

REGULATORY AMENDMENT

TO THE

REEF FISH FISHERY MANAGEMENT PLAN

FOR SETTING THE

1993 RED SNAPPER TOTAL ALLOWABLE CATCH

*(Includes Environmental Assessment,
and Regulatory Impact Review)*

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Table of Contents

HISTORY OF MANAGEMENT	1
PROPOSED ACTION	3
MANAGEMENT OBJECTIVE AND OPTIMUM YIELD	3
REEF FISH FRAMEWORK PROCEDURE AS SPECIFIED IN THE FMP	4
SPAWNING POTENTIAL RATIO (SPR)	6
STATUS OF RED SNAPPER STOCK	7
Harvest Trends	7
Recruitment Trends	8
Shrimp Trawl Bycatch Mortality	9
Fishing Mortality Rates	9
Generation Time	9
Spawning Potential Ratio (SPR)	10
Conclusions	10
MANAGEMENT ALTERNATIVES AND REGULATORY IMPACT REVIEW	11
Introduction	11
Proposed Alternative	11
Rejected Alternatives	19
Private and Public Costs	21
Summary of Regulatory Impacts	22
Determination of a Major Rule	22
Initial Regulatory Flexibility Analysis	23
ENVIRONMENTAL ASSESSMENT	25
Environmental Consequences	25
Finding of No Significant Environmental Impact	25
SCIENTIFIC RESEARCH AND DATA NEEDS	26
REFERENCES	27
PUBLIC REVIEW	28

Abbreviations Used in This Document

ABC	Allowable Biological Catch
BRD	Bycatch Reduction Device
Council	Gulf of Mexico Fishery Management Council
EEZ	Exclusive Economic Zone
FMP	Fishery Management Plan
GMFMC	Gulf of Mexico Fishery Management Council
NMFS	National Marine Fisheries Service
OY	Optimum Yield
Plan	Reef Fish FMP for the Gulf of Mexico
RD	Regional Director (NMFS Southeast Regional Office)
RFSAP	Reef Fish Scientific Assessment Panel
SEFC	Southeast Fisheries Center, Miami, Florida (NMFS Southeast Regional Office)
SPR	Spawning Potential Ratio
TAC	Total Allowable Catch
TED	Turtle Excluder Device
YPR	Yield Per Recruit

1. HISTORY OF MANAGEMENT

The Reef Fish Fishery Management Plan was implemented in November 1984. The regulations, designed to rebuild declining reef fish stocks, included: (1) prohibitions on the use of fish traps, roller trawls, and powerhead-equipped spear guns within an inshore stressed area; (2) a minimum size limit of 13 inches total length for red snapper with the exceptions that for-hire boats were exempted until 1987 and each angler could keep 5 undersize fish; and, (3) data reporting requirements.

The National Marine Fisheries Service (NMFS) has collected commercial landings data since the early 1950's, recreational harvest data since 1979, and in 1984 initiated a dockside interview program to collect more detailed data on commercial harvest. The first red snapper assessment in 1988 indicated that red snapper was significantly overfished and that reductions in fishing mortality rates of as much as 60 to 70 percent were necessary to rebuild red snapper to a recommended 20 percent spawning stock potential ratio (SPR - See Section 5 below). The 1988 assessment also identified shrimp trawl bycatch as a significant source of mortality.

The Council, through Amendment 1 to the Reef Fish Fishery Management Plan, implemented in 1990 a 7 fish recreational bag limit and a 3.1 million pound commercial quota for red snapper that together were to reduce fishing mortality by 20 percent and begin rebuilding the population. However, analyses available to the Council during development of Amendment 1 indicated that additional red snapper harvest restrictions would be necessary in the future to rebuild to 20 percent SPR by the target year of 2000. The Council also implemented a framework procedure (described in Section 4) to allow for annual management changes.

At the direction of the Council, the Reef Fish Scientific Assessment Panel (RFSAP) met in March 1990 and reviewed the 1990 NMFS Red Snapper Stock Assessment. The recommendation of the panel at that time was to close the directed fishery because the Allowable Biological Catch (ABC) was being harvested as bycatch of the shrimp trawl fishery. No viable alternatives were identified that would achieve the 20 percent SPR goal by the year 2000 without closure of the directed fishery; because no means existed for reducing trawl bycatch. As a result, Amendment 3 was implemented in July 1991, which provided additional flexibility in the annual framework procedure by allowing the target date for rebuilding an overfished stock to be changed depending on changes in scientific advice. It set a new red snapper target year of 2007 for achieving the 20 percent spawning potential goal established in Amendment 1.

The first regulatory changes to set and implement a Total Allowable Catch (TAC) under the Amendment 1 framework procedure were proposed in a March 1991 Regulatory Amendment and implemented in July 1991 (GMFMC 1991). The 1991 Regulatory Amendment set a red snapper TAC of 4.0 million pounds to be allocated with a commercial quota of 2.04 million pounds and a 7 fish recreational daily bag limit (1.96 million pounds). It also contained a proposal by the Council to effect a 50 percent reduction of red snapper bycatch in 1994 by the offshore EEZ shrimp trawler fleet, to occur through the mandatory use of finfish excluder devices on shrimp trawls, reductions in fishing effort, area or season closures of the shrimp fishery, or a combination of these actions. This combination of measures was projected to achieve a 20 percent SPR by the year 2007.

Amendment 4, proposed in November 1991 and implemented in May 1992, established a moratorium on the issuance of new reef fish permits for a maximum period of three years, during

or after which the Council will consider and may implement a more comprehensive effort limitation program. The moratorium was created to moderate short term future increases in fishing effort and to attempt to stabilize fishing mortality. The moratorium allows the transfer of permits between vessels owned by the permittee or between individuals when the permitted vessel is transferred. Amendment 4 also changed the due date for NMFS stock and socioeconomic assessments from April to August to allow the assessment to incorporate more timely landings data from the previous year. If NMFS decides not to publish a proposed rule of the recommended management measures, Amendment 4 requires that the Regional Director must notify the Council of his intended action within 15 days of receipt of the Council's proposal along with the reasons for NMFS concern and suggested changes to the proposed management measures that would alleviate the concerns.

In August 1992 the Council received an updated red snapper stock assessment from NMFS. At the direction of the Council, the Reef Fish Stock Assessment Panel and the Socioeconomic Panel met in August to review the stock assessment and issue recommendations for a 1993 TAC and measures for implementation. The Standing and Special Reef Fish Scientific and Statistical Committees and the Reef Fish Advisory Panel met in September to review the stock assessment and reports from the two previous panels, and the Council reviewed the reports and recommendations of all of the groups at its meeting in September 1992. This regulatory amendment represents the Council's proposed red snapper TAC for 1993.

2. PROPOSED ACTION

The Council proposes to establish a 1993 TAC for red snapper of 6.0 million pounds, with 3.06 million pounds allocated to the commercial fishery and 2.94 million pounds allocated to the recreational fishery¹. The commercial allocation will be implemented by a quota, and the recreational allocation will be implemented by a 7 fish recreational daily bag limit. The FMP provides that if the recreational or commercial quota is exceeded, subsequent quotas will be reduced to compensate for the excess. The Council will continue to monitor the status of the stock through review of annual stock assessments and trends in the red snapper recruitment index available from the NMFS research survey cruises. Future management actions will be based on changes in stock size and recruitment levels.

The Council also proposes to extend the target date for achieving a 20 percent spawning potential ratio to the year 2009, and to continue the proposal to effect a 50 percent reduction of red snapper in shrimp trawl bycatch by 1994. The 50 percent reduction will occur through mandatory use of finfish excluder devices on shrimp trawls, reductions in fishing effort, area/season closures of the shrimp fishery, or a combination of these actions.

3. MANAGEMENT OBJECTIVE AND OPTIMUM YIELD

The primary objective and definition of Optimum Yield (OY) for the Reef Fish Fishery Management Plan is any harvest level which maintains, or is expected to maintain, over time a survival rate of biomass into the stock of spawning age to achieve at least a 20 percent spawning 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 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

¹This allocation ratio in terms of weight is 51 percent commercial and 49 percent recreational, based on the landings data contained in Amendment 1, Table 8.1.

complex that would not at least allow a harvest of optimum yield on a continuing basis.

4. REEF FISH FRAMEWORK PROCEDURE AS SPECIFIED IN THE FMP

Optimum Yield (OY) can be achieved with annual total allowable catch (TAC) specifications for each species or species group. The Council has established a framework procedure where, on an annual basis, a scientific working group will establish a range of Allowable Biological Catch (ABC), and the Council will set a TAC and prescribe fishing restrictions to attain the management goal of OY for implementation by the Regional Director (RD) of NMFS prior to the beginning of a fishing year.

Procedure for Specification of TAC:

1. Prior to August 1 each year, or such other time as agreed upon by the Council and RD, the Southeast Fisheries Center of NMFS (SEFC) will: a) update or complete biological and economic assessments and analyses of the present and future condition of the stocks for red snapper and other reef fish stock or stock complex; b) assess to the extent possible the current SPR levels for each stock; c) estimate fishing mortality (F) in relation to $F_{20 \text{ percent SPR}}$; 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) analyze social and economic impacts of any specification demanding adjustments of allocations, quotas, or bag limits.
2. The Council will convene a Scientific Assessment Panel, appointed by the Council, that will, as a working group, review the SEFC assessment(s), current harvest statistics, economic, social, and other relevant data. It 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 panel as in need of catch restrictions for attaining or maintaining OY. 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 2007 target date, or by a time period (target date), or set of time periods (target dates) specified by the stock assessment panel. Any time period specified by the assessment panels 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. 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 SEFC reports are inadequate to compute an ABC based on the spawning stock biomass per recruit model, the above working group 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, and the economic and social impacts associated with those levels. The working group report will 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 working group may also recommend additional species for future analyses.

3. The Council will conduct a public hearing on the working group 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 Standing Scientific and Statistical Committees and may convene these groups before taking action.
4. The Council in selecting a TAC level and 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 provided for in (1), (2), and (3), utilize the following criteria:
 - a. Set TAC within or below the ABC range or set a series of annual TACs to obtain the ABC level within 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 1979-1987². However, if 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 spawning stock biomass per recruit (SPR) goal.
5. The Council will provide its recommendations to the RD for any specifications in TACs and target dates for each stock or stock complex, 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 RD.
6. Prior to each fishing year, or other such time as agreed upon by the RD and Council, the RD 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 National Standards, and other applicable law, he shall forward for publication notice of proposed TACs and associated harvest restrictions by November 1, or such other time as agreed upon by the Council and RD (providing up to 30 days for additional public comment). The RD will take into consideration all 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 RD.

²This allocation ratio in terms of weight is 51 percent commercial and 49 percent recreational, based on the landings data contained in Amendment 1, Table 8.1.

If NMFS decides not to publish the proposed rule of the recommended management measures, or to otherwise hold the measures in abeyance, then the Regional Director must notify the Council of his intended action within 15 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.

7. Appropriate regulatory changes that may be implemented by notice action 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.

5. SPAWNING POTENTIAL RATIO (SPR)

Spawning potential ratio is an index of a population's health as measured by the biological ability of the adult fish to produce spawn or eggs. A particular estimated level of SPR is directly dependent on the estimated number of living adult fish (or females) which is controlled by the prevailing fishing mortality exerted on the population. This biological spawning ability can be measured in terms of total adult fish biomass (number alive x average weight), gonad biomass (number alive x average gonad weight), or eggs produced (number alive x average number of eggs spawned) for each age class of fish.

A generation of fish in a population must on average produce the same number of adult fish in the next generation for a population to persist without decline or, in other words, be in equilibrium. All populations of animals attempt to attain levels of equilibrium, however environmental fluctuations prevent this from happening in most cases. Fishing reduces the number of adults surviving from a given number of recruits by reducing their life expectancy. To prevent population collapse the egg to recruit survival probability and/or the fecundities of the survivors must rise in response to the fishing induced lowered abundance of adults (Goodyear 1989). Clearly, the above population mechanisms allow a population to be harvested without damaging its biological potential. However, as harvest pressure grows (fishing mortality increases), a point is reached where the population loses more fish through harvesting than it can replenish, and overfishing occurs. A population can also exist at an equilibrium level below its optimum level and can increase in size if fishing mortality is reduced.

Various measures of optimal fishing have been defined whereby fishing greater than the optimal level results in overfishing. The concepts of maximum sustainable yield (MSY) and maximum yield per recruit (YPR) are the two most common measures of optimal fishing. For reasons set forth in Amendment 1, the measure of optimal fishing for reef fish was chosen to be 20 percent SPR, which in a YPR context results in management advice similar to that needed to achieve maximum YPR.

Calculation of SPR is similar to calculation of YPR, except, instead of attempting to maximize yield from a year class of fish, achieving a certain level of spawning potential is attempted. This spawning potential is estimated as the fraction or ratio of spawning ability of the species when being fished divided by the spawning ability of the species under conditions of no fishing mortality; i.e., only natural mortality occurs. The SPR of a population is then controlled by the fishing mortality exerted on each age class of fish.

6. STATUS OF RED SNAPPER STOCK

This section is taken in from the 1992 stock assessment (Goodyear 1992a), the Interim Stock Assessment Panel Report (Goodyear 1992b) and the Final Stock Assessment Panel Report (Goodyear 1992c). Additional information came from the 1991 Regulatory Amendment to the Reef Fish FMP (GMFMC 1991).

The red snapper within the Gulf of Mexico's Exclusive Economic Zone (EEZ) and adjoining territorial sea are considered to be a single unit stock for management purposes. Although the possibility exists for genetic exchange among red snapper occurring in the southwestern Gulf of Mexico, the Atlantic Ocean, and northern Gulf through larval drift, juvenile and adult red snapper do not migrate long distances once they adopt a benthic life style. It is this nonmigratory behavior of juvenile and adult red snapper that allows for separate management of the red snapper occurring in the U.S. Gulf of Mexico.

Harvest Trends

Commercial: Gulf of Mexico red snapper harvested by U.S. fishermen are primarily caught in the northern Gulf from Panama City, Florida to Galveston, Texas. The fishery is primarily prosecuted in federal waters, offshore, and outside of state waters. The greatest part of the present commercial and recreational harvest is directly south and to the west of the Mississippi River.

In the commercial red snapper fishery the primary gear types used are manually operated handlines or power assisted lines (bandit rigs). Landings from these gear types are reported under a single gear code for handlines. Other gear types used to harvest red snapper include bottom longlines, buoy lines and fish traps, although total landings of red snapper from fish traps have been small.

Total commercial landings of red snapper include fish captured in both U.S. and foreign waters. Landings since 1964 have been separated into the two sources, and analysis was based on domestic landings only. Commercial landings were relatively stable at around 7 million pounds from 1964 until the mid-1970's (Figure 1). They declined to 4.1 million pounds in 1980, recovered to 7.1 million pounds in 1983, and then declined to 2.7 million pounds in 1990. In 1991 and 1992 commercial landings were curtailed by a 2.04 million pound commercial quota. The 1991

commercial fishery closed on August 24 with a total of 2.2 million pounds landed. In 1992 the fishery closed on February 22. An estimated 2.5 million pounds of red snapper were landed during the regular season (Poffenberger 1992). It was reopened from April 3 to May 14 with a 1,000 pound trip limit under an emergency rule to alleviate economic hardships caused by the February closure. Total 1992 commercial landings including landings made under the emergency rule are estimated to be 3.1 million pounds.

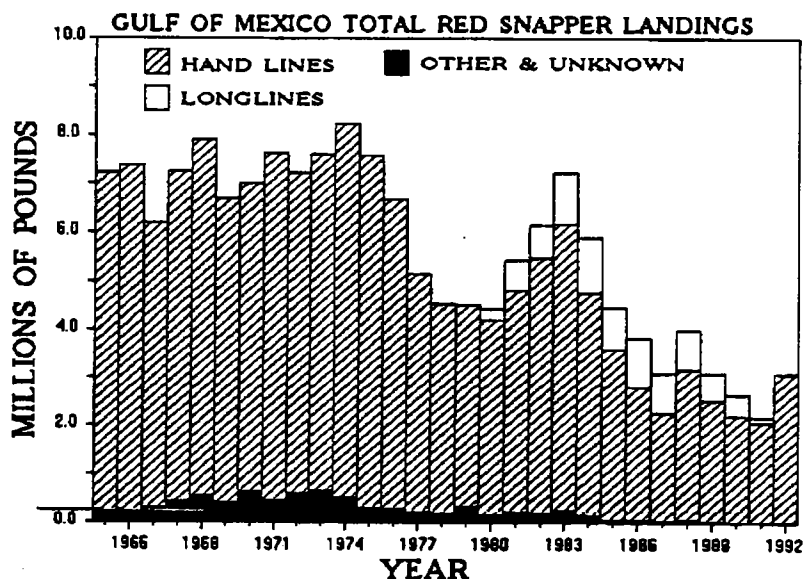


Figure 1 Commercial landings of red snapper from U.S. waters of the Gulf of Mexico (fig. 34 in Goodyear 1992a).

Recreational: The recreational harvest of red snapper declined from about 5 million fish and 10 million pounds in the early 1980's to about 1 million fish and 2 million pounds since about 1986 (Figure 2). In 1991 an estimated 0.9 million fish and 2.2 million pounds were harvested recreationally. 1992 harvest estimates are not currently available since the 1992 recreational fishery is not yet complete. However, the 1992 stock assessment has projected a recreational harvest of 3 million pounds of red snapper. Since 1990, size and creel limits have resulted in about half the recreational catch being released (Figure 3).

Recruitment Trends

A Fall Groundfish Survey has been conducted in the northern Gulf of Mexico by the NMFS Pascagoula Laboratory since 1972. This survey samples age 0 and age 1 red snapper. The SEAMAP program has been coordinating trawl samples in the Gulf of Mexico during June and July since 1982. The Summer SEAMAP survey samples almost entirely age 1 red snapper since age 0 fish are too small to be sampled in the summer. By decomposing the Fall Groundfish Survey estimates into age 0 and age 1 red snapper and combining with the Summer SEAMAP estimates, a time series of red snapper recruitment to age 1 was obtained for 1972-1990 (Figure 4). This time series shows a general decline from a high age 1 recruitment value of 15.99 for the 1972 year class to a low of 0.97 for the 1986 year class. The strong

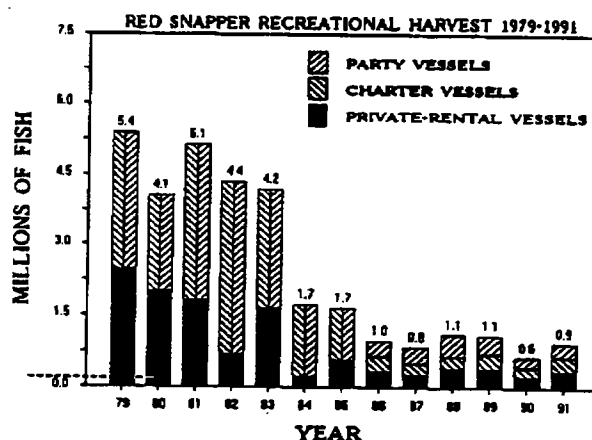


Figure 2 Estimated numbers of red snapper harvested by recreational fishermen by mode, 1979 to 1991 (fig. 47 in Goodyear 1992a).

1989 year class had a recruitment value of 8.90, and the 1990 year class had a recruitment value of 3.80.

Shrimp Trawl Bycatch Mortality

Age 1 red snapper constitute an important part of the shrimp trawl bycatch each month. Young of the year red snapper begin to recruit to the bycatch in June and July and become the dominant part of the bycatch each month. The cumulative instantaneous mortality estimates from shrimp bycatch range for the 1982 through 1990 year classes range from a high of 1.97 for the 1982 year class to a low of 1.65 for the 1985 year class. The 1990 year class mortality rate was 1.96. The average mortality rate for all year classes was 1.79 implying an average conditional survival probability of 17 percent for the shrimp fishery.

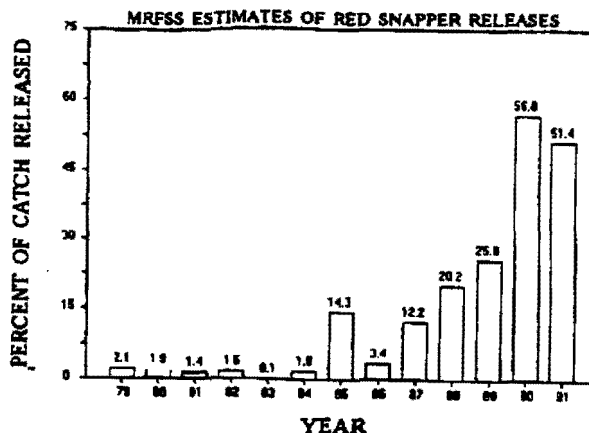


Figure 3 Estimated fractions of red snapper caught and released by recreational fishermen 1979-1991 (fig. 48 in Goodyear 1992a).

Fishing Mortality Rates

Fishing mortalities were calculated from a catch-at-age table using catch curves and virtual population analysis and a natural mortality of 0.2 per year. In 1984-1985 the peak was above $F=0.7$ but declined to about $F=0.4$ in 1990, largely because of conservation actions. In 1991 the estimate of fishing mortality was $F=0.433$ and in 1992 it increased slightly to $F=0.468$ for the fully vulnerable age 3 fish.

For comparison the red snapper yield per recruit analyses provided estimates of $F_{0.1}$ and F_{max} , two management benchmarks typically used to determine overfishing, at $F_{0.1}=0.18$ per year and $F_{max}=0.28$ per year, assuming a 33 percent mortality of released fish. The current rate of $F=0.468$ is much higher than either $F_{0.1}$ or F_{max} . Expressed as conditional fishing mortality rates, $F_{0.1}=0.18=16\%$ of the vulnerable stock, $F_{max}=0.28=24\%$ of the vulnerable stock, and $F_{1992, \text{ age } 3}=0.468=37\%$ of the vulnerable age 3 stock.

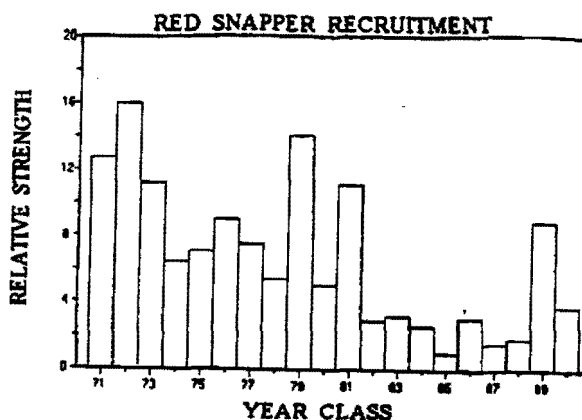


Figure 4 Year class strength estimate for red snapper 1971-1990 (fig. 27 in Goodyear 1992a).

Generation Time

The red snapper generation time was estimated to be 13 years in the unfished stock by combining fecundity, growth, and natural mortality. The framework procedure specifies that the rebuilding period cannot exceed 1.5 times the generation time (19.5 years). Given 1990 as the beginning date

for the rebuilding period, 1.5 generations equates to mid year 2009. The original target date of 2000 and the target date of 2007 established in Amendment 3 are both within this allowed rebuilding period, as is the maximum date of 2009.

Spawning Potential Ratio (SPR)

The terms spawning stock biomass per recruit (SSBR) used in Amendment 1 and spawning potential ratio (SPR) used in the stock assessments both refer to the same index of population status. This regulatory amendment follows the terminology of the stock assessments by using SPR because it is technically a more correct reference to spawning stock index.

The SPR for red snapper was about 0.6 percent of the unfished level in 1984. By 1992, it had increased to about 1 percent, still far below the target level of 20 percent. The Stock Assessment Panel, in an interim report (Goodyear 1992c) reported that the overwhelming majority of red snappers measured by port samplers from the 1992 harvest were a single year class of age 3 fish. Thus, the 1992 landings do not signal a recovery of the fishery, but rather the entrance of the strong 1989 year class. The Panel recommended allowing strong year classes to survive and accordingly hasten the recovery of the stock.

Conclusions

Red snapper is a slow growing species known to live as long as 20 years and probably forms a single stock in the northern Gulf of Mexico. Juveniles are often associated with sandy or muddy bottom, but older fish tend to aggregate in areas of hard limestone or other irregular bottom formations. Adults are relatively sedentary. Dispersal of red snapper among different areas occurs primarily by the transport of larvae while they live as plankton in the water column.

The 1990 red snapper assessment (Goodyear and Phares 1990) reinforced earlier conclusions that the red snapper population in the Gulf of Mexico was overfished, with an SPR of 0.6 percent. The 1992 stock assessment reports that the present value of SPR for red snapper is about 1 percent. While this represents a small improvement, it is still substantially below the 20 SPR percent goal established in Amendment 1. The conservation measures currently in place are enhancing the condition of the stock. The proposed measures will allow the stock to continue to recover. However, without the planned permanent reduction in the shrimp bycatch mortality rate, it will not be possible to attain the spawning stock goals within the one and a half generation times specified by the Plan.

7. 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 regulations are major under criteria provided in Executive Order 12291 and whether the proposed regulations 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 recordkeeping requirements. The RFA requires that if regulatory and recordkeeping requirements are not burdensome, then the head of a Federal agency must certify that the requirement, if promulgated, will not have a significant effect on a substantial number of small entities.

This RIR analyzes the probable impacts that the proposed alternatives for the Reef Fish Fishery Management Plan (FMP) would have on the commercial and recreational directed red snapper fisheries. Although the current FMP subject to proposed regulatory amendment covers only reef fish within its management unit, the proposed management measures are considered with the major assumption that bycatch of juvenile red snapper in the shrimp fishery would be reduced in half by 1994. The shrimp fishery has been identified as a major source of juvenile red snapper fishing mortality due to incidental catches in shrimp trawls. Currently, however, the Council is not proposing any measures to achieve the bycatch reduction in 1994. The succeeding analysis focuses mainly on impacts on the red snapper fishery with general discussions on the consequences of the bycatch reduction on the shrimp fishery.

In this document, the "Socioeconomic Impacts" statements under each of the management options comprise the bulk of the RIR. The problems and objectives are described in previous sections of the regulatory document as a part of the RIR by reference.

Proposed Alternative

Establish a 1993 TAC for red snapper of 6.0 million pounds, with 3.06 million pounds allocated to the commercial fishery and 2.94 million pounds allocated to the recreational fishery. The commercial allocation will be implemented by a quota, and the recreational allocation will be implemented by a 7 fish recreational daily bag limit.

Set a target date to achieve a 20 percent SPR of 2009, along with a proposed 50 percent reduction of red snapper bycatch in 1994 by the offshore EEZ shrimp trawler fleet. The 50 percent reduction will occur through mandatory use of finfish excluder devices on shrimp trawls, reductions in fishing effort, area or season closures of the shrimp fishery, or a combination of these actions.

Rationale: Based on biological data and projections presented in the 1992 red snapper stock assessment, the TAC can be increased to 6.0 million pounds and still be consistent with the goals of the rebuilding program specified by the Plan. The Council proposes this alternative in order to alleviate the negative social and economic impacts on the fishery participants as brought about by low quotas imposed by the Council for the last three years while at the same time maintaining the target recovery of the red snapper stock. This alternative maintains the existing structure of the directed fishery and associated secondary industries and coastal communities. The proposed TAC is 50 percent higher than the current level and is the upper limit of the ABC range established by the Stock Assessment Panel. The proposed target recovery date of 2009 is two years longer than the current period and is within the target period specified by the Council in the Reef Fish FMP, as amended. It is the Council's intention to rebuild the red snapper stock to 20 percent SPR by the target year of 2009 while attempting to maintain the integrity of the associated industries and economies dependent on the fishery. The Council fully recognizes the need to achieve a 50 percent reduction in incidental catch of juvenile red snapper in shrimp trawls by 1994 in order to meet its recovery target for the red snapper stock.

Biological Impacts: The 1992 red snapper stock assessment (Goodyear 1992a) estimated the red snapper generation time to be 13 years. This is the mean age of the mothers of the young comprising a year class in the absence of fishing and was calculated as a function of fecundity, growth and natural mortality. This estimate does not include any direct consideration of possible senescence in older ages which might reduce the value. However, it does reflect the effect of truncating the function relating maximum weight to length at the maximum observed value (500 grams). Thus, it could be argued that the value does indirectly reflect some senescence in the older ages.

Based on a generation time of 13 years, the maximum rebuilding period (1½ generation times) allowed for red snapper is 19.5 years. Amendment 1 was implemented in February 1990 (except for certain permitting provisions, which were implemented in January 1990). Using February 1990 as the start of the rebuilding period, the maximum target date allowed for the rebuilding period is July, 2009.

The management measures currently in place, combined with a strong 1989 year class, are having an impact on the red snapper stocks. The estimate of SPR has increased from 0.6 percent in 1984 to about 1 percent in 1992. Anecdotal information from fishermen is that abundance of red snapper has increased. It appears that the recovery of the red snapper stocks has begun. Given the assumption of a 50 percent reduction in shrimp bycatch of red snapper in 1994, a 4 million pound TAC is still projected to achieve a 20 percent SPR by the year 2007. Increasing the TAC to 6 million pounds will result in higher mortality rates and reduced annual survival of the red snapper spawning stock biomass. The recovery will continue but at a slower rate. A 6 million pound TAC with the previously stated shrimp bycatch reduction is projected to achieve a 20 percent SPR by the year 2009.

The 6 million pound TAC will not achieve the 20 percent SPR management goal by 2007 unless the target date is extended or unless the assumption of shrimp trawl bycatch reduction is increased to

60 percent in 1994 (Table 1). Since extending the target date to 2009 is permitted under the regulatory framework procedure, the 2009 target date along with the assumption of a 50% shrimp trawl bycatch reduction in 1994 is proposed as an integral part of the 6 million pound TAC. Although the recovery will take two years longer than previously specified, the long term health of the resource once the recovery is complete will not be affected.

Recruitment to the age 1 year class is highly variable and not predictable except as a long term underlying stock-recruit function.

Recruitment in any given year will almost certainly be either higher or lower than the predicted value. Several strong year classes can accelerate the recovery. Conversely, several weak year classes can slow down the recovery and require that the TAC be reduced. The stock assessment projections assume that strong year classes and weak year classes will balance each other out over the long term.

The assumption of a 50 percent reduction in shrimp trawl bycatch of red snapper is very important to achieving the 20 percent SPR goal. This does not mean a 50 percent reduction in the absolute pounds or numbers of red snapper caught but rather a reduction in the instantaneous mortality rate associated with shrimp trawl bycatch. As such, the actual pounds or number of red snapper caught is proportional to the red snapper stock size. Once the 50 percent reduction is achieved and maintained, the pounds or number of red snapper caught will increase as red snapper stock size increases. However, the achievability of the 20 percent SPR goal is very sensitive to achieving a shrimp bycatch reduction. A lower percentage of bycatch reduction or a delay in implementation will require reduced TAC's to achieve a 20 percent SPR by 2009. At low or no bycatch reduction levels, a 20 percent SPR cannot be achieved at any level of TAC.

The commercial allocation of 3.06 million pounds is proposed to be implemented by a quota. In 1990 the commercial quota was 3.1 million pounds, but only 2.7 million pounds were harvested. The 1993 quota of 3.06 million pounds is almost as high as the 1990 quota. However, the total number of permittees has increased from 1,622 in 1990 to 2,199 in 1992. Analysis of the 1992 logbook data indicates that fishermen changed their behavior in 1992 to more directly target red snapper. The red snapper stocks have improved slightly from 0.6 to 1.0 percent SPR. As a result of the extended 1992 closure there are likely to be large aggregations of red snapper when the season opens. For these reasons, the quota is likely to be harvested very quickly, similar to the 1992 harvest. In 1992, the commercial fishery was projected to reach its quota by February 22, and the fishery was closed on that date. It was subsequently determined that the Commercial fishery landed 2.53 million pounds of red snapper in January and February, exceeding its quota of 2.04 million pounds by 24 percent. From April 3 to May 14 the commercial fishery was reopened under a 1,000 pound trip limit. During this period an additional half million pounds of red snapper were landed, bringing the total 1992 commercial harvest to 3.1 million pounds, about 52% above its quota. 1992 was the final year of a three year grace period which the Plan allowed for achieving the allowable biological catch. If the commercial allocation is exceeded in 1993, subsequent allocations will be adjusted to assure meeting the 20 percent SPR goal by 2009.

Table 1 (from Goodyear 1992b)

TAC Required to Make 20% SPR Target		Target Date	
Given Bycatch Reduction of:	Beginning in:	2007	2009
40%	1994	3 MP	4 MP
	1995	-- *	3 MP
50%	1994	4 MP	6 MP
	1995	-- **	5 MP
60%	1994	6 MP	7 MP
	1995	5 MP	7 MP

* SPR equals 18.1 percent in 2007 under a 3 mp TAC

** SPR equals 19.3 percent in 2007 under a 4 mp TAC

The Council is proposing in a separate action to reduce the rate of harvest through measures which include issuing a red snapper endorsement to qualified fishermen. This action cannot be taken within the framework procedure, therefore, the Council has requested NMFS to implement an emergency action, which the Council proposes to follow up with a Plan amendment.

The recreational allocation of 2.94 million pounds is expected to be achieved by maintaining the current 7 fish daily bag limit. In 1991 the recreational fishery harvested 2.1 million pounds of red snapper under the 7 fish bag limit. The 1992 recreational fishing season is still open. However, by assuming that the ratio of commercial to recreational catch rates remains the same in 1992 as in 1991, the 1992 stock assessment projects the recreational harvest to be 3.0 million pounds. If the recreational harvest rate remains the same for 1993, then the recreational sector should meet or only slightly exceed its allocation. However, increased harvest rates due to increased abundance of red snapper or increased participation in the fishery could result in the recreational sector exceeding its allocation significantly. As with the commercial sector, if the recreational allocation is exceeded in 1993, subsequent allocations will be adjusted to assure meeting the 20 percent SPR goal by 2009.

The red snapper population will be continually monitored by stock assessments and as provided in the framework procedure, management measures will be adjusted, as necessary, to ensure that the red snapper stock continues to rebuild toward the Council's goal of 20 percent SPR by 2009, as proposed in this Regulatory Amendment. The data base and interpretations of the data are necessarily continually changing with each assessment. It is expected that available data will improve over time and will lead to better scientific advice and management.

Socioeconomic Impacts: The implicit TAC for 1990 was 5 million pounds (MP). Approximately 62 percent of the TAC, or 3.1 MP, was allocated to the commercial sector and the rest, to the recreational sector although harvest of the latter sector was controlled through a 7 fish bag limit. For 1990 the commercial and recreational harvests were 2.66 MP and 1.43 MP, respectively. For the 1991 fishing season, a formal TAC of 4.0 MP was established by the Council, and it was allocated according to the 51:49 commercial/recreational ratio adopted by the Council in 1990. Such allocation translated in a 2.04 MP commercial quota and a 1.96 recreational allocation. The commercial quota was reached in August 1991 and the fishery was closed for the rest of the year. The recreational allocation was controlled by the 7 fish bag limit and remained open throughout 1991. The estimated commercial catch for 1991 was 2.18 MP or about 7 percent above its quota. The estimated recreational catch for 1991 was 2.16 MP or about 10 percent above its allocation. The same TAC level and allocation ratio in 1991 were adopted for the 1992 season. The commercial fishery was closed in February 1992 upon reaching its quota, but was re-opened from April 3 through May 14, 1992 under a 1,000 pound trip limit. The estimated total commercial harvest for 1992 was 3.1 MP, or about 52 percent above its quota. Of this total landing 2.5 MP were landed during the regular season and the rest during the extended season. The recreational sector is again controlled by the 7 fish bag limit and will remain open for the entire 1992 fishing year. Recreational harvest for 1992 is projected to reach 3.0 MP or about 58 percent above its allocation.

Short Run Impacts

In principle, an increase in TAC from 4 to 6 MP means a 50 percent increase in commercial and recreational allocations, and would generate more (relative to status quo) benefits to both sectors.

Considering, however, the TAC overruns in the previous season, the large increase in TAC would not materially affect the harvests (in pounds) of either the commercial or recreational sector if compliance or enforcement were perfect. The mandated condition that overruns in 1993 may be debited against the sector's 1994 or succeeding year's allocation serves as a deterrent against allocation overruns, if each sector acts as a collective unit. But in an open access fishery, individual interests override collective interest and thus close adherence to its allocation by a sector is not likely to happen. Since there is closure in the commercial sector once the quota is reached and quota monitoring has been relatively adequate, commercial landings for 1993 would likely be within the sector's allocation. The recreational harvest, being controlled mainly by the bag limit, has the potential to exceed the sector's allocation. The likelihood of such occurrence cannot be assessed but is known to depend on a host of factors including but not limited to an actual or perceived increase in stock abundance, increase in angler population, and decrease in fishing cost.

Although the TAC increase is not likely to translate in large increases in harvests in 1993 relative to actual harvests in 1992, it could result in a different configuration of costs and benefits. In the commercial sector, a derby fishery occurred in 1992 and the quota was reached in February. Historically (i.e., for the period 1986-1990), average monthly red snapper landings in the Gulf fluctuated around 200,000 pounds. In 1991, monthly landings were below the historical average from January through May and above the historical average thereafter until the fishery was closed in August. Ex-vessel values seasonally fluctuated in generally the same manner as landings. Average monthly prices (i.e. ex-vessel values divided by landings) were marginally below average during months of peak landings and marginally above average during months of below-average landings. In 1992, the landings for January and February were extremely higher than the historical average for these two months (Waters, 1992a). Ex-vessel prices dropped dramatically for these two months relative to the historical average or to the 1991 prices for these two months. For example, in Louisiana the 1991 average ex-vessel price ranged from \$3.45 to \$3.50 per pound and dropped to a range of \$2.05 to \$2.11 per pound in 1992 for the January/February period (Waters, 1992b). In other localities the ex-vessel price even dropped to as low as \$1.75 per pound (Chickie's Seafood, 1992). While the derby resulted in very low ex-vessel prices, it could also be expected to have caused an increase in the cost of fishing as fishermen raced to get their share of the quota. Profits to fishermen were then squeezed from both ends. The impacts on fish dealers cannot be readily ascertained. While they have the potential to be opportunistic, moving the product through the market might have been difficult due to the presence of fish substitutes (groupers, other snappers, and imports of reef fish) ordinarily flowing to the wholesale and retail markets at this time of the year. In January and February of 1991, the wholesale price for red snapper at the Fulton Fish Market ranged from \$3.65 to \$4.93 per pound. For these two months in 1992, wholesale price for red snapper ranged only from \$2.56 to \$3.75 (Waters, 1992b). It appears likely that low ex-vessel prices reflected low wholesale prices. It is also possible that fish dealers did not jump on the opportunity proffered by a glut in the ex-vessel market in order to preserve their long-term relationship with harvesters. The profit level of fish dealers may have been only slightly affected by the oversupply of domestic red snapper. At the face of low prices for red snapper, consumers in general might have benefited from the derby, but the extent of such benefits cannot be measured in the absence of empirically estimated consumer demand for red snapper. The reopening of the commercial season under a 1,000 pound trip limit partially alleviated the losses to harvesters. Ex-vessel and wholesale prices rebounded slightly during the extended season, but under a trip limit fishing costs could still rise. Profits to harvesters might still be at low levels even when the commercial season was extended.

The derby in the commercial sector has not materially affected the benefits derived by the recreational sector from red snapper fishing. The extended commercial season, however, resulted in some type of congestion in certain reef tracts in the EEZ off Alabama. The extent of losses in recreational benefits in terms of reduction in consumer surplus and in profitability of charter vessels cannot be determined.

The proposed increase in TAC (and commercial quota) alone will not eliminate the derby in the commercial fishery and may even intensify it if fishing effort is not controlled, resulting in more foregone benefits to the commercial harvest sector. Current proposals to extend the 1993 commercial fishing season under an emergency action (to be subsequently followed with a plan amendment) would help to ensure that potential benefits from an increase in TAC would be realized. The current emergency action proposal would limit the number of fishermen eligible to fish commercially for red snapper. The increase in commercial quota would thus be mostly shared by those eligible to fish for red snapper in larger quantities but not exceeding certain trip limits (2,000 pounds per trip as currently proposed). Mainly because of the trip limit component of the proposed emergency action, the expected increase in profitability of the entire commercial sector is not assured. Smaller boats have the potential to gain more of the benefits from an increase in quota. The increase in profitability of larger vessels from an increase in quota is doubtful. It may be noted that about 39 percent of respondents to a red snapper survey who indicated they fished on large vessels (greater than 50 feet) primarily targeting red snapper opposed any type of trip limits while an equal percentage of respondents favored trip limits of 1,000 pounds or less; the rest preferred trip limits of more than 1,000 pounds (Red Snapper Survey, 1992). Given this scenario, it appears that some large vessels may not be able to take advantage of an increase in commercial quota. An extended season with a higher quota may benefit fish dealers. The impacts on consumers are again not determinable.

Assuming the recreational sector does not exceed its 1993 allocation, the proposed increase in TAC (and recreational allocation) will not directly translate in an increase in benefits for this sector since it would be harvesting in 1993 about the same amount as actual harvest in 1992. There are, however, certain indirect benefits from an increase in recreational allocation. For one, the recreational sector may not face any threat of bag limit reductions in order to stay within its allocation. Second, an increase in TAC may be perceived by anglers as an indication of more potentially successful fishing trips due to stock abundance or to less intense competition from the commercial sector. Another benefit, particularly for the for-hire sector, would be in terms of maintaining a more stable environment for recreational fishing. These benefits would be in terms of generating more consumer surplus for the recreational anglers and higher profits for the for-hire vessels.

In 1992 commercial permits issued to vessels in the reef fish fishery totaled 2,214, and due to the three-year moratorium no more than these permits may be issued for the next two seasons. There is no accurate count of the number of recreational anglers fishing for red snapper in the Gulf. In 1989 for the entire Gulf, excluding Texas, an estimated 1.48 million recreational anglers made about 13.68 million trips, and red snapper accounted for about 1.48 percent of primary species sought by anglers (NMFS-MRFSS, 1991). About 43.5 percent did not indicate any species preference. In previous studies, an estimated 838 charter boats and 92 party boats operated in the Gulf, with varying proportion of time spent for targeting snapper species assemblage (Ditton et al., 1988; Holland and Milon, 1989). Although not all commercial permittees and recreational anglers, including for-hire vessels, harvest red snapper all are in a position to potentially benefit, directly or indirectly, from the TAC increase. Direct benefits arise from the harvest or increase in harvest of

red snapper. Indirect benefits may come about by easing the pressure on other fisheries. However, the distribution of benefits crucially hinges on the type of measures adopted to control fishing in 1993. In the recreational sector, allocation is controlled mainly by the same bag limit of 7 fish per person per day, and therefore benefits from the TAC (allocation) increase may be proportionally spread out among the anglers and for-hire vessels. The commercial sector faces a different situation. Current proposals to extend the 1993 commercial fishing season may restrict the allocation of benefits from the red snapper quota and the proposed increase in quota to a relatively few fishermen. These proposals, however, are not an integral part of this regulatory amendment.

Long Run Impacts

The long run impacts of the proposed measures depend largely on the recovery of the stock, the market conditions for red snapper, and the change in demand for recreational fishing, and future regulatory changes. Once the SPR target is reached and maintained at that level, a significantly higher TAC may be supported by the red snapper stock. This level was previously estimated to be around 12 MP (GMFMC, 1991), but more recent data and analysis appear to indicate a substantially higher number (approximately 18 MP). The proposed TAC increase will still enable the achievement of the Council's target SPR of 20 percent by extending the recovery period to 2009. A very crucial assumption used is the achievement in 1994 of a 50 percent reduction in red snapper mortality from shrimp trawl bycatch. Granting at first that a 50 percent bycatch reduction is achieved, and that the current conditions in the commercial and recreational red snapper fisheries as well regulatory actions do not significantly change in the future, the proposed increase in TAC means slower stock recovery. This translates to a reduction in short run losses but to a delay in the realization of significantly higher benefits. An economic analysis of this scenario involves tradeoffs in the value of catches over time, and the concept of **net present value** is useful as the criterion for evaluation of the dynamic tradeoffs between short-term losses and long-term gains in the value of catch rates (Riechers, 1992). The succeeding estimations are performed in order to get some general insights into the long-term impacts of the proposed TAC increase and the extension of the recovery period to 2009, and not to measure the actual level of impacts. The same technique used in earlier regulatory amendment is employed for estimation purposes (see GMFMC, 1991).

Table 2 below shows the changes in commercial and recreational surpluses resulting from the proposed increase in TAC relative to the status quo. The status quo provides for a 4 MP TAC allocated between the commercial and recreational sectors according to a 51:49 ratio. The recovery period under the status quo ends in 2007. In contrast, the proposed measures provide for a 6 MP TAC and a recovery period ending in 2009. The commercial/recreational allocation remains the same. The policy period considered is 1993-2009 because the proposed TAC would be in place starting 1993, and the impacts after 2009 would be zero since the status quo and proposed measures would have the same TACs and allocations. The federally mandated 10 percent discounting rate is used, but a lower rate of 3 percent is also employed to determine the sensitivity of results to the discounting rate used.

As can be gleaned from the table, the impacts of the proposed measures are positive for both sectors from 1993 through 2007 due to a higher TAC. Impacts in the last two years of the policy period are negative, because the status would then provide for a higher TAC. Over the entire policy period, the proposed measures would generate positive economic impacts for both the commercial and recreational sectors. The sum of positive values in the early years exceed the sum of negative values in the last two years. The relatively large increases in TAC and allocation under the status quo occur at a much later time such that they are heavily discounted even using a low

discounting rate. The direction of effects is not affected by the choice of a discounting factor as shown in the table.

Table 2. Approximate Changes in Commercial and Recreational Benefits
(Million Dollars)

Period	At 3% Discounting Rate		At 10% Discounting Rate	
	Commercial	Recreational	Commercial	Recreational
1993	2.5	1.5	2.2	1.3
1994	2.4	1.4	2.0	1.2
1995	2.4	1.4	1.8	1.1
1996	2.4	1.3	1.7	1.0
1997	2.3	1.3	1.6	0.9
1998	2.3	1.3	1.4	0.8
1999	2.3	1.2	1.3	0.7
2000	2.2	1.2	1.2	0.7
2001	2.2	1.2	1.1	0.6
2002	2.1	1.1	1.0	0.5
2003	2.1	1.1	1.0	0.5
2004	2.1	1.1	0.9	0.5
2005	2.0	1.0	0.8	0.4
2006	2.0	1.0	0.8	0.4
2007	2.0	1.0	0.7	0.3
2008	- 9.9	- 2.4	- 3.2	- 0.8
2009	- 9.7	- 2.4	- 3.0	- 0.7
1993–2009	13.8	13.3	13.4	9.3

The estimated long term impacts are bound to change if the major assumptions earlier mentioned are not met. Benefits to the directed red snapper fishery presupposed achievement of the target bycatch reduction in 1994. The impacts on the shrimp fishery largely depend on the type of measures adopted at that time. Area closures of EEZ waters only or closures of state or federal waters, except off Louisiana, were previously determined to result in negative impacts to the shrimp industry. The use of an excluder device that would result in shrimp loss was found to result in negative impacts to the shrimp fishery (see GMFMC, 1991). A bycatch research plan has already been established to address the problem (see GSAFDF, 1992). A study along this line also needs to determine the value to the finfish fishery of the major species discarded. Another determining factor in the long run is the market condition for red snapper. The demand for red snapper as food fish may be expected to increase over time mainly due to an increase in population and real income as well as possibly due to taste changes. If greater harvest of red snapper in the future replaces imports, benefits to the commercial fishery may be more than what has been estimated. If such increase in harvest replaces domestic catches of other reef fish, the direction of

change in overall benefit to the reef fish fishery becomes indeterminate. Harvest efficiency is another factor that determines profitability in the fishery. The types of regulatory measure that may be adopted in the future for the fishery will definitely have a significant bearing on the long term structure of benefits from the red snapper fishery. Recreational demand may also change, and in the long run population in the coastal states and real income will define the strength of demand for recreational fishing trips. Saltwater fishing days in the year 2010 have been projected to reach 2.3 million in Alabama, 49.0 million in Florida (east and west), 3.3 million in Louisiana, 1.4 million in Mississippi, and 20.9 million in Texas (SFI, 1992). Not all days will be spent for red snapper fishing, but the level appears to be relatively high and can be a potential source for a strong fishing pressure on the red snapper stock.

Rejected Alternatives

Rejected Alternative 1: Status Quo. Retain the red snapper TAC at 4.0 million pounds with 2.04 million pounds allocated to the commercial sector and 1.96 million pounds allocated to the recreational sector. Retain the target date of 2007 and the proposed 50 percent reduction in shrimp trawl bycatch of red snapper in 1994.

Rationale: The Council rejected a 4 million pound TAC as being unnecessarily restrictive given that the Plan allows the target date to be set at the year 2009. Without additional measures to extend the season, the commercial quota was projected to be filled in 40 days. The recreational sector would require a closed season of up to six months with a 7 fish bag limit, or a reduced bag limit of 4 fish with no closed season, or some combination of reduced bag limit and closed season (Table 3).

Table 3 (from Goodyear 1992b)

Recreational and Commercial Options to Implement TACs

TAC	4 MP (2.04 C:1.96 R)		5 MP (2.55 C:2.45 R)		6 MP (3.06 C:2.94 R)	
Recreational Sector	Bag Limit	Fishing Season	Bag Limit	Fishing Season	Bag Limit	Fishing Season
	7	May-Oct	7	Mar-Nov	7	All year
	6	Mar-Oct	6	Apr-Feb		
	5	Mar-Nov	5	All year		
	4	All year				
Commercial Sector	Trip Limit	Fishing Season	Fishing Season		Fishing Season	
	None	40 days	53 days		64 days	
	2500 lbs	64 days	87 days		105 days	
	1000 lbs	105 days	140 days		169 days	
	400 lbs	210 days	275 days		330 days	

Biological Impacts: This alternative would rebuild the red snapper population somewhat more quickly than the preferred alternative. The 20 percent SPR goal would be reached in 2007 with current projection trends in stock recovery and assuming a 50 percent bycatch reduction in 1994 (Table 1). Commercial

quota closure and reduced recreational bag limits or closed seasons would result in higher catch and release mortality than under the preferred alternative.

Socioeconomic Impacts: Retaining the status does not change the potential level of benefits and costs in the fishery. The distribution of such benefits and costs would depend on other measures that may be adopted for 1993. Under this option, the benefits discussed in connection with impact determination of the Preferred Alternative would be foregone. Although this option would mean achieving the target SPR of 20 percent two years earlier, the economic benefits have been determined to be less than those under the Preferred Alternative.

Rejected Alternative 2: Establish a red snapper 1991 TAC of 6.0 million pounds, with 3.06 million pounds allocated to the commercial fishery and 2.94 million pounds allocated to the recreational fishery. Set the minimum size limit for red snapper at 14 inches total length.

Set a target date to achieve a 20 percent SPR of 2009, along with a proposed 50 percent reduction of red snapper bycatch in 1994 by the offshore EEZ shrimp trawler fleet. The 50 percent reduction will occur through mandatory use of finfish excluder devices on shrimp trawls, reductions in fishing effort, area or season closures of the shrimp fishery, or a combination of these actions.

Rationale: This alternative is similar to the preferred alternative except for the addition of a 14 inch size limit. The Council rejected this alternative because the increase in minimum size limit from 13 to 14 inches was expected to have only a minimal impact. Testimony from fishermen indicated that a 14 inch size limit would have only a small impact on their catches.

Biological Impacts: This alternative would rebuild the red snapper population to 20 percent SPR by the year 2009. Red snapper average 13 inches in November of their age-2 year. They grow to 14 inches average total length by May of their age-3 year. Since spawning season begins in May, the protection from the fishery offered by this increase would end before the fish have a chance to spawn. Consequently, the increased size limit would not change the year that SPR is achieved nor would it extend the season for the commercial sector. The 1989 year class will be over 16 inches average total length by January 1993, thus the increased size limit would have no impact on their harvest. With a 33 percent release mortality, as assumed in the 1992 stock assessment, maximum yield per recruit occurs at 16 inches. Above 16 inches release mortality offsets any gain from the increased size limit, and the recovery of the stock begins to slow. The Council proposes to implement as part of Amendment 5 a gradual increase in minimum size limit to 16 inches through a series of three bi-annual one inch incremental increases.

Socioeconomic Impacts: This alternative differs from the preferred one only on the size limit requirement which is proposed to be increased to 14 inches total length or about 1.34 pounds. An increase in size limit may be expected to negatively impact the harvest of fish of both commercial and recreational users. Recreational harvest of red snapper varies in number and weight by fishing mode and state. For 1991, the average weight across all states and fishing modes of recreationally caught red snapper was about 2.07 pounds (Goodyear, 1992a). This would approximately correspond to a little over 16 inches in total length. On average then, the impact of an increase in size limit to 14 inches on the recreational sector would not be very substantial. Among the states, Texas recreational anglers caught the lowest average weight of 1.79 pounds, and among the fishing modes the headboat anglers (mainly in Texas) caught the lowest average weight of 1.93 pounds. Thus recreational catches may only be minimally affected by the increase in size limit, at least on average. Although in terms of catch, an

increase in size limit may not directly translate in catch reduction, recreational anglers may be compelled to increase their fishing cost or experience less valuable fishing trips. In this sense, consumer surplus may decline. The marketability of fishing trips by charter and head boats may also be adversely impacted by less valuable fishing trips brought about by a size limit increase.

The commercial sector has caught and sold red snapper in the 1 to 2 pound category. With an increase in size limit to 14 inches, a part of this category will be lost to imports. Historically, a 2 to 4 pound fish commands a slightly higher ex-vessel and wholesale price than lower sizes. Anecdotal information indicates that the 2 to 4 pound fish is more marketable than smaller or larger sized fish. To a certain degree, such marketability of the 2 to 4 pound fish may be due to the level of supply for that size category in the market. If such marketability is mainly attributable to the demand for such size category, it is likely that revenues lost in lower size categories may be outweighed by revenue gains in larger size categories once the size limit is increased to 14 inches. However, the net effect on profitability is also dependent on the cost of fishing at higher size limits. Given a limit on a per trip basis, it is likely that fishing costs to catch larger size fish would increase at least in the short run. Thus, an increase in size limit on top of trip limits could possibly reduce the commercial sector's profitability in the short run. Over time as a higher size limit provides for a higher yield per recruit, fishing cost may decrease due to fish abundance. In addition, fishermen might also adjust their operation to the imposed trip limit. Higher profitability then may be realized over the long run.

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.....	\$ 15,000
NMFS administrative costs of document preparation, meetings and review.....	\$ 20,000
Law enforcement costs.....	\$ none
Public burden associated with permits.....	\$ none
NMFS costs associated with permits.....	\$ none
TOTAL.....	\$ 35,000

The Council and Federal 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 Regulatory Impacts

In principle, the proposed measures to increase the TAC from 4 MP to 6 MP and to extend the rebuilding period from 2007 to 2009 are expected to result in an increase in short term benefits to both commercial and recreational sectors. However, the increase in TAC would not substantially affect the amount of harvest from either sector when compared with actual or projected harvest for 1992 although the distribution of benefits and costs may change. The distribution of short run benefits for the commercial sector is highly dependent on other measures to be adopted for the 1993 season. The long run impacts are positive when basic assumptions, particularly the shrimp bycatch reduction, are met. Total costs for preparation of this regulatory action are estimated at \$35,000.

Determination of a Major Rule

Pursuant to E.O. 12291, a regulation is considered a "major rule" if it is likely to result in: a) an annual effect on the economy of \$100 million or more; b) a major increase in costs or prices for consumers, individual industries, federal, state, or local government agencies, or geographic regions; or c) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

The proposed measures are not expected to have a \$100 million effect per year on the economy or to cause an increase in the price of red snapper. Also, cost increases to the red snapper industry, commercial and recreational, are not expected. The federal government is not expected to incur any increase in enforcement or in the administration of permits. Any adverse impacts on competition and innovation cannot be associated with the proposed measures, but may arise depending on other measures to be adopted in 1993 or in the future. Employment and investment in the reef fish fishery may be promoted through adoption of the proposed measures. On balance, the proposed measures are not deemed to constitute a "major rule" under any of the mentioned criteria.

Initial Regulatory Flexibility Analysis

Introduction

The purpose of the Regulatory Flexibility Act (RFA) is to relieve small businesses, small organizations, and small governmental entities from burdensome regulations and record keeping requirements. The category of small entities likely to be affected by the proposed plan amendment is that of commercial and for-hire businesses currently engaged in the reef fish fishery. The impacts of the proposed action on these entities have been discussed above. The following discussion of impacts focuses specifically on the consequences of the proposed action on the mentioned business entities. An Initial Regulatory Flexibility Analysis (IRFA) is conducted to primarily 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.

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. The Small Business Administration (SBA) defines a small business in the commercial fishing activity as a firm with receipts of up to \$2.0 million annually. SBA also defines a small business in the charter boat activity as a firm with receipts up to \$3.5 million per year. Practically all current participants of the reef fish fishery readily fall within such definition of small business. Since the proposed action will affect practically all the current participants, the "substantial number" criterion will be met. This particular conclusion abstracts from any other measures to be adopted for the reef fish fishery.

Economic impacts on small business entities are considered to be "significant" if the proposed action would result in any of the following: a) reduction in annual gross revenues by more than 5 percent; b) increase in total costs of production by more than 5 percent as a result of an increase in compliance costs; c) 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; d) capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or e) as a rule of thumb, 2 percent of small business entities being forced to cease business operations (NMFS, 1992).

In principle, a 50 percent increase in TAC and therefore in commercial quota will result in more than 5 percent increase in gross revenues to this sector. Charter boat operators may also be expected to generate more than 5 percent increase in gross revenues. However, considering the quota overruns in both commercial and recreational sectors in 1992, the proposed increase in TAC will not be expected to increase either sector's harvests and gross revenues if no sector exceeds its 1993 allocation. Thus, while in principle a significant economic impact will ensue from raising the TAC, in actuality such increase will not significantly differ from 1992 levels.

Explanation of Why the Action is Being Considered

Refer to the section on Problems and Issues in the RIR and to Section 4 of the amendment document.

Objectives and Legal Basis for the Rule

Refer to Section 3 of the amendment text. The Magnuson Fishery Conservation and Management Act of 1976 provides the legal basis for the rule.

Demographic Analysis

Refer to the Fishery Management Plan for the Reef Fish Fishery of the Gulf of Mexico United States Waters, as amended.

Cost Analysis

Refer to the sub-section on Private and Public Costs and Summary of Regulatory Impacts.

Competitive Effects Analysis

The industry is composed practically of small businesses. The impacts of the measures considered under this amendment are deemed not to involve disproportional small versus large business effects.

Identification of Overlapping Regulations

The proposed action does not create overlapping regulations with any state regulations or other federal laws.

Conclusion

In principle, the proposed measures in this regulatory amendment may be regarded as significant. The foregoing information and pertinent portions of the RIR are deemed to satisfy the analysis required under the RFA.

8. ENVIRONMENTAL ASSESSMENT

Environmental Consequences

Physical and Human Environment: To the extent that can be ascertained, the action proposed in this amendment will have no impact on the physical environment. The change in the TAC for red snapper will allow continuation of a directed fishery while rebuilding the overfished stock to optimum yield and thus be beneficial to the fishing industry.

Fishery Resource: The TAC proposed in this amendment with a concomitant extension of the recovery period to 2009 is consistent with the Council's objective of rebuilding the overfished red snapper stock within one and a half generation times.

Effect on Endangered Species and Marine Mammals: The NOAA conducted a consultation under Section 7 of the Endangered Species Act regarding the impact of Amendment 1 which included the framework measures under which this action is being taken. Therefore, no additional Section 7 consultation is necessary. A biological opinion resulting from that consultation found that neither the directed fisheries nor the proposed action will 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 action are necessary because there are no harmful impacts to the environment.

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

Irreversible and irretrievable commitments of resources: There are no irreversible commitments of resources caused by implementation of this 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 action is an adjustment of the original regulations of the FMP under the framework procedure set forth in Amendment 1 to rebuild overfished reef fish stocks. The proposed action 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

9. SCIENTIFIC RESEARCH AND DATA NEEDS

The following scientific research and data needs have been identified with assistance from the scientific and industry advisory panels.

Biological Needs

- detailed histological studies are required to characterize the actual reproductive contribution of females by age. Given the overlap of sizes among ages, the collection and analysis of red snapper hard parts for age determination is essential.
- Estimation of seasonal catchability coefficients for evaluating closure impacts.
- evaluation of bycatch reduction effectiveness of approved TED's and BRD's.

Socioeconomic Needs

- estimation of commercial demand and supply for red snapper and reef fish
- estimation of recreational demand for red snapper and reef fish
- cost and returns estimate for the commercial red snapper and reef fish industry
- cost and returns estimate for the for-hire sector in red snapper and reef fish fishery
- social impact assessment of the red snapper and reef fish fishery
- bioeconomic modeling and estimation of the red snapper and reef fish fishery

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11. PUBLIC REVIEW

A public hearing were held to obtain public comments on this regulatory amendment was held during the Gulf Council meeting in September 1992 in New Orleans, Louisiana. In addition, public comments were considered which were made at twenty workshops conducted by Dr. Michael Orbach on red snapper effort management at locations throughout the Gulf Coast. Copies of this document may be obtained from the Gulf of Mexico Fishery Management Council office, 5401 West Kennedy Boulevard, Suite 331, Tampa, Florida 33609, (813)228-2815.

LIST OF AGENCIES CONSULTED

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

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

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