AMENDMENT NUMBER 2

TO THE

FISHERY MANAGEMENT PLAN FOR REEF FISH

(Includes Regulatory Impact Review, Regulatory Flexibility Analysis and Environmental Assessment)

FEBRUARY 1990

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I. INTRODUCTION

A. Background

The Gulf of Mexico Fishery Management Council submitted the Reef Fish Fishery Management Plan in August 1981; it was approved by the Secretary of Commerce in June 1983, and implemented in November 1984. The implementing regulations designed to rebuild declining reef fish stocks included these measures: (1) prohibitions on the use of fish traps, roller trawls, and powerheads within an inshore stressed area; (2) construction requirements, maximum size, and numerical limits for fish traps; (3) permit requirements for fish trap operators; and, (4) a minimum size limit of 13 inches total length for red snapper. The record keeping and reporting requirements specified in the FMP were implemented in July 1987. The approved reporting requirements include: (1) persons fishing fish traps; (2) commercial vessel owners and operators; (3) dealers and processors; and, (4) commercial vessel, charter vessel, and headboat inventory. The proposed mandatory reporting for recreational private boat and charter/headboat fishermen was not implemented.

Amendment 1 to the FMP was submitted to the Secretary of Commerce in August 1989 and was implemented in January 1990. The proposed regulations were as follows: (1) require a permit for vessels harvesting reef fish for sale; (2) establish a 50 percent earned income criterion to qualify for a permit; (3) provide for the charging of fees to cover the administrative costs of issuing permits and trap tags; (4) require reporting by operators of charter vessels; (5) require permitted vessels to display identification numbers; (6) eliminate exemptions to the size limit for red snapper; (7) establish size limits for other major species; (8) prohibit sale of fish smaller than the size limits; (9) modify the stressed area where certain gear is prohibited by extending the area off Louisiana and Texas; (10) prohibit use of longline and buoy gear for taking reef fish inside of 50 fathoms to the west and inside of 20 fathoms to the east of Cape San Blas, Florida, respectively; (11) establish bag limits for certain snappers, groupers, and amberjack; (12) provide for the possession of two days' bag limits for charter vessels and headboats on trips in excess of 24 hours; (13) restrict vessels with shrimp trawl or entangling net gear aboard to the bag limits; (14) establish annual commercial quotas for red snapper and deep and shallow water groupers; (15) prohibit fishing for and sale of reef fish when an annual quota is reached; (16) reduce the number of traps that may be fished by a vessel; (17) establish other technical changes to facilitate compliance; (18) include a procedure for setting total allowable catch annually; and, (19) establish as long-term optimum yield the restoration of stocks to a 20 percent spawning stock biomass per recruit ratio level by the year 2000.

B. FMP Objective

The primary management objective of the Reef Fish Fishery Management Plan, as amended by Amendment 1 is to "Stabilize long-term population levels of all reef fish species by establishing a certain survival rate of biomass into the stock of spawning age to achieve at least 20 percent spawning stock biomass per recruit."

C. Problems Requiring Plan Amendment 2

The Reef Fish Advisory Panel first recommended that the jewfish populations be protected by a complete prohibition on its harvest and possession at its April 1989 meeting during review of Amendment 1 which contained a proposal for a jewfish 50-inch size limit. The Council maintained it's position after reviewing the Advisory Panel's comments since other fishermen presented testimony to the Council in support of the proposed size limit while maintaining that jewfish did not need total protection.

After Amendment 1 was submitted for Secretarial approval, the Council was contacted by an Advisory Panel member, a commercial jewfish fisherman, who reported that the available stocks of jewfish were much more depleted than had been reported previously. The approval letter implementing Amendment 1 recommended the Council reconsider a prohibition on the harvest of jewfish given that Florida was proceeding with a complete prohibition on the harvest and possession of jewfish. Furthermore, since the Council announced it would be readdressing the question of total protection for jewfish, numerous letters have been received and virtually all were in agreement that jewfish was indeed seriously overfished and in need of total protection. Many of these letters were from divers and dive boat operators who cite personal observations concerning the continuing decline of jewfish.

D. Optimum Yield

Optimum Yield is any harvest level for each species which maintains, or is expected to maintain, over time, a survival rate of biomass into the stock of spawning age to achieve at least a 20 percent spawning stock biomass per recruit (SSBR) population level, relative to the SSBR that would occur with no fishing.

E. Overfishing

1. A reef fish stock or stock complex is overfished when it is below the level of 20 percent of the spawning stock biomass per recruit that would occur in the absence of fishing.

2. When a reef fish stock or stock complex is overfished, overfishing is defined as harvesting at a rate that is not

consistent with a program that has been established to rebuild the stock or stock complex to the 20 percent spawning stock biomass per recruit level.

3. When a reef fish stock or stock complex is not overfished, overfishing is defined as a harvesting rate that, if continued, would lead to a state of the stock or stock complex that would not at least allow a harvest of OY on a continuing basis.

II. DESCRIPTION OF FISHERY AND UTILIZATION PATTERNS

A. Commercial Fishery

Little information exists on the history of jewfish fishing. However, it appears that jewfish, historically, have been harvested only as an incidental species, initially in the red snapper fishery and later in the combination grouper/snapper fishery in the Gulf of Mexico. From 1964 through 1969 snapper boats operating out of Alabama landed 53 to 70 percent of the entire Gulf of Mexico harvest (Swingle, 1976). Even as late as the latter 1970s jewfish was such a low priced fish that only a few fishermen bothered with landing them (D. DeMaria, personal communication). Although annual commercial landings of jewfish in the mid 1960s occasionally exceeded 200,000 pounds, most of which were caught incidental to the snapper fishery operating off Yucatan, Mexico. In 1979 only 37,000 pounds of jewfish were harvested in domestic waters and commanded a dockside price of approximately 40 cents per pound (Table 1). However, in 1987 jewfish landings totaled 101,000 pounds--a threefold increase--with a dockside price ranging from 60 to 90 cents per pound. As typical in other fisheries, landings apparently have increased in response to increasing market value. Jewfish is a highly valued delicacy in the Florida Keys and the South Florida metropolitan areas which are probably the primary markets for jewfish today. Reportedly, most jewfish sold commercially, at least in the Key West area, are sold directly to restaurants and are not recorded by the NMFS landings data collection system (D. DeMaria, personal communication). Even so, reported landings in the four most southern Florida counties (Monroe, Collier, Charlotte, and Lee Counties) accounted for 78 percent of the total Gulf landings and the entire West Florida landings accounted for 99 percent of the Gulf total (Tables 1 and 2). With the exception of the South and Southwest Florida areas, jewfish appear to be an incidental harvest to the reef fish fishery.

Commercial landing trends of jewfish are difficult to interpret prior to 1979 because for about 20 years a particular dealer in Southwest Florida grossly inflated his reported landings. For example, in the years from 1979-1984, the period for which landings are available by dealer, this particular dealer's reported landings were up to five times greater than the entire remainder of West Florida landings. Since this dealer was never a major processor of reef fish, the best "adjustment" is to simply

delete the dealer's landings from the data files. Therefore, all data reported in this amendment have been adjusted to reflect total reported landings, excluding those of the dealer discussed above.

Most of the commercial jewfish harvest is taken from federal waters (Table 4). The primary gear category used to harvest jewfish is the hand line which includes bandit rigs and hydraulic and electric reels as well as the more traditional hand line (Table 5). Speargun and longline gear types have been taking increasing amounts of jewfish since 1979. The trawl gear category reportedly takes a small but significant proportion of the harvest. Some of the harvested fish attributed to trawl gear may have been caught by hand line gear aboard shrimp vessels while at anchor.

The reported landings of jewfish for the entire Gulf appear to have been increasing slightly through the years, although some decline in harvest after 1985 can be observed. Ex-vessel values have increased even more than landings. Average ex-vessel price per pound for the Gulf increased from 39 cents in 1979 to 74 cents in 1987 (Table 1). The average dockside price paid for the entire 1979-1987 period was 58 cents per pound.

Ex-vessel prices apparently varied among different geographical areas, but no statistical tests can be presented to determine the significance of these differences. On average, prices were highest in Monroe county and lowest in the Alabama through Texas areas. Differences in prices could be due to variations in quality of the product or to differing strength in demand. The established market in the Keys could account for a relatively stronger demand in these areas than in others.

Landings and prices also vary from month to month (Table 3). On average, peak landings occur in the months of August and September. These peak landings practically coincide with spawning activities of jewfish. December and January usually record the lowest landings. Variations in prices do not seem to correlate inversely with variations in landings, possibly indicating that price variations are driven primarily by seasonal changes in demand.

B. Recreational Fishery

Estimates of recreational landings of jewfish are available only since 1979 (Table 6) through the MRFSS, however since jewfish is a relatively rare species the MRFSS sampling protocol does not provide precise estimates. Therefore the varying estimates of harvest among years, fishing areas, and fishing modes, are difficult to interpret for apparent trends.

The recreational sector apparently has been a strong participant in the jewfish fishery harvesting about 3,000 fish weighing around 192,000 pounds in 1987 (Table 6). In total weight of fish landed, the recreational sector accounts for a greater percentage (relative to the

commercial sector) of jewfish harvest for the 1979-1987 period (Tables 1 and 6). There are, however, certain problems with the accuracy of this percentage share. Through the 1979-1987 period, reported recreational harvests varied widely probably because the MRFSS survey intercepted a limited number of jewfish in its dockside survey. It is likely, though, that recreational participation in the fishery is significant and possibly has increased in the last few years.

Recreational jewfish harvests occur primarily off Florida and Louisiana and are virtually nonexistent off other Gulf states. Florida accounts for most of the jewfish recreational harvest. It is not clear from available information as to whether recreational catches are predominantly in state or federal waters (Table 6). The possibility that recreational catches from state and federal waters are about the same cannot be discounted. The private/rental mode of fishing appears to dominate other fishing modes in the harvest of jewfish. As with the commercial sector of the fishery, harvest by spearguns is probably the primary gear targeted toward jewfish, with capture by other gear representing largely an incidental harvest.

Comments have been received from the recreational fishing public suggesting that one of the best recreational uses of jewfish is for non-consumptive exploitation where divers are provided opportunities to observe and photograph these impressively large fish rather than to harvest them.

C. Status of the Stock

1. Distribution

The jewfish (*Epinephelus itajara*) is found on both Atlantic and Pacific sides of Central America (Smith, 1971). In the Atlantic, jewfish occur from Brazil throughout the Caribbean and Gulf of Mexico (Smith, 1971; Hoese and Moore, 1977; Robins and Ray, 1986). However, Randall (1968) reported that although jewfish were common in waters off Florida and in the Gulf of Mexico, it was relatively uncommonly seen in the West Indies. In the Gulf of Mexico, jewfish appear to be most abundant off Southwest Florida and the Florida Keys, although Hoese and Moore (1977) reported that jewfish "... is the most common large inshore grouper off Texas from April through October." However, the MRFSS has sampled only 2 jewfish outside of Florida, one in 1979 and another in 1984; the NMFS headboat survey which has operated in the Gulf since 1986 has observed no jewfish outside of the Southwest Florida area; and, the Texas Parks and Wildlife surveys (Osburn et al., 1988) of sport-boat fishermen in Texas reports harvest of jewfish only by private-boat anglers in the 1983-1984 Territorial Sea high-use weekday and the 1985-1986 EEZ low-use weekend fishing categories where jewfish accounted for just 0.65 and 2.00 percent of the total harvest of "Other Species", respectively. If jewfish, at one time, were relatively common in the northwestern Gulf, they do not appear to be so today.

2. Reproduction

Jewfish are suspected to be protogynous hermaphrodites (born female and changing to male later in life), similar to other groupers. Smith (1971) found evidence of ova remnants in the gonad of a six foot male collected near Bimini. The size or age of sexual transition is unknown and it is possible that some males pass through an immature female stage and mature only as males (L. Bullock, FMRI, FDNR, personal communication). Also, many of the larger fish taken commercially have been females (see Figure 3). The ongoing Florida Department of Natural Resources (FDNR) study of jewfish has found no transitional fish among those sampled from the commercial fishery. Thus, it is not conclusive whether jewfish are indeed protogynous hermaphrodites or gonochoristic (sexes separate).

In the eastern Gulf of Mexico, females with ripe ova have been found during July through October with August to mid-October apparently the period of peak reproductive activity (D. DeMaria, personal communication). Spawning aggregations of jewfish have been observed in waters as shallow as 30-40 feet in depth.

In the FDNR study, female jewfish sexually matured at about 50-inches total length (105 pounds in weight). The youngest sexually mature female sampled was ten years of age, assuming one annulus per year. No specific information on fecundity exists. The smallest mature male was 43-inches total length, and the youngest sexually mature male was about five years old (L. Bullock, FMRI, FDNR, preliminary unpublished data).

3. Growth

Jewfish are long-lived and can attain a size of 700 pounds (Smith, 1971). Age and growth data collected by FDNR on 449 jewfish (see Figures 1,2, and 3) were used to develop a von Bertalanffy growth equation (L. Bullock, FMRI, FDNR, preliminary unpublished data) as follows:

$$L_t = 2011 * (1 - e^{0.119 * (t + 0.841)}), \text{ where}$$

length is in millimeters (2011 mm = 79.2 inches).

Morphometric equations developed for jewfish with the FDNR data (Lew Bullock, personal communication) include weight-length,

$$W_{kg} = 3.9 * 10^{-8} * SL^{2.965}, \text{ and}$$

standard length-total length,

$$TL_{mm} = 1.176 * SL_{mm} + 32.446,$$

where W is gutted weight, SL is standard length, and TL is total length. Gutted weight to whole weight conversions were made by multiplying gutted weights by 1.18 to obtain whole weights (NMFS, ESO commercial landings documentation).

Randall (1968) found fishes, hawksbill turtle, crabs, slipper lobster, and most often spiny lobster in the stomachs of jewfish. Smith (1971) reported a large proportion of the jewfish's prey were crustaceans.

4. Spawning Stock Biomass Per Recruit

The above growth equations and an estimate of total mortality from the age distribution in Figure 2 provided the material essential for a relative assessment of spawning stock biomass per recruit (SSBR) for the jewfish resource. Total mortality was estimated to be 0.85 for fish older than age 11. Natural mortality was assumed to equal 0.15, as in Reef Fish Amendment 1 for other groupers, with fishing mortality equal to 0.70. These mortality estimates indicate that approximately 60 percent of the remaining jewfish population die each year. Size at entry into the fishery was assumed to occur at 20 inches total length.

It appears that uncontrolled fishing (the condition that existed prior to implementation of Amendment 1), if allowed to continue, would result in an estimated SSBR level of 0.2 percent of the potential SSBR with no fishing. Under the 50-inch size limit established by Amendment 1, the projected equilibrium SSBR level would be 11 percent or less, depending on the mortality rate of undersize fish. If as much as 50 percent of the released undersize fish die, the equilibrium SSBR level would be only 1.3 percent. Given the difficulty in harvesting jewfish it is very likely that undersize release mortalities are indeed very high. A logbook survey of recreational anglers fishing around oil rigs off Louisiana (Stanley and Wilson, unpublished manuscript) found no record of jewfish being harvested after a one and a half year study and they concluded it was probably due to the difficulty in landing hooked fish. In addition, divers have reported observing many jewfish hooked, speared, or injured by powerheads that were in poor health or dying (letters on file). The jewfish resource is probably already severely overfished or in the process of becoming severely overfished under existing fishing conditions throughout its range in the Gulf of Mexico.

III. ALTERNATIVE MANAGEMENT OPTIONS

A. Proposed Option

Prohibit the Harvest or Possession of Jewfish.

Ecological Impacts: A prohibition on the harvest of jewfish would provide virtually complete protection for the species in waters off Florida since that state has prohibited the harvest or possession of jewfish in state waters. Jewfish off the other Gulf states will be protected in federal waters only. Most fishermen familiar with the jewfish fishery agree the species is substantially overfished and in need of total protection. The current conditions in the fishery, if allowed to continue, would drive the jewfish resource to such low levels that the species eventually may be considered to be threatened or endangered. The jewfish is the largest of western North American groupers, reaching weights of up to 700 pounds and are top predators in the food chain. They are slow growing, very territorial, and easily harvested, all of which are life history characteristics that make jewfish stocks susceptible to overfishing or to other sources of non-natural mortality. Available SSBR analyses indicate the jewfish resource is significantly overfished and may be less than one percent, whereby the Councils goal is at least a 20 percent SSBR level.

Socioeconomic Impacts: The direct effects of this measure would be reductions in ex-vessel revenues of the commercial sector and losses in consumer benefits in the recreational sector. These short-term losses from both sectors are not expected to be significant as the fishery for jewfish is relatively small. Enhancement of non-consumptive use partly compensates the loss to the consumptive use segment of the recreational sector. Consumers of jewfish will also experience short-term losses in benefits if other supply sources of jewfish or its close substitutes cannot make up for the loss due to closure of the fishery in the Gulf. The price for jewfish is expected to increase although at less than proportional change in quantity supplied considering the inflexibility of demand for the species.

Fishermen and for-hire vessel operators would be adversely impacted by this measure, although there appears to be strong support for this proposed measure by both user groups. The recreational divers that attended the public hearing in Louisiana voiced opposition to this proposed measure claiming it would adversely affect their operations and that jewfish were not depleted in their area. However, a one and a half year study of recreational angling around oil rigs--areas where jewfish would be most likely found--recorded no landings of jewfish (Stanley and Wilson, unpublished manuscript).

Current biological information appears to indicate that the jewfish resource is not likely to support a sustained fishery. As the stock is considered to be overfished, this measure will likely result in enhancing the benefits derived from the stock. When and how this benefit will be shared by present and future participants in the fishery is not readily

determinable, particularly since the period of time necessary for the closure to be effective cannot be predicted.

B. Alternative Option Considered

Status Quo - Maintain the 50-inch minimum size limit, as implemented in Amendment 1 to the Reef Fish FMP.

Ecological Impacts: The status quo option of maintaining a 50-inch minimum size limit provides some protection to immature fish but none to mature spawning fish when they are most susceptible to harvest. Anecdotal reports from recreational and commercial divers indicate that the status quo measure would be insufficient to rebuild the jewfish stocks to former levels of abundance. The jewfish is of such large size that only a few fishermen are successful at harvesting them efficiently enough to prevent waste of fish that are mortally wounded but not harvested. Potential SSBR levels with the 50-inch minimum size limit may be from 1 to 11 percent, significantly less than the Council's goal of 20 percent SSBR.

Socioeconomic Impacts: Considered as the status quo, no short-term effects ensue from adopting this measure. Its long-term effects are closely linked with the biological status of the stock. The ecological analysis pointed out that the size limit measure is not adequate to restore the stock to its previous level of abundance, specifically in terms of SSBR level targeted by the Council. The economic implication of this is that some benefits from a more restrictive management of the stock will be foregone by adopting this measure.

IV. REGULATORY IMPACT REVIEW AND REGULATORY FLEXIBILITY ANALYSIS

A. Introduction

National Marine Fisheries Service (NMFS) requires a Regulatory Impact Review (RIR) for all regulatory actions that are of public interest. The RIR does three things: 1) it provides a comprehensive review of the level and incidence of impacts associated with a proposed or final regulatory action, 2) it 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 the problem, and 3) it ensures 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.

The RIR also serves as the basis for determining whether any proposed regulations are major under criteria provided in Executive Order 12291 (E.O. 12291) and whether the proposed regulations would have a significant economic impact on a substantial number of small entities in compliance with the Regulatory Flexibility Act of 1980 (RFA). The primary purpose of the RFA is to relieve small businesses, small

organizations, and small governmental jurisdictions (collectively: "small entities") of burdensome regulatory and recordkeeping requirements. The RFA requires that if regulatory and recordkeeping requirements are not burdensome, then the head of a Federal agency must certify that the requirement, if promulgated, will not have a significant effect on a substantial number of small entities.

This RIR/RFA analyzes the impacts of alternative measures affecting jewfish, as considered under Amendment 2 to the Reef Fish FMP. Amendment 1 to the Reef Fish FMP has been approved and implemented and so is considered the base case for purposes of this RIR.

B. Problems, Objectives and Management Measures

The problems in the fishery as well as the objectives and measures considered in this Amendment have been outlined in previous sections.

C. Impacts of Management Measures

1. Current Scenario

The Reef Fish FMP, implemented in 1984, imposed no restrictions on fishing of jewfish. Amendment 1 to this FMP proposed a host of measures affecting the reef fish fishery, including a minimum size limit of 50 inches on harvested jewfish. Currently, there is only one specific restriction on the harvest of jewfish in waters within the direct jurisdiction of the Gulf states. Florida has, as of February 1, 1990, prohibited the harvest or possession of jewfish completely.

Reported commercial landings of jewfish in the Gulf increased threefold from 37,000 pounds in 1979 to 121,000 pounds in 1985, but have since declined. Average commercial landings for the nine-year period were 78,000 pounds valued at $45,000 using the 1987 price. Recreational harvests for the 1979-1987 period have sharply fluctuated, with the average number of fish caught equal to about 8,000 that was equivalent to about 306,000 pounds. For this nine-year period, the recreational harvest of jewfish has accounted for about 78 percent (in weight) of all jewfish harvested in the Gulf (Tables 1 and 6).

2. Proposed Option: Prohibition of Harvest or Possession of Jewfish

Short-term Impacts: Closure of this fishery translates in the short-term benefits foregone by both commercial and recreational sectors. Based on the 1979-1987 average catch and 1987 price for jewfish, the commercial harvest sector would have to forego revenues amounting to $45,000. The actual amount could be less than this

because of the reduction in revenue due to the size limit pursuant to Amendment 1. Also it is not possible to estimate the portion of this amount attributable to the recreational anglers who sold their catch but would be prevented from doing so under the minimum income requirement of Amendment 1.

The commercial jewfish fishery currently supports a relatively few number of fishermen. Hand lines account for most of the reported catches, probably as bycatch in other segments of the reef fish fishery. Longlines, spearguns, and trawls are the other gear types used in the commercial harvest of jewfish. The directed fishery probably consists primarily of speargun users. West Florida accounts for most of the jewfish landings. Although some landings are reported for Alabama and Louisiana, landings in the rest of the Gulf states have been relatively insignificant. At a sales level of $45,000, the commercial harvest sector for jewfish can be considered to support only around two to three full-time equivalent jobs. Since in actuality these full-time jobs are distributed to several fishermen, it can be expected that the impact of this proposed measure will be proportionately distributed to these persons with no single person being literally put out of work.

Gulfwide average ex-vessel price (weighted by state landings) for jewfish has increased considerably within the last several years, from 39 cents per pound in 1979 to 74 cents per pound in 1987. In the Key West area, price per pound has even increased to as much as $1.25 from 50 to 60 cents per pound 11 years ago (D. DeMaria, personal communication, 1989). This increase is not totally due to general price inflation. Deflating these prices by the general producer price index with 1979 as the base year would result in a 1987 average price of 55 cents, which still represents a 41 percent increase over the 1979 price. With an increase in supply this price increase can be attributed mainly to the increase in demand for jewfish. Using price as a rough indicator of strength in demand, it can be said that commercial demand for jewfish is relatively stronger in Florida than in any of the Gulf states (see Table 2). A closure of the Gulf jewfish fishery would tend to increase the price for jewfish in Florida more than in any of the Gulf areas. Using the grouper ex-vessel demand (as employed in Amendment 1) as an approximation of jewfish demand, closure of the fishery could increase the price by as much as 46 percent (using a price flexibility of 0.46 as estimated by Keithly and Prochaska, 1985). This condition creates incentives to supply jewfish taken from other areas, such as the Atlantic side of Florida beyond state waters (since Florida has virtually closed this fishery in state waters). If this substitution is not enough to bring down the price to its original level, consumers will have to bear some welfare losses from the closure of the fishery.

As with the commercial sector, the extent of the recreational fishery is not precisely known. Using a very limited sample of recreational catch of jewfish for the period 1985-1987, it was

estimated in Amendment 1 that the 50-inch size limit would substantially impact the recreational catch of jewfish, with the reduction amounting to as much as 92 percent of total recreational catch of jewfish. If the years 1979 through 1987 were used a 61 percent reduction in recreational catch would occur (see Table 7). In the deliberations of the Council leading to the formulation of measures adopted for Amendment 1, the 1985-1987 period was chosen to reflect current conditions in the fast changing reef fish fishery. With indications that the recreational fishery for jewfish had increased in recent years (several letters to the Gulf Council by fishermen), there was good reason to believe the 1985-1987 period would be reflective of the current recreational fishery. However, the MRFSS survey which is the primary basis for data pertaining to recreational catches, has consistently recorded only a very limited number of jewfish catches therefore the 1979-1987 period would be preferred from a statistical standpoint. Without a compelling reason to choose one period over the other, the 61 to 92 percent is taken as a range of reduction in recreational catch due to the 50-inch size limit. Thus, closure of the fishery can be expected to reduce recreational catch by a range of 8 to 39 percent over the size limit reduction.

Using methods similar to those employed in Amendment 1, Table 8 presents the welfare losses resulting from an 8 to 39 percent reduction in recreational catch. Since it is virtually impossible to approximate the number of anglers targeting jewfish and the average trip each angler takes, only the losses per angler per trip are presented in this table. These losses are very rough approximations. Welfare loss per angler would range from $0.43 to $1.54 per trip. Although no data can be presented, it is believed that anglers affected by the closure would be relatively few.

Welfare losses to the entire recreational sector are mitigated by the fact that the jewfish fishery also attracts non-consumptive exploitation, such as viewing or photographing. Closure of the fishery would significantly enhance this non-consumptive use as more and ultimately bigger fish would be available for observation.

Reductions in revenues to the for-hire sector can be expected from the closure of the jewfish fishery, but there is not enough data to approximate the revenue losses to this sector. If reported observations that jewfish anglers rarely keep the jewfish they catch are indicative of the majority of jewfish anglers, it is possible that closure of the fishery would hardly impinge on the revenues of the for-hire sector since catch and release can still be practiced by customers of for-hire vessels. Non-consumptive users definitely will not drop out and in fact will be implicitly encouraged by the closure.

The impacts of closure of the fishery on economic activities are expected to be minimal as the size of both commercial and recreational sectors of the fishery is considered to be relatively

small. At an average sales level of $45,000 in the commercial sector, total impacts (direct, indirect, and induced) can be expected to be less than $100,000 since the output multiplier is only around two for groupers, including jewfish. Recreational expenditures directly related to the jewfish fishery is not known but is expected not to be significant.

Long-term Impacts: The discussion above on the status of the stock revealed that the SSBR level for jewfish would reach around 0.2 percent if fishing under the no-regulation management regime is continued. The 50-inch size limit would potentially raise this ratio to 11 percent but could be as low as 1.3 percent if the undersize released mortality is as great as 50 percent. Given this information, the jewfish stock may be considered to be overfished, and overfishing would continue even under a 50-inch management regime. If the state of current harvest is beyond maximum sustainable yield, as can be expected from an overfished species, a strong possibility exists that harvest of the species also far exceeds maximum economic yield. Under this condition, closure of the fishery which provides maximum protection for the species is expected to increase long-term economic benefits from the fishery, given that the applicable interest rate is not high.

In the absence of some biological information, uncertainty as to when the fishery could be opened is introduced by the proposed measure. Among others, the exact length of the closure period has to be known to determine if future gains actually outweigh short-term losses to both commercial and recreational sectors. It has to be reiterated that short-term impacts are not all losses as non-consumptive benefits will be enhanced. This benefit tends to increase as the fishery closure extends further into the future.

Although the fishery will be totally closed, incidental catches will still occur. Discards and survival of the released fish become important issues in this regard.

3. Alternative Option: Status Quo--50-Inch Minimum Size Limit.

Short-term Impacts: Since the 50-inch size limit, as proposed in Amendment 1, is considered the status quo for the purpose of this RIR, no short-term effects result from this option.

Long-term Impacts: Under the 50-inch size limit, initial percentage reduction in both commercial and recreational harvests are expected to be substantial relative to the case of no regulation. However, it has been contended by some fishermen that this measure is not sufficient to protect the dwindling jewfish stock. This claim appears to be supported by the SSBR analysis which indicated that at best only 11 percent SSBR level will be attained under the 50-inch minimum size limit measure. Stock depletion is then unlikely to be prevented by maintaining the "status quo." Under this situation, economic rent from the fishery will eventually disappear. Indeed

this is an inevitable result of an open access system of fishery management. From testimonies of fishermen targeting this species and the SSBR assessment, the long-term condition of diminishing economic rent from the fishery will occur in the near future under current management. Along this line, certain benefits relative to the proposed option, for example, will be foregone by maintaining the status quo.

V. HABITAT CONCERNS

Adult and juvenile jewfish inhabit shallow waters and reside around bottom features which provide cover and protection, e.g., shipwrecks, reefs, ledges, piers, bridges, and mangrove lined shores (Godcharles, personal communication; Hoese and Moore, 1977; Robins and Ray, 1986; C. L. Smith, 1971; Thompson and Munro, 1978). Juveniles have been found along bulkheads and bridges (Springer and Woodburn, 1960) and in upland canals in Tampa Bay (Lindall et al., 1975). The preferred habitat of adults is the high-relief ledges and wrecks further offshore (G. B. Smith, 1976). The habitat preferences of jewfish make them easily accessible to fishermen, and especially vulnerable to spearfishermen. Furthermore, their narrow habitat preference causes this species to be highly susceptible to hypothermia (Gilmore et al., 1978) and red tide (Smith, 1976) induced mortalities. Large numbers of these fish are reported to aggregate around isolated reefs, rock ledges, and wrecks in 150 foot depths and less on the southwest and southeast Florida shelf during the spawning season (P. Colin and D. DeMaria, personal communication). Indeed, aggregations up to 24 fish in depths as shallow as 15 feet have been observed in Hobe Sound, Florida (W. Parks, personal communication).

VI. VESSEL SAFETY CONSIDERATIONS

Amendment by P.L. 99-659 to the Magnuson Act requires that a fishery management plan or amendment must consider, and may provide for, temporary adjustments (after consultation with the Coast Guard and persons utilizing the fishery) regarding access to the fishery for vessels otherwise prevented from harvesting because of weather or other ocean conditions affecting the safety of the vessels.

No vessel will be forced to participate in the fishery under adverse weather or ocean conditions as a result of the imposition of management regulations set forth in this amendment to the Reef Fish Fishery Management Plan. Therefore, no management adjustments for fishery access will be provided.

There are no fishery conditions, management measures, or regulations contained in this amendment that would result in the loss of harvesting opportunity because of crew and vessel safety effects of adverse weather or ocean conditions. No concerns have been raised by the people engaged in the fishery or the Coast Guard that the proposed management measures directly or indirectly pose a hazard to crew or vessel safety under

adverse weather or ocean conditions. Therefore, there are no procedures for making management adjustments in the amendment due to vessel safety problems because no person will be precluded from a fair or equitable harvesting opportunity by the management measures set forth.

There are no procedures proposed to monitor, evaluate, and report on the effects of management measures on vessel or crew safety under adverse weather or ocean conditions.

VII. COASTAL ZONE CONSISTENCY

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 - requires that all federal activities which directly affect the coastal zone be consistent with approved State coastal zone management programs to the maximum extent practicable. The proposed changes in federal regulations governing reef fish in the EEZ of the Gulf of Mexico will make federal regulations more consistent with either existing or proposed State of Florida regulations and are necessary to maintain the health of the Gulf of Mexico jewfish resource.

While it is the goal of the Council to have complementary management measures with those of the states, federal and state administrative procedures vary and regulatory changes are unlikely to be fully instituted at the same time. Based upon the assessment of this amendment's impacts in previous sections, the Council has concluded that this amendment is an improvement to the federal management measures for the jewfish fishery.

This amendment is consistent with the Coastal Zone Management Program of the States of Alabama, Florida, Louisiana, and Mississippi to the maximum extent possible; Texas does not have an approved Coastal Zone Management Program.

This determination has been submitted to the responsible state agencies under Section 307 of the Coastal Zone Management Act administering approved Coastal Zone Management Programs in the states of Alabama, Florida, Mississippi, and Louisiana.

VIII. ENDANGERED SPECIES AND MARINE MAMMAL ACTS

The proposed actions have no anticipated impact on threatened or endangered species or on marine mammals. A Section 7 consultation was conducted for the original FMP, and it was determined the FMP was not likely to jeopardize the continued existence of threatened or endangered animals or result in the destruction or adverse modification of habitat that may be critical to those species; this amendment proposes no changes to the FMP relative to species included in the Endangered Species Act or the Marine Mammal Act.

IX. PAPERWORK REDUCTION ACT

The purpose of the Paperwork Reduction Act is to control paperwork requirements imposed on the public by the federal government. The authority to manage information collection and record keeping requirements is vested with the Director of the Office of Management and Budget. This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The Council proposes through this amendment to establish no additional permit or data collection programs, therefore no reporting burden on the public or cost to the government will be incurred through this amendment.

X. FEDERALISM

No federalism issues have been identified relative to the actions proposed in this amendment and associated regulations. The affected states have been closely involved in developing the proposed management measures and the principal state officials responsible for fisheries management in their respective states have not expressed federalism related opposition to adoption of this amendment.

XI. NATIONAL ENVIRONMENTAL POLICY ACT -- ENVIRONMENTAL ASSESSMENT

The discussion of the need for this amendment, proposed actions and alternatives, and their environmental impacts are contained in Section III of this amendment.

The proposed amendment is not a major action having significant impact on the quality of the marine or human environment of the Gulf of Mexico. The proposed action is an adjustment of the original regulations of the FMP to protect the jewfish resource from depletion. The proposed action should not result in impacts significantly different in context or intensity from those described in the Environmental Impact Statement (EIS) published with the initial regulations implementing the approved FMP. The preparation of a formal EIS is not required for this amendment by Section 102(2)(c)(c) of the National Environmental Policy Act or its implementation regulations. For a discussion of the need for this amendment, please refer to Sections I and III.

Mitigating measures related to proposed actions are unnecessary. No unavoidable adverse impacts on protected species, wetlands or the marine environment are expected to result from the proposed management measures in this amendment.

Both the short- and long-term benefits of more compatible regulations and reductions in jewfish mortality will protect the resource from further depletion, better achieve the objectives of the FMP, and lessen the environmental impacts of the fishery. Overall, the benefits to the

nation resulting from implementation of this amendment is greater than management costs incurred.

Finding of No Significant Environmental Impact

Having reviewed the environmental assessment and the available information relating to the proposed actions, I have determined that there will be no significant environmental impact resulting from the proposed actions.

Approved: _____

Assistant Administrator for Fisheries Date

RESPONSIBLE AGENCY:

Gulf of Mexico Fishery Management Council
Lincoln Center, Suite 881
5401 West Kennedy Boulevard
Tampa, Florida 33609
(813) 228-2815

LIST OF AGENCIES AND PERSONS CONSULTED:

In addition to comments received during the development of this amendment and six public hearings (minutes and list of persons attending are available upon request), comments were solicited from the following governmental bodies:

Gulf of Mexico Fishery Management Council
- Reef Fish Advisory Panel
- Reef Fish Special Scientific and Statistical Committee
- Standing Scientific and Statistical Committee

Alabama Coastal Zone Management Program
Florida Coastal Zone Management Program
Louisiana Coastal Zone Management Program
Mississippi Coastal Zone Management Program

Alabama Department of Conservation and Natural Resources
Florida Marine Fisheries Commission
Florida Department of Natural Resources
Louisiana Department of Wildlife and Fisheries
Mississippi Department of Wildlife Conservation
Texas Parks and Wildlife Department

National Marine Fisheries Service
- Southeast Region
- Southeast Center

United States Coast Guard

LIST OF CONTRIBUTORS:

Douglas R. Gregory, Jr., Gulf of Mexico Fishery Management Council
Antonio B. Lamberte, Gulf of Mexico Fishery Management Council

LOCATION AND DATES OF PUBLIC HEARINGS:

January 3, 1990	American Legion Hall, 5610 Junior College Road, Key West, Florida
January 3, 1990	Freeport Community House, 1300 West Second Street, Freeport, Texas
January 4, 1990	Lee County Courthouse--Lee Room, 2115 Second St., Ft. Myers, Florida
January 8, 1990	Marine Education Center Auditorium, 115 Beach Blvd., Biloxi, Mississippi
January 9, 1990	Howard Johnson Hotel, 6401 Veterans Boulevard, Metairie, Louisiana
January 24, 1990	Wyndam Hotel, 900 North Shoreline Boulevard, Corpus Christi, Texas

XII. BIBLIOGRAPHY

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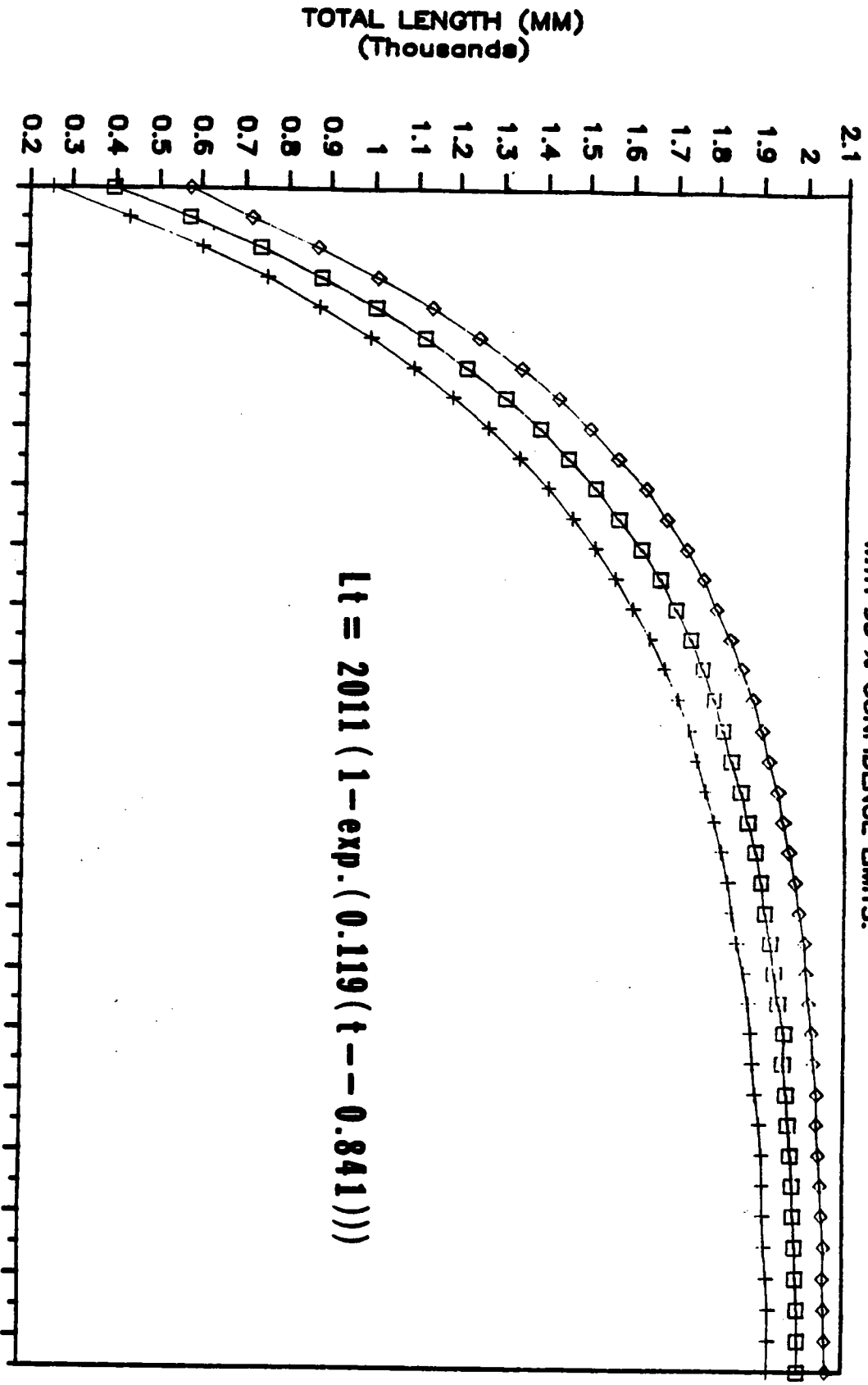
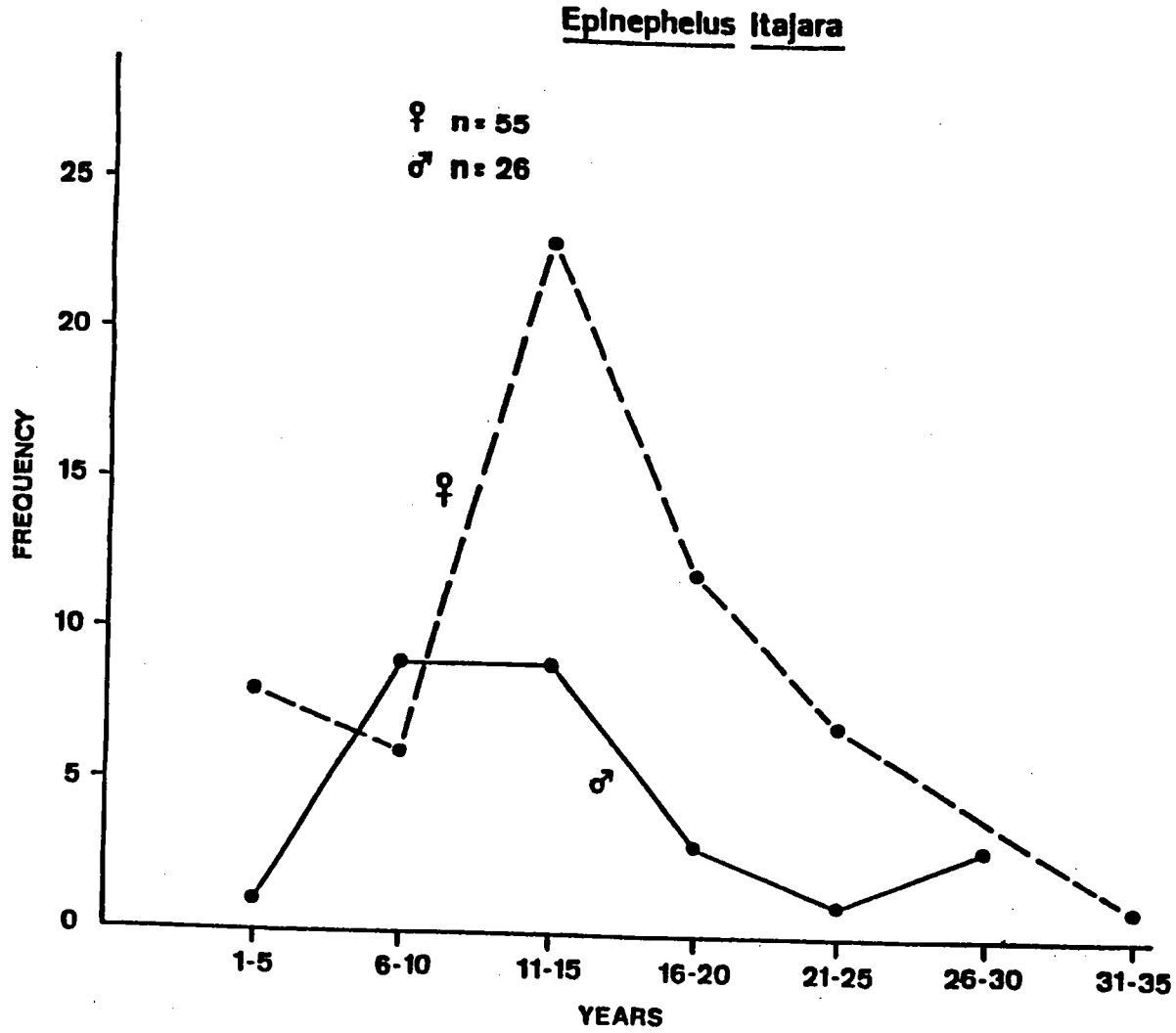
FIGURE 1



Provided by Lew Bullock, Florida Marine Research Institute, Florida Department of Natural Resources.

FIGURE 2



Note: This age distribution is probably not representative of the entire population because the majority of samples came from large, reproductively-active individuals in summer aggregations.

Provided by Lew Bullock, Florida Marine Research Institute, Florida Department of Natural Resources.