REGULATORY AMENDMENT

TO THE

REEF FISH FISHERY MANAGEMENT PLAN

FOR RED SNAPPER INCLUDING

TOTAL ALLOWABLE CATCH, BAG LIMITS,

MINIMUM SIZE LIMITS, AND SEASONS

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

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Abbreviations Used in This Document

ABC	Allowable Biological Catch
AP	Advisory Panel
BRD	Bycatch Reduction Device
CPUE	Catch Per Unit Effort
EEZ	Exclusive Economic Zone
F	Rate of instantaneous fishing mortality
FMP	Fishery Management Plan
GMFMC	Gulf of Mexico Fishery Management Council
M	Rate of instantaneous natural mortality
MP	Million Pounds
MSY	Maximum Sustainable Yield
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OY	Optimum Yield
Plan	Reef Fish FMP for the Gulf of Mexico
RD	Regional Director (NMFS Southeast Regional Office)
RFA	Regulatory Flexibility Act of 1980
RFSAP	Reef Fish Stock Assessment Panel
RIR	Regulatory Impact Review
RSAP	Red snapper Advisory Panel
SBA	Small Business Administration

SEAMAP	Southeast Area Monitoring and Assessment Program (fishery-independent data program)
SEFSC	Southeast Fisheries Center
SEP	Socioeconomic Panel
SPR	Spawning Potential Ratio
SSBR	Spawning Stock Biomass Ratio (an older term for SPR)
SSC	Scientific and Statistical Committee
TAC	Total Allowable Catch
TL	Total Length
TPWD	Texas Parks and Wildlife Department
VPA	Virtual Population Analysis (a method for estimating mortality rates and number of fish at age from catch-at-age data)
YPR	Yield Per Recruit

1.0 INTRODUCTION

The red snapper resource in the Gulf of Mexico is in an overfished condition, and is currently under a management program to restore the stock to a level above the presently defined overfished threshold of 20 percent spawning potential ratio (SPR) by the year 2019.

During the recovery program, red snapper stock assessments or assessment updates are conducted on an annual basis. Based on these assessments, the Council selects changes to fishing regulations (size limits, bag and trip limits, closed seasons, etc.) that are needed to achieve management goals.

Regulatory amendments differ from plan amendments in that they are used establish seasonal fishing regulations, whereas plan amendments are used to make changes in the basic policies and procedures defined in a fishery management plan. A regulatory amendment is limited in its scope and follows a specific framework procedure that is described in the Reef Fish Fishery Management Plan (FMP), as amended (see Appendix A).

This regulatory amendment specifies the total allowable catch (TAC) for red snapper. It also includes other measures for the red snapper fishery including: setting the commercial and recreational fishing seasons, providing a bag limit for recreational fishermen and eliminating the bag limit for captain and crew of for-hire vessels, and establishing minimum size limits for the commercial and recreational fisheries.

2.0 HISTORY OF MANAGEMENT RELATING TO RED SNAPPER

This section contains a brief chronology of management measures that have been implemented for red snapper through regulatory amendments, using the framework procedure for setting TAC as shown in Appendix A. Disapproved or withdrawn regulatory amendments are not discussed. For a complete history of management, including approved, disapproved, and withdrawn actions, refer to the most recent plan amendment.

March 1991: Red snapper TAC was set at 4.0 million pounds to be allocated with commercial quota of 2.04 million pounds and recreational allocation of 1.96 million pounds under a 7 fish bag limit. This regulatory amendment also adopted a policy of attaining a 50 percent reduction of red snapper bycatch in the shrimp trawl fishery, and set the recovery date for attaining 20 percent SPR at the year 2007.

October 1992: The 1993 red snapper TAC was raised to 6.0 million pounds to be allocated with a commercial quota of 3.06 million pounds and a recreational allocation of 2.94 million pounds under a 7 fish bag limit. Also changed was the target year to achieve a 20 percent red snapper SPR from 2007 to 2009,

based on the Plan provision that the rebuilding period may be for a time span not exceeding 1.5 times the potential generation time of the stock and an estimated red snapper generation time of 13 years.

October 1993: The opening date of the 1994 commercial red snapper fishery was set for February 10, 1994. Commercial vessels were restricted to land red snapper no more than one trip limit per day. The TAC was retained at the 1993 level of 6.0 million pounds, with the same commercial/recreational allocation.

October 1994: The 6.0 million pound red snapper TAC and commercial trip limits were maintained. The opening date of the 1995 commercial red snapper fishery was set for February 24, 1995. The recreational daily bag limit was reduced from 7 fish to 5 fish, and the minimum size limit for recreational fishing was raised from 14 inches TL to 15 inches TL.

December 1995: Red snapper TAC was increased to 9.12 million pounds and the target recovery date was extended to the year 2019, based on new biological information that increased the generation time estimate to 19.6 years.

March 1996: An addendum to the December 1995 regulatory amendment split each of the 1996 and 1997 commercial red snapper seasons into two sub-seasons, with February 1 and September 15 openings, respectively, and 3.06 million pounds for the first sub-season and the remainder for the second sub-season.

March 1997: The opening date for the 1997 second sub-season was moved from September 15 to September 2 to close by September 15, and thereafter the fishery would be open for the first 15 days of each month until the 1997 quota was reached.

January 1998: The scheduled minimum size increase from 15 inches TL to 16 inches TL was abated maintaining the 15-inch TL size limit.

April 1998: The NMFS implemented an interim rule to set TAC at 6.0 million pounds with a caveat that the additional 3.12 million pounds, requested by the Council, would only be released pending successful performance of bycatch reduction devices (BRDs). (This additional TAC was released in August 1998 following a satisfactory performance report on BRDs). A request for a 5-fish recreational bag limit and a zero bag limit for captain and crew of for-hire vessels was also rejected by NMFS; and by interim rule, a 4-fish bag limit was instituted.

3.0 PURPOSE AND NEED FOR ACTION

Since implementation of the red snapper stock recovery plan, the Council has conducted annual reviews of the status of red snapper stocks. Typically, a new assessment has been prepared by the NMFS/SEFSC every two years with a comprehensive update in the intervening years. In October 1997, the Reef Fish Stock Assessment Panel (RFSAP) reviewed a new stock assessment for red snapper (Schirripa and Legault 1997) for the purpose of recommending the 1998 ABC. However, the RFSAP was unable to recommend a TAC that included a probability distribution because of a lack of a probability analysis. In addition, it was noted that new guidelines for National Standard 1 based on the recently re-authorized Magnuson-Stevens Act would probably call for new overfishing definitions and criteria in developing recovery targets for overfished stocks. At that time, the RFSAP was uncertain as to what recovery target the ABC range should address. NMFS subsequently clarified that, until new overfishing definitions and rebuilding plans were developed and approved by NMFS, management of red snapper should continue to be based on the existing rebuilding target of 20 percent SPR within 1.5 generation times.

The RFSAP reconvened in January 1998 to review additional analysis by NMFS, as well as an independent red snapper stock assessment prepared by Dr. Brian Rothschild (Rothschild et al. 1997) and the results of an independent peer review into the data collection programs, research, and management of red snapper (MRAG Americas 1997). Upon reviewing this additional information, the RFSAP recommended a range of acceptable biological catch (ABC) of 3 to 6 million pounds, a reduction from the 1997 TAC of 9.12 million pounds. In making this recommendation, the RFSAP was pessimistic that a sufficient reduction in bycatch mortality would be achieved in 1998, and the RFSAP felt that the Council should begin a transition to a management strategy based on constant fishing mortality (F) which is a more risk adverse philosophy.

In October 1998, the RFSAP convened to review Schirripa (1998a), an update of the 1997 stock assessment that incorporated data through 1997. With regard to recommending an ABC range, the RFSAP again recommended a transition from a constant catch to a constant F strategy. The RFSAP also continued to recommend an ABC range between 3 and 6 million pounds (GMFMC 1998a). Also, this recommendation was again primarily based on a pessimistic outlook with regard to a reduction in bycatch mortality and the proposed change to a F_{msy} management strategy. It was also predicated on analyses by Schirripa (1998a) that indicated a short-term trend in stock biomass and egg production that showed a decreasing abundance of larger, more fecund fish and a corresponding decline in egg production.

The Council has noted the lack of information on the impact that a reduction in TAC would have on the red snapper fishing industries and fishing communities. During public testimony received at its January 19-23, 1998 meeting in Point Clear, Alabama and recently at the November 9-12, 1998 meeting in Galveston, Texas, the Council received overwhelming testimony that a reduction in TAC to 6.0 million pounds will have a serious, adverse effect on

the commercial, recreational, and for-hire sectors of the red snapper fishery. Furthermore, as discussed in Section 6.0, scientific data continue to support the fact that if a 55 to 60 percent reduction in bycatch mortality can be achieved by 2001, the Council can meet or exceed its current goal of achieving a 20 percent SPR by the year 2019.

Additionally, under the Council's SFA Generic Amendment, the preferred alternative is to achieve a 26 percent SPR under guidelines for implementation of the SFA and recommendations of the Council's scientific advisors. Mace (1998) indicated that a 26 percent SPR was an appropriate MSY target. The RFSAP agreed with this projection, but added that it may change as additional data are collected, and there is probably no statistical difference between 26 and 30 percent SPR for a MSY proxy (GMFMC 1998a). The 26 percent SPR is also the current the preferred alternative for a overfishing threshold in the Council's SFA Generic Amendment. Because the red snapper stock is also considered to be overfished under the new SFA guidelines and the Council's preferred alternative, the new rebuilding period under the SFA guidelines would extend to 2033 provided that the SFA Generic Amendment is implemented sometime in 1999. Analyses by Schirripa (1998a) indicate that the Council can meet or exceed these recovery criteria with a TAC as high as 12 million pounds and a reduction in bycatch mortality of between 50 and 60 percent. The proposed 9.12 million pound TAC would be considered conservative under this new rebuilding program that will be submitted in January 1999. In summary, a reduction in TAC is not needed to meet either the current recovery plan or the soon-to-be-implemented plan under the SFA Generic Amendment. The status quo TAC of 9.12 million pounds is needed to provide economic and social stability to the red snapper fishery while bycatch reduction is further evaluated, and to avoid immediate and severely negative social and economic impacts to both the commercial and recreational fisheries that would certainly result from reducing TAC by more than one third.

Bag and size limit analyses prepared by Schirripa (1998b) and Holiman (1998a) projected that, if TAC were kept at the status quo level (4.47 million pounds for the recreational allocation) and the minimum size limit remained at 15 inches TL, the recreational fishery would likely close during September with a 4-fish bag limit. Even a 2-fish bag limit would not extend the season into December and the current 5-fish bag limit would probably force a closure in August. Schirripa (1998b) noted that to maintain the current 4-fish bag limit, the size limit would have to be increased to approximately 18 inches TL before a quota closure would be avoided, and this action could significantly increase release mortality. Because of the likelihood that the recreational fishery will be forced to close at some time during the year, the Council felt that a known closure during the first part of the year would be the least disruptive. Consequently, after hearing public testimony from recreational fishermen and charter/head boat associations, the Council is proposing to delay the opening of the recreational fishing season to March 1. Furthermore, as discussed in Section 6.0, reductions in the bag and minimum size limits may be more effective at reducing the rate of the recreational catch, and they may substantially reduce release mortality.

The commercial red snapper fishery has been subjected to a derby fishery since the inception of quota management. In 1996, the commercial season was split into 2 subseasons with the first season starting February 1 with about 2/3 or the quota allocation, and the second season starting in September with the remaining allocation. In 1997, the September season was further restricted by a 14-day opening from September 2 to 15, and the first 15 days of each month thereafter until the subquota was harvested. For the 1998 fishing season, Amendment 15 implemented a harvesting period only during the first 15 days of each month for each of the subseasons beginning February 1 and September 1. These actions have not affected the length of the season. As a result of poor weather conditions during September 1998, the season was extended as compared to recent years. Additionally, public testimony supported additional restrictions on the number of days fished each month during this period to bolster prices. Consequently, the Council is proposing to open the fall season for the first 10 days of September in 1999 and the first 10 days of each month thereafter until the second subquota is reached or the season closes on December 31.

4.0 PROPOSED ACTIONS

- Maintain the red snapper TAC at status quo - 9.12 million pounds, with 4.47 million pounds allocated to the recreational fishery and 4.65 million pounds allocated to the commercial fishery.

- Set the recreational daily bag limit for red snapper at 4 fish for recreational fishermen, and set a bag limit of zero fish for the captain and crew of for-hire vessels.

- Set the opening date of the recreational red snapper fishing season at March 1.

- Reduce the minimum size limit for red snapper from 15 inches total length (TL) to 14 inches TL for both the commercial and recreational fisheries.

- Change the opening criteria for the second commercial red snapper fishing season from the first 15 days of each month, beginning September 1, to the first 10 days of each month, beginning September 1, until the second-season suballocation is met or the season closes on December 31.

5.0 DESCRIPTION OF THE FISHERY, MANAGEMENT OBJECTIVES, AND STATUS OF THE RED SNAPPER STOCK

Description of the Red Snapper Fishery

The fishery for red snapper is composed of a directed commercial fishery, a for-hire recreational fishery, and private recreational anglers. The commercial fishery has been managed via a quota

since 1990 and has historically utilized both hook-and-line and long line gear. Amendment 1 effectively eliminated long line gear from nearshore waters, and in recent years their contribution to the overall red snapper catch is insignificant. Amendment 1 also established a quota for the commercial fishery. Since 1990, the recreational fishery has been managed through bag limits and minimum size limits. With the passage of the SFA the recreational component has also been managed by a quota beginning with the 1997 fishing year. With the implementation of quota management and the setting of annual TAC and allocations, the commercial segment of the fishery has been subjected to an ever increasing derby fishery with depressed prices. From 1990 through 1997, the recreational fishery has been characterized as having substantial overruns of its quota, with the exception of 1996. In 1997 and 1998, the recreational fishery was closed when the quota allocation was anticipated to have been met, November 27, 1997 and September 29, 1998, respectively.

Both commercial and recreational catches have shown an increasing trend since about 1990. Recreational catches have also increased in terms of mean weight of fish landed during this same period.

In recent years, red snapper were mainly caught and landed in the northern and western Gulf comprising the area from Bay County, Florida to Texas. In the earlier years until 1988, landings included harvests from both U.S. and Mexican waters. Catches from Mexican waters comprised about half of total landings until about 1967, and then gradually dropped over time until 1988. Since then landings have come solely from U.S. waters. In those early years, red snapper were also landed in other areas in Florida south of Bay County, Florida. In the 1990's, however, landings of red snapper in the northern and western Gulf accounted from a low of 95.7 percent to a high of 99.4 percent of all red snapper landings.

Recreational landings have been identified from three survey sources: Texas Parks and Wildlife Department (TPWD), NMFS-Headboat and NMFS-MRFSS. All three surveys reflect an increasing trend in landings since about 1984, however, landings have been relatively stable since about 1993 (Figure 11, Schirripa 1998a). On the other hand, the percentage of the catch that is released (presumably undersized fish) has increased dramatically over this same period from about 3 percent in 1984 to over 62 percent in 1997 (Figure 12 Schirripa 1998a). There has also been a shift in state shares of the recreational landings, notably the recovery of landings in Florida and the growth of landings in Louisiana and Alabama.

Commercial Fishery: In 1990, the commercial quota was initially set at 3.1 MP which was 51 percent of TAC when adjustments were made. The TAC was set at 4 million pounds in 1991, and subsequently increased to 6 million pounds in 1993 and to 9.12 million pounds in 1996. For 1996, the commercial harvest was split into two segments, with 3.06 million pounds allocated to a February 1 opening and the remaining quota allocated to a September 15 opening. The February 1 season was open for 64 days and closed on April 5. The September 15 season was open for 22 days and closed on October 7. In 1997, the February 1 season was open for 53 days closing on March 26; however, the fall season opened on September 2, closed

on September 15, and reopened on October 1 through October 6 for a total of 18 fishing days. The 1998 fishing year opened on February 1 under a 15 day open - 15 day closed procedure with the commercial allocation being be split by season, similar to 1996 and 1997. The February 1 season closed on April 13 after only 40 actual fishing days under a 3.06 million pound allocation. Although the NMFS initially released only a 3.06 million pound portion for the year under a 6.0 million pound TAC, in August 1998 the remaining portion of the recommended 9.12 million pound TAC was approved, and the season reopened on September 1. The 1998 season closed on October 15; however, it would probably have closed sooner if not for poor weather conditions. Table 1 shows the commercial harvest, quota, and percentage over/under the commercial allocation for 1990 through 1997.

Recreational Fishery: Recreational red snapper harvest allocations since 1991 have been set at 49 percent of the TAC, or 1.96 million pounds in 1991 and 1992, 2.94 million pounds for 1993 through 1995 and 4.47 million pounds for 1996, 1997, and 1998. Actual recreational harvests in pounds of red snapper have exceeded the allocation in every year, except 1996. With the passage of the SFA in 1996, the recreational fishery was closed in 1997 and 1998 when this sector was projected to have reached its share of TAC. Table 2 shows the harvest, quota, and percentage over/under the recreational allocation for 1990 through 1997.

Optimum Yield

The current statement of Optimum Yield (OY) for the reef fish complex (including red snapper) is as follows:

> *The primary objective and definition of Optimum Yield (OY) for the Reef Fish Fishery Management Plan 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 a 20 percent spawning potential ratio (SPR).*

Definition of Overfishing

The following is the definition of overfishing contained in Amendment 1 of the Reef Fish Fishery Management Plan (FMP).

1. *A reef fish stock or stock complex is overfished when it is below the level of 20 percent SPR.*

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 static SPR 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.*

Status of the Red Snapper Stock

The red snapper stock in the Gulf of Mexico is considered to be seriously overfished with the most current estimate of transitional SPR at about 0.53 percent (as compared to the overfished threshold of 20 percent SPR) (Schirripa 1998). When the RFSAP used a natural mortality (M) value of 0.2, the SPR estimate was about 4 percent. Based on additional information, the RFSAP concluded that the best estimate of M was 0.1, which caused the numerical estimate of SPR to decline to 0.4 percent, and the rebuilding period to extend to 2019 (from 2010), based on the Goodyear (1995) analysis (GMFMC 1995).

Although current estimates of SPR are low, other indicators of the relative health of the stock have shown an increasing trend. Indices of recruitment based on abundance of age 0 and age 1 fish from 1972 to 1997 showed the lowest level in 1987. However, since 1990 these estimates have been above average for 6 of the last 8 years, and Schirripa (1998a) reported that 1995, 1996, and 1997 estimates were high compared to most years since 1982. Goodyear (1997) also found juvenile red snapper at sampling stations during 1996 where they had previously not been observed, indicating an expansion in range. Schirripa (1998a) found similar results during 1997 sampling. He also noted a relatively low mean weight and a high numerical abundance during the 1997 sampling, indicative of a relatively strong year class in 1997.

Catch per unit effort estimates (CPUE) for the recreational fishery, private/rental mode, as reported by Schirripa (1998a) from the Marine Recreational Fisheries Statistics Survey (MRFSS) data, indicated a level to slightly downward trend since 1992. Data from the charterboat mode, however, showed catch per hour more than doubling since 1994. Schirripa (1998a) explained that potential variation in these results from these data could be related to differences in targeting between the two groups and the possibility that charterboats can more consistently locate red snapper.

Amendment 9 to the Shrimp FMP (GMFMC 1997a) required the use of bycatch reduction devices (BRDs) in shrimp trawls used in the Exclusive Economic Zone (EEZ) for the entire northern Gulf of Mexico from Cape San Blas, Florida to Brownsville, Texas. This amendment was implemented on May 14, 1998, and its purpose was to reduce the fishing mortality rate on juvenile red snapper (age 0 and age 1) by a minimum of 44 percent from the 1984-89 average. Previous studies have shown that currently permitted BRDs are capable of achieving this level of bycatch reduction or more (Watson et al. 1997). Preliminary results of a study by NMFS in the summer of 1998 showed an average, overall reduction of 24 percent (the observed average was 33 percent, absent extra mortality factors). This level of bycatch reduction is probably low and not representative of the performance of the shrimp fleet because 70 to 80 percent of the

observations using the Fisheye BRD included an installation location under the "elephant ear" or lazy line attachment point, while net shop interviews indicated that only about 32 percent of the installations were in this position. Observed bycatch reduction with the Fisheye BRD in this position were poorest at an average of only 30 percent; however, at positions ahead of or behind the elephant ear, bycatch reduction percentages were 40 percent and 52 percent, respectively. On November 27, 1998, the NMFS prohibited any part of the lazy line attachment system from overlapping or obstructing a Fisheye BRD. The preliminary results of the NMFS study analyses showed that a 61 percent reduction in bycatch mortality from shrimp trawls was achievable. Based on these analyses, it is highly probable that the recent trend in recovery of the red snapper will be enhanced as a result of the implementation of BRDs and through increased compliance and improvements to BRD designs in the future.

6.0 MANAGEMENT ALTERNATIVES AND REGULATORY IMPACT REVIEW

Introduction

The 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 regulation is a "significant regulatory action" under certain criteria provided in Executive Order 12866 and whether any proposed regulation will 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 record keeping requirements. The RFA requires that if regulatory and record keeping 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 analyzes the probable impacts that the proposed alternatives for the Reef Fish Fishery Management Plan (FMP) would have on the directed commercial and recreational red snapper fisheries. Although this proposed regulatory amendment covers only red snapper within the Reef Fish FMP, the proposed management measures are considered with the major assumption that the reduction in the bycatch mortality rate of juvenile red snapper in the shrimp fishery that began with the implementation of Amendment 9 to the Shrimp FMP in 1998 will continue and increase in the future. The shrimp fishery has been identified as a major source of juvenile red

snapper fishing mortality due to incidental catches in shrimp trawls. The following analyses focus mainly on impacts to the red snapper fishery.

In this document, the "Economic Impacts" subsections comprise the bulk of the RIR. The purpose and need for the proposed alternatives are described in previous sections but are also considered as part of the RIR.

Proposed Alternatives

Total Allowable Catch (TAC)

Proposed Alternative 1. Status Quo - Maintain TAC for the 1999 fishing season for red snapper at status quo - 9.12 million pounds, with 4.65 million pounds allocated to the commercial quota and 4.47 million pounds allocated to the recreational fishery.

Rejected Alternative 2. Reduce the TAC for red snapper to 6.0 million pounds or 3.0 million pounds

Rationale:

Following a review of the 1997 stock assessment along with recommendations of the Councils RFSAP, SSC, SEP, and Peer Group Review Panels, the Council voted in January 1998 to retain the 9.12 million pound TAC for the 1998 fishing season. The Council took this action, which was contrary to the recommendations of the RFSAP, the SSC, the SEP and the Peer reviewers, based in part on the following excerpted reasoning from the February 1998 Regulatory Amendment (GMFMC 1998b):

> "....the red snapper stock is not declining, but rebuilding. Rebuilding in recent years has been constant and substantial. It is highly probable that the stock will continue to rebuild at the current 9.12 million pound TAC, and will eventually reach its target SPR of 20 percent provided bycatch reduction in the shrimp trawl fishery is achieved. The question is not one of whether the stock is declining or rebuilding, but whether rebuilding is proceeding fast enough to meet the recovery target date.....
>
> Evidence of this recovery is shown in both scientific and anecdotal information that indicate that the red snapper stock is expanding geographically into areas where the fish were not previously taken or were not very abundant. Goodyear (1997) reported that:"
>
>> 'It is noteworthy that the strength of the 1995 year class, which was predicted from the 1996 Summer SEAMAP Survey data, may underestimate the actual year-class size. Inspection of the spatial distribution of the data indicate that in 1996, red snapper were taken on the edges of the sampling region in places where they had not been previously encountered. This suggests a more widespread distribution of the 1995 year class with

respect to past sampling years. One anticipated consequence of the recovery plan is an expansion of the resource into formerly occupied habitat. The observations related to the apparent increased spatial distribution of the 1995 year class in 1996 may reflect the beginning of the expected trend. An unfortunate byproduct of this expansion will be an erosion in the utility of the relations between the historical resource survey and recruitment. Some attention should be given to this problem if the resource survey data are to remain a central component of the assessment process for red snapper.'

"In recommending an ABC range of 3 to 6 million pounds rather than 3 to 9 million pounds, the RFSAP noted that this suggestion was based on the premises that: 1) a reduction in TAC would begin a transition process toward a management strategy based on constant F as recommended by the Peer Group Review Panels, 2) real bycatch levels of red snapper by the shrimp fishery are unknown, 3) a lower TAC is risk adverse, and 4) there is a forthcoming need to reach an MSY management threshold within 10 years resulting in substantially lower TACs. Some of these assumptions are not only improbable, they are outside of the responsibility of the RFSAP. First, it is the Council's and NMFS' responsibility to decide whether to change the management strategy to a constant F and to determine an acceptable level of risk in management, not the RFSAP's or the Peer Review Panels'. The Council has not chosen to proceed under a constant F strategy for a number of reasons; some of which are outlined under "Economic Impacts". The Council has in most cases, however, looked at a probability range between 15 and 85 percent, with a midpoint of 50 percent, in setting TAC based on its management goal. In the case of red snapper, the management goal is 20 percent SPR by the year 2019; and there is a 50 percent probability that this goal will be reached with a 9 million pound TAC and reasonable bycatch reduction. The assertion that there is a need to reduce TAC at this time in order to reach an MSY management threshold in 10 years has not been established..... The RFSAP recommendation assumed that NMFS would be unable to effectively implement BRD regulations in 1998. In so doing, the RFSAP assumed a likelihood that is contrary to what has been stated by NMFS and is outside of its responsibility. In advising the Council that ABC should range from 3 to 6 million pounds the RFSAP interjected itself into judgements that are the responsibility of the Council."

In reviewing Schirripa (1998a), the RFSAP made basically the same recommendations as discussed above for basically the same reasons. It is noted, however, that although the SEP concurred with the RFSAP and recommended a reduction in TAC, the SEP also recommended that TAC be set for 2-year intervals and only revisited when a new, full stock assessment is completed. The 1999 fishing year is an "off-year", and a new stock assessment for red snapper is not scheduled until September 1999 for TAC considerations in 2000. At its November 1998 meeting, the Council again rejected these TAC recommendations for basically the same reasons as discussed above.

The February 1998 Regulatory Amendment (GMFMC 1998b) further stated:

> "As reported in the 1996 red snapper stock assessment (Schirripa and Legault 1997), future levels of SPR are much more sensitive to differences in bycatch reduction than to differences in levels of TAC.... there would be a gain in SPR of only 3.6% in the target year (2019) with a 6 million pound versus a 9 million pound TAC and a 60% bycatch reduction (24.5% vs. 20.9%). In contrast, there would be a 7.4% gain in SPR at a 9 million pound TAC and a 60% versus 45% bycatch reduction (20.9% vs. 13.5%)...."

Data presented by Schirripa (1998a) showed only about a 2.2 percent increase in SPR by 2019 with a 6 million pound TAC versus a 9 million pound TAC. Although no additional analyses of SPR in 2019 were conducted with less than an assumed 50 percent bycatch reduction, it is likely that bycatch reduction is still a more important factor in increasing SPR than a reduction in TAC to 6 million pounds.

The February 1998 Regulatory Amendment (GMFMC 1998b) continued:

> "Analyses presented..... indicate that even if bycatch reduction is below the 60 percent level in the first few years, there is still a 50 percent probability of reaching the 20 percent SPR target by 2019. Although it is likely that a 60 percent bycatch reduction would not be achieved in 1998, it is reasonable to expect compliance to increase and the performance of BRDs to increase as shrimp fishermen learn how to properly use BRDs....."

A BRD evaluation study was conducted by NMFS during the summer of 1998. As previously discussed, the preliminary results of this study concluded that BRDs are capable of reducing bycatch mortality of age 0 and age 1 red snapper by over 60 percent (61 percent). Furthermore, updated analyses by Schirripa (1998a) continued to show that with a 9.0 million pound TAC the 20 percent SPR goal by 2019 will be achieved with between 55 and 60 percent bycatch reduction (19.3 percent SPR at 55 bycatch reduction and 21.7 percent SPR at 60 percent bycatch reduction) (Table 3). The estimated SPR in 2019 at 50 percent bycatch reduction was 17.1 percent. In reviewing SPR proxies for maximum sustainable yield (MSY), the RFSAP noted that the current estimation was 26 percent; however, the RFSAP concluded that this estimate was relatively imprecise and would likely change over time. Consequently, the RFSAP recommended a range of 26 to 30 percent SPR as a proxy for MSY, and most members noted that there was probably no statistical difference between 26 and 30 percent SPR (GMFMC 1998a). Based on this conclusion, there is probably no statistical significance among SPR projections in 2019 assuming 50 to 60 percent bycatch reduction (17.1 percent to 21.7 percent).

In the February 1998 Regulatory Amendment (GMFMC 1998b) the Council also noted that:

> "The year of recovery (2019) was projected based on a stock assessment analysis that uses a mathematical model which scientists have agreed is not designed to make 20-year projections. As noted by Goodyear (1995), improvements in SPR using this method for

stock analysis are primarily evident in the later years of a recovery period. There is also legitimate disagreement among competent scientists on how to conduct this assessment, in particular, whether it is more appropriate to use fecundity-based rather than weight-based SPR and the value used for natural mortality (M). The Council has been advised that this method is the best available; however, its precision to determine stock status in 20 years, or more, is low. The only consequence involved if the model underprojects the recovery date and the stock does not reach its target on that precise date is to delay for a year or two the transition from a recovery plan to a plan for stock maintenance and further building toward OY. The consequences of a delayed transition are minor, if not insignificant, when compared to the near certain social and economic disruption that an immediate cut to a 6 million pound TAC would cause."

At both the January 1998 meeting in Point Clear, Alabama and the November 1998 meeting in Galveston, Texas, the preponderance of public testimony indicated that a cut in the red snapper TAC to 6 million pounds would have substantial negative economic impacts, particularly on the recreational for-hire industry and fishing communities that are dependent on recreational fishing and tourism. The February 1998 Regulatory Amendment (GMFMC 1998b) summarized the effects of maintaining the 9.12 million pound TAC for the 1998 fishing season. That summary is repeated, in part, below because it is applicable to this year's action to maintain TAC at status quo for the 1999 fishing year.

"The Council's action does not abandon the target for recovery by 2019, and it is expected that future biological advice will continue to support the probability of meeting this target. The Council feels that a status quo TAC of 9.12 million pounds represents the most acceptable balance of risk between failure to meet the 2019 recovery deadline and harm to the resource users because: 1) a 60% or higher level of bycatch reduction has been demonstrated to be feasible and probable given an initial implementation period; 2) the 60 percent reduction would not be required until the year 2001....., allowing time for technology transfer and increased compliance with the use of BRDs; 3) the level of bycatch reduction has a far greater impact on future SPR levels than the level of TAC; and 4) a cut in TAC would entail severe economic and social disruptions with relatively little impact on future SPR."

".....It is contrary to the Magnuson-Stevens Act and to sound fishery management to implement drastic cuts in TAC that will have only a minor impact on SPR levels in 2019, but will have severe and immediate economic and social impacts on the fishing community. Maintaining a constant TAC during the phase-in of bycatch reduction regulations will allow management to assess the actual impact of bycatch reduction without the complicating factor of a fluctuating TAC."

Although the Council's choice of TAC for 1998 and 1999 is higher than that recommended by its scientific advisory panels, the Council notes that under the Council's SFA Generic Amendment, the preferred alternative is to achieve a 26 percent SPR under new guidelines for

implementation of the SFA. This standard is more conservative than the current 20 percent SPR goal. Mace (1998) and the RFSAP (GMFMC 1998a) have agreed that a 26 to 30 percent SPR is an appropriate proxy for MSY, which is the new standard to which overfished stocks must be rebuilt. Also, under the new SFA guidelines and the Council's preferred alternative, the new rebuilding period would extend to 2033 provided that the SFA Generic Amendment is implemented sometime in 1999. Under rebuilding scenarios developed by Schirripa (1998a), a 9.0 million pound TAC with only a 50 percent reduction in bycatch mortality would yield an SPR estimate of 26 percent in 2029 and 28 percent in 2033. A 12.0 million pound TAC and only a 50 percent reduction in bycatch mortality would result in a 26 percent SPR in 2033 (Table 3). If an increased reduction in fishing mortality from bycatch reduction can be achieved to the predicted level of at least 60 percent by 2000, Schirripa (1998a) projected SPRs in 2033 of 35 percent with a 9.0 million pound TAC and 33 percent with a 12 million pound TAC. Since the proposed 9.12 million pound TAC will allow the Council to meet the conditions of the current rebuilding program, and it is much more conservative than that needed to meet the soon-to-be-required rebuilding program, there is no rationale that would justify imposing the severe social and economic burdens and potential disfranchisement on commercial and recreational fishermen that would certainly result from reducing TAC to 6 million pounds or less in 1999.

Biological Impacts:

Potential biological impacts of retaining the 9.12 million pound TAC in 1999 versus reducing the TAC to 6.0 or 3.0 million pounds are discussed in the "Rationale" above. Actual effects on the recovery of the red snapper stock are presently unknown; however, they are probably insignificant considering the length of the present recovery period and the fact that the rebuilding target is imprecise. Also, as previously noted, bycatch reduction is a much more important biological factor in the rebuilding process for red snapper. Future rebuilding schedules are likely to change along with the rebuilding target, adding additional uncertainty to evaluations of potential impacts.

Economic Impacts:

Given the fact that at the current TAC, both the commercial and recreational sectors have been filling their allocations and the fishery closed for some period of time during the year, any reductions in TAC would only worsen the short-run situations in both fisheries. The succeeding discussions attempt to estimate the short-run impacts of TAC alternatives by focusing on the adverse impacts of reducing TAC from 9.12 MP to 6.0 MP. The long-run outlook depends on a myriad of factors, some of which will be identified as part of the discussion of an approach for assessing the long-run effects of TAC alternatives. Some illustrative calculations for the commercial fishery are presented in assessing the long-term effects of TAC alternatives.

Since 1990, the commercial fishery for red snapper has been managed with quotas set at 51% of TAC and seasonal closures upon reaching each year's quota. The fishery was first closed

in August of 1991. Since then, the fishery has developed derby-like fishing conditions in which fishermen are compelled to harvest fish as quickly as possible to maximize their shares of the overall quota before the season is closed. Seasons have become shorter despite implementation of trip limits and larger minimum size limits. Dockside prices have also fallen to enable the market to absorb the large volume of fish that are landed during relatively short periods of time. For fishing years 1996, 1997, and 1998, the commercial quota was set at 4.65 million pounds with 3.06 million pounds allocated to a spring season and the remainder allocated to a fall season. A 15-day on and 15-day off schedule was adopted for the 1997 fall season and 1998 spring and fall seasons. The 1998 season also marked the start of a license limitation program that replaced the endorsement system that had been in effect since 1993. The same trip limit tier of 2,000 and 200 pounds that was in place under the endorsement system was carried over to the license limitation program, with the higher trip limit granted to Class 1 licensees and the lower trip limit to Class 2 licensees.

Table 4 presents annual commercial red snapper quotas and duration of the fishing season at different minimum size limits. About 133 Class I vessels and more than 500 Class 2 vessels participated in the red snapper fishery in 1998 (Waters 1998). Class 1 vessels accounted for more than 90 percent of total red snapper landings in 1998.

A TAC of 6.0 million pounds would reduce the corresponding commercial quota by 34 percent, from 4.65 million pounds to 3.06 million pounds. The immediate effect of this more stringent quota on commercial fishermen would be to reduce domestic landings and net operating revenues. The SEP (GMFMC 1998c) estimated that net operating revenues with a 9.12 million pound TAC would be approximately $6.9 million compared to $5.6 million with a smaller 6.0 million pound TAC. The net operating revenue loss, then, from a reduction in TAC would be $1.3 million. In these calculations, ex-vessel prices are assumed to average $2.25 per pound (eviscerated weight) with a 9.12 million pound TAC and $2.55 with a 6.0 million pound TAC. Note that a higher price may be expected from a lower TAC due to the inflexibility of the demand for red snapper. Also assumed is the participation of all 134 boats with Class 1 licenses and 571 boats with Class 2 licenses. Class 1 boats are assumed to average 2.55 days per trip with routine trip costs of $672 (Table 7 in Waters 1996). Class 2 boats are assumed to average 1.46 days per trip with routine trip costs of $228 (Table 8 in Waters 1996). Each licensed boat is assumed to catch its limit per trip. Considering various linkages in economic activities among fishery related industries throughout the Gulf region, this loss in vessel revenues may be expected to ripple through these industries.

A reduced TAC to 6.0 million pounds would eliminate the fall season for the commercial fishery, and thus would likely induce a faster race to catch fish during the spring season. Table 4 shows that at the commercial quota of 3.06 million pounds, the number of fishing days dropped from 94 days in 1993 to 52 days in 1995 even with an increase in size limit to 14 inches total length in 1994. A similar reduction in fishing days occurred at the higher quota of 4.65 million pounds, from 86 days in 1996 to 68 days in 1998. The increase in the minimum size limit to 15 inches TL plus the 15-day on and 15-day off schedule did little to alleviate the

situation. In 1998, the spring season lasted 40 days and the fall season, 28 days. What is particularly unique about the fall 1998 season is that approximately 1.34 million pounds were landed in the two open weeks of October, with close to 66 percent of which being landed in the second week. Antozzi and Waters (1998) noted that this is the highest rate of landings since quota management and its associated derby began in the early 1990's. This fishing ability only enhances the probability that actual fishing days in 1999 (spring season) would be less than the 40 days experienced in 1998 if TAC were reduced to 6.0 million pounds, thereby worsening the derby.

The effects of a derby are well known, but some available estimates on the extent of the effects on commercial vessel revenues need to be discussed. Waters (1997) determined that the derby reduced exvessel price by about $0.85 per pound. Bell (1997) further noted that when converted to 1996 prices, the derby effect amounted to a $1.35 per pound reduction in red snapper price. At the commercial quota of 4.65 million pounds, this derby-induced reduction in red snapper price would correspond to a loss of approximately $6.3 million in vessel revenues. This loss is staggering, especially when compared to the 1996 total exvessel revenues of $7.9 million. A intensified derby may only be expected to increase these losses.

In the November 3, 1998 meeting of the Red Snapper AP, one member who is a Class 1 license holder indicated he had left the red snapper fishery due to the regulations imposed on the fishery. This happened even at the higher TAC of 9.12 million pounds. How many more would follow suit at the lower TAC of 6.0 million pounds cannot be determined. Nevertheless, it is instructive to note that under the current license limitation program, both classes of licenses command some monetary values. Additionally, stacking of two or more licenses on one vessel is not allowed in the red snapper fishery, at least until October 1, 2000. Given this scenario, an owner of a license who decides to exit the fishery would be better off either holding on to his/her license until the fishery improves (or license prices go up with improvements in the fishery), or simply sell the license to another vessel owner. The worst case situation, then, is that a license holder who exits the fishery is likely to be compensated for that exit. The compensation would certainly be higher for Class 1 licenses. Moreover, compensation for either Class 1 or Class 2 licenses would be higher at a higher TAC.

Table 5 shows salient features of regulatory rules governing the recreational red snapper fishery. Despite increases in TAC (and the associated recreational allocation) and more restrictive bag and size limits, the recreational red snapper fishery has exceeded its allocation every year since 1990 (Table 2). Consequently, closure of the fishery was introduced in 1997. A further reduction in the recreational bag limit from 5 to 4 fish starting May 1998 did not alleviate the situation, and the fishery closed for the last 3 months of 1998.

As with the commercial sector, changes would likely occur in the recreational sector, even if the status quo TAC and recreational quota were maintained, mainly because of the provision that the fishery be closed upon reaching its quota. A reduction in TAC can only be expected to bring about more adverse effects on the recreational fishery. As shown in Table 6, which is

taken from (GMFMC 1998a) based on Schirripa (1998), maintaining the status quo TAC, size limit, and bag limit would result in a mid-August closure of the fishery. A lower TAC of 6.0 million pounds, with the same size and bag limits, would further shorten the season by another 4 to 5 weeks.

Based on Holiman (1998a), the SEP (GMFMC 1998c) estimated that a closure starting the end of June would affect 315,552 catch trips[2] while a closure at the end of July would affect 239,957 catch trips. Thus, 75,595 trips would be affected trips in July. Also, a closure at the end of August would affect 170,343 catch trips, and subtracting these trips from the 239,957 trips for July results in 69,614 affected trips in August. On the basis of Table 6, about 75 percent of trips in July and 50 percent of trips in August would be affected if TAC were reduced to 6.0 million pounds. Adding the affected trips in July and August results in 91,503 additional trips that would be affected if TAC were reduced to 6.0 million pounds. This is approximately 15 percent of all catch trips. Of these additional trips, about 37 percent are headboat trips, 26 percent charter trips, 29 percent private/rental trips, and 8 percent Texas private and charterboat trips. Relative to the number of trips for the year taken by anglers through various fishing modes, a 6.0 million TAC would reduce angler trips by 21 percent in headboats, 12 percent in charterboats, 16 percent in private/rental trips, and 13 percent in private and charter trips in Texas.

Reductions in red snapper trips would translate to reductions in economic values in the form of angler consumer surplus and for-hire vessel profits. In view of the fact that there is no adequate information available that can be used to determine these economic values, only some general economic implications of the additional closure period from a lower TAC are reviewed.

Current recreational demand estimates in other fisheries in the Gulf are quite variable[3]. Milon (1988) estimated the demand for king mackerel trips in the Gulf using travel cost techniques, and found a statistically significant relationship between catch rates and angler trips. Analogous, statistically significant results were found by Green (1989) for red drum and Leeworthy (1990) for Gulf king mackerel. Although Milon (1988) and Green (1989) observed increasing trips with increasing catch rates, Leeworthy's (1990) estimates showed decreasing trips with increasing catch rates. This result is rather counterintuitive, thus he rejected this relationship in favor of the positive, significant results for the Gulf area. Milon (1993) re-estimated the demand for king mackerel in the Gulf using more recent data (1990 and 1991), and found no statistically significant relationship between angler trips and king mackerel catch rates. His comparison of king mackerel demand estimates led him to state that ". . .it is not possible to conclude that king mackerel catch rates influence the number of trips taken by

[2]Catch trips are angler trips that caught red snapper regardless of the target species.

[3]There are currently several attempts at estimating recreational demand using information from the recently completed MRFSS-add on economic survey, but it will be a year or two before results would be available.

anglers who target king mackerel." This statement refers to overall anglers and does not distinguish anglers by mode of fishing. Greene et al. (1994) estimated the recreational demand for reef fish in the Gulf under various specifications. Their generalized least squares estimates resulted in a statistically significant but negative relationship between catch rates and angler trips for the combined data set. On the other hand, the trip and catch rate relationship was found to be positive and statistically significant for single day Florida trips. Greene et al. (1994) cautioned against using this estimate in calculating consumer surplus. The model is based on single day Florida trips, and more importantly, the estimated price coefficient is negative and not statistically significant from zero. A price term approaching zero implies that recreational fishing would command an infinite value at this range. Given existing recreational demand estimates, it is not possible to translate the projected reduction in angler trips into angler economic surplus. Given this caveat, some general range of economic impacts are provided below.

In a general survey of empirical evidence of valuing marine recreation, Freeman (1993) found the value to range from $0.97 to $799 per trip. Estimates for fisheries in the Gulf and Florida in particular fall within this range. For example, Bell et al. (1982) reported a value of $58 per trip which was estimated within the context of Florida residents' valuation of access to Florida marine fisheries. For king mackerel, Leeworthy (1990) estimated a value of $47 per trip. Greene et al. (1994) showed a value for reef fish of $676 per trip. Since there is no compelling reason to use one estimate over another, the range reported by Freeman (1993) may be used to provide a general range of impacts. Hence, a closure of the recreational fishery from early July to mid-August as a result of reducing TAC to 6.0 million pounds would reduce economic value from $88,000 using the value of $0.97 per trip to $73 million using the value of $799 per trip. In this calculation, the number of trips affected by the additional closure is 91,503 as estimated above. Although these values provide a general picture of the range of effects of an additional closure of the red snapper fishery, it is deemed that the "true" impacts of the closure on recreational anglers would be substantially greater than $88,000 and less than $73 million. One other point worth noting regarding these estimates is that no distinction is made among the possibly different valuations of trips by fishing mode.

Another sector potentially affected by the additional closure of the recreational red snapper fishery is the for-hire vessel industry that is comprised mainly of charter and headboats. For-hire vessels are required by all Gulf states to secure licenses in order to operate in state waters. Only since January 1996, as implemented through Amendment 11 to the Reef Fish FMP, have for-hire vessels been required to secure federal permits. This federal permitting rule also stipulates that such vessels possess appropriate licenses required by states (e.g., charter, head, or guide boat licenses). The NMFS' records show that as of February 1998, there were 721 vessels with only charter reef fish permits and 192 vessels with both commercial and charter reef fish permits, or a total of 913 for-hire vessels. There is no breakdown of these vessels into charterboats and headboats. The vessel distribution by state is: 89 in Alabama, 542 in Florida, 62 in Louisiana, 29 in Mississippi, and 191 in Texas. The total number of vessels is close to the 930 charter and headboats operating in the Gulf in 1987 (Ditton et al. 1988; Holland and Milon

1989); however, this number is well below that determined to comprise the population of charter and headboats used for survey purposes. Holiman (personal communication) reported that there are about 165 headboats in the Gulf, of which 57 are in Alabama and Florida (west coast), 9 in Louisiana, and 18 in Texas. Of the reported Alabama and Florida headboats, there is a strong possibility that 5 are in Alabama and the rest in Florida. He also reported that exclusive of Texas, for which there are no estimates of charterboats, there are 2,392 charterboats in the Gulf, of which 89 are in Alabama, 1,987 in Florida (west coast), 249 in Louisiana, and 67 in Mississippi. Using these numbers, only about 36 percent of charter and headboats in the Gulf have federal charter/headboat reef fish permits.

It is possible that the low proportion of federally permitted for-hire vessels is indicative of the majority operating mainly in state waters. It is also possible that this could be a result of a lack of knowledge about the federal permitting system, despite the fact that the federal permit requirement has been in effect for more than two years. A case like this occurred with the coastal migratory pelagic charter/headboat permitting system for several years after its implementation. In that fishery, there were reportedly many for-hire vessels that did not possess the required federal permit apparently due to lack of knowledge of such a requirement. This problem surfaced only three years ago when the Council entertained (but did not adopt) a proposal to impose a moratorium on such permits. Even then, the required federal permit had already been in existence for about 10 years. At any rate, a range of 913 to 2,557 for-hire vessels operating in the Gulf could be adversely affected by the early July to mid-August additional recreational fishery closure under a TAC of 6.0 million pounds. For the current purpose, however, the lower number is used, but the information given above regarding the breakdown into headboats and charterboats is used, with some modifications introduced below.

The NMFS charter permit file includes vessels for the entire Gulf. There would naturally be some permitted vessels, particularly those in Florida, that do not participate in the red snapper fishery. For-hire vessels in the Panhandle area are the ones most likely to participate in the red snapper fishery. In an earlier study of for-hire vessels in Florida, Holland and Milon (1989)[4] reported that about 27 percent of all charter and headboats in the west coast of Florida operated out of the Panhandle. Applying this percentage to the number of for-hire vessels in Florida yields 146 for-hire vessels operating in the Panhandle area. Given this adjustment, the number of for-hire vessels participating in the red snapper fishery could be approximately 517. The state-by-state distribution of charterboats would be: 84 in Alabama, 95 in Florida, 53 in Louisiana, 29 in Mississippi, and 173 in Texas. The corresponding distribution for headboats would be: 5 in Alabama, 51 in Florida, 9 in Louisiana, none in Mississippi, and 18 in Texas.

Based on an earlier study of charter and headboats in the Gulf (Ditton et al. 1988; Holland and Milon 1989), Table 7 is generated showing the average gross revenue of for-hire vessels, with the dollar value converted to 1996 dollars.

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[4]This study is currently being updated under a MARFIN-financed project.

There is a good possibility that some of these numbers would be relatively low compared to more recent conditions in the industry. For example, an economic impact study of charter fishing in Orange Beach, Alabama (Malone 1994) reported that 105 boats earned a total of about $10.4 million in 1994 from charter fees and miscellaneous crew fees (fish cleaning, tips, etc.), or roughly $99,000 per boat. This is more than twice that reported in Table 7. At any rate, the numbers reported in Table 7 can provide general approximations of the impact on for-hire vessel revenues resulting from an early July to mid-August closure.

As previously discussed, approximately 12 percent of all charterboat catch trips and 21 percent of all headboat trips would be affected by the additional closure under a TAC of 6.0 million pounds. In the absence of information regarding the amount of vessel revenue specifically generated from fishing for red snapper during the additional closed weeks, it is simply assumed that for-hire vessels in Alabama through Texas would cease fishing entirely during the closure, or if they continue fishing, earn only a relatively minimal amount. In this case, the revenue loss would be about 12 percent for charterboats and 21 percent for headboats.

For-hire vessels in Florida are less likely to be as dependent on red snapper as those in the rest of the Gulf states. To account for this condition, the percentage reduction of trips for Florida for-hire vessels is modified by the proportion of time expended by these vessels in targeting snappers. According to Holland and Milon (1989), the mean percent of time expended in targeting snappers by for-hire vessels operating in the Florida Panhandle is approximately 21 percent for charterboats and 38 percent for headboats during the period August to December. Table 8 summarizes the potential revenue impacts of a 12 percent and 21 percent reduction in red snapper trips by charter and headboats, respectively.

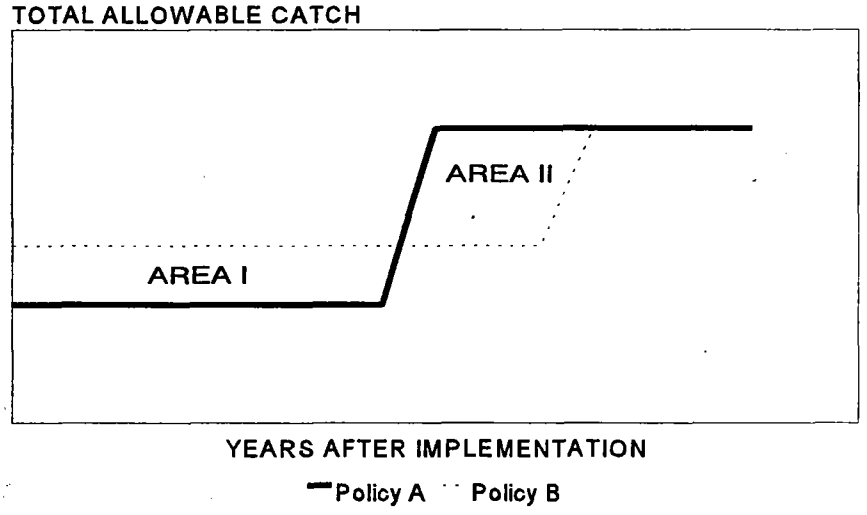
There are several points worth mentioning regarding the results shown in Table 8. First, the estimates refer to gross revenues while the more important economic variable would be net profit. Second, if the condition reported by Malone (1994) above is indicative of the general present conditions for charter fishing operations throughout the Gulf, then potentially the impacts of a closure could be twice as much as those reported in Table 8. Third, dependence on red snapper varies across the Gulf, thus there would be differential impacts on for-hire vessel operations across the Gulf that may not be indicated in Table 8. Those vessels in areas that depend more on red snapper as a major selling point of charter and headboat trips would bear more of the impacts, since species substitution would not be a viable alternative for success in their operations. Fourth, there is a good possibility that an early July to mid-August closure of the fishery, in addition to the August-December closure, would be too burdensome for many for-hire vessels to remain in the fishery. It is likely that some trips previously taken during the additional closed period may be re-scheduled early in the year, but this would probably not offset the trip loss since trips that used to be taken in August through December would also have to be re-scheduled early in the year. In general, both revenues and costs would fall as the number of trips taken is reduced. Interestingly, profits could fall, remain constant, or even rise under the condition of reduced revenues and costs depending on the relative changes in revenues and costs. At any rate, for-hire vessels could continue to operate even at a reduced

number of trips so long as operating revenues (mainly composed of charter fees and other fees, such as bait, food and drinks, fish cleaning, use of rod and reel, etc.) cover operating expenses. Below this "shut-down" point, it would be less costly for vessel owners to stop operation entirely and liquidate the assets.

While the number of vessels possibly exiting the fishery cannot be determined, it may be noted that the revenue losses shown in Table 8 in conjunction with Table 7 would be equivalent to the gross revenues of about 2 charterboats in Florida, 10 charterboats in Alabama, 6 charterboats in Louisiana, 4 charterboats in Mississippi, and 21 charterboats in Texas. The corresponding headboat number would be 4 in Florida and 6 in other areas of the Gulf. In the event that vessels exit the fishery, additional losses would be incurred in terms of reduction in the value of the boat and other boat-related investments.

A more ideal approach to assessing the economic impacts of TAC alternatives is to compare short-run and long-run costs and benefits associated with each TAC alternative. The SEP (GMFMC 1998c) outlined the basic approach to this type of analysis which is illustrated in Figure 1 below.

Figure 1. Comparison of two hypothetical constant catch policies.



Source: GMFMC (1998c).

Consider Policy A as equivalent to a TAC of 6.0 MP and Policy B, to a TAC of 9.12 MP. The two policies provide the same TAC after the rebuilding period for red snapper. Since the lower TAC may be associated with faster stock recovery, Policy A allows a faster TAC adjustment. Areas I and II define the difference in net economic benefits of the two policies. From an economics standpoint, Policy A is adjudged better than Policy B if the net present value of Area

I exceeds that of Area II. The net present value concept is important in this approach since future net benefits have to be discounted to make them comparable to present net benefits.

This type of analysis requires data, foremost of which are the recovery period, TAC during the recovery and post-recovery periods, bycatch reduction level, target SPR, and estimated economic functions (both commercial and recreational) that would translate TAC into net economic benefits. The absence of most of these data prevented the SEP from quantifying the two areas featured in the graph. At any rate, the SEP did generate some sample calculations of the effects of TAC alternatives on the commercial sector as shown in Table 9. No comparable estimates could be made for the recreational sector(GMFMC 1998c).

Except for the last column, all numbers are based on Schirripa (1998a). The numbers in the last column are estimated present value (PV) of benefits in the commercial sector at the specified combinations of bycatch reduction, TAC and SPR. The values consist of two numbers, namely, the benefits during the rebuilding period and those after the rebuilding period; the latter of which consist of a discounting factor and an unknown amount of benefits (FB). The calculations used a discount rate of 7 percent and assumed a 30 percent SPR target.

The examples given in Table 9 can be used to compare the effects of alternative TACs for the commercial harvesting sector. Given a 55% reduction in bycatch of juvenile red snapper, a 6 million pound TAC would be preferred over the present 9.12 million pound TAC if commercial benefits during the post-recovery period exceeded \$61.5 million per year (i.e., if FB_{55} > \$61.5 million). If bycatch were reduced by 60%, then a 6 million pound TAC would be preferred to a 9.12 million pound TAC if commercial benefits during the post-recovery period exceeded \$64.5 million per year.

Because of the absence of important information, a definitive ranking of TAC alternatives, even from the commercial sector's standpoint, cannot be developed. The calculations, however, illustrate the type of analysis that is needed to determine the net economic impacts of TAC alternatives over time.

In addition to modeling issues (the biological model appears to be in better shape at this stage than its economic counterpart), there are more fundamental issues to contend with over the long-run. On the biological side, such issues as the effects of greater red snapper abundance on other species and the nature and extent of the carrying capacity would take on more important roles. On the economic side, the management system adopted for both the commercial and recreational sectors and the nature of the commercial and recreational market for red snapper would become major determinants in assessing the economic effects of greater red snapper abundance. On top of all these, there is the issue of impacts on fishing communities. There is currently a dearth of information on fishing communities to assess short-run impacts of management changes, and if information is not improved, assessment of the long-term impacts of management on fishing communities and overall assessment of long-term effects will fall far short of being considered adequate.

Recreational Bag Limit

Proposed Alternative: Set the recreational daily bag limit for red snapper at 4 fish for recreational fishermen, and set a bag limit of zero fish for the captain and crew of for-hire vessels

Rejected Alternative: Set the recreational bag limit at 3 fish per person per day

Rejected Alternative: Retain a bag limit for the captain and crew of for-hire vessels equal to that of recreational fishermen

Rejected Alternative: Status Quo - Set the recreational bag limit at 5 fish per person per day

Rationale:

In most instances, the use of bag limits to control the harvest by the recreational sector has been favored over quota closures. The SEP noted that a lower bag limit with a longer season yields more economic benefits than a higher bag limit with a closure, provided that the bag limit is not low enough to discourage taking recreational fishing trips (GMFMC 1998c). A 4-fish bag limit, as opposed to the previous 5-fish bag limit, was implemented by NMFS through an interim rule in April 1998 in an effort to reduce the recreational catch and help avoid a quota closure in 1998 as occurred on November 27, 1997. By itself, this measure was not sufficiently effective to prevent the September 29, 1998 closure, partly because it was not implemented until nearly 3½ months into the fishing year. Additionally, other factors that have not been fully analyzed may have contributed to the even earlier closure in 1998, e.g. weather and other environmental conditions, availability of fish by size and area, effort, etc. These factors seemingly caused the rate of harvest by the recreational fishery to be accelerated in 1998 as compared with previous years. Schirripa (1998b) and GMFMC (1998c) noted that under a 4-fish bag limit coupled with a 9.12 million pound TAC, the recreational allocation of TAC (4.47 million pounds) would be caught by early September 1999, if no other measures were taken. These studies also indicated that even if the bag limit was reduced to 2 fish, a recreational closure would probably be required in early November 1999. The preponderance of public testimony by for-hire fishermen has indicated that a bag limit lower than 4 fish would significantly impact their ability to attract charters. The 4-fish bag limit in combination with the other measures discussed herein would probably result in lengthening the season beyond these projected closures; however, the extent of their combined effects is unknown.

Holiman (1998a) suggested that a zero bag limit for captain and crew could reduce total recreational harvest by about 140,000 pounds, or about 3 percent of the projected 1998 harvest. If the recreational sector was confined to its allocation, a 3 percent reduction would be about 134,100 pounds. The Council explicitly linked the proposed zero-fish bag limit for captain and crew of for-hire vessels with proposals for a 14-inch minimum size limit and 4-fish bag limit.

The Council also intended that these actions along with the other proposed actions in this regulatory amendment be tied to the status quo 9.12 million pound TAC. As previously noted, if TAC were reduced, the recreational quota closure would occur much sooner in the year, possibly mid-summer. In this situation, any reduction in the closed season caused by the other proposed actions would probably be negligible. By implementing the 4-fish bag limit for recreational fishermen in conjunction with a zero-fish bag limit for the captain and crew of for-hire vessels and a 14-inch TL minimum size limit, the Council believes that a significant reduction in the recreational harvest can be realized. These actions coupled with the March 1 opening of the recreational fishing season, could result in extending the recreational fishing season.

Biological Impacts:

The proposed alternative to reduce the bag limit from 5 fish per person per day to 4 fish per person per day and to reduced the bag limit for captain and crew of for-hire vessels to zero, are primarily directed at extending the season under the current 9.12 million pound TAC. Beginning with the 1997 fishing year, the Magnuson-Stevens Act required that the recreational fishing season for red snapper be closed when this sectors allocation of TAC is projected to be reached. Consequently, overruns of the recreational allocation that occurred in previous years have been effectively eliminated or substantially reduced. Since the recreational fishery will probably catch its allocation of TAC under the 4-fish bag limit with a zero-fish bag limit for captain and crew of for-hire vessels, and the recreational fishery is constrained by a quota closure if this occurs; there should be no biological impacts from the proposed alternative. If these measures combined with the other proposed alternatives in this regulatory amendment result in the recreational allocation not being taken, the recovery of the red snapper stock could be expedited. For this to happen, the underrun of the recreational allocation of TAC would probably have to be repeated over several years. Current projections do not indicate that a underrun is likely.

Economic Impacts:

A reduction in recreational bag limit would affect catches from both the private boats and for-hire vessels. The effects on these two segments may be assessed by determining the resulting reduction in the number of recreational trips taken. A reduced bag limit may be expected to reduce the value of a fishing trip, but since the season may be lengthened, there would be a compensating positive effect of allowing more fishing trips. Hence, under a reduced bag limit, the economic value of each trip would be less, but there would be more trips taken due to a longer season. While a more ideal analysis would be to determine the net effect of the reduction in economic value, i.e., angler consumer surplus and for-hire vessel producer surplus, per fishing trip and the increase in economic values due to an increase in the number of trips, the absence of necessary information precludes conducting this analysis. Instead an approach similar to that used in assessing the impacts of changing TACs is used. This approach involves

determining the change in the number of trips taken and translating this change into some form of economic value.

Table 10, which was provided by Holiman (personal communication), presents the closure dates under 5-fish or 4-fish bag limits with and without the zero bag limit provision for captain and crew of for-hire vessels. Assuming a TAC of 9.12 million pounds, the fishery would be closed on September 10 under the 4-fish bag limit instead of August 18 under the 5-fish bag limit. A zero bag limit for captain and crew of for-hire vessels, which would reduce landings by 3 percent, would add 3 open days under the 5-fish bag limit or 5 days under the 4-fish bag limit. A combination, then, of a 4-fish bag limit and zero bag limit for captain and crew would extend the fishing season by about a month relative to what would happen under a 5-fish bag limit for all anglers, including captain and crew. An extended season would allow 62,700 additional trips to be taken, and this is approximately 11 percent of all catch trips. Of these additional trips, about 31 percent are headboat trips, 32 percent charter trips, 29 percent private/rental trips, and 8 percent Texas private and charter boat trips. Relative to the annual number of trips for the year taken by anglers through various fishing modes, the extended season would allow an increase in angler trips by 12 percent in headboats, 10 percent in charterboats, 11 percent in private/rental trips, and 10 percent in private and charter trips in Texas.

There are at least two major assumptions underlying the effects on trips as described above. First, the distribution of angler effort would not change due to the reduction in bag limits. While there is a very high likelihood that effort would be shifted around, generally from the closed to the open period, the nature of this shift cannot be determined. Second, anglers would continue taking trips during the open season, although the value per trip would be lower than under a higher bag limit. It may be expected that there are individuals that would take fewer trips or stop fishing at all even if expected catch rates are only slightly reduced. On the other hand, there are others that would continue to fish even at relatively low catch rates. One reason for this differing behavior is the particular individual's valuation of a red snapper trip. Another reason is the presence of other factors, such as income and leisure time that shape one's demand for a red snapper fishing trip. Such behavior could be quantitatively captured by estimating the demand for red snapper trips, which would show the reduction in trips taken as catch rates declined. As stated earlier, this information is not available.

Noting the above assumptions, a similar translation of these additional trips into economic terms, as was done with TAC alternatives, is conducted as follows. For anglers, a range of $0.99 to $799 per trip was earlier used, but considering that each trip would now be associated with a lower value, an adjustment to this range needs to be made. Again, in the absence of the necessary information, it is simply assumed that the percent reduction in the trip limit from 5 to 4 fish, which is 20 percent, directly translates to an equal percent reduction in value per trip. Applying this adjustment, the range of values would be $0.79 to $639 per trip. Consequently, the extended season that allows an increase in fishing trips of 62,700 would increase economic value from $49,533 to $40.1 million. As before, it should be noted that these numbers do not take into account the likely differences in trip values by fishing mode.

The corresponding effects on for-hire vessel revenues are presented in Table 11. These effects are calculated similar to what was done in assessing the impacts of alternative TACs.

Recreational Fishing Season

Proposed Alternative: Set the opening date of the recreational red snapper fishing season at March 1

Rejected Alternative: Status Quo - retain the current opening date of January 1

Rejected Alternative: Set other seasonal closures

Rationale:

The purpose of this measure is to reduce recreational fishing effort via a known seasonal closure during the least desirable fishing months. Fishermen in some areas, e.g. south Texas, may be more affected than others; however, the Council chose these months for closure based on the preponderance of public testimony that indicated this closure period would be the least disruptive to fishing operations. The most recent 4-year average landings during this (January-February) period show that such a closure would result in a reduction in landings of about 11 percent (Holiman 1998b). Although this reduction is slightly less than the same 4-year average percentage for a November-December closure of 16 percent (Holiman 1998b), this measure in combination with the other proposals discussed above should provide for the least disruption to current recreational fishing practices for red snapper. Additionally, a January-February closure should have a positive effect on vessel safety, similar to the January closure of the commercial fishery.

Biological Impacts:

As discussed above this proposed action is mainly being recommended to extend the recreational fishing season by implementing a seasonal closure during a known period that is least disruptive to the current recreational fishery. As noted above, this closure period would potentially reduce landings by about 11 percent. With a January 1 opening in 1998, the quota was landed and the fishery was closed on September 29. Since the November-December period accounts for about 16 percent of landings and October would also include additional landings; it is probable that an additional closure would occur in the fall. Because the January-February closure by itself is not expected to reduce overall landings, there should be no biological impacts of the proposed alternative. If this action combined with the other proposed alternatives in this regulatory amendment results in the recreational allocation not being taken, the recovery of the red snapper stock could be expedited; however, current projections do not support a reduction in landings. Furthermore, appreciable effects would probably only be observed if a reduction in landings occurred for several years.

Economic Impacts:

The economic implications of the Proposed Alternative may be determined in the same way as was done for the previous two sets of alternatives, i.e., in terms of changes in economic values resulting from changes in angler trips. Table 10 provides the necessary information for determining the net effects on the number of trips taken by anglers.

As previously mentioned, maintaining the status quo TAC of 9.12 million pounds, 5-fish bag limit, 15-inch minimum size limit, and January 1 opening, the fishery would probably close on August 18. Under the same conditions, but with the season opening postponed until March 1, the closure projection extends to September 2. The Proposed Alternative, then, would allow 15 more days of fishing in the fall but at the expense of 60 fishing days in the winter (January and February). There is a possibility that the fishing experience in the fall would differ from that in the winter, but both the direction and magnitude of difference cannot be determined. While the difference between 15, open fishing days and 60, closed fishing days is large, the effect in term of trips is relatively small. Under the status quo, 391,067 total trips, of which 244,077 are for-hire trips, would have been taken by the time the fishery is closed on August 18. A winter closure would allow 384,176 total trips to be taken, of which 242,511 are for-hire trips. The net loss would be 6,891 total trips, of which 1,566 are for-hire trips. The economic values involved here would be substantially less than those estimated for the previous two sets of alternatives.

While the overall economic loss is relatively small, the sharing of that loss across recreational anglers and for-hire vessels would differ around the Gulf. It has been reported that the winter months are especially important to for-hire vessels in South Texas. Under this condition, most of the losses from a winter closure would be borne by these vessels. Vessels in other areas that fish heavily in fall would stand to gain from this arrangement.

Minimum Size Limit for Red Snapper

Proposed Alternative: Reduce the minimum size limit for red snapper from 15 inches TL to 14 inches TL for both the commercial and recreational fisheries

Rejected Alternative: Status Quo - retain the current 15-inch TL minimum size limit

Rejected Alternative: Increase the minimum size limit to 16 or 18 inches TL

Rationale:

The Council included alternatives to reduce the commercial minimum size limit to 13 or 14 inches TL in its Sustainable Fisheries Act (SFA) Generic Amendment. This action was based on the premise that release mortality was much higher than the 33 percent level used for stock assessment purposes (see Biological Impacts discussion below). It was also justified on the

basis that the commercial fishery is usually conducted in deeper waters using hydraulically or electrically assisted bandit gear with multiple hooks that retrieve fish much faster than ordinary, hand-cranked hook-and-line gear. The nature of this fishery causes increased incidences of embolisms and other fishing-related mortality. In discussion, the Council also noted that the release mortality for the recreational fishery is probably much higher than the 20 percent level currently being used in analyses. Alternatives for reduced minimum size limits were removed from the SFA Generic Amendment because the Council believed that it was imperative that the issue be addressed through the framework procedure for implementation in 1999. The Council subsequently recommended that the 14-inch TL minimum size limit be implemented for the upcoming fishing year.

Figure 9 of Schirripa and Legault (1997) showed a substantial increase in the percentage of released red snapper by the recreational sector from about 1987 to 1996. They also noted a very significant increase in 1990 with the implementation of the 13-inch TL minimum size limit. Subsequent increases to 14 inches TL in 1994 and to 15 inches TL in 1995 have resulted in an average annual release percentage for the period 1990 through 1997 of nearly 53 percent, and the 1997 level was the highest on record at 62 percent. Observer studies (Goodyear 1995) indicated that in 1995 the commercial sector was discarding about 41 percent of their catch.

Very little, if any, improvement in the status of the red snapper stock has been seen in stock assessment analyses since 1990 as measured by transitional SPR. One probable reason for a lack of observed positive effects of minimum-size-limit increases and the likelihood that they may be negatively affecting the stocks is that as the minimum size limit increased, the stocks had to be fished harder to achieve the same yield, resulting in even higher release mortality. The Council believes that this phenomenon has been occurring in both the commercial and recreational fisheries for red snapper, particularly since the minimum size limit was increased to 15 inches TL.

In public testimony, numerous recreational fishermen and charterboat operators indicated that they were killing large numbers of undersized fish in order to get a bag limit of legal-sized red snapper. They believed that a lower minimum size limit of 13 to 14 inches TL would result in anglers keeping many fish that they are presently required to discard, resulting in an overall reduction in mortality. Most also testified that they were able to capture their bag limit. Based on this recent and previous public testimony and the biological impact analyses, there is little, if any, biological benefit from a 15-inch TL minimum size limit as opposed to a 14-inch TL limit, and there is a strong potential that this increase has negatively impacted the recovery of the red snapper stock through increased release mortality. Consequently, the Council believes that a reduction in the minimum size limit is appropriate to avoid potential negative impacts to the recovery of the red snapper stock and to ameliorate the current negative social and economic impacts of this regulation. Additionally, the Council believes that it is imperative that this action be taken in combination with the other requested actions in this regulatory amendment in order to effectively manage the recreational sector of this fishery, and that they be implemented as soon as possible.

Biological Impacts:

Amendment 5 to the Reef Fish Fishery Management Plan (FMP) proposed a gradual increase in the minimum size limit for red snapper from 13 inches TL to 14 inches TL in 1994, 15 inches TL in 1996, and 16 inches TL in 1998. The Council took this action primarily because an earlier stock assessment (Goodyear 1992) indicated that biomass yield would be maximized by delaying harvest until fish reach 19 to 21 inches TL and reducing instantaneous fishing mortality (F) to about 0.2 (18 percent annual mortality). Attaining this fishing mortality rate that would maximize yield per recruit (YPR) was recognized as a long-term goal, and a gradual increase was favored over an immediate increase to reduce adverse social and economic impacts on the directed recreational and commercial fisheries. This goal was also contingent on potential gains in YPR not being negated from release mortality of undersized fish. As discussed below, increasing the minimum size limit over the last few years may have caused an increase in fishing mortality that is having a negative effect on the spawning potential ratio (SPR) and impeding the recovery of the red snapper stock.

In referring to a potential increase in the minimum size limit from the current 15 inches TL, Schirripa (personal communication) indicated that unless size limits were sufficiently large enough to significantly reduce the bag limit, the likely result would be an increase in the total number of fish being killed in order to obtain a bag limit of larger-sized fish. This scenario may have been occurring since 1990 as the minimum size limit has increased from 13 inches TL to 15 inches TL. If so, a reduction in the minimum size limit would be expected to reduce fishing mortality and bring about a faster recovery of the red snapper stock. Such action is further justified by the fact that the number of fish caught that are below the current 15-inch TL minimum size limit approximately doubled from 1996 to 1997 (GMFMC 1998c).

Schirripa and Legault (1997) examined the effects of various minimum size limits on YPR and SPR. Two different selectivity patterns were used in their analyses: computed selectivities that varied vulnerability by age; and, a flat-top selectivity pattern that assumed equal vulnerability for all ages after being fully selected. According to the authors, the computed selectivities may be an artifact of the method used. If the flat-top selectivity pattern is used in combination with fixed yield (which is the most probable case since both fisheries are regulated by quotas and quota closures) in a comparison of the effect of size limits versus no size limit on SPR (Table 21B of Schirripa and Legault 1997), the results showed substantial reductions in SPR with increases in the minimum size limit. A reduction of approximately 5.5 percent was computed between a 14-inch and a 15-inch minimum size limit. They also noted that an increase in minimum size limit from 15 to 16 inches TL would probably not increase the SPR value in the year 2019, primarily because released fish were being subjected to release mortality but were not contributing to yield. Consequently, the Council approved and NMFS implemented a regulatory amendment that negated the scheduled minimum size limit increase from 15 to 16 inches TL and maintained the 15-inch minimum size limit for the 1998 fishing season.

Goodyear (1995) and Palma and Deriso (1990) also noted that minimum size limits may focus fishing mortality on the faster growing individuals in a population, thus increasing the number of slower growing individuals. This selective mortality could result in a long-term reduction in YPR as the slower growing fish are subject to natural and other mortalities, including release mortality, over a longer period of time. Consequently, the recently instituted increases in the minimum size limit for red snapper could be having a negative effect on YPR and, as previously mention, possibly negatively impacting the recovery of these stocks.

Schirripa and Legault (1997) assumed a 33 percent and 20 percent release mortality for the commercial and recreational fisheries, respectively. Recent data (Karen Burns, personal communication) indicated that hooking mortality is more likely near 50 percent for the recreational fishery and may increase with increases in the depth of water fished due to fishermen's decreased ability to detect strikes. Although Burns' study included a very limited sample of a headboat, the majority of public testimony supports a release mortality higher than 20 percent. Additionally, although there are no data on release mortality for the commercial fishery, the majority of public testimony from commercial fishermen implies a near 100 percent mortality on undersized red snapper. If an increasing portion of the recreational red snapper catch is being released and the release mortality is significantly higher than that being factored into recent analyses (50 percent vs. 20 percent), the potentially negative, biological effects of the present 15-inch minimum size limit are much worse than current estimates would suggest.

Economic Impacts:

Reducing the minimum size limit to 14 inches TL would result in 2-pound fish entering the market, and a reduction to 13 inches TL would result in 1- to 2-pound fish entering the market. Given a fixed commercial quota that has been reached every season, a change in the minimum size limit would not affect the total landings of the commercial sector, but it would affect the timing of those landings and the revenue structure of vessels.

The commercial sector has historically caught and sold red snapper in the 1 to 2 pound categories. These market categories were lost to the commercial fishery when the minimum size limit was increased from 13 inches TL to 14 inches TL and eventually to 15 inches TL (the current minimum size limit). Imports have essentially filled these categories in more recent years. The red snapper pricing system among red snapper dealers, as described in Amendment 5, historically used from 1 to 4 tiers of pricing red snapper based on pound sizes, with 1 to 2 tiers being the most common. Whatever the tier system used, the 2 to 4 pound category generally commanded a premium price over smaller or larger sizes. The 1 to 2 pound category commanded a premium price when a 2-tier system was used, but only a secondary price with 3 to 4 tiers. Given the information that a 2-tier system is most common, it is not readily ascertainable whether a 1 to 2 pound fish commanded higher prices than a 2 to 4 pound fish since both sizes are listed as commanding premium prices. Considering that exvessel demand is derived from consumer demand through wholesale demand, wholesale prices (consumer prices are not available) would be highly indicative of red snapper exvessel price structure.

Information from the Fulton Fish Market shows that at least from 1987 through 1992, wholesale prices for medium size (presumed to be 1 to 2 pounds) red snapper had been higher than those for smaller sizes (Waters 1992). This could very likely mean that exvessel prices for 2 to 4 pound sizes had been higher than for those of smaller sizes for the period mentioned. On the other hand, information for 1993 appeared to indicate that the 1 to 2 pound fish command higher wholesale prices (Antozzi 1993). Recently, Antozzi and Waters (1998) reinforced that finding when they indicated that fish of 1 to 2 pounds were sometimes priced 15 to 25 cents more than larger fish. This reasoning implies higher exvessel prices for smaller size categories than for larger size categories.

Both demand and supply factors have a role on this apparent price reversal. Demand considerations related to the price structure of red snapper are more difficult to pin down. Although an empirically estimated demand function for snappers in the Southeast is available (Keithly and Prochaska 1985), it provides only very general quantitative relationships between snapper price, snapper landings, imports, and income. A similar remark may be made of a more recent estimate of the relationship between red snapper price and landings (Waters 1997). Since these estimations were done for a different purpose, they understandably lack the necessary detail to address such issues as price differentials for various sizes of red snapper. Nonetheless, such estimates show that the demand for snappers is relatively inelastic, indicating that large changes in total quantity of snapper landings are associated with small opposite changes in snapper price. In many public hearings held throughout the Gulf, it has been contended that 1 to 2 pound red snappers command a relatively higher demand, especially among restaurants. While this claim is supported by the premium price for smaller snappers in the 1993 open fishing season, it does not appear to support the premium price attached to 2 to 4 pound sizes in previous years. A change in demand could have possibly occurred in 1993, but there is no information to support this claim.

Supply factors may be of some use to explain the mentioned price reversal. With demand being constant, one possible explanation for the price reversal is that the supply of 1 to 2 pound fish in 1993 must have been relatively low compared to those of previous years and to the 1993 supply of larger fish. The 1989 and 1990 year classes of juvenile red snapper were well above previous average years, with the former being about twice as abundant as the latter year class. By the beginning of 1993, the 1989 and 1990 year classes averaged about 16.7 and 13.1 inches TL, respectively, and a 1 to 2 pound fish is smaller than 16 inches TL. Although it remains to be fully validated by an examination of commercial landings by size categories, there appears to be some reason to believe that in 1993 there was a relatively higher supply of larger sized fish, and this resulted in lower prices for this size category relative to smaller size fish. By 1994, the 1989 and 1990 year classes averaged about 19.8 and 16.7 inches TL, respectively, so that larger size fish would then command lower prices than smaller fish because the 1991 year class was not as strong as the 1989 or 1990 year classes. Similar price conditions would exist in subsequent years since subsequent year classes were also not as strong. Hence, under the condition that the 1989 and 1990 year classes dominated subsequent year classes, catches of larger fish would be very likely higher and would likely depress prices for these size

categories. Thus, it is very likely that the price reversal was caused by more supply of larger fish.

Whether the described condition continues into the future is not certain. In more recent years, recruitment has not been as high as that in 1989, but it has generally been increasing since 1993. The 1996 year class would be about 1 to 2 pounds in 1999, indicating that in that year the price of 1 to 2 pound fish category relative to larger fish categories would not be as high as in 1993. In this case, there is a possibility that a reduction in the minimum size limit to 14 or 13 inches TL would be accompanied by substantial increases in the 1 to 2 pound fish. The expected revenue to the commercial sector would then not be as high as what could be expected in 1993. The price differential between small and large fish could still exist once the size limit is reduced, but there is no guarantee that total revenues to the industry would substantially increase. In addition to these considerations about price differential, the effect of a minimum size limit reduction on the length of the season is also important. If more fish become available to fishermen, the likelihood of the quota being met sooner becomes high. Thus, there is a good possibility that a reduction in the minimum size limit would only worsen the derby condition in the commercial fishery.

The impacts of a size limit reduction on the recreational fishery is not determinate. At the current bag and size limit, most of the trips are catching the bag limit, but at the same time the discard rate is relatively high (Schirripa, 1998a). If the minimum size limit reduction allows more fish to be retained, the season could be shortened; on the other, if the anglers' reaction is such that larger fish are replaced by smaller fish to the extent that smaller fish are caught first, the season could last longer since the quota is measured in pounds. It is very likely, however, that fishing would not cease simply because the bag limit is met. The possibility of highgrading exists, such that smaller fish that are caught first would be retained until they can be replaced with larger fish. This practice can partly be mitigated if fishermen's effort is concentrated in specific areas where smaller fish abound. Given these possibilities, the fishing season could either last longer or shorter.

Commercial Red Snapper Fishing Season

Proposed Alternative: Change the opening criteria for the second commercial red snapper fishing season from the first 15 days of each month, beginning September 1, to an opening at noon on September 1st to noon on September 10th and from noon on the 1st to noon on the 10th for each succeeding month until the fall suballocation is met or the season closes on December 31

Rejected Alternative: Change the opening criteria for the first and second seasons to an opening date of noon on the 1st to noon on the 8th, and from noon on the 16th to noon on the 23rd for each month beginning February 1 until the first season allocation is met and beginning September 1 until the second season allocation is met or the season closes on December 31.

Rejected Alternative: Change the opening criteria for the second commercial red snapper fishing season from the first 15 days of each month, beginning September 1, to the first 7 days of each month, beginning September 1, until the second-season allocation is met or the season closes on December 31

Rejected Alternative: Status Quo - Retain the current first and second season opening for the first 15 days of each month beginning February 1 and September 1 (noon on the 1st to noon on the 15th)

Rationale:

As previously discussed, the Council instituted a split season for the commercial red snapper fishery in 1996. The purpose of this split season was to spread the available quota over a greater portion of the year, thus ameliorating some of the negative effects of the derby fishery that became acute in 1992. In approving a 15-day open and 15-day closed period for each month during the two open seasons (February 1 and September 1) (GMFMC 1997b), the Council noted that this action should spread the available commercial quota over a longer period. It would also lessen the potentially negative effect on vessel safety when compared with a one-week opening each month. On the other hand, Waters and Antozzi (1997) noted that a one-week per month season would probably produce greater economic benefits from the available harvest as compared with a two-week per month strategy. In GMFMC (1997), it is noted that if such increased benefits are shown to be true, the Council could implement changes through the framework procedure.

Based on public testimony and other information presented in the course of setting TAC for the 1999 fishing year, the Council determined that a reduction in the monthly opening periods for the fall season (beginning September 1) would be more beneficial to the industry. The Council again rejected a one-week per month period, believing that it was insufficient to accommodate the needs of the industry. The Council also rejected a proposal for two, one-week periods each month (opening at 12:00 noon on the 1st and closing at 12:00 noon on the 8th; opening again on 12:00 noon on the 16th and closing at 12:00 noon on the 23th) because it would be difficult to enforce and captains may have difficulty maintaining crews. The Council felt that a 10-day period would be an acceptable compromise that may provide greater economic benefits than the current 15-day period without the potential negative impacts on vessel safety and the ability to maintain crews.

Biological Impacts:

Since the fall commercial red snapper season closed following landings of the quota suballocation after 18 and 28 days during 1997 and 1998, respectively, there should be no biological impacts on the red snapper stock. The available quota can be taken under either of the proposed or rejected alternatives; and under current procedures, the fishery is closed when

the allocation is reached. Consequently, there should be no increase or reduction in harvest that would cause a biological impact on the stock.

Economic Impacts:

The derby in the commercial red snapper fishery that resulted in shorter seasons and large landings during the open season has exposed the inverse proportional relationship between landings and prices. In 1997, for example, the average price per pound in January was $3.15; but when the season opened in February, the average priced dropped to $1.89 per pound. Prices remained above $2 during the closed months until the fishery opened again in September, and landings surged in October. A more dramatic situation occurred in the fall season of 1998. In the second week of October, when more favorable fishing weather prevailed, landings increased to an historic peak of about 880,000 pounds. The corresponding average of low prices dropped to $1.25 per pound which has been attribute by fishermen to heavy domestic landings and the entry of imports during the period (Antozzi and Waters 1998).

Given past experience, particularly the one that occurred in the second week of October 1998, a 10-day instead of a 15-day open period in the fall season would do very little to improve the revenue performance of commercial fishing vessels. In fact, the price situation could become worse, if the longer closed period forces dealers to fill the market with imported products. Based on their previous analysis, Antozzi and Waters (1998) reiterated their suggestion of a series of "micro-derbies" which would implement a 1-week on, 1-week off schedule. They contended that this system would allow increased time for inventory distribution while allowing a continuity of supply of domestic red snapper, which would discourage imports.

Private and Public Costs

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

Council costs of document preparation, meetings, public hearings, and information dissemination	$25,500
NMFS administrative costs of document preparation, meetings, and review	$15,000
Law enforcement costs	$ none
Public burden associated with permits	$ none
NMFS costs associated with permits	$ none
TOTAL	$40,500

The Council and NMFS costs of document preparation are based on staff time, travel, printing and any other relevant items where funds were expended directly for this specific action. The proposed measures are not expected to incur additional enforcement cost and permit cost to either the public or NMFS.

Summary of Economic Impacts

In principle, maintaining the status quo for TAC would entail no direct changes on both the commercial and recreational participants in the red snapper fishery. Relative to a TAC of 6.0 million pounds, the recreational fishery could remain open for 5 additional weeks. The long-term impacts of maintaining the status quo TAC relative to lower TACs could not be estimated, but several issues have been raised when assessing the long-term effects of managing the red snapper resource.

The proposed measure to reduce the recreational bag limit from 5 to 4 fish, plus a zero bag limit for captain and crew of for-hire vessels, is expected to reduce the projected rate of recreational harvest, and thus would extend the season by about 4 weeks. This measure, however, is not enough to allow the fishery to remain open throughout the year. While this measure would potentially reduce the angler's economic value per trip as well as reduce the benefits of captain and crew, such reductions are compensated for by reducing the length of closure in the recreational red snapper fishery. Given certain assumptions, this measure would increase the benefits to both anglers and for-hire vessels.

Postponing the opening of the recreational fishery from January 1 to March 1 would allow the fishery to remain open for 15 days more in the fall. Although the tradeoff between winter closed days and fall open days is relatively large, the accompanying reduction in the number of anger trips affected is disproportionately small.

A reduction in the minimum size limit for red snapper offers some potential to worsen the derby in the commercial fishery. The corresponding impacts on the recreational sector cannot be determined.

The proposed reduction in fishing time from 15 days to 10 days for each open month in the fall commercial red snapper season is expected to achieve minimal effects on improving the revenue performance of vessels. The longer closed period within a month could even worsen the price condition if dealers are forced to rely on imported products to meet market demand.

Government costs are estimated at $40,500, and all cost items pertain to the Council and NMFS costs in preparing this amendment.

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; 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; or d) raise novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

The entire commercial red snapper fishery had an ex-vessel value of about $8.3 million in 1997. There is currently no adequate measure of the recreational red snapper fishery impacted by the proposed regulation. Results from demand estimates in other fisheries indicate that the economic impacts from lowering the TAC to 6.0 million pounds could be substantial although given the estimates used for the current purpose, it is deemed that the impacts would not exceed the $100 million mark. Considering that the proposed action is to maintain the status quo TAC, it is concluded that any revenue or cost impacts on the fishery would be significantly less than $100 million annually. Other measures proposed in this amendment are not expected to materially impinge on the revenues of commercial and for-hire vessels.

With the proposed measures in this amendment, particularly the status quo TAC at 9.12 million pounds, commercial and for-hire vessel costs of fishing operations remain unaffected. In addition, prices to consumers are not expected to be affected by the proposed action. The proposed reduction in bag limit from 5 to 4 fish, with zero bag limit for captain and crew, is expected to reduce catch but only to the extent of slightly lengthening the current recreational fishing season. The quota is still expected to be met. As can be gleaned from the cost estimates, there are no major increases in cost to the Federal, State, or local government agencies. In fact the costs incurred by these agencies are only those that are directly related to the formulation of the proposed regulation. Since the proposed regulation has no adverse effects on the commercial and for-hire sectors, except potentially on captain and crew of for-hire vessels, any of the sub-items under item (c) above would not apply.

With the potential exception of January-February closure of the recreational fishery, the measures proposed in this amendment are not expected to raise novel legal or policy issues. With that one exception, all measures proposed in this amendment have already been considered by the Council in the past. The major issue raised against the two month closure in the recreational fishery is that it would be bias against for-hire vessels in South Texas. The rationale for this proposed measure appears to adequately address the extent of the problem raised by this issue.

Based on the foregoing, it is concluded that this regulation if enacted would not constitute a "significant regulatory action" under any of the criteria enumerated above.

Determination of the Need for an Initial Regulatory Flexibility Analysis

Introduction

An Initial Regulatory Flexibility Analysis (IRFA) is conducted primarily to determine whether the proposed action would have a "significant economic impact on a substantial number of small entities." In addition to analyses conducted for the Regulatory Impact Review (RIR), the IRFA provides an estimate of the number of small businesses affected, a description of the small businesses affected, and a discussion of the nature and size of the impacts.

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.

Determination of Significant Economic Impact on a Substantial Number of Small Entities

In general, a "substantial number" of small entities is more than 20 percent of those small entities engaged in the fishery (NMFS, 1992). In 1992, a total of 2,195 permits were issued to qualifying individuals and attached to vessels, and are deemed to comprise the reef fish fishery in the U.S. Gulf of Mexico. There are currently 1,532 active permits, of which 134 also hold red snapper Class I licenses and 579 hold red snapper Class II licenses. Others are in the process of being renewed. There are currently 913 permits issued to charterboats and party boats operating in the Gulf, although based on population of for-hire vessels used for survey purposes, there could be as many as 2,557 for-hire vessels operating in the Gulf. The Small Business Administration (SBA) defines a small business in the commercial fishing activity as a firm with receipts of up to $3.0 million annually. SBA also defines a small business in the charterboat activity as a firm with receipts up to $5 million per year.

All of the commercial reef fish harvesting entities affected by the rule will qualify as small business entities because their gross revenues are less than $3 million annually. In addition, for-hire vessels in the Gulf affected by the proposed rule generally earn less than $5 million in annual revenues and are thus considered to be small business entities. Hence, it is clear that the criterion of a substantial number of the small business entities comprising the commercial reef fish harvesting industry and the for-hire sector 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.

The regulations are likely to result in a change in annual gross revenues by more than 5 percent. Of the measures proposed none is expected to directly reduce gross revenues of commercial and for-hire vessels. However, the proposed zero bag limit for captain and crew of for-hire

vessels would potentially reduce the income of these persons by an unknown amount. It has been estimated that this provision would reduce recreational landings by 3 percent. To the extent, however, that the zero bag limit would allow for-hire vessels to operate 3 to 5 days longer in the season, the gross revenues of these vessels would likely be enhanced although by less than 5 percent of total revenues.

Annual compliance costs (annualized capital, operating, reporting, etc.) increase total costs of production for small entities by more than 5 percent. No production cost increases are expected under any of the proposed measures in this amendment.

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 are no differential impacts.

Capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities. There are no expected changes in capital costs of complying with the proposed rule.

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. Considering that the status quo TAC is maintained and that all the other measures are designed, although not totally expected, to extend the recreational season or improve the revenue performance of commercial vessels, no business entity is expected to cease operation. Exit of some vessels from the fishery may occur, but not as a direct result of the measures proposed in this amendment. The zero bag limit for captain and crew of for-hire vessels would not impinge on the financial viability of for-hire vessels.

Conclusion

In view of the determination that none of the criteria being considered for the proposed rule are expected to have a significant economic impact on small business entities, it is concluded that an IRFA is not needed.

10.0 ENVIRONMENTAL ASSESSMENT

Environmental Consequences

Physical and Human Environment: The actions proposed in this amendment will have no impact on the physical environment. Had a reduced TAC or reduced bag limit been implemented, there would have been a decreased ability of recreational for-hire boats to attract

customers and an increased time when the recreational fishery is closed. During closed seasons, losses would be sustained not only by the owners and operators of the for-hire vessels, but also by tackle shops, hotels, restaurants, and other industries in the fishing communities that are dependent upon the fishing tourist industry. The proposed actions minimize this negative impact, and provide stability in the recreational red snapper regulations for at least one more year.

Fishery Resource: Provided that a 60% shrimp trawl bycatch reduction can be achieved, the actions proposed in this amendment are consistent with the Council's objective of rebuilding the overfished red snapper stock within one and a half generation times. The proposed TAC of 9.12 million pounds is within the 50% probability of achieving 20 percent SPR by 2019 under these assumptions. Of course, the expected impact of bycatch reduction is based on assumptions about natural mortality rates and computer projections. Implementing bycatch reduction and observing, rather than projecting, its impact should result in improved management in the future. Maintaining a constant TAC during the phase-in of bycatch reduction regulations will allow management to assess the actual impact of bycatch reduction without the complicating factor of a fluctuating TAC.

Charterboat fishermen testified at the January 1998 Council meeting that they were able to attract few customers during the 1997 recreational closure. If this behavior persists, then effort shifting to other species during the closed seasons may be insignificant. However, it is also possible that, as fishermen adjust to having a red snapper open and closed season, effort on alternative species may begin to increase over time. Species such as vermilion snapper or triggerfish may be likely substitute species in the reef fish fishery, but it is also possible that effort shifting could affect non-reef fish species such as mackerels, sharks, tunas, or other coastal species.

Effect on Endangered Species and Marine Mammals: It is requested that NOAA conduct a consultation under Section 7 of the Endangered Species Act. It is anticipated that the proposed actions will not jeopardize the recovery of endangered or threatened species or their critical habitat.

Effect on Wetlands: The proposed action will have no effect on flood plains, wetlands, or rivers.

Mitigating Measures: No mitigating measures related to the proposed actions are necessary because there are no harmful impacts to the environment.

Unavoidable Adverse Effects: The proposed action does not create unavoidable adverse affects.

Irreversible and Irretrievable Commitments of Resources: There are no irreversible commitments of resources expected from implementation of this regulatory amendment.

Finding of No Significant Environmental Impact

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 actions are adjustments of the original regulations of the FMP under the framework procedure set forth in Amendment 1 to rebuild overfished reef fish stocks. The proposed actions should not result in impacts significantly different in context or intensity from those described in the environmental impact statement and environmental assessment published with the regulations implementing the FMP and Amendment 1.

Having reviewed the environmental assessment and available information relative to the proposed actions, I have determined that there will be no significant environmental impact resulting from the proposed actions. Accordingly, the preparation of a formal environmental impact statement on these issues is not required for this amendment by Section 102(2)(c) of the National Environmental Policy Act or its implementing regulations.

Approved:_____ _____

Assistant Administrator for Fisheries Date

11.0 OTHER APPLICABLE LAW

Habitat Concerns

Reef fish habitats and related concerns were described in the FMP and updated in Amendments 1 and 5. The actions in this regulatory amendment do not affect the habitat.

Vessel Safety Considerations

A determination of vessel safety with regard to compliance with 50 CFR 605.15(b)(3) has been requested from the U.S. Coast Guard. Actions in this regulatory amendment are not expected to affect vessel safety; however, rejected alternatives that would reduce the red snapper TAC could result in a more intense derby fishery in the commercial sector and jeopardize vessel safety.

Coastal Zone Consistency

Section 307(c)(1) of the Coastal Zone Management Act of 1972, as amended, requires that all federal activities that 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 red snapper in the EEZ of the Gulf of Mexico will make no changes in federal regulations that are inconsistent with either existing or proposed state regulations.

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.

Both the proposed and rejected levels of TAC are likely to result in a recreational quota closure of red snapper in federal waters. In 1997, none of the Gulf coastal states implemented compatible closures in state waters, resulting in an inconsistency between state and federal regulations. Recreational red snapper quota management in federal waters is required under Section 407(d) of the Magnuson-Stevens Fishery Conservation and Management Act, and is consistent with the objective of preventing overfishing by the recreational sector while maintaining bag limits at levels acceptable to the recreational for-hire industry. Where applicable, this regulatory amendment is consistent with the Coastal Zone Management programs of the states of Alabama, Florida, Louisiana, Mississippi, and Texas to the maximum extent possible. Determinations of applicability or consistency have 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, Louisiana, and Texas.

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. This authority encompasses establishment of guidelines and policies, approval of information collection requests, and reduction of paperwork burdens and duplications.

The Council does not propose, through this regulatory amendment, to establish any additional reporting requirements or burdens.

Federalism

No federalism issues have been identified relative to the actions proposed in this regulatory amendment. Therefore, preparation of a federalism assessment under Executive Order 12612 is not necessary.

12.0 PUBLIC REVIEW

Public hearings to obtain public comments on this regulatory amendment were held during the Gulf Council meeting in November 1998 in Galveston, Texas. Copies of this document may be obtained from the Gulf of Mexico Fishery Management Council office, 3018 U.S. Highway 301 North, Suite 1000, Tampa, Florida 33619-2266, (813)228-2815.

List of Agencies Consulted:

Gulf of Mexico Fishery Management Council's
- -Reef Fish Stock Assessment Panel
- -Socioeconomic Panel
- -Standing and Special Reef Fish Scientific and Statistical Committee
- -Red Snapper Advisory Panel

National Marine Fisheries Service
- -Southeast Regional Office
- -Southeast Fisheries Science Center

Responsible Agency:

Gulf of Mexico Fishery Management Council
The Commons at Rivergate
3018 U.S. Highway 301 North, Suite 1000
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(813) 228-2815

List of Preparers:

Gulf of Mexico Fishery Management Council
- Richard Leard, Fishery Biologist
- Antonio Lamberte, Economist

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Table 1. Comparison of commercial red snapper quota, actual harvest, and percentage over or under the allocation, 1990-1997.

Year	Commercial Quota	Commercial Harvest	Percentage over(+)/under(-)
1990	3.10 MP	2.66 MP	-14%
1991	2.04 MP	2.23 MP	9%
1992	2.04 MP plus emergency season	3.14 MP	53%
1993	3.06 MP	3.02 MP	-1%
1994	3.06 MP	3.25 MP	6%
1995	3.06 MP	2.95 MP	-4%
1996	4.65 MP	4.35 MP	-7%
1997	4.65 MP	4.79 MP	3%

Table 2. Comparison of recreational red snapper quota, actual harvest, and percentage over or under the allocation, 1990-1997.

Year	Recreational Allocation	Recreational Harvest	Percentage over(+)/under(-)
1990	No allocation was explicitly specified	1.28 MP	N/A
1991	1.96 MP	2.08 MP	6%
1992	1.96 MP	3.71 MP	89.00%
1993	2.94 MP	5.91 MP	101%
1994	2.94 MP	5.24 MP	78%
1995	2.94 MP	4.19 MP	43%
1996	4.47 MP	3.85 MP	-13%
1997	4.47 MP	5.25 MP	17%

Table 3. Projected SPR in target years under combinations of bycatch reduction and TAC (Table 1, RFSAP - October, 1998)

Bycatch Reduction (percent)	Directed Harvest (mill. lbs.)	SPR 2019	SPR 2032	SPR 2034	SPR 2037
50	0	.24	.32	.33	.33
	3	.21	.30*	.30	.31
	6	.19	.29	.29	.30
	9	.17	.27	.28	.29
	12	.14	.25	.26	.28
55	0	.26	.35	.36	.37
	3	.23	.33	.34	.35
	6	.21	.32	.33	.34
	9	.19	.30	.31	.33
	12	.16	.29	.30*	.31
60	0	.28	.39	.40	.41
	3	.26	.37	.37	.38
	6	.24	.36	.36	.38
	9	.22	.34	.35	.38
	12	.18	.32	.34	.35
70	0	.34	.48	.49	.51
	3	.31	.45	.46	.48
	6	.30*	.44	.45	.47
	9	.27	.43	.44	.46
	12	.24	.41	.43	.44

* Rounded to 0.30 but unrounded value is 0.295-0.299

Table 4. Commercial red snapper quotas, size limits, and length of fishing seasons, 1990 through 1998.

Year	Quota (Million Pounds)	Size Limit (Inches TL)	Duration (Days)
1990	3.10	13	365
1991	2.04	13	235
1992	2.04	13	53[1]
1993	3.06	13	94
1994	3.06	14	77
1995	3.06	14	52[2]
1996	4.65	15	86[3]
1997	4.65	15	71[4]
1998	4.65	15	68[5]

[1]Re-opened for 42 days under a 1,000-pound trip limit; total catch reached 3.14 million pounds.
[2]Re-opened for 36 hours due to pre-mature closure of the fishery on April 15, 1995.
[3]Split season into spring and fall subseasons.
[4]Split season with fall subseason open on a 15-day schedule.
[5]Split season with both spring and fall subseasons on a 15-day schedule.

Table 5. Management features of the recreational red snapper fishery

Year	Allocation[1] (Million Pounds)	Size Limit (Inches TL)	Bag Limit (Number of Fish)
1990	2.97	13	7
1991	1.96	13	7
1992	1.96	13	7
1993	2.94	13	7
1994	2.94	14	7
1995	2.94	15	5
1996	4.47	15	5
1997	4.47[1]	15	5
1998	4.47[2]	15	4[3]

[1]Considered a quota beginning 1997; the fishery closed on Nov. 27, 1997.
[2]The fishery closed on September 30, 1998.
[3]Bag limit was 5 fish from January through April, 1998.

Table 6. Projected 1999 recreational red snapper quota closures

TAC (Rec. Quota)	Bag Limit			
	5	4	3	2
3 (1.47) MP	early May	mid May	early June	mid June
4.5 (2.21) MP	mid June	late June	early July	late July
6 (2.94 MP)	early July	mid July	early August	late August
9.12 (4.47) MP	mid August	early September	early October	mid November

Note: Season is assumed to open on January 1, 1999.

Source: GMFMC (1998a).

Table 7. Average annual gross revenue of representative for-hire vessels

State	Charterboat (Dollars)	Headboat (Dollars)
Florida	85,746	153,870
Alabama	44,229	124,827[1]
Louisiana	63,204	
Mississippi	52,164	
Texas	35,561	

[1]Average for head boats in Alabama, Louisiana, Mississippi, and Texas.

Table 8. Gross revenue reductions from an early July to mid-August closure of the red snapper fishery

State	Charterboats (Million Dollars)	Headboats (Million Dollars)
Florida	0.21	0.63
Alabama	0.45	0.84[1]
Louisiana	0.40	
Mississippi	0.18	
Texas	0.74	
Total	**1.98**	**1.47**

[1]Headboats in Alabama, Louisiana, Mississippi, and Texas.

Table 9. Net present values of alternative constant catch policies

Bycatch Reduction	TAC (MP)	SPR 2019	SPR 2032	30% SPR In Year	PV of Comm Benefits (Million Dollars)
50%	6 MP	19%	28%	2037	$ 79.5 + 0.95 FB_{50}
50%	9.12	17	27	2037+	?
55%	6 MP	21%	32%	2028	$ 74.4 + 1.75 FB_{55}
55%	9.12	19	30	2031	$ 94.2 + 1.43 FB_{55}
60%	6 MP	24%	36%	2024	$ 70.9 + 2.30 FB_{60}
60%	9.12	22	34	2026	$ 89.7 + 2.01 FB_{60}

Source: GMFMC (1998c).

Table 10. Impacts of bag limits and winter closure of the recreational red snapper fishery

	5-FISH BAG*						4-FISH BAG					
	UNIFORM			CAP/CREW REDUCTION**			UNIFORM			CAP/CREW REDUCTION**		
MONTH	SUM	CUM	CLOSE	SUM	CUM	CLOSE	SUM	CUM	CLOSE	SUM	CUM	CLOSE
JAN	0.300	0.300		0.291	0.291		0.247	0.247		0.240	0.240	
FEB	0.276	0.576		0.268	0.559		0.230	0.477		0.223	0.463	
MAR	0.392	0.968		0.380	0.939		0.332	0.809		0.322	0.785	
APR	0.371	1.339		0.360	1.299		0.318	1.127		0.308	1.093	
MAY	0.609	1.948		0.591	1.890		0.514	1.641		0.499	1.592	
JUN	0.753	2.701		0.730	2.620		0.629	2.270		0.610	2.202	
JUL	1.123	3.824		1.089	3.709		0.944	3.214		0.916	3.118	
AUG	1.193	5.017	18	1.157	4.866	21	1.003	4.217		0.973	4.090	
SEP		5.017		0.000	4.866		0.866	5.083	10	0.840	4.931	15
OCT		5.017		0.000	4.866			5.083		0.000	4.931	
NOV		5.017		0.000	4.866			5.083		0.000	4.931	
DEC		5.017		0.000	4.866			5.083		0.000	4.931	
CLOSURE EFFECTS												
JAN		AUG	26		AUG	29		SEP	19		SEP	24
JAN+FEB		(=SEP 2)	33		(=SEP 5)	36		SEP	27		(=OCT 2)	32

*The Schirripa analysis did not provide August landings for the full month. The number presented here assumes that the August harvest rate under 5 fish is equal to the July/August rate under the 4-fish bag (August @ 5 fish=(1.003/0.944)*1.123=1.193).
**Assumes a 3% reduction in total landings as a result of the 0 captain/crew bag limit.
Source: Holiman (personal communication).

Table 11. Gross revenue increases from a reduction in the bag limit from 5 to 4 fish, but with an extended season

State	Charterboats (Million Dollars)	Headboats (Million Dollars)
Florida	0.17	0.36
Alabama	0.37	0.48[1]
Louisiana	0.34	
Mississippi	0.15	
Texas	0.62	
Total	**1.65**	**0.84**

[1]Headboats in Alabama, Louisiana, Mississippi, and Texas.

APPENDIX A

Procedure for Specification of TAC:

1. Prior to October 1 each year, or such other time as agreed upon by the Council and RA, the NMFS Southeast Fisheries Science Center (SEFSC) and Economics and Trade Division (ETD), Southeast Regional Office (SERO) will: a) update or complete biological and economic assessments and analysis of the present and future condition of the stocks and fisheries for red snapper and other reef fish stocks or stock complexes; b) assess to the extent possible the current SPR levels for each stock; c) estimate fishing mortality (F) in relation to $F_{20\ \text{percent SPR}}$ and F_{OY}; d) estimate annual surplus production, F_{max} or other population parameters deemed appropriate; e) summarize statistics on the fishery for each stock or stock complex; f) specify the geographical variations in stock abundance, mortality, recruitment, and age of entry into the fishery for each stock or stock complex; and g) provide information for analyzing social and economic impacts of any specification demanding adjustments of allocations, quotas, bag limits or other fishing restrictions.

2. The Council will convene a Scientific Reef Fish Stock Assessment Panel (RFSAP), and a Socioeconomic Assessment Panel (SEP) appointed by the Council, that will, as working groups, review the SEFSC and ETD assessments, current harvest statistics, economic, social, and other relevant data. The RFSAP will prepare a written report to the Council specifying a range of ABC for each stock or stock complex which is in need of catch restrictions for attaining or maintaining OY. The ABCs are catch ranges that will be calculated for those species in the management unit that have been identified by the Council, NMFS, or the working panels as in need of catch restrictions for attaining or maintaining OY. For overfished stocks, the range of ABCs shall be calculated so as to achieve reef fish population levels at or above the 20 percent SPR goal by January 1, 2000, for all reef fish except red snapper which has a January 2019 target date, or by a time period (target date), or set of time periods (target dates) specified by the RFSAP. Any time period specified by the stock assessment panel for consideration by the Council under this framework procedure cannot exceed a period equal to 1.5 times the potential generation time of the stock or such other time period as specified by plan amendment. Generation times are to be specified by the stock assessment panel based on the biological characteristics of the individual stocks. For stock or stock complexes where data in the SEFSC reports are inadequate to compute an ABC based on the spawning stock biomass per recruit or SPR models, the RFSAP will use other available information as a guide in providing their best estimate of an ABC range that should result in at least a 20 percent SPR level. The ABC ranges will be established to prevent an overfished stock from further decline. To the extent possible, a risk analysis should be conducted indicating the probabilities of attaining or exceeding the stock goal of 20 percent SPR, the annual transitional yields (i.e., catch streams) calculated for each level of fishing mortality within the ABC range. The SEP will examine the economic and social impacts associated with fishing restrictions required to

attain those levels. The working groups reports may include recommendations on bag limits, size limits, specific gear limits, season closures, and other restrictions required to attain management goals, along with the economic and social impacts of such restrictions, and the research and data collection necessary to improve the assessments. The RFSAP may also recommend additional species for future analysis.

3. The Council will conduct a public hearing on the RFSAP and SEP reports at, or prior, to the time it is considered by the Council for action. Other public hearings may be held also. The Council will request review of the reports by its Reef Fish Advisory Panel and Scientific and Statistical Committees and may convene these groups before taking action.

4. The Council in selecting a TAC level, and a stock restoration time period (target date), if necessary, for each stock or stock complex for which an ABC range has been identified will, in addition to taking into consideration the recommendations and information provided for in (1), (2), and (3), utilize the following criteria:

   a. Set TAC within or below the first ABC range or set a series of annual TACs to obtain the ABC level within the first three years or less.

   b. Subdivide the TACs into commercial and recreational allocations which maximize the net benefits of the fishery to the nation. The allocations will be based on historical percentages harvested by each user group during the base period of 1979-1987. However, if for an overfished stock the harvest in any year exceeds the TAC due to either the recreational or commercial user group exceeding its allocation, subsequent allocations pertaining to the respective user group will be adjusted to assure meeting the specified target date for achieving the spawning potential ratio (SPR) goal.

5. The Council will provide its recommendations to the NMFS Regional Administrator for any specifications in TACs and stock restoration target dates for each stock or stock complex, and the quotas, bag limits, trip limits, size limits, closed seasons, and gear restrictions necessary to attain the TAC, along with the reports, a regulatory impact review and environmental assessment of impacts, and the proposed regulations before October 15, or such other time as agreed upon by the Council and Regional Administrator.

6. Prior to each fishing year, or other such time as agreed upon by the NMFS Regional Administrator and Council, the Regional Administrator will review the Council's recommendations and supporting information; and, if he concurs that the recommendations are consistent with the objectives of the FMP, the Magnuson-Stevens Act National Standards, and other applicable law, he shall forward for publication notice of proposed rules for TACs and associated harvest restrictions by November 1, or such other time as agreed upon by the Council and Regional Administrator (providing up to 30 days for additional public comment). The Regional Administrator will take into consideration all public comment and information received and will forward for publication in the Federal

Register the notice of final rule by December 1, or such other time as agreed upon by the Council and Regional Administrator.

7. The commercial allocations of reef fish TACs, and the recreational allocation of red snapper TAC, shall be considered to be quotas. Appropriate regulatory changes that may be implemented by proposed rule in the Federal Register include:

   a. The TACs for each stock or stock complex that are designed to achieve a specific level of ABC within the first year, or annual levels of TAC designed to achieve the ABC level within three years.

   b. Bag limits, size limits, vessel trip limits, closed seasons or areas, gear restrictions, and quotas designed to achieve the TAC level.

   c. The time period (target date) specified for rebuilding an overfished stock with the restriction that a time period specified under this framework procedure cannot exceed a period equal to 1.5 times the generation time of the stock under consideration.

8. The NMFS Regional Administrator is authorized, through notice action, to conduct the following activities:

   a. Close the commercial fishery of a reef fish species or species group that has a commercial quota or sub-quota at such time as projected to be necessary to prevent the commercial sector from exceeding its allocation for the remainder of the fishing year or sub-quota season.

   b. Close the recreational red snapper fishery in the EEZ, i.e., reduce the red snapper bag limit to zero, at such time as projected to be necessary to prevent the recreational sector from exceeding its allocation for the remainder of the fishing year.

   c. Reopen a commercial or recreational season that had been prematurely closed if needed to assure that an allocation can be reached.

9. If the NMFS decides not to publish the proposed rule of the recommended management measures, or to otherwise hold the measures in abeyance, then the Regional Administrator must notify the Council of his intended action within 30 days of receipt of the Council's proposal and the reasons for NMFS concern along with suggested changes to the proposed management measures that would alleviate the concerns. Such notice shall specify: 1) the applicable law with which the amendment is inconsistent, 2) the nature of such inconsistencies, and 3) recommendations concerning the actions that could be taken by the Council to conform the amendment to the requirements of applicable law.