the outcome of the meeting. Also, please provide me the name of who to contact & adress of the National Marine Fisheries Service so that I can write & urge the requirement of BRDs on shrimp trawls in the Gulf.

Thank you very much for making my comments available to members of the Gulf Fishery Management Council.

Thank Very Much / Sincerely

Chandler John Ed.
CMHI #79
1600 West 24th St.
Pueblo, Colorado 81003

ax; 813-225-7015 12/2/1996 from Jeff Noel,pob 568 Fulton,Tx.78358

ear Mr. Swingle and persons concerned.

Thank-You for the opportunity to express my concerns to you and the coun-il I would like to mention briefly that I am 41 yrs. old, have been a full time commercial shrimper for 21 yrs. own and operate a 73'shrimp trawler fulltime n the Gulf of Mexico, primarily off the Texas coast.

I understand from a laymans point of view the issues of by catch and by catch reduction are much clearer and simpler than from myself, the one who is out on the water attempting to make a living. I see a lot of things in the shrimp industry that are in grave need of addressing, please let me urge you to make contact with me to discuss these things in detail. I would like to refer to my concerns and solutions in short later in this letter.

The red snapper industry that I am aware of as of Nov.1996 is as follows in brief. Commercial fishing is tightly regulated, but when the permit hold-i- fishermen are allowed to work they seem to do very well. They do not com-plain of the lack of fish only about the weather. What charter boat captains I have talked to say they have no trouble getting their clients their legal limits. So I am not so sure that the red snapper is in trouble. It seems that after long lining was outlawed and limits were set on commercial and sport fishermen that the snapper are getting more populated.

As for the use of BRDS, I am opposed to it. I feel it is unnecessary and that other things should be done in the shrimp industry to help the recovery of the snapper stock. A very important thing to do is to close the entire Gulf in the summer when Texas has her closure. Then add more artificial reefs for the fish. And I feel it's time for limited entry in the shrimping industry.

It would also help to limit the trawl to no more than 200 ft. of maximum spread for off shore waters and 100 ft. for the inshore waters.

You must understand we are having a tough time wiht T.E.D.s and I feel it is better to leave the fishing gear alone. To keep the fleet at a reasonable level, with additional closures would go a long way to help both industries.

Thank-You sincerely Jeff Noel

JOHN SIRACUSA
State Senator
District 21

SENATE

STATE OF LOUISIANA

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DEC 3 1996

3905 HIGHWAY 90 E
MORGAN CITY, LOUISIANA
(504) 384-0703
LINC: (504) 384-6061

COMMITTEES:
Agriculture
Environment
Natural Resources

November 25,1996

Gulf of Mexico Fisheries Management Council
5401 W.Kennedy Blvd,Suite 331
Tampa,FL 33609

RE: FED
TERREBONNE PARISH COUNCIL

Please find enclosed a copy of correspondece and subsequent resolution from the Terrebonne Parish Council in regards to the FED's proposed to reduce by-catch by shrimpers. As you will note, the Council is opposed to the mandated FED's. And certainly, I would agree, the reasoning to install the FED's is to protect the young red snapper population, we have on good authority that the juvenile snapper population is on the rise.

As a personal favor to us, please review carefully the mandate to install FED's on shrimping vessels, to see if this is really warranted. Anxiously awaiting you reply, we remain,

Sincerely,

John Siracusa
State Senator

JS/ggb
Encl.

J. B. BREAUX, CHAIRMAN

RAY BOUDREAUX, VICE-CHAIRMAN

TRICT 1
PERCY GABRIEL, SR.

DISTRICT 2
WAYNE THIBODEAUX

DISTRICT 3
RAY BOUDREAUX

DISTRICT 4
CHRISTA M. DUPLANTIS, R.N.

PARISH COUNCIL

PARISH OF TERREBONNE

POST OFFICE BOX 2768

HOUMA, LOUISIANA 70361

(504) 873-6519

FAX (504) 873-6521

PAUL A. LABAT, CLERK

DISTRICT 5
J. B. BREAUX

DISTRICT 6
HAROLD LAPEYRE

DISTRICT 7
CINDY ROGERS

DISTRICT 8
CARL CHAUVIN

DISTRICT 9
DANIEL DAVID HENRY

11-25 FED
9 prisoners

November 21, 1996

Honorable John Siracusa, Senator
8905 Highway 90 East
Morgan City, LA 70380

RE: Fish Excluder Devices

Dear Senator Siracusa:

The Terrebonne Parish Council has received information and much public comment on the proposal by the Gulf of Mexico Fisheries Management Council to require Fish Excluder Devices to be included on the nets of commercial shrimp fishermen. Although the rationale is to protect the young red snapper population, independent studies indicate that the snapper population is on the rise.

The Parish Council adopted the attached resolution opposing the mandated use of Fish Excluder Devices. The reasons for the Council's decision are included in the resolution.

As always, your favorable consideration of the Council's position will be appreciated. Thank you.

Sincerely,

Paul

Paul A. Labat
Council Clerk

PAL/ctc
Attachment

OFFERED BY: Mr. D. Henry.
SECONDED: Unanimously.

RESOLUTION NO. 96-476

WHEREAS, the Terrebonne Parish Council has recently learned that the Gulf of Mexico Fisheries Management Council is proposing regulations which will require commercial shrimp fishermen to attach Fish Excluder Devices onto their nets, and

WHEREAS, the Parish Council Members represent numerous commercial fishermen who would be greatly impacted by the F.E.D. requirement, and

WHEREAS, the claim that the nets of commercial shrimpers are responsible for catching 80% of the juvenile red snapper population is hard to believe due to the increase in the numbers of snappers in the Gulf of Mexico, and

WHEREAS, the Parish Council is concerned that the mandatory use of F.E.D.'s would cause many honest, hardworking people, many of whom are Native Americans, to give up their generations - old heritage of commercial fishing and to seek other means of supporting their families.

NOW, THEREFORE BE IT RESOLVED, by the Terrebonne Parish Council, on behalf of the Terrebonne Parish Consolidated Government, that this governing authority OPPOSE the mandatory use of Fish Excluder Devices on the nets of commercial shrimp fishermen, and

BE IT FURTHER RESOLVED, that a copy of this resolution be sent to all members of Louisiana's Congressional Delegation, Governor Mike Foster and members of Terrebonne Parish's Legislative Delegation.

THERE WAS RECORDED:

YEAS: C. Duplantis, J.B. Breaux, H. Lapeyre, C. Rogers, C. Chauvin, D. Henry, P. Gabriel, Sr., W. Thibodeaux and R. Boudreaux, Jr.

NAYS: None.

NOT VOTING: None.

ABSENT: None.

The Chairman declared the resolution adopted this 20th day of November, 1996.

* * * * * * * * * *

I, PAUL A. LABAT, Clerk of the Terrebonne Parish Council, do hereby certify that the foregoing is a true and correct copy of a resolution adopted by the Assembled Council in

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

DEC 02 1996

DEC 10 [illegible]

GULF FISHERIES COUNCIL

Wayne E. Swingle
Gulf of Mexico Fishery Management Council
Lincoln Center
5401 West Kennedy Blvd
Suite 331
Tampa, Florida 33609

RE: Draft Supplement Environmental Impact Statement (SEIS) for Amendment 9 to the Fisheries Management Plan (FMP) for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters

Dear Mr. Swingle:

The U. S. Environmental Protection Agency (EPA) has reviewed the referenced document in accordance with EPA's responsibilities under Section 309 of the Clean Air Act and Section 102 (2) (c) of NEPA. The document described impacts of actions that are proposed to reduce the bycatch mortality of juvenile red snapper in the Gulf of Mexico. The use of certified Bycatch Reduction Devices (BRDs) is intended to reduce the incidents of incidental take of bycatch in the shrimp fishery of the EEZ.

EPA supports the above actions described in the Draft SEIS, but we are concerned about the socioeconomic impacts of the proposed action. Domestic fishermen required to use BRDs would be, because of reduced netting efficiency, at a competitive disadvantage as compared with foreign producers who capture shrimp with standard, traditional trawls. The final SEIS might include some strategies for mitigating economic pressure on the domestic shrimp industry from foreign sources.

While we support the use of BRDs as described in the Draft SEIS, we stress the need for continuing research that will improve shrimp catch-per-unit effort and diminish bycatch below that being achieved by today's technology. A 50 percent bycatch reduction is said to be achievable by at least one BRD design, which is impressive considering the short amount of time that research in bycatch reduction has been ongoing.

With the increasing pressure being placed upon on wild fish and shellfish populations, we anticipate more activity in the raising of the more profitable commercial species using mariculture. The number of mariculture projects in this country is expected to increase because of high demand for fish and shellfish products concomitant with dwindling wild stocks of commercial species. Research is needed to determine possible impacts on indigenous shrimp species to inadvertent introductions of exotic shrimp species, and the impacts on disease from mariculture operations to both cultured and wild shrimp. Other

areas of research include the impacts of habitat and water quality alteration on shrimp growth, and the impacts of beach renourishment projects on shrimp production.

EPA's rating for this Draft SEIS is "LO", that is, this review has not identified any environmental impacts requiring substantive changes to the document. We appreciate the opportunity to review this document. If more information is required, please call me or John Hamilton at (404) 562-9617.

Sincerely,

Heinz Mueller

Heinz J. Mueller, Chief
Office of Environmental
Assessment

APPENDIX F

APPENDIX F

Gulf of Mexico Fishery Management Council's Responses to Comments Regarding Amendment 9 to the FMP for the Shrimp Fishery of the Gulf of Mexico, U.S. Waters with SEIS, RIR, IRFA, and SIA

1. Comment: Biological data are not conclusive and have not been explained to the public in a meaningful way.
Response: Magnuson Act requires actions to be based on the best available scientific information, and these data indicate that the red snapper stock cannot recover from overfishing without further reductions in shrimp trawl bycatch. The amendment was reviewed twice by the Shrimp Advisory Panel, disseminated to fishery associations and the public through various media channels, and presented at 14 public hearings throughout the Gulf.

2. Comment: Amendment likely to be unenforceable if state agents are required to handle significant numbers of cases.
Response: Requirements of the amendment pertain only to federal waters of the EEZ. States with cooperative enforcement agreements are allowed to make cases in accordance with their agreements.

3. Comment: Red snapper quota has been increased by 52% (nearly 2.0 million pounds of additional harvest since 1993).
Response: The Total Allowable Catch (TAC) remained the same (6.0 million pounds) for 1993, 1994, and 1995). The TAC was increased to 9.12 million pounds in 1996 under the assumption that bycatch from shrimp trawls would be reduced by approximately 50% in 1997.

4. Comment: Bycatch Reduction Devices (BRDs) will have severe and adverse economic impacts on the shrimping industry with questionable benefit to the red snapper species.
Response: BRDs affect both the cost and revenue of shrimp vessels; although revenue reductions dominate the effect on profits. The Fisheye 30 BRD and Andrews TED are estimated to result in total surplus reductions of $116 million and $1.1 billion, respectively, over the very long-run. Over the first 15 years of BRD implementation, surplus reductions on an annual basis range from $10 million to $40 million for the fisheye 30 BRD and from $10 to $100 million for the Andrews TED. The higher numbers occur only in the first year of implementation; the reductions diminish in subsequent years. Over the long-term, the number of vessels is reduced by about 3 to 4 percent with the fisheye 30 BRD and about 11 percent with the Andrews TED. While mainly couched in qualitative terms, the impacts on the red snapper industry have been determined to be positive to the extent that some form of effort limitation program is implemented on the fishery. Such benefits arise from allowing the red snapper TAC to be maintained at a higher level. For example, if the current TAC of 9.12 million pounds is maintained until the stock recovers, net benefits to the commercial red snapper fishery would amount to about $118 million over the period 1996 to 2020. Benefits to the recreational fishery could not be estimated.

5. Comment: Claims have been made by the GMFMC that nearly 80% of the juvenile red snapper population is caught by shrimp trawlers in the Gulf of Mexico.
Response: The Council has not made such claims, and they are not included in Amendment 9. Amendment 9 is predicated on the need to reduce the bycatch mortality rate for juvenile red snapper

(age 0 and age 1) by 50% from the 1984-1989 average. Phillip Goodyear in the NMFS' 1992 red snapper stock assessment update noted that mean survival to the directed fishery is reduced by about 81% because of the bycatch problem.

6. Comment: At least 2 studies have shown that of all the bycatch of commercial shrimpers, red snapper were one of the least affected species.
Response: Nichols et al. (1990) reported that for the offshore shrimp fleet red snapper ranked 9th in abundance among 14 species evaluated with approximately 20 million individuals being caught in 1989 as bycatch.

7. Comment: The federal government forced Turtle Excluder Devices (TEDs) on fishermen and did nothing to stop destruction by other countries.
Response: The GMFMC is not a federal agency, and it is not responsible for requiring TEDs under the Endangered Species Act. Furthermore, the Council is not involved with foreign policy.

8. Comment: Prohibition of longlining and other restrictions on the directed fisheries (endorsements, quotas, seasons, trip limits, bag limits, size limits, etc.) have been responsible for recovery of the red snapper stock.
Response: Regulations of the directed fisheries for red snapper since 1990 have probably had a positive impact on increasing the red snapper population; however, the best available data indicate that the stock cannot recover from an overfished state without further reduction in bycatch mortality.

9. Comment: Instead of requiring BRDs, close the entire Gulf to shrimping during the summer period of the Texas Closure.
Response: The Council has determined that seasonal closures (such as the Texas Closure) would not have a significant impact on reducing bycatch of juvenile red snapper because juveniles are distributed over the shrimping ground for approximately 14 months. More lengthy closures would be more costly to the shrimp fishery than the use of BRDs. Also, the majority of the juvenile red snapper are distributed in offshore waters of Texas and Louisiana. Limited summer closures in other areas would not have a significant impact on reducing bycatch of red snapper and would be more costly to the shrimp industry.

10. Comment: In lieu of BRDs, add more artificial reefs and implement a limited entry program for the shrimping industry.
Response: Although artificial reefs have been shown to increase fishing opportunities for the directed fisheries for red snapper, they have not been shown to provide a significant increase in critical habitat for juveniles; their effect on increasing the population is therefore unknown. Also, the addition of reefs reduces the amount of untrawlable bottom that in the areas of juvenile red snapper abundance is also important bottom for shrimp. Consequently, the shrimp industry has opposed additional artificial reefs in areas of shrimp abundance. The shrimp industry and the Council addressed limited entry in 1990 and again with Amendment 9 and rejected the alternative (see section on "Impractical and/or Previously Rejected Bycatch Reduction Options)."

11. Comment: It would help to limit trawl spread in offshore waters to 200 feet and 100 feet in inshore waters.

Response: It is unlikely that a reduction in the size or number of trawls being used would have a significant impact on bycatch of juvenile red snapper without an accompanying decrease in the number of vessels because there are currently more vessels operating than are needed to catch the available shrimp (see RIR discussions).

12. Comment: Red snapper is neither a threatened nor endangered species.
Response: We agree.

13. Comment: The decrease in red snapper populations was largely due to heavy fishing pressure.
Response: Fishing pressure from the directed commercial and recreational fisheries definitely contributed to declines in the red snapper stock (see SEIS for Amendment 5 to the Reef Fish FMP of the Gulf of Mexico). Shrimp trawl bycatch is, however, a major contributor to mortality of age 0 and age 1 red snapper. Goodyear (1993) estimated that the mean survivability to the directed fishery is reduced by approximately 81 percent as a result of bycatch. Additionally, RFSAP (1995) noted that the red snapper stock could not recover above the overfished state without a 50 percent reduction in bycatch mortality.

14. Comment: The requirement of BRDs would cause many active and transgenerational shrimp fishermen to leave the fishery.
Response: The requirement for use of the fisheye 30 BRD has been determined to reduce the number of shrimp vessels by 3 to 4 percent; while requiring the Andrews TED could reduce the number of vessels by about 11 percent. These affected fishermen are expected to leave the shrimp fishery.

15. Comment: In the 1980s, biologists figured 10 pounds of bycatch for each pound of shrimp caught, and research showed that up to 90% of juvenile red snapper were dying in trawls.
Response: During the 1970's, the ratio of total finfish to shrimp bycatch was estimated at 10:1; however, in the early 1990's this bycatch ratio was estimated at approximately 4:1. The 1990 stock assessment reported that over 90% of the fishing mortality on juvenile red snapper (age 0 and age 1) was attributed to shrimp trawling (Goodyear 1990).

16. Comment: At a rate of 4 pounds of finfish killed for each pound of shrimp, shimmers have killed and wasted at least 800 million pounds of finfish annually in recent years.
Response: It is correct that about 800 million pounds of finfish have been caught annually as by catch in recent years; however, not all by catch is wasted. Some of this by catch is sold or used for food. Other amounts re-enter the food chain or provide a nutrient source for future primary productivity. Also, many of the by catch species are short-lived with high natural mortalities in the first year of life.

17. Comment: A couple dozen small snapper, croaker, mackerel and other fish are dying for each pound of shrimp.
Response: See above responses regarding by catch by weight. Estimates of the total numbers of all finfish species caught for each pound of shrimp are not available. Table 2 of Amendment 9 provides data for 1989 on the numbers of the most frequently encountered finfish species caught in the offshore shrimp fishery.

18. Comment: A BRD will cut bycatch by 50% while reducing shrimp catch by 0 to 6%.
Response: Only 2 BRDS are proposed for certification as meeting the 44% bycatch reduction criterion for juvenile red snapper (fisheye 30 mesh position and 5" Andrews TED). The estimates of reduction in shrimp by weight for these 2 BRDS are 3 and 16%, respectively.

19. Comment: The cost of adding BRDS is about $100.00 per boat.
Response: BRDS cost about $50 per net, or $200 per vessel with four nets. The Andrews TED is estimated to cost about $200 per net or $800 per vessel with four nets.

20. Comment: Red snapper bycatch in the shrimp industry declined by 50% from 1972 to 1993, and the overall finfish bycatch by weight has declined by 60% since the 1970s (NMFS Cooperative . Research Program 1995)
Response: Although the estimate of red snapper bycatch in 1972 was approximately 70 million fish and the estimate in 1993 was about 35 million fish, the bycatch between these years has generally been between 20 and 30 million fish. Slightly higher levels were observed in the early 1980s and early 1990s; while slightly lower levels were seen in the mid 1970s and mid 1980s. Although the ratio of finfish bycatch by weight to shrimp catch has decreased from 10:1 in the 1970s to 4:1 in 1994, this change in ratios may not reflect a 60% reduction in total bycatch. Furthermore, the causes for the reduction and any trend over the period are not known.

21. Comment: Prior to limited entry and restrictive size limits, shrimp boats landed thousands of pounds of small (8 to 12-inch) red snapper. This size-class of red snapper is now a regulatory discard, and the current fishery does not significantly impact this size red snapper.
Response: Data on the amount and size distribution of shrimp-trawl-caught red snapper are inadequate to confirm the amounts previously landed; however, recent stock assessments note that the majority of the bycatch mortality is on age 0 and age 1 fish. The average size of age 1 fish is about 7 inches; consequently, there is a component of the age 1 bycatch that encompasses the size range mentioned. It could also be significant since the mortality on the age 1 component of the bycatch is the largest (82%).

22. Comment: Estimates of shrimp loss from TEDs and the extended funnel BRD are not consistent with some industry personnel's observations.
Response: Data reported in Table 4 of Amendment 9 are best available.

23. Comment: There is current disagreement as to whether some TEDs (other than the Andrews TED)are also operating as a BRD for red snapper, and the Council should ask NMFS to evaluate TEDs by comparing them with "naked nets." Also, without this information, it is practically impossible to determine the economic impacts to the shrimp industry or whether the goal of a 50% reduction in bycatch mortality is being achieved.
Response: We agree; however, the current best estimate of bycatch reduction of juvenile red snapper from TEDs, other than the Andrews TED is that it is not significantly different from zero.

24. Comment: Current practices to determine effort in the shrimp fishery lead to estimates that are "best available data;" however, the estimates may be severely overestimated particularly those for

a particular area or depth zone. These overestimates could bias the GLM model estimates of shrimp trawl bycatch.
Response: We agree that the current estimates are best available data. The Council also evaluated the possibility that by catch was overestimated by 14 and 33%. These evaluations concluded that even a 33% upward error would not affect the need to further reduce bycatch of red snapper (Goodyear 1996).

25. Comment: The Council should form a Shrimping Effort Data Task Force to evaluate the accuracy of current data collection efforts as well as to make recommendations to NMFS regarding necessary changes to the data collection effort so that the data are of more use in the future.
Response: In 1993, the Council established a special panel to review effort data from the shrimp fishery. The panel was asked to review possible sources of bias in catch data and to evaluate its impacts, if any, on effort estimates. The panel was also asked to review the methodology used to collect the data. Recommendations were made to the Council in a "Report to the Gulf Council on Shrimp Effort" in May 1994. The Council will likely look at additional ways to improve estimates of effort in all fisheries covered by existing management plans in keeping with the Sustainable Fisheries Act of 1996.

26. Comment: The SPR target for Gulf red snapper is flawed due to inaccurate historical data on red snapper landings by area caught.
Response: Estimates of SPR are not solely based on landings or catch. CPUE may be used as and indices of abundance; however, other factors, including biological ones, are used in estimating SPR. The SPR target as reflected in Amendment 9 is to recover the stock above the overfished level of 20%. The 20% SPR as a overfishing threshold is consistent with other species with similar biological and ecological characteristics.

27. Comment: Determination of the economic impacts of present and proposed regulations (TEDs and BRDS) is hampered by uncertainties regarding shrimp loss both from the gears themselves and from potential losses of biomass due to changes in ecological relationships.
Response: We agree.

28. Comment: Domestic fishermen who are required to use BRDS would be at a competitive disadvantage because of reduced efficiency when compared with foreign producers who are not required to use BRDS. The SEIS might include strategies for mitigating economic pressure on domestic shrimp producers from foreign producers.
Response: Table R-10 of Amendment 9 shows that over 80% of the U.S. consumption of shrimp comes from foreign imports. Additionally, the majority of foreign shrimp are maricultured. Consequently, the effects of any reduced efficiency or shrimp loss from BRDS in competition with foreign wild-caught shrimp would be insignificant. Additionally, since BRDS reduce culling time and the shrimp loss has been shown to be below 3% for some devices, the use of BRDS could actually increase harvest efficiency and improve the product.

29. Comment: Research is needed to evaluate the impacts of mariculture, including inadvertent release of nonindigeneous species of shrimp and disease organisms.

Response: We agree, and the Council is addressing these problems through its recently revised mariculture policy.

30. Comment: The public is inflamed at the shrimp industry because of erroneous reports that the finfish bycatch to shrimp ratio is 10:1, and the NMFS reported in the late 1980s that shrimp bycatch was responsible for the collapse of the red snapper fishery.
Response: The overall public perception of the shrimp industry is unknown. See Comment 15 above.

31. Comment: Over 60% of the Gulf vessels have left the fishery; therefore, the reduction in bycatch is automatically down over 60%.
Response: A reduction in vessels does not translate equally into a bycatch reduction. The shrimp industry in the Gulf has more vessels than are needed to harvest the available resource of shrimp; consequently, a reduction in the number of vessels may not reduce the effective effort that is the standard on which bycatch reduction is measured. The 1995 stock assessment for red snapper noted a 10% reduction in effective effort; consequently, the bycatch reduction criterion for red snapper was reduced from 50% to 44%. Also, see Table R-2 for estimates of the number of vessels operating in the Gulf shrimp fishery.

32. Comment: There has been an implication that the offshore shrimp fleet is "wasting" a natural resource which equates to removing them from the ecosystem; however, bycatch is , in fact, redistributed as food for other fish.
Response: See Comment 16 above.

33. Comment: The shrimp industry should be managed to ensure that no undue burden is placed on any segment thereof.
Response: The "purpose and need" section of Amendment 9 states this intent of the Council; however, the Council also has the responsibility to ensure that overfishing is not perpetuated on any species under management.

34. Comment: Regulations on seafood, such as Amendment 9, are making it impossible for anyone, except the very rich to afford to buy it.
Response: The price of various seafood and seafood products varies considerably, and it is also affected by imports.

35. Comment: Most of the bycatch is composed of trash or inedible fish that have a life cycle similar to shrimp, about 12 to 14 months.
Response: See Table 2 of Amendment 9 for a list of the most common bycatch species.

36. Comment: Not one of NMFS' stock assessments has considered the effects of the "Dead (hypoxic) Zone" on the abundance of shrimp, fish, sea turtles, or marine mammals. Other such factors may also have been ignored in stock assessments. Without consideration of these factors on the status of the stock, how can NMFS purport that BRDs will rebuild red snapper populations.
Response: Stock assessments consider a wide variety of factors including biological, ecological, and those related to fishing. Currently, the best available data indicate that the red snapper stock cannot

rebuild above the overfished status without further reduction in bycatch mortality which has been determined to be a significant component of the total mortality.

37. Comment: The Council and NMFS have never encouraged outside peer review of stock assessments by providing funding to pay for it.
Response: Peer review has been accomplished through Stock Assessment Panels and other voluntary review, but it has not been funded.

38. Comment: Statistical flaws in the estimates of bycatch have not been addressed.
Response: See Comment 24.

39. Comment: Estimates of catch comparisons on trawls with and without BRDs and trawls with and without TEDs have flaws in their analyses.
Response: Table 4 of Amendment 9 shows the most recent performance of BRDs under testing. It also shows data on the Andrews TED that is being recommended for certification as a BRD.

40. The SSC and SAP do not have representation from statisticians or oceanographers, and its members serve voluntarily and are not paid. This causes assessments to have minimal peer review and to basically reflect the unchallenged views of NMFS scientists.
Response: The SSC and SAP have members that are skilled in fishery population dynamics which requires considerable statistical ability and experience. It is true that members are not paid; however, they are compensated for actual expenses to attend meetings to review data and assessments. The Standing SSC (14 members) contains 1 NMFS employee; the Special Reef Fish SSC (5 members) contains 3 NMFS employees: the Reef Fish Stock Assessment Panel (7 members) contains 1 (retired) NMFS employee. These members must be reappointed every 2 years.

41. Comment: Amendment 9 does not conform with the requirements of the Magnuson-Stevens Act of 1996, particularly Sections 405 and 407.
Response: The Council has been advised by NOAA General Counsel that Amendment 9 is not in conflict with the Magnuson-Stevens Act.

42. Comment: Over the years, the shrimp industry has reduced bycatch through fishing gear changes and modifications, regulatory mandates, reduction in fishing effort through vessel reductions, area closures, seasonal closures (Texas Closure), loss of trawlable bottom, use of TEDs, and research studies; however, no credit has been given to these reductions.
Response: The effects of these and other aspects of the shrimp fishery are discussed under Rejected Alternative A.1. In summary, only reductions in effective effort have been shown to significantly reduce the bycatch mortality rate for juvenile red snapper, and these reductions have not been sufficient to preclude the need for BRDs and further reduction in bycatch mortality in order to rebuild the stock by the Council's goal of 20% SPR by the year 2019.

43. Comment: For the last 3 years, the NMFS and Council have allowed the recreational component to exceed its quota by nearly double of spawning age fish 4 years and older; thus changing the statutory allocation of TAC from 51% commercial/49% recreational to 59% recreational/41% commercial.

Response: The Council has established a management regime for red snapper that includes a TAC with an estimated division of 51% commercial/49% recreational based on historic harvest levels for these components of the fishery. (This split is not a statutory allocation.) Based on a permit system and requirements for reporting landings, the commercial fishery is closed when its portion of the TAC is anticipated to be met. The 51% base is the guide for closure of the commercial fishery. The percentages of the actual catch for the most recent complete years (1993 and 1994) are approximately 63% recreational and 37% commercial. The recreational fishery has been managed through size limits and bag limits. Unanticipated increases in effort have caused the recreational allocation overruns. The size composition of the recreational allocation overages has not been determined; however, based on a minimum size of 14 inches, legal catches would include mostly fish age 3 and above.

44. Comment: There has been a surplus in red snapper since 1990 which has increased TAC without bycatch regulations, and the reasons for this surplus are that the contribution of the shrimp fishery to bycatch reduction of juvenile red snapper age 0 and age 1 has been underestimated and NMFS has overestimated bycatch of these age groups in shrimp trawls.
Response: See Comment 42 for response to the underestimation of bycatch reduction by the industry since 1990. Additionally, any increases in the population of red snapper have most likely resulted from regulations imposed since 1990, the extremely strong year class in 1989, and relatively strong year classes since 1989 (Goodyear 1995). With regard to the possibility of overestimation of bycatch, see Comment 24.

45. Comment: The Magnuson Act requires that management measures be fair and equitable; consequently, imposition of strict bycatch limits on the shrimp industry would also require enforcement of strict catch limits on the recreational fishery.
Response: The Sustainable Fisheries ct of 1996 requires that the red snapper recreational fishery be closed when its allocation is expected to be reached.

46. Comment: A 25% reduction in bycatch from shrimp trawls results in a 5% loss of shrimp biomass, and a 50% reduction results in a 11% loss of shrimp biomass.
Response: These data are 1 of 4 scenarios examined in Amendment 9. See Ecological Impacts under Proposed Alternative A.2 and Appendix B.

47. Comment: An evaluation of the social and economic impacts of Amendment 9 on the 31 or more "fishing communities" as defined in the Magnuson-Stevens Act has not been done. This includes not only the shrimp industry itself but also the indirect land-based infrastructures, municipality budgets, and lending institutions.
Response: While there have been no rigorous studies on the economic impacts of Amendment 9 on various fishing communities, the RIR and SIA do consider the best available data on the economic and social impacts of bycatch reduction requirements on the shrimping industry and its participants. These sections of Amendment 9 also address the known impacts to selected finfish fisheries.

48. Comment: If no action is taken to reduce bycatch mortality of red snapper, long-term risks to the red snapper fishery and health of the Gulf ecosystem would be severe, and if bycatch is reduced, the benefits to the marine ecosystem will be tremendous.

Response: Available data indicate that red snapper stocks cannot recover above the established overfished threshold without further reduction in bycatch mortality. Impacts to the Gulf ecosystem that may occur as a result of taking action or not taking action are unknown.

49. Comment: There is limited species-specific bycatch data for the Gulf.
Response: NMFS has been collecting species-specific bycatch data since 1971.

50. Comment: Yields from the directed red snapper fishery would increase 60 to 90% if shrimp trawl bycatch did not exist.
Response: As indicated in Amendment 9, the long-term potential yield for red snapper is estimated at 33 million pounds annually. The TAC for 1996 was 9.12 million pounds; thus the potential increase is approximately 362%.

51. Comment: The use of BRDs will have significant benefits for other nontarget species, and king and Spanish mackerel are severely affected bycatch loss.
Response: Although it is likely that there will be initial increases in the survivability for numerous finfish species, the long-term effects of this exclusion on the population size of most species in the bycatch complex is not known. For the more long-lived species, it is likely that the stock size will increase; however, bycatch mortality on the short-lived species may to some extent be replaced by natural mortality. Bycatch reduction is also likely to change predator/prey relationships even among the more long-lived species, and such changes could have both positive and negative effects on population abundance among species. The significance of benefits to both managed and unmanaged species that are currently caught as bycatch has not been evaluated. There is insufficient data to determine if king and Spanish mackerel stocks are severely affected by shrimp-trawl bycatch, and neither stock is currently considered to be overfished.

52. Comment: Atlantic croaker will benefit tremendously from the use of BRDs.
Response: See Comment 51.

53. Comment: The DSEIS includes mention of ancillary benefits to species other than red snapper in several places; however, an adequate discussion of these benefits is lacking.
Response: See Comment 51.

54. Comment: Section 6.0 - Environmental Consequences notes that environmental of the proposed alternatives are considered in Sections 2.0, 3.0, and 4.0; however, Section 3.0 does not exist.
Response: The heading for Section 3.0 - Affected Environment was inadvertently eliminated from the text of page 34 of the public hearing draft dated 9/20/96. This heading will be inserted in the final draft of Amendment 9 between "Social Impacts of Proposed Alternative E.2" and "Biological Environment."

55. Comment: The DSEIS should analyze the ecological benefits that will result from the reduction of bycatch of nontarget species and the recovery of potentially important fisheries.
Response: "The ecological impacts of bycatch are not fully understood." Consequently, analyses of the ecological benefits, if any, to individual species or fisheries cannot be accomplished. Also, see Comment 51.

56. Comment: Bycatch is the most significant threat for a great number of species in the Gulf. The reduction of bycatch will allow for the recovery of impacted populations and increase the likelihood that economically valuable Gulf fisheries can be sustained.
Response: Red snapper is the only species under management in the EEZ that has been determined to be overfished and to be unable to recover above the established overfished definition within the Council's specified time-frame without further reductions in shrimp-trawl bycatch or elimination of the directed fishery for some period of time. Also, see Comment 51.

57. Comment: The DSEIS focuses almost exclusively on potential decreases in shrimp stock biomass and potential impacts to marine mammals and seabirds that feed on bycatch.
Response: We disagree. Changes in potential ecological relationships among finfish species excluded by BRDs are discussed under Proposed Alternative A.2 - Ecological Impacts and the original modeling of these scenarios is included in Appendix B. Furthermore, under Section 6.0 - Environmental Consequences - a wide range of potential ecological effects are discussed.

58. Comment: The primary focus of the DSEIS analysis must be the impact on the Gulf ecosystem and benefits of reducing bycatch. Impacts to the shrimp fishery and animals which might be dependent on bycatch as an unnatural food source should be a secondary focus.
Response: See Comment 51 with regard to analyses of ecosystem impacts and benefits. Impacts to the shrimp fishery are a major consideration of the DSEIS, particularly as part of Amendment 9 because this amendment applies to the shrimp fishery. EISs and SEISs for other FMPs such as the Reef Fish and Coastal Migratory Pelagics FMPs have rightly focused on impacts to these and other finfish species. Additionally, many of the bycatch species are not an "unnatural" food source for marine mammals and sea birds; they are simply made more readily available.

59. Comment: Significant ecological and economic benefits of bycatch reduction can be achieved without reducing the effectiveness of shrimp trawls, and the use of BRDs will result in economic benefits to the shrimp fishery through decreased workload from culling unwanted bycatch.
Response: With regard to ecological benefits, see Comment 51. With regard to the economic impacts, the RIR shows that the use of the fisheye 30 mesh BRD and the Andrews TED could reduce the annual total surplus for the shrimp fishery by $116 million and $1.1 billion, respectively.

60. Comment: Since 1990, the size of try nets and the length of time that they are pulled have both increased considerably resulting in an increase in the number of observed captures of sea turtles and probably finfish bycatch.
Response: The Council is not aware of any studies that have shown that the size or tow times for try nets has increased appreciably since 1990. Try nets used in Texas and Louisiana typically have headrope lengths of between 15 and 16 feet. Furthermore, the Council is unaware of data that show an increase in the capture of sea turtles or finfish in try nets.

61. Comment: Proposed regulations will require TEDs in try nets with a 12 foot headrope length and larger, and requiring both a TED and a BRD in the same try net will ease enforcement and minimize confusion among shimmers and enforcement officials.
Response: The Council's proposed alternative would only require a BRD in a try net larger than 16 feet (headrope measurement). Consequently, try nets with headrope lengths between 12 and 16 feet

would only require a TED. Although requiring a TED and a BRD in try nets 12 feet and larger may provide for more consistent regulations, the use of a BRD in a try net in some ways defeats the purpose of the try net as it has traditionally been used, i.e. to ascertain the amount of shrimp and bycatch that are likely entering the main net(s) on a periodic basis.

62. Comment: There is a likelihood that shrimp trawl bycatch is one of the primary reasons that red snapper populations off Florida, east of Cape San Blas are relic; thus BRDS should be required in all waters of the EEZ of the Gulf of Mexico.
Response: The primary reason why red snapper populations are relic off Florida is that as the stock has become overfished the range of the stock has decreased to the center, which is a typical ecological phenomenon. There are no historic data to show that there have ever been significant numbers of juvenile red snapper off Florida east of Cape San Blas, and shrimp-trawl bycatch is mainly juveniles.

63. Comment: Requiring BRDS in all trawls in the Gulf region would benefit enforcement.
Response: We agree; however, it would create an unnecessary burden to the shrimp fishery considering the objectives of Amendment 9.

64. Comment: The bycatch reduction criteria should be increased over time (from 50% in 1997 to 75% in 2017) to provide for recovery of the red snapper stock above the overfished status prior to 2019 because red snapper are capable of a much quicker recovery. Additionally, the bycatch reduction criteria should not be decreased until the stock is fully recovered.
Response: Proposed alternative E.2 would allow the Council to increase of decrease the bycatch reduction criterion in accordance with its rebuilding program which includes a continued allowance for a directed fishery. Increasing the percent reduction in bycatch mortality above 66% level would likely force a closure of the shrimp fishery in the area west of Cape San Blas if the Andrews TED is decertified and if more efficient BRDS are not developed. This change could also result in closures or reductions in TAC for the directed commercial and recreational red snapper fisheries.

65. Comment: A 50% reduction in bycatch would mean that 10 million pounds rather than 20 million pounds of red snapper would die in shrimp trawls each year.
Response: The Council's goal is a 50% reduction in the bycatch mortality rate for juvenile red snapper age 0 and age 1 from the average annual mortality rate on these age groups during 1984 and 1989. Table 2 of Amendment 9 notes that approximately 20 million red snapper were caught as bycatch in 1989. Since the majority of these fish are age 0 and age 1, their individual weight is considerably less than one pound each. Additionally, since the bycatch reduction goal is a reduction in the mortality rate, it would probably not translate directly as a 50% reduction in either weight or number of fish.

66. Comment: The DSEIS does not assess the impacts of the Gulf shrimp fishery on endangered and threatened sea turtles.
Response: Amendment 9 to the Shrimp FMP has been promulgated under the requirements of the Magnuson Fishery Conservation and Management Act of 1976, as amended and the newly adopted Magnuson-Stevens Fishery Conservation and Management Act. The protection of endangered and threatened species is accomplished through the requirements of the Endangered Species Act of 1973,

as amended. The NMFS has been provided with the responsibility for promulgating regulations for the protection and recovery of endangered and threatened sea turtles and for determining impacts to protection and recovery efforts. The Council's responsibilities are delegated by the Magnuson Act and now the newly adopted Magnuson-Stevens Act. The Council is charged with developing fishery management plans and amendments in order to maintain sustainable fisheries in the Gulf of Mexico. As such, Amendment 9 analyzes the known environmental impacts of the proposed management measures designed to recover the overfished stock of red snapper and references impacts to endangered and threatened species under regulations promulgated by NMFS (see Section 10). Furthermore, the NMFS (in a Section 7 consultation dated December 20, 1996) concluded that the requirement of BRDS is unlikely to greatly change the impacts of the shrimp fishery on endangered and threatened species.

67. Comment: Because the DSEIS does not include a discussion of impacts to protected species, NMFS must proceed with separate NEPA consideration of the continued operation of this fishery on sea turtles and other protected species.
Response: As previously discussed, the DSEIS does include discussion of the known environmental impacts of the proposed actions; consequently, there should be no requirement for additional NEPA consideration.

68. Comment: The Council should address limited entry in the shrimp fishery of the Gulf.
Response: The Council has addressed limited access considerations. See Impractical and/or Previously Rejected Bycatch Reduction Options in Amendment 9.

69. Comment: The impact of bycatch on red snapper has been exaggerated because natural mortality for red snapper ages 0 and 1 is likely higher than projected by NMFS.
Response: Most stock assessments completed prior to 1995 included an estimate of natural mortality, M=0.2. Subsequent analyses have shown that because red snapper are believed to be more long-lived (to at least age 53), the M=0.2 is probably too high. For example, Hoenig (1983) estimated total mortality (Z), which is the combination of natural mortality (M) and fishing mortality (F), at only 0.18. Consequently, in the 1995 stock assessment, Goodyear (1995) used the value of M=0.1 and concluded that this was perhaps a more realistic estimate.

70. Comment: Current data suggest that red snapper are on the road to recovery; the standing stock and young-of-the-year index of abundance are increasing.
Response: Estimates of abundance as year-class strengths show an increase in 1993 and 1994 as compared to the 3 previous years; however, these estimates are significantly lower than most estimates from 1971 through 1981 (Goodyear 1995 - Figure 33). There was, however, an extremely strong year-class in 1989; the largest in over 10 years. The subsequent seemingly upward trend in recruitment is not sufficient to support the contention that the red snapper stock is "on the road to recovery," and the best available data show that the stock cannot recover from the overfished status without further reductions in shrimp-trawl bycatch.

71. Comment: Since 1990, the number of age 2 and older fish have increased from 6 to 15.6 million fish in 1994 (Goodyear 1995 - Table 98), and this trend coupled with the young-of-the-year index (see Comment 70) indicates that recover of the red snapper stock is occurring.

Response: Goodyear (1995) - Table 98 shows that the number of age 2 and above fish at the beginning of 1990 and 1994 was 6.3 million and 12.8 million, respectively. It also reports that the numbers for 1991, 1992, and 1993 were 13.9, 15.1, and 15.6 million, respectively. The increase in numbers for 1991 through 1993 may, at least in part, be the result of the entrance of the large 1989 year-class to the age 2 and above age groups; whereas, the decline in 1994 could be influenced by the reduction in numbers of this year-class. These data do not support the contention that recovery is being achieved (see Comment 70).

72. Comment: Amendment 9 does not satisfy the requirements of the Magnuson Act that management measures be fair and equitable and reasonably calculated to promote conservation because of increasing TACs for the directed fishery and the proposal to require BRDS for the shrimp fishery to allow red snapper stocks to recover from a "significantly overfished" status.
Response: In addition to the requirements of the Magnuson Act that measures to allocate or assign fishing privileges be fair and equitable to all such fishermen and reasonably calculated to promote conservation, it also provides that such measures be carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges. Current data indicate that shrimp-trawl bycatch is the most significant source of mortality on age 0 and age 1 red snapper. Since the Magnuson Act also requires that management measure shall prevent overfishing, Amendment 9 addresses the most significant source of mortality. Additionally, if this source of mortality is not reduced, data indicate that the red snapper stock cannot recover above the overfished status.

73. Comment: The Magnuson-Stevens Act adds a National Standard that limits bycatch restrictions to those necessary to "avoid serious adverse environmental impacts on such bycatch species or the ecology of the affected area," and as such, the Council cannot and should not regulate every conceivable alleged bycatch problem.
Response: Amendment 9 only addresses the red snapper stocks in the Gulf of Mexico that are considered to be overfished and incapable of recovery without further reductions in shrimp-trawl bycatch.

74. Comment: Gulf shrimp fishing effort has increased some 200 percent since the 1960s. The Texas Closure and changes in general fishing practices have resulted in intense pulse fishing in localized areas.
Response: As noted in the discussion of effort under Section A.1 of Amendment 9, effort in the offshore fishery as measured in 24-hour days has been relatively stable; however, in 1994 and 1995, this effort measurement was approximately 10 percent less than the 1984 through 1989 average (RFSAP 1995). Additionally, available data show that the number of vessels has generally declined since the late 1980s. The Texas Closure may have caused the temporary relocation of some vessels to other areas; however, its contribution to pulse fishing is unknown. Pulse fishing has generally increased as the shrimp fleet has become more efficient (more horsepower, better gear, better communications, etc.), and concentrations of effort at times occur over a broad area of the northern and western Gulf. The NMFS has addressed the impacts of the localized changes in effort in nearshore waters in 61 FR 66933, December 19, 1996. Also see Comment #66.

75. Comment: Amendment 9 proposes the certification of the Andrews 5" TED as a certified BRD with implementation of the amendment.
Response: See Comment #66. Also, if the NMFS decertifies this TED on the basis that it does not meet applicable criteria, Proposed Alternative C.1 of Amendment 9 notes that this gear would no longer be certified as a BRD.