

GULF OF MEXICO FISHERY MANAGEMENT COUNCIL

Lincoln Center, Suite 881 • 5401 W. Kennedy Blvd.
Tampa, Florida 33609-2486 • 813 228-2815

May 17, 1991

Dr. Andrew J. Kemmerer
Regional Director
National Marine Fisheries Service
9450 Koger Boulevard
St. Petersburg, Florida 33702

00.MAY91*004262

Dear Andy:

At our recent meetings, the Gulf and South Atlantic Councils reviewed the report of their Mackerel Stock Assessment Panel (Panel), recommendations of the Scientific and Statistical Committees (SSC) and Advisory Panels (AP), and heard public comment with respect to the setting of annual levels of total allowable catches for king and Spanish mackerels for the 1991-1992 fishing year. A copy of the Panel's report and summaries of the recommendations of the SSCs and APs are attached.

In accord with the provisions of the FMP, the Councils have developed recommendations as follows:

Spawning Potential Ratio and Target Level Percentage

The minimum target level percentage for SPR for restoration of overfished stocks of king and Spanish mackerels be set at 30 percent.

Rationale: The amended FMP provides that a minimum target level percentage of spawning stock biomass per recruit (more appropriately defined as a spawning potential ratio (SPR)) be used as a measure of overfishing for king and Spanish mackerels and cobia. The appropriate level for each stock is to be identified by the Panel, approved by the SSCs, and adopted by the Councils. Using the $F_{0.1}$ management strategy in the 1990 assessment, the Panel recommended and the Councils approved levels of 40 and 35 percent for king and Spanish mackerels. With the addition this year of assessment of shrimp trawl bycatch, improvements in recruitment, and refinements in the analyses, the Panel recommended that 30 percent would be more appropriate for both king and Spanish mackerel. The SSCs concurred and both Councils approved this refinement of the estimate.

The South Atlantic Council emphasized that this was to be considered a minimum level and not a target. The Council was concerned that the use of an SPR of 30 percent resulted in a dramatic increase in the most likely value of ABC. However, it was noted that the reason for this was that recent year's fishing mortality rates for Atlantic king mackerel have been below the target levels, allowing the populations to accumulate some surplus that could be harvested. It was also pointed out that previous ABC calculations were based on a target fishing mortality rate of $F_{0.1}$ rather than an SPR level. The fishing mortality rate associated with an SPR of 30 percent (F_{30}) is almost the same as $F_{0.1}$. Therefore, had the Stock Assessment Panel calculated ABC based on $F_{0.1}$ rather than F_{30} the results would have been almost identical. For Atlantic Spanish mackerel the differences in ABC resulting from use of either $F_{0.1}$, F_{35} , or F_{30} are relatively small.

TAC and Bag Limit Recommendations

Gulf Group King Mackerel

ABC = 4.0 - 7.0 million pounds (M) (most likely value = 4.9M)

TAC = 5.75M

Recreational (68%) = 3.91M = 0.574M fish

Commercial (32%) = 1.84M

Eastern Zone (69%) = 1.27M

Western Zone (31%) = 0.57M

Dr. Andrew J. Kemmerer
May 17, 1991
Page 2

The bag limit is to remain three per person per day for anglers on charter vessels excluding captain and crew or two for all persons (except off Florida). For private vessels and all vessels off Florida: two fish per person.

Rationale: The TAC of 5.75 is within the ABC range and was recommended by the Council's AP. Increases in spawning stock biomass each year since 1986 (Figure 2, Stock Assessment Report) encouraged the Council to select a TAC somewhat above the most likely point value of ABC but which the Council felt is still at a conservative level. Because this migratory group is defined as being overfished, the ABC range is set by the Panel to restore the stock within one generation period, and the recreational bag limit reverts to zero when the allocation is estimated to be taken. The Council's intent is to distribute the recreational allocation through the fishing year without having the bag limit close. The slight increase in TAC, the decrease in the allowable charter vessel bag limit off Florida, and the smaller average size limit of individual king mackerel (Stock Assessment Panel Report, Sect. VI 1.) will aid in the achievement of this objective.

Gulf Group Spanish Mackerel

ABC = 7.1 - 12.2M (most likely value = 8.6M)

TAC = 8.6M

Recreational (43%) = 3.7M = 2.72M fish

Commercial (57%) = 4.9M

The Recreational bag limit is to be 10 fish per person per day, except off Texas it is to be three fish and off Florida, five fish.

Rationale: TAC is to be set for the most likely value of ABC as recommended by the AP. This stock is still considered to be overfished by definition, and the ABC range recommended by the Panel will restore the stock within a generation. ABC ranges for the Gulf and Atlantic groups are approaching MSY. The bag limits, which remain unchanged, should again extend through the fishing year without reverting to zero.

Atlantic King Mackerel

ABC = 9.6 - 15.5 million pounds (M) (most likely value = 11.5M)

TAC = 10.5M

Recreational (62.9%) = 6.60M = 0.735 fish

Commercial (37.1%) = 3.90M

Bag Limit = five fish per person per day throughout the range.

Rationale: The Council noted that neither the commercial nor recreational quotas were taken last year and was concerned that at least one explanation for this is that there are not as many fish as the assessment indicates. Further, even if the assessment is correct, the Council was concerned that the most likely value of ABC was higher than the stock could support on a continuing basis. For these reasons the Council adopted a TAC of 10.5 million pounds, somewhat less than the most likely value of ABC.

Since the stock is not considered overfished, current SPR is 48 percent, and the recreational fishery is not expected to take their allocation in 1991/1992, the Council voted to increase the bag limit to five fish per person per day. This increase is not expected to cause a quota overrun and is strongly supported by the North Carolina charter industry who contend their fall charter business is off by 40 percent due largely to the current three fish bag limit. A five fish bag limit is expected to result in the revitalization of this industry.

Dr. Andrew J. Kemmerer
May 17, 1991
Page 3

Atlantic Spanish Mackerel

ABC = 5.5 - 13.5 million pounds (M) (most likely value = 7.0M)

TAC = 7.0M

Recreational (50%) = 3.5M = 2.778M fish

Commercial (50%) = 3.5M

Bag Limit = 10 fish per person per day north of Florida; Florida bag limit to track Florida state regulations but not to exceed 10 fish per person per day.

Rationale: TAC was set at the most likely value of ABC as determined by the Mackerel Stock Assessment Panel. The differential bag limit was approved by the Council with the understanding that Florida was going to consider amending state regulations to increase the bag limit on Spanish mackerel. Since Atlantic Spanish mackerel are considered overfished, the recreational bag limit will revert to zero if the allocation is taken. However, the recreational fishery is not expected to take its allocation in 1991/1992 since preliminary data indicate that the recreational quota was not taken in 1990/1991 despite a much smaller quota. An increase in the bag limit in Florida to 10 fish per person per day is not expected to result in a zero bag limit.

The likely inability of the recreational fishery to take its allocation caused the Council to consider TACs of greater than 7.0 million pounds. It was suggested that a TAC of 9.0 million pounds would probably result in an actual total catch of about 7.0 million pounds since the commercial fishery would take its allocation (4.5 million pounds), and the recreational fishery would take no more than 2.0-2.5 million pounds. The Council ultimately rejected this TAC because it was felt that the stock was still recovering from overfishing, and if the TAC was not taken, it would hasten the recovery time. Further, it was noted that the recreational fishery depends on high population levels to make Spanish mackerel worth pursuing. Allowing the population to increase to greater levels would ultimately benefit all user groups, and might encourage more recreational fishing for this species.

The Councils request that these changes be implemented for the 1991-1992 fishing season.

Sincerely,

Edward F. McCulla
J.R.

Edward F. McCulla
Chairman
Gulf Council

Roy O. Williams
J.R.

Roy O. Williams
Chairman
South Atlantic Council

EFM:ROW:TRL:bab

Enclosures: Report of the Stock Assessment Panel
Regulatory Impact Review
Report of the Joint SSC
Report of the South Atlantic Council Mackerel AP
Report of the Gulf Council Mackerel AP

cc: Gulf Council, w/o Stock Assessment Panel Report
Bob Mahood
John Bryson
Mackerel Stock Assessment Panel, w/o Stock Assessment Panel Report
Staff

REGULATORY IMPACT REVIEW
of
CHANGES IN TAC, QUOTAS, AND BAG LIMITS
for
KING AND SPANISH MACKEREL
GULF OF MEXICO AND ATLANTIC MIGRATORY GROUPS
managed under the
FISHERY MANAGEMENT PLAN
for the
COASTAL MIGRATORY PELAGIC RESOURCES
of
GULF OF MEXICO AND THE SOUTH ATLANTIC

Prepared by
Gulf of Mexico Fishery Management Council
and
National Marine Fisheries Service

May 1991

INTRODUCTION

Executive Order 12291 "Federal Regulations" establishes guidelines for promulgating new regulations and reviewing existing regulations. Under these guidelines each agency, to the extent permitted by law, is expected to comply with the following requirements: (1) administrative decisions shall be based on adequate information concerning the need for and consequences of proposed government action; (2) regulatory action shall not be undertaken unless the potential benefit to society for the regulation outweighs the potential costs to society; (3) regulatory objectives shall be chosen to maximize the net benefits to society; (4) among alternative approaches to any given regulatory objective, the alternative involving the least net cost to society shall be chosen; and (5) agencies shall set regulatory priorities with the aim of maximizing the aggregate net benefit to society, taking into account the condition of the particular industries affected by regulations, the condition of the national economy, and other regulatory actions contemplated for the future.

In compliance with Executive Order 12291, the Department of Commerce (DOC) and the National Oceanic and Atmospheric Administration (NOAA) have determined that this proposed notice action for changes in the total allowable catch, allocations and bag limits for king and Spanish mackerel reflect important DOC/NOAA policy concerns and are the object of considerable public interest. In such a case, DOC/NOAA require the preparation of a Regulatory Impact Review (RIR). The RIR provides a comprehensive review of the level and incidence of impact associated with the proposed or final regulatory actions. The analysis also provides a review of the problems and policy objectives prompting the regulatory proposals and an evaluation of the major alternatives that could be used to solve problems. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives so that the public welfare can be enhanced in the most efficient and cost effective way.

COASTAL MIGRATORY PELAGICS PLAN

The Fishery Management Plan for the Coastal Migratory Pelagic Resources of the Gulf of Mexico and the South Atlantic (FMP) was prepared jointly by the Gulf of Mexico and South Atlantic Fishery Management Councils (Councils). The Assistant Administrator for Fisheries, NOAA (Assistant Administrator) approved the FMP on April 1, 1982, and the Secretary of Commerce (Secretary) implemented final regulations on February 4, 1983, under the authority of the Magnuson Fishery Conservation and Management Act, as amended (Magnuson Act). Amendment 1 to the FMP was prepared jointly by the Councils, approved on July 26, 1985 by the Regional Director, NMFS, and implemented September 22, 1985. Amendment 2 was submitted on April 1, 1987 and implemented in July, 1987. Amendment 3 was submitted on March 14, 1989 and was approved on March 15, 1990. Amendment 4 was submitted on May 22, 1989 and was implemented on October 19, 1989.

The FMP manages the coastal migratory pelagics fishery throughout the exclusive economic zone (EEZ) off the South Atlantic coastal states from the Virginia-North Carolina border south and through the Gulf of Mexico to the U.S.A.-Mexico border. Pending approval of Amendment 5 to the fishery plan, management area could extend to areas currently under the jurisdiction of the Mid-Atlantic Council. Major species in the management unit for the FMP are Spanish mackerel,

king mackerel, and cobia. Within the mackerel stocks, Gulf of Mexico and Atlantic migratory groups are distinguished for both species. Amendments 1 and 2 provide for annual assessments and adjustment of acceptable biological catch (ABC), total allowable catch (TAC), and bag limits for king and Spanish mackerels, both of which have within them one or more overfished migratory groups.

PROBLEMS BEING ADDRESSED

1. Atlantic and Gulf Spanish Mackerel and Gulf King Mackerel are Overfished

The 1991 report of the mackerel stock assessment panel states that until the risk of recruitment overfishing is no longer a concern, Spanish mackerel and the Gulf migratory group of king mackerel should be considered overfished.

2. New Recruits into the Atlantic and Gulf Spanish Mackerel and Gulf King Mackerel Stocks Need Protection to Allow for an Increase in the Spawning Stock Biomass

There is evidence of some increase in recruitment in most recent years. The stock assessment panel felt there was potential for the increased recruitment to contribute to recovery of the spawning biomass as well as increased catch levels. However, conservative fishing mortality rates are still needed as there is considerable uncertainty in the strength of the newest year classes. Female Spanish mackerel may begin spawning at age 1, and age 2 females make a significant contribution to the spawning potential of the stock. Female king mackerel are sexually mature at age 4.

OBJECTIVES

1. To restore the spawning stock biomass of Spanish mackerel and Gulf king mackerel.
2. To protect new recruits in the mackerel fishery so they can add to the spawning biomass and thereby allow for larger catches in the future.

DESCRIPTION OF THE COMMERCIAL AND RECREATIONAL KING AND SPANISH MACKEREL FISHERIES

King and Spanish mackerel are important to both recreational and commercial fishermen in the Gulf of Mexico and South Atlantic waters. Following is a brief description of the conditions in both of these fisheries. A more complete description exists in the Coastal Migratory Pelagics FMP.

Recreational anglers are estimated to have caught 3.46 (4.10)¹ million pounds (MP) of Atlantic and 1.97 (2.06) MP of Gulf king mackerel in the 1990 fishing year (ending March 31 or June 30, 1991, depending on the stock). Anglers also took 2.95 (1.38) MP of Atlantic and 1.02 (1.02) MP of Gulf Spanish mackerel. The majority of the recreationally caught king mackerel were taken by charter and private boat anglers with a small percentage being caught from man-made structures. Recreational catches of Spanish mackerel were more evenly distributed between charter boat, private boat, and man-made structures than were king mackerel catches. In the 1990-1991 fishing year, the recreational quota was exceeded for only the Gulf group of king mackerel. This condition almost parallels the previous year's performance when recreational quotas were not exceeded for all mackerel species. The last two years' recreational catches present as a stark contrast to those of the 1988-1989 season when all, but the Gulf Spanish mackerel, recreational quotas were exceeded and the fishery closed before the fishing season ended.

Commercial landings of Atlantic and U.S. Gulf king mackerel were 2.34 (2.61) and 1.56 (1.62) M, respectively. Spanish mackerel commercial landings for the Atlantic and U.S. Gulf groups were 3.46 (3.34) and 1.80 (1.74) M. King mackerel were caught mostly with gill nets and hooks and lines. The use of purse seines and drift nets which rapidly developed in fishery off the east coast of Florida has been prohibited for the overfished mackerel species, namely, Gulf king mackerel and Gulf and Atlantic Spanish mackerel. The Atlantic group of king mackerel may still be harvested with purse seine, but not with drift nets. Spanish mackerel were caught almost exclusively with gill nets and over 85 percent of the commercial fishery occurred in Florida. In the 1990-1991 season, there were 3,306 mackerel permits issued, 1,652 of which were for commercial harvest purposes and 1,654 were issued to charter boats. Most commercial permits were issued to hook and line vessels for all groups of mackerel (Raulerson, 1991). In the 1990-1991 fishing year, commercial quotas for Gulf king and Atlantic Spanish mackerel were met before the fishing season ended. The commercial fishery for Gulf Spanish and Atlantic king mackerel remained open throughout the season. The commercial quota for the Gulf king mackerel was met in the Western Zone about four months after the season opened. It took about seven months after the season began before the commercial quota for the Eastern Zone was met. Similar closures occurred the previous year for these species. In the 1988-1989 fishing season, the commercial fishing season for Gulf king mackerel was longer in the Eastern Zone but shorter in the Western Zone. Commercial fishery for the Atlantic Spanish mackerel closed about eight months after the season began, with large catches being made shortly after the season began. The fishing season for this segment of the fishery is about the same as that of the previous year's. Somewhat surprising is the fact that commercial quotas for Atlantic king and Gulf Spanish mackerel were not met, with these segments of the fishery remaining open until the fishing year ended (March 31, 1991 for Atlantic king and June 30, 1991 for Gulf Spanish mackerel). These segments of the fishery also remained open throughout the 1989-1990 fishing season. Reports had it then that fishermen in the Florida Keys prosecuting Gulf Spanish mackerel refused to continue fishing sometime during the second half of the 1989-1990 fishing season because of low dockside prices for this stock group. However, some limited fishing resumed until the season ended when price agreements between harvesters and fish houses were concluded. No incidence of that nature has been reported for the 1990-1991 fishing season. Reports have it, though, that for the 1990-1991 season, fish was not schooled and moved to deeper waters, and thus made it difficult to catch them in large amounts. It may be noted that in the 1988-1989 fishing season, these segments of

¹Number in parenthesis is the corresponding catch for the immediately preceding fishing year.

the fishery closed about one to two months before the season ended.

METHODOLOGY AND FRAMEWORK FOR ANALYSIS

The alternatives considered are described below. For this Notice Action the choice of TAC cannot exceed the upper ranges of ABC as estimated by the stock assessment panel. There would be no relevance in comparing these alternatives to a hypothetical unregulated fishery since "no regulation" is not an option under Notice Action.

Ideally, the expected net present values of the yield streams over time associated with the different alternatives would be compared in evaluating impacts. Unfortunately, estimates of the yield streams and their associated probabilities are not available. The approach taken in analyzing alternative TACs and allocations is to describe and/or quantify the changes in short-term benefits in terms of changes in ex-vessel values for the commercial sector, changes in consumer surplus to the recreational anglers, and changes in profits to the charter boats (Raulerson, 1991). The baseline scenario consists of the respective commercial and recreational quotas for the 1990-1991 fishing season. The most likely ABC value estimated by the stock assessment panel was the focal point in Council deliberations leading to the setting of TAC for the 1991-1992 fishing season. On this account, the most likely value, if not the TAC chosen, is regarded as the rejected alternative. Although the 1990-1991 TACs are also viable alternatives, they are taken as basis for determining the impacts of the chosen TACs, and are thus implicitly incorporated in the analysis of impacts. Although the data to compare long term effects of various possible TAC levels within ABC are not available, the expected direction and possible magnitude of economic impacts are discussed. Effects of closures related to allocations are evaluated where appropriate.

IMPACTS OF PROPOSED AND ALTERNATIVE ACTIONS

Gulf Group King Mackerel

The stock assessment panel concluded that the U.S. Gulf resource appeared to have continued to respond somewhat toward recovery. An ABC range of 4.0 - 7.0 MP has been established. The most likely estimate of ABC is 4.9 MP. As provided in Amendment 2, the TAC may not be set higher than the upper range of ABC. Stock recovery is less likely to occur at the upper end of the ABC than at the lower end. Allocations between user groups remain at 32 percent commercial and 68 percent recreational. The commercial allocation is sub-divided into 69 percent eastern zone and 31 percent western zone.

1. Preferred Alternative: Set TAC at 5.75 MP

Commercial allocation	1.84 MP
Eastern Zone	1.27 MP
Western Zone	0.57 MP
Recreational allocation	3.91 MP = 0.574 M fish
Bag limit =	2 fish/person/day private vessels and all vessels off Florida; 3 fish/person/day charter (excluding captain and crew) or 2 fish/person/day (including captain and crew) off other states; reverts to zero when allocation is filled.

Being within the ABC range and only slightly above the most likely value, this TAC allows a fishing mortality rate that is consistent with the target stock recovery. This TAC is 1.5 MP above the preceding year's TAC, and thus would enable the different user groups to experience higher benefits. The distribution of benefits is not expected to be substantially altered, because the various percentage allocations among different user groups, including the various bag limits for the recreational sector, generally remain the same. The bag limit for Florida charter boats was reduced in order to extend the season before the bag reverted to zero.

In the 1990-1991 fishing season, the commercial quota was filled in October 1990 in the Western Zone and January 1991 in the Eastern Zone. A similar closure occurred in the 1989-1990 fishing season despite an increase in quota from the 1988-1989 fishing season. The recreational quota for the 1990-1991 season was also fully taken in December 1990, which was halfway into the fishing season. It is thereby expected that a similar closure in both the commercial and recreational fisheries will happen in the 1991-1992 season despite the increase in commercial quota. The high likelihood of closure under the proposed TAC warrants analyzing the impacts of changes in quotas. Ex-vessel demand for king mackerel is price inflexible; that is, price decreases less than proportional to increases in harvest (Prochaska, 1978). Relative to the baseline, the proposed TAC would generate an additional \$0.54 million of ex-vessel revenues to the commercial sector. The impacts on processors and consumers cannot be quantified, but are expected to be positive due a decrease in price as harvest increases.

The fact that the recreational quota was fully taken is a strong indication of a high recreational demand for king mackerel. Milon (1990) emphasized the importance of king mackerel as a keeper in determining the recreational demand for the species, an additional fish caught translates to an increase in recreational benefits. Additional benefits, in terms of consumer surplus, amounting to \$1.31 million would be realized by the recreational anglers. The increase in recreational quota, even if the bag limits remain the same, would increase the number of trips taken by anglers through charter boats. This increased trips would generate additional profits to the charter boats amounting to \$0.09 million.

The long-term effects of the proposed TAC are expected to be positive when contrasted with the previous year's TAC. The major rationale for this is that while this TAC is within the level that would restore the stock to desired level, more benefits are generated in both the short term and the long term.

2. Rejected Alternative: Set TAC at 4.9 M, the most likely estimate of ABC

The only difference between this alternative and the preferred one is the magnitude of TAC. Percent allocation among user groups and recreational bag limits are identical to those of the preferred option. At this TAC level, allocation would be:

Commercial allocation	1.57 MP
Eastern Zone	1.08 MP
Western Zone	0.49 MP
Recreational allocation	3.33 MP
Bag limit =	2 fish/person/day private vessels and all Florida vessels; 3 fish/person/day charter (excluding captain and crew) or 2 fish/person/day (including captain and crew) off other states; reverts to zero when allocation is filled.

This alternative provides the highest likelihood that allowed fishing mortality would not significantly prevent the recovery of the stock to the target level. This catch level is 0.85 MP, or 15 percent, lower than the proposed TAC, but 0.65 MP or 15 percent higher than last year's TAC. As with the proposed TAC, this quota is expected to be fully taken in the current fishing season. The bag reversion to zero will be earlier in the season. The distributional impacts of this TAC would not substantially differ from those of the previous season. Relative to last season's TAC, this option would generate additional \$0.24 million of ex-vessel revenues to the commercial sector, \$0.56 million of consumer surplus to the recreational anglers, and \$0.04 million of profits to the charter boat industry.

Atlantic Group King Mackerel

The stock assessment report states that the abundance of Atlantic king mackerel of spawning ages increased during the early to mid 1980s and may have declined slightly in recent years. There appears to be an adequate spawning biomass present which should continue in the future as long as fishing mortality rates do not increase greatly. There appears to be significant amounts of recruitment coming into the fishery, but again high fishing mortality rates could reduce the size of these year classes. This stock is not currently considered to be overfished because the fishing mortality rate does not presently appear to be exceeding F_{30} , and the spawning stock biomass does not appear to be low enough to affect recruitment. For the 1990-1991 season the TAC was set at 8.3 MP within the ABC range of 6.5 MP to 15.7 MP. For the 1991-1992 season, the stock assessment panel recommends an ABC range of 9.6 MP to 15.5 MP. The fixed allocation ratio remains at 62.9 percent recreational and 37.1 percent commercial.

1. Preferred Alternative: Set TAC at 10.5 MP

Commercial allocation	3.90 MP
Recreational allocation	6.60 MP = 0.735 M fish
Bag Limit =	5 fish per person per day throughout the range

This TAC is within the ABC range and below the most likely value that allows a fishing mortality rate that is consistent with maintaining the stock at a healthy level. This TAC is 2.2 MP, or 27 percent, above the preceding year's TAC, and thus would enable the different user groups to experience higher benefits. In principle, the distribution of benefits between commercial and recreational users is not expected to be substantially altered, because the percentage allocations for the two groups remain the same. The actual distributional impacts on these two user groups largely depend on whether the respective quotas will be taken or not. In the last two seasons, both the commercial and recreational quotas were not fully taken, and the fishery remained open throughout the season. If the proposed bag limit increase results in the recreational sector exceeding its quota and the commercial quota is not fully taken, there will be effected a de facto reallocation of fish from the commercial to the recreational sector. As long as the overall TAC is not exceeded, this reallocation could generate higher benefits to the nation, since values would be realized for those fish not taken by the commercial sector. Among the recreational users, the distributional effects would be slightly altered. In the previous season, the bag limits were 2 fish off Florida and 3 fish elsewhere (per person per day). Although all recreational users would benefit from the increased quota, fishing off Florida would generate relatively higher benefits.

The commercial allocation under the proposed TAC is 0.82 MP, or about 27 percent, higher than that of the 1990-1991 fishing year. It may be recalled that the 1990-1991 TAC was lower than that of the 1988-1989 fishing season, yet in both seasons less than 80 percent of the commercial quota was filled. Given this consideration, a quota underrun in the 1991-1992 fishing season will likely occur, unless there is a significant upward shift in the demand or downward shift in fishing costs for king mackerel. To a limited extent, expectations about quota underruns may have to be tempered with the prospect that the Mid-Atlantic Council's area of jurisdiction will partake of this quota once Amendment 5 to the Mackerel FMP is approved and implemented. For the quota increase to have an effect, the commercial harvest in the 1991-1992 season should exceed 3.08 MP (last year's quota). It may be stressed that the commercial catch has exceeded 3.08 MP in only 3 of the past 10 years. Under this scenario, this choice of TAC can be expected to have minimal effects on the commercial fishermen.

The recreational allocation of 6.60 MP is 1.38 MP, or 26 percent higher than the past year's allocation. In the past two fishing seasons, less than 80 percent of total recreational quota was taken, and the fishery remained open throughout the fishing season. Apparently the bag limit succeeded in holding recreational catches below the allocation despite the stipulation that bag limits would not revert to zero once the allocation was met. It may be noted that the 2-fish bag limit for federal waters off Florida was earlier set to be consistent with regulations for state waters. The proposed 5-fish bag limit would no longer be consistent with state bag limits for king mackerel. It is not yet known whether state bag limits would be changed to be consistent with the proposed federal bag limit. In any case, the increase in bag limit increases the chance of the recreational sector filling its quota, and this chance would be increased further if states also increase their bag limits. Given the possibility that the proposed recreational allocation may be filled, the increase in recreational quota would generate additional benefits to the subject sector. The additional benefits generated would amount to \$0.97 million of consumer surplus and \$0.11 million of charter boat profits.

2. Rejected Alternative: Set TAC at 11.5 MP, the most likely estimate of ABC

The only difference between this alternative and the preferred one is the magnitude of TAC. Percentage allocation among user groups and recreational bag limits are identical to those of the preferred option. At this TAC level, allocation would be:

Commercial allocation	4.27 MP
Recreational allocation	7.23 MP
Bag Limit =	5 fish per person per day throughout the range

This alternative provides the highest likelihood that allowed fishing mortality is constrained to that rate consistent with maintaining the stock at a healthy level. This catch level is 1.0 MP, or 10 percent, higher than the proposed TAC, and 3.2 MP or 39 percent higher than last year's TAC. The distributional impacts of this TAC would not substantially differ from those of the proposed option. As with the proposed option, the commercial quota is not likely to be filled, and therefore minimal impacts on the commercial fishermen may be expected. The proposed recreational quota is only slightly lower than the recreational catch in 1984 when fishing was not regulated. As with the proposed option, the increase in bag limits increases the chance that the recreational catch will increase substantially. If the quota under this option is fully taken, the recreational sector will realize additional benefits amounting to \$1.4 million in consumer surplus and \$0.17 million in charter boat profits.

Gulf Group Spanish Mackerel

The stock assessment panel found evidence of some increase in recruitment and spawning stock biomass in the most recent years. The panel felt there was potential for the increased recruitment to continue to contribute to recovery of the spawning biomass. Recommended ABC range is 7.1 to 12.2 MP. Allocations remain at 57 percent commercial and 43 percent recreational.

1. Preferred Alternative: Set TAC at 8.6 MP, the most likely estimate of ABC²

Commercial allocation	4.9 MP
Recreational allocation	3.7 MP = 2.72 M fish
Bag limit =	3 fish/person/day off Texas, 5 fish/person/day off Florida, and 10 fish/person/day off other Gulf states (reverts to zero when allocation is filled)

The preferred TAC is the most likely ABC, and therefore allows fishing mortality to be at a rate most consistent with the target path for stock recovery. This TAC is 3.35 MP, or 64 percent, higher than last year's TAC, and thus offers higher potential benefits to all user groups. The

²Since this is the most likely estimate of ABC, there is no explicit rejected alternative. As earlier noted, the TAC for the 1990-1991 fishing year is implicitly the only rejected alternative.

percentage allocation between the commercial and recreational sectors is maintained. In this light, the distributional impacts of this option do not differ substantially from those of last year's quotas. Additionally, the distributional impacts among the different recreational groups would not differ from those of last year's, since the bag limits for these two fishing seasons are essentially similar. The only slight difference is the bag limit for fishing off Florida which changed from 3 fish to 5 fish (per person per day) on January 1, 1991.

Both commercial and recreational quotas were not filled for the last two consecutive fishing years. Commercial harvest of Spanish mackerel in the 1990-1991 fishing year was less than 60 percent of commercial quota. Recreational harvest for that year was also less than 50 percent of the recreational quota. At the proposed TAC and commercial/recreational allocation, last season's harvest would only be 36 percent of the commercial quota and 32 percent of the recreational quota. Thus, there appears to be a remote possibility that the proposed commercial or recreational quota would be fully taken. To have any impacts, the catch for the 1991-1992 season should exceed 1.74 MP for the commercial sector and 1.02 MP for the recreational sector. These were last year's commercial and recreational catches of Spanish mackerel. Unless market conditions significantly improve soon, these catches will not be realized.

Given current conditions, the proposed quotas would have very minimal impacts on both the commercial and recreational sectors. If these quota levels are at least maintained over a number of years without any reduction, fishing effort can be expected to rise gradually as coastal population increases further and the national or regional economy recovers from current slump.

Atlantic Group Spanish Mackerel

The report of the stock assessment panel notes an historical decline in spawning biomass in the Atlantic but that recruitment may be up for this stock. The ABC range for this group is recommended to be 5.5 to 13.5 M with the most likely value estimated at 7.0 M. The allocation formula adopted in 1989 called for greater share for the recreational sector for any TAC increase until the recreational and commercial shares are equalized. The proposed increase in TAC allows the equalization of the two shares, thus the proposed allocation is 50 percent commercial and 50 percent recreational.

1. Preferred Alternative: Set TAC at 7.0 M, the most likely estimate of ABC

Commercial allocation	3.5 MP
Recreational allocation	3.5 MP = 1.569 M fish
Bag limit =	5 fish/person/day off Florida until altered but to not exceed 10 fish/person/day; 10 fish/person/day in other states (reverts to zero when allocation is filled)

The preferred TAC is the most likely ABC, and therefore allows fishing mortality to be at a rate most consistent with the target path for stock recovery. This TAC is 2.0 MP, or 40 percent, higher than last year's TAC, and thus offers higher potential benefits to all user groups. The

commercial/recreational shares of the proposed TAC are equal. This equalization implies that the recreational sector would have potentially higher increase in benefits than the commercial sector from the increase in TAC. The realization of these benefits depends on whether the respective quotas would be filled.

For the last two fishing seasons, the commercial fishery closed about 8 to 9 months after it opened. The 1990-1991 commercial allocation was filled towards the end of January 1991, and in the previous fishing year, the commercial fishery closed on December 23, 1989. Over 80 percent of the commercial fishery occurred in Florida and 72 percent of the landings were taken there within one month of the appearance of the fish. The proposed commercial quota is 0.38 MP, or 11 percent, higher than that of the previous year. Noting the existence of overruns in commercial quota for the last two years, the proposed commercial allocation will be likely taken. Relative to the previous year's quota, the proposed increase in commercial quota would generate additional ex-vessel revenues amounting to \$0.41 million.

The recreational fishery did not fully fish out its allocation in the past two fishing seasons. In the 1989-1990 fishing season, only about half of the quota was filled. Part of the explanation comes from the fact that there was a large increase in recreational allocation for the 1989-1990 season. Another possible reason is the lagged reaction of anglers to quota overruns and controversial fishery closure in the previous year (1988-1990). This is partly borne out by the fact the total recreational catch in the 1989-1990 fishing season was only about 50 percent of that of the 1988-1989 season. This delayed reaction of anglers to management actions is again apparent in the 1990-1991 fishing season when about 80 percent of recreational quota was taken. However, the 1990-1991 recreational quota was 0.9 MP less than its 1989-1990 level. In terms of actual catch, the 1990-1991 catch was only about 11 percent higher than that of the previous year. Given this scenario, it is likely that the proposed recreational quota, which is 1.64 MP higher than previous quota, would not be fully taken even if the record 1988-1989 catch would be fished. For the proposed increase in recreational quota to have an effect, the catch should exceed the previous year's quota of 1.86 MP. Assuming the recreational catch would equal the 1988-1989 record of about 2.8 MP, this choice of a TAC would generate additional \$1.0 million in consumer surplus and \$0.14 million in charter boat profits.

2. Rejected Alternative: Set TAC at 9.0 MP³

Commercial allocation	4.5 MP
Recreational allocation	4.5 MP
Bag limit =	5 fish/person/day off Florida until altered but to not exceed 10 fish/person/day; 10 fish/person/day in other states (reverts to zero if allocation is reached)

Although this TAC is within the ABC range, the probability of stock recovery within the given time

³Although the proposed TAC is also the most likely estimate of ABC, this option was specifically considered in Council deliberation, and thus represents as one viable alternative. The previous TAC is still considered an implicit rejected option.

frame would be reduced by some amount, since it is above the most likely estimated ABC. This TAC is 4.0 MP, or 80 percent, higher than the previous TAC. All user groups will potentially receive increased benefits. In principle, the distributional effects of this option would be similar to those of the preferred one. However, as earlier discussed, the recreational quota may not be filled, but the commercial quota will be taken. Thus, even if the two groups have equal share of the TAC, the commercial sector is bound to receive bigger increases in benefits. Relative to the previous year's quota, this option would generate \$1.52 million of additional ex-vessel revenues to the commercial sector. The impacts on the recreational sector would be similar to those estimated for the proposed option.

Spawning Potential Ratio and Target Level Percentage

A 30 percent spawning potential ratio (SPR) is the minimum level suggested in adopting a definition of overfishing for king and Spanish mackerels. This level has been deemed to be very reasonable in maintaining the stock at greater abundance. Currently, only the Atlantic group of king mackerel is considered not "overfished" under this definition. Previously, it was suggested that 40 percent and 35 percent SPR levels for king and Spanish mackerels, respectively, were reasonable levels in maintaining the stock at greater abundance. Subsequent refinements in analysis showed these levels to be very conservative.

The relationship of the 30 percent SPR to optimum yield (OY) that accounts for socioeconomic factors are relatively unknown and further research is needed if some quantification of this relationship is desired. At any rate, broad statements can be enunciated with respect to the socioeconomic implications of the chosen 30 percent SPR. The 30 percent SPR, as a minimum level, provides enough cushion for the stock to self-replenish while allowing some surplus to be harvested. At this SPR level, the stock can support both recreational and commercial harvest on a continuing basis. The estimated ABC ranges consistent with attaining or maintaining the 30 percent SPR level have provided TACs that proved to be generally sufficient to supply the needs of both the recreational and commercial sector. In the last two years, only the allowable catch for the Gulf king mackerel has been deficient in meeting both recreational and commercial needs. The deficiency in allowable catch of Atlantic Spanish mackerel for commercial purposes is not directly attributable to the ABC (and TAC) derived from targeting an SPR level of 30 percent. Such deficiency is more a function of the allocation formula than of the chosen TAC. Therefore, there is strong reason to believe that the 30 percent SPR does not severely restrict the enjoyment of the mackerel resource by various user groups. At any rate, the case for the Gulf king mackerel may need to be further analyzed to determine whether the deficiency in allowable catch is directly a function of the chosen 30 percent SPR and whether short-run losses in both recreational and commercial benefits may be later recouped when higher TACs can be accommodated.

Government Costs of Regulation

Federal government costs of this action were associated with meetings, travel, calculation of ABC's, preparation of various documents and reviewing all documents. Other sources of additional costs include extraordinary research specifically done for the purpose of this particular action, additional

statistics costs, and additional enforcement costs resulting from the action. In the latter cases, no additional costs are anticipated.

Prepare and implement action	\$30,000
Research	None additional required
Statistics	None additional required
Enforcement	None additional required

SUMMARY AND NET EXPECTED IMPACT OF PROPOSED ACTION

The notice action being addressed constitutes changes in management for four distinctive groups of king and Spanish mackerel. These changes are considered as four independent actions, and there is no justification to attempt a net benefit statement for all four actions considered as a unit. Therefore, this summary proceeds on the basis of the four groups of mackerels being considered as distinct fisheries. The major emphasis of the summary is on the expected economic impact of the preferred alternatives. It may be noted that for each fishery the alternatives considered are generally the preferred alternative, the most likely value of ABC, and implicitly the previous year's quotas.

Gulf Group King Mackerel

The preferred alternative (set TAC at 5.75 MP with no change in bag limits) establishes a TAC higher than that of the previous season, and is expected to generate additional benefits of \$1.31 million in ex-vessel revenues, \$0.09 million in consumer surplus, and \$0.40 million in charter boat profits. The distributional effects of the preferred alternative on various user groups would be similar to those of the previous year's TAC. The preferred alternative would also generate higher benefits than the rejected alternative, primarily because the former has a higher TAC.

Atlantic Group King Mackerel

The preferred alternative (set TAC at 10.5 MP with higher bag limit of 5 fish per person per day) establishes a TAC higher than that of the previous season, and therefore offers potentially higher benefits to all user groups. Realization of these benefits largely depends on filling the quota. Based on more recent catches, the commercial sector is expected to realize only minimal increases in benefits. The increase in recreational bag limit makes it more likely for this sector to harvest its quota. Given this consideration, the preferred alternative would generate additional benefits of \$0.97 million in consumer surplus and \$0.11 million in charter boat profits. Although in principle, distributional effects of the preferred alternative would be about similar as those of the previous year's TAC and allocation, the recreational sector may be able to realize relatively greater benefits because of the increased bag limit. These differential effects are related more to the likelihood of each user group filling its respective quota than to the nature of the allocation method. The preferred TAC is lower than the most likely estimate of ABC, and allows potentially higher benefits to be realized. The actual difference in benefits between these two alternatives largely depends on the extent the quotas are filled.

Gulf Group Spanish Mackerel

The recommended TAC is 8.6 MP, and it is also the most likely estimate of ABC. This choice was determined to have minimal impacts on both the recreational and commercial sectors, mainly because the respective quotas are unlikely to be filled. However, it may be noted that the commercial sector has the capacity to fill the quota if and when market and environmental conditions are favorable.

Atlantic Group Spanish Mackerel

The preferred alternative sets TAC at 7.0 MP, which is also the most likely estimate of ABC. With the expectation that the commercial quota will be filled, this alternative would generate additional \$0.41 million in ex-vessel revenues. The recreational quota is not expected to be fully taken. However, an increase in catch over that of last year's is very likely. Given this possibility, the preferred alternative is expected to generate additional \$1.0 million of consumer surplus and \$0.14 million of charter boat profits. In principle, the distributional effects of the preferred alternative would be different from those of the previous season's TAC, because of the new allocation between the recreational and commercial sectors. The equalization of the two groups' share of the TAC would potentially benefit the recreational sector more than the commercial sector. Given the expectation that the commercial quota would be filled, but not the recreational quota, the differential effects may not be significant at least in the 1991-1992 fishing season. The rejected alternative provides for a higher TAC of 9.0 MP, which is higher than the most likely estimate of ABC (i.e., the preferred alternative). The impacts of this higher TAC differ from those of the preferred option only with respect to the commercial sector. Granting that the higher commercial quota will be filled, this rejected option would generate an additional \$1.52 million in ex-vessel revenues.

Government Costs

Government costs for preparing and implementing this action are estimated at \$30,000. This is the same amount as the previous year's. There are expected to be no additional costs from data collection, research or law enforcement from this action.

REFERENCES

Anonymous. 1991. Report of the Mackerel Stock Assessment Panel.

Godcharles, M. 1991. Preliminary Landings of Gulf and Atlantic King and Spanish Mackerel. Southeast Region, NMFS, St. Petersburg, FL.

Milon, J. Walter. 1989. Specification of the Recreational Catch Rate for Evaluating Regulations in the Gulf of Mexico Mackerel Fishery. Paper presented for the session on "Marine Fisheries Valuation in a Political World," SEA Annual Meetings, Orlando, FL.

Prochaska, F.J. 1978. Prices, Marketing Margins, and Structural Change in the King Mackerel Marketing System.

Raulerson, R. 1991. Economic Impact of ABC Ranges for Atlantic Group of King and Spanish Mackerel. Southeast Region, NMFS, St. Petersburg, FL.

_____. 1991. Economic Impact of ABC Ranges for Gulf Group of King and Spanish Mackerel. Southeast Region, NMFS, St. Petersburg, FL.

Summary Report

Intercouncil Mackerel Scientific and Statistical Committee

Tampa, Florida

April 17, 1991

15 of 19 Gulf members were present

4 of 11 South Atlantic members were present

The Intercouncil SSC reviewed the Report of the Mackerel Stock Assessment Panel and recommended:

1. It is recommended to the Councils that they include persons with economic and social science expertise to the Mackerel Stock Assessment Panel to provide an integrated understanding of relevant factors in support of fisheries management. It is further recommended that this innovation be extended to all other fishery assessment panels in place in the respective regions.
2. Recommend that as a high priority item the Councils explore with NMFS ways to obtain current information on Mexican catches of mackerel including size frequencies.

Rationale: The most recent reported Mexican catches are for 1988. A MARFIN contract study by Mote Marine Laboratory continues to be the only source of needed catch by size data. The assessment panel is unable to develop an ABC range for Western group king mackerel without more Mexican data.

3. The Gulf Council's SSC accepted the Report of the Mackerel Stock Assessment Panel with concern about the validity of the impact of bycatch of mackerels in shrimp trawls. (There were two members apposed and one voting "present")

The South Atlantic Council's SSC accepted and approved the report. (There was one abstention).

Rationale: There continues to be concern over estimates of fish bycatch in shrimp trawls. Estimates are available only in the Gulf fishery. Though Spanish mackerel have been reported as taken as bycatch in some areas of the Atlantic, complete estimates are not available. Some members of the SSCs felt they had insufficient time to review the material and others noted the lack of a social impact evaluation.

4. The adjustment of the SPR from 35 percent for Spanish mackerel and 40 percent for king mackerel to a new level of 30 percent for both was accepted within the report.

Following the Intercouncil meeting, the Gulf SSC meeting on other matters adopted the following:

It is recommended to the Gulf of Mexico Fishery Management Council that they,

1. Strongly endorse the need for applied social and anthropological research in support of their decision making efforts.
2. Endorse the need for employing sociologists or anthropologists in the NMFS Regional Office, Southeast Fisheries Center, and on Council staff.
3. Encourage attention to social impacts as required by the Magnuson Act in all future reports and planning documents submitted to them.

Rationale: We are pleased and eager to make contributions as mandated by the Magnuson Act in assessing social decisions of fisheries management. However, it makes little sense to continue to involve sociologists and anthropologists in the SSC when reports and planning documents rarely, if ever, contain any such information to be reviewed and evaluated as "best available scientific data".

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

1 SOUTHPARK CIRCLE, SUITE 306
CHARLESTON, SOUTH CAROLINA 29407-4699
TELEPHONE (803) 571-4366

Roy Williams, Chairman
Susan Shipman, Vice-Chairman

Robert K. Mahood, Executive Director

April 18, 1991

Summary Report South Atlantic Council Mackerel Advisory Panel Meeting Charleston, South Carolina April 18, 1991

The following members were in attendance: Bartron, Bayliss, Forbes (Vice-Chairman), Hudgins, Pelosi (Chairman), Tompkins.

The AP made the following recommendations to the Council:

1. That TAC for the Atlantic group of king mackerel be set at 11.5 million pounds for the 1991/92 fishing year, and that the bag limit be increased to 5 fish per person per day for North Carolina, South Carolina and Georgia. It was further recommended that the bag limit for Florida be increased by one fish per person per day but should be consistent with state regulations.

The rationale for increasing the bag limit is that the recreational fishery has not met its allocation in the last two years. Further, the stock is apparently healthy and the recommended increases are not expected to result in quota overruns.

2. That the TAC for Atlantic Spanish mackerel be set at 8.6 million pounds and the bag limits remain unchanged.

The AP was concerned that the increase in ABC was due mostly to a single year class now entering the fishery, and that the following year class appears to be below average. The AP did not want to see bag limits increase only to have to be decreased next year when the below average year class is the predominant year class in the fishery. However, the AP believes that there is a large number of very large, old fish in the population that should be harvested before they are gone. These fish could be taken by the commercial fishery but are not caught by the recreational fishery. Increasing the TAC will allow the commercial fishery to harvest these large fish.

The AP approved the following motions on options for Amendment 6.

A. Rebuilding overfished stocks within a specified period.

The AP recommended that the time period for rebuilding not be specified in a specific number of years but that rebuilding be accomplished within a generation time.

B. Frequency of assessments and adjustments.

The AP recommended option B-1. No change (i.e. annual assessments and adjustments).

C. Allocation of Gulf migratory group king mackerel.

The AP recommendation on this issue was to allocate the fish caught between the Volusia- Flagler County line and the Dade-Monroe County line to the appropriate group based on the best available scientific information on the proportions of each group in the catch from this mixing zone.

One member of the AP thought that the line was in the wrong place and should be moved instead of moving fish around. One member thought that Florida had so many votes (voting on both Gulf and South Atlantic Councils) that they would have an unfair advantage and would end up moving allocating fish for their advantage rather than for scientific reasons.

D. Adjustment of quotas to compensate for exceeding previous year's quotas.

The AP recommended that the Council add commercial trip or landing limits as a Notice Action provision of the plan with the following options available and adjustable as needed:

- a. Closed days of the week.
- b. Closed holidays.
- c. Periods of different trip limits in the same fishing year.
- d. Trip limits could vary by geographic area.
- e. Trip limits may be set by number of fish or pounds of fish.

To include all species in the Coastal Migratory Pelagics plan.

The AP recommended that the Council recognize Florida and North Carolina landing laws and implement compatible trip limits.

E. Dolphin management.

The AP recommended the following:

- a. Set a recreational bag limit of 10 fish per person per day.
- b. Set a commercial trip limit of 1,000 pounds for North Carolina, South Carolina, and Georgia with no size limit. Set a 500 pound trip limit for Florida with a minimum size to reflect Florida law (currently 20 inches FL).
- c. Require a Federal commercial permit to land dolphin in excess of the bag limit.

F. Distribute the commercial king mackerel allocation equitably among fishermen.

There was no consensus on this issue. Some expressed the desire for sub-allocations

by gear type for the Gulf group king mackerel.

G. Income requirement for commercial permits.

The AP recommended that to be eligible for a commercial permit the owner or operator must be able to show that at least 25% of his earned income was derived from commercial fishing (i.e. sale of catch or charter fishing) during one of the three preceding calendar years.

Other Recommendations

1. The AP urged the Council to place a high priority on getting a handle on the bycatch of king and Spanish mackerel in the shrimp fishery.
2. The AP recommended that the Council undertake genetic studies of king mackerel in the east Florida zone of mixing to determine the mixing rate.
3. The AP recommended that the Council request that catches from the Mid-Atlantic area be submitted earlier.

Summary Report
Gulf of Mexico Fishery Management Council
Mackerel Advisory Panel Meeting
Tampa, Florida
April 16, 1991

12 of 15 members were present.

The following motions were adopted:

1. Recommend to the Council that TAC for Gulf group king mackerel be set at 5.75 million pounds for the 1991-1992 fishing season (ABC range 4.0-7.0), and the bag limit be reduced to two fish per person per day (no exception to allow the current three fish for charter boats).

Rationale: The panel generally agreed that there has been good recruitment and recovery of king mackerel stocks. The panel would like to see the recreational fishery remain open throughout the fishing year and feels that the increase in TAC of 1.85 million pounds (1.26M to the recreational fishery and .59M to the commercial fishery) would help extend the fishery through the season.

2. Recommend that the TAC for Gulf group Spanish mackerel be set at 8.6 million pounds, the most likely value of TAC. The panel recommends no change in the current bag limits except that it would hope to see consistency across the Gulf. (Currently the bag limit is 10 fish with 5 off Florida and 3 off Texas).

Rationale: The total of the most likely value of ABC for the Gulf and Atlantic group ($8.6 + 7 = 15.6$) approaches the MSY of 18 million pounds. With the elimination of trawl bycatch the stocks could be close to MSY.

Other actions:

1. The panel considered but rejected a proposal to reduce the bag limit on cobia from 2 to 1 fish per person per day.
2. Individual suggestions for consideration in Amendment 6 but not acted upon were:
 - a. Consider revision of Gulf group king mackerel fishing year.
 - b. Consider change in boundary of Atlantic and Gulf king mackerel groups, recognizing there will be a zone of mixing.

- c. Consider better determination of migratory groups including initiation and use of mitochondrial DNA studies.
- d. Consider use as seasonal adjustments such measures as variable trip limits by season or area.
- e. Consider different fishing years for recreational and commercial quotas to coincide with fishing activities.
- f. Consider bag limits and quotas on dolphin and bluefish.