9.0 MANAGEMENT REGIME AND REGULATORY IMPACT REVIEW

9.1 Introduction

This section lists the proposed and alternative management measures as they apply to the five Councils; provides an estimate of the economic, biological and sociological impacts of those measures, and presents Councils' rationale for proposing certain measures and not proposing the alternatives. Because the major thrust of the proposed management regime is to prevent certain otherwise inevitable events from occurring, the benefits cannot be evaluated in a traditional, quantitative RIR analysis. For this reason this section presents the costs, benefits and analysis of impacts of the management measures in a more qualitative sense. Nevertheless, to ensure the adequacy of the RIR, a more traditional economic analysis and Regulatory Flexibility Analysis is presented in Appendix I. That analysis, by necessity, uses data that may not be accurate or may not be reflective of the billfish fishery over its entire range. For example, tag recapture rates are used to estimate the number of additional billfish that would be made available as a result of measures contained in this plan. However, it is generally believed that tag shedding, tag-related mortality and underreporting of recaptures all result in a considerable underestimate of the actual recapture rate. Further, while other ways of valuing the recreational fishery have been suggested (e.g., compensation necessary to not go fishing, reduced participation resulting from decline in fishing success), only marginal value (i.e., willingness to pay for one extra fish) is used in assessing increased value to the recreational fishery as per NMFS recommendations. The Councils do not believe that the value of these fish to the recreational fishery can be expressed by this single value.

The marginal values used in the RIR were derived from an economic survey of the big game fishery in New Jersey, those being the only ones available, and it is not known whether these values are representative of the fishery throughout its range, or even if they are accurate for New Jersey. Further, the marginal values were derived from a survey question which was not appropriate to the billfish fishery. That is, "considering the amount of fish caught on a typical trip, how much extra would you be willing to pay in trip costs to catch one more fish of the following species?" Catching an additional blue marlin per trip is such an unrealistic scenario that the answer cannot possibly be meaningful. The population would have to increase at least 20 times before an additional blue marlin could be caught per trip because the vast majority of trips do not catch any blue marlin. An alternative way of phrasing a question to estimate marginal value that would be more appropriate to a rare event fishery such as the billfish fishery might be, "how much extra would you be willing to pay in trip costs to double your chances of catching a fish of the following species (or to increase your fishing success rate by 100%)." If phrased this way the response, more appropriately, would be tied to the trip rather than the catch, but could be equated to a marginal value per fish.

Beyond these reservations, the most important shortcoming of this approach is that it fails to capture and evaluate the most essential element of this management plan which is to implement

measures before the fishery begins to decline. If these preemptive steps are not taken and the commercial fishery is allowed to develop at the expense of the recreational fishery to the point that participation begins to decline, then the net loss to society certainly cannot be expressed merely by the "willingness to pay for an additional fish". A decline in availability of fish will ultimately mean a decline in recreational participation (and number of tournaments, vessels, etc.) because the recreational fishery is directed specifically at these species. The cancellation of even 10 percent of the billfish tournaments would represent a loss of at least $2 million annually in entry fees alone. A decline in availability to the commercial fishery (because measures in this plan will make them "unavailable" to the commercial fishery), on the other hand will not have a similar impact because billfish are only an insignificant bycatch of fisheries directed at other species (swordfish and tuna). Thus, evaluating the benefits of the plan requires speculation as to what will occur in the future if these measures are not implemented, and the present trends allowed to continue. The analysis in Appendix I attempts only to evaluate the impacts of the management measures on the fishery as it exists today, using available data.

While the increase in fishing mortality or harvest necessary to effect a collapse in the recreational fishery is unknown, in the closely related recreational swordfish fishery, such a collapse occurred long before the resource itself collapsed (possibly even before MSY was reached). The recreational swordfish fishery flourished for perhaps five years (1977-81) when catch rates were reasonably high (approximately four to six nights to catch a swordfish). As the commercial longline fishery expanded, recreational catch rates declined and within five years the recreational fishery was completely eliminated (catch rates dropped to approximately one fish for eight nights of fishing). This FMP attempts to prevent a similar occurrence in the much more valuable recreational billfish fishery.

The problems in the fishery (Section 5) and the management objectives (Section 6) are included in this section by reference. This section and Appendix I thus fulfill the requirements of Executive Order 12291.

9.1.1 Executive Order 12291

"Federal Regulation" established 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 benefits to society for the regulation outweigh 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 priorities regularly 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) require the preparation of a Regulatory Impact Review (RIR) for all regulatory actions which either implement a new fishery management plan or significantly amend an existing plan, or may be significant in that they effect important DOC/NOAA policy concerns and are the object of public interest.

The RIR is part of the process of developing and reviewing fishery management plans and is prepared by the Regional Fishery Management Councils with the assistance of the National Marine Fisheries Service (NMFS), as necessary. 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 or Council 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 serves as the basis for determining whether the proposed regulations implementing the fishery management plan or amendment are major/non-major under Executive Order 12291, and whether or not the proposed regulations will have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act (P.L. 96-354).

9.1.2 Regulatory Flexibility Act

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.

9.1.3 Paperwork Reduction Act

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

9.1.4 Small Business Administration

The Small Business Administration (SBA) defines a small business in the commercial fishing activity, classified and found in the Standard Industrial Classification Code, Major Group, Hunting, Fishing and Trapping (SIC 09), as a firm with receipts up to $2.0 million annually.

SBA defines a small business in the charter boat activity to be in the SIC 7999 code, Amusement and Recreational Services, not elsewhere classified as a firm with receipts up to $3.5 million per year.

9.2 Proposed Management Measures

The following management measures have been agreed upon by all five Councils and form the basis for managing the billfish resource within the U.S. EEZ. It is the Councils' intent that the proposed management measures apply to fish caught inside or outside the EEZ and possessed from the seaward boundary of the EEZ to shore.

- Management measure #1: The sale of all billfish from the management unit is prohibited ("no sale provision"), with one exception (see management measure #5). The management units are: blue and white marlin from the North Atlantic Ocean, sailfish from the west Atlantic and spearfish from the entire Atlantic.
- Management measure #2: Only billfish (i.e., blue marlin, white marlin, sailfish and spearfish) exceeding the following minimum sizes and having been captured by recreational fishermen using conventional rod and reel may be retained:

blue marlin:	86 inches from tip of lower jaw to fork of tail
white marlin:	62 inches from tip of lower jaw to fork of tail
sailfish:	57 inches from tip of lower jaw to fork of tail
spearfish:	no minimum size

  These minimum sizes apply to all billfish taken from the management unit.
- Management measure #3: Possession of billfish aboard commercial longline and pelagic drift net vessels is prohibited. This measure applies to all billfish taken from the management unit.
- Management measure #4: Data reporting requirements: a) Mandatory logbooks aboard swordfish and tuna longline vessels, b) Onboard observers, c) Mandatory tournament reporting for those tournaments selected by NMFS, and d) Develop a methodology to estimate total catch and effort in the recreational fishery.
- Management Measure #5: The small-scale handline fishery in Puerto Rico will be exempt from the prohibition on sale. Billfish taken by this fishery are also exempt from minimum size requirements.
- Foreign fishing management measures: All measures presently implemented and/or approved but held in reserve through the PMP are adopted in their entirety into this FMP. No additional management measures that apply to foreign fishing are proposed in this FMP. These measures and their rationale can be found in the PMP for Atlantic Billfishes and Sharks and in 50 CFR Section 611.61. Briefly, these measures are: (1) no foreign longlining in the Atlantic EEZ out to 100 miles from Cape Lookout north to U.S./Canada boundary from June 1 to November 30; (2) all billfishes must be released at the surface of

the water by cutting the line without removing the fish from the water; 3) reporting requirements; and (4) time and area restrictions in Gulf of Mexico and Atlantic EEZ from Key West to Cape Lookout are approved but not implemented.

9.2.1 Management Measure #1: No Sale Provision

Rationale: The no sale provision is for the express purpose of preventing a commercial market for these species from developing, thus preventing the primary objective of the FMP from being realized. Historically billfish have had little commercial value in the continental U.S., entering local commercial markets in very limited quantities generally only as a smoked product. Recently, with the increased demand for fresh fish, and an increasing potential supply resulting from the expansion of the U.S. swordfish and tuna longline fleets, billfish landings have increased. Table 5 shows the reported commercial landings from 1979-86. A clear trend in increased landings and value can be seen. Figure 1 shows the reported billfish landings for Puerto Rico. Although landings appear to increase through 1980 and then decrease, this is at least in part due to the 1981 - 1986 landings not having been adjusted for under reporting whereas earlier landings were corrected for this. More importantly is the trend in price per pound. In the last ten years, the price in Puerto Rico has increased more than 300 percent. A similar trend has been seen in all Council areas. Recent wholesale prices for marlin were reportedly $2.25 per pound (July 1987) in the New England area. With the increasing trend in value and the ability of the U.S. longline fleet to increase their landings, it is inevitable that many billfish that previously would not have been caught commercially or if caught would have been released, will now be retained for sale. In addition, some recreational fishermen sell their catch. When marlin were worth $0.50 per pound, they may not have been worth retaining. At present prices ($1.00 - $1.50) more recreational fishermen would be willing to retain fish they might have previously released. These activities, if continued unabated, will prevent the primary objective of this FMP from being realized. The no sale provision in conjunction with the prohibition on retention by commercial fishing vessels and the minimum size restrictions will maximize the availability of the resource to the recreational fishery, thus moving towards OY.

The Councils recognize that only a small percentage of the stock of any of the billfishes is contained within the EEZ and thus subject to these management measures. The intention of this plan, however, is to maximize the availability of billfish for the largely non-consumptive use of the recreational fishery within the jurisdictional constraints prescribed by the Magnuson Act as amended. The Councils can only exercise the authority permitted them under the law.

Any regulation that reduces mortality will obviously promote conservation. This measure is designed to reduce mortality resulting from both commercial and recreational fishing activity. It will reduce recreational fishing mortality by encouraging recreational fishermen to release their catch unless of trophy size so that these fish may again be available to others. Although it is estimated that 41 percent of the billfish caught by domestic longline vessels are dead when brought

Table 5. Commercial billfish landings (in lbs and $), 1979-1986.

	Gulf		Atlantic		Caribbean		Total	
	lbs	$	lbs	$	lbs	$	lbs	$
1979	0	$0	24,771	$9,112	14,228	$12,751	38,999	$21,863
1980	*	$0	26,896	$17,877	20,250	$22,410	47,146	$40,287
1981	*	$0	51,346	$21,346	16,756	$15,080	68,102	$36,426
1982	9,407	$4,090	38,372	$15,494	13,330	$14,930	61,109	$34,514
1983	3,168	$2,690	35,372	$20,726	11,669	$15,170	50,209	$38,586
1984	21,934	$13,304	121,618	$66,442	9,562	$14,152	153,114	$93,898
1985	55,755	$35,153	105,012	$59,407	11,077	$16,394	171,844	$110,954
1986	141,400	$89,082	50,218	$29,085	12,597	$16,549	204,215	$134,716

*Confidential landings not included in totals.
(Source: NEFC and SEFC, NMFS)

alongside (Table 6), this measure (in conjunction with the possession prohibition) will ensure that the other 59 percent that are alive will be released. It should be noted that the percent of live billfish reported by observers on domestic longliners is much higher than on foreign longliners. From 1982 to 1986, observers aboard Japanese longliners in the EEZ recorded 1451 billfish, of which 949 or 65.4 percent were dead (Table 7).

No Sale Provision to Apply to Imports: The intent of the no sale provision is to prevent a commercial fishery from developing so that the availability of billfishes to the recreational fishery is maximized. If the prohibition on sale merely redirects the commercial effort on these fish from domestic to foreign vessels, nothing will have been accomplished. The FMP is not intended to prevent foreign vessels from pursuing their present fishing activities. Rather, the effect of extending the scope of this regulation is to remove the incentive for foreign vessels to increase their billfish landings to fill the market void that will be created by prohibiting domestic vessels from selling billfish. If the market is filled with fish taken from the same stock by foreign vessels, then billfish mortality will continue to increase and the number of billfish available to the recreational fishery will continue to decrease. Further, without the measure applying to fish from the entire stock, a U.S. vessel could offload its billfish catch in one of the Caribbean Islands or in the Bahamas and ship the fish back into the U.S. as imports, something that will almost certainly occur if the U.S. market develops and the price increases significantly.

The Councils believe that prohibiting the sale of a species of fish is a legal action under the Magnuson Act if the intent is for conservation of the resource. Since the Councils intent is to manage billfish as a recreational fishery, conservation of the resource, in this context, requires maintaining the population at the highest possible level. Allowing the development and expansion of the commercial harvest from these stocks would be inconsistent with these objectives. Clearly, since these measures impact foreign and domestic fishermen equally, the Councils are not trying to secure a marketing advantage for domestic fishermen, eliminate competition or manipulate the market place or the price.

Further, if imports are not prohibited, U.S. longliners will perceive this measure as neither fair nor equitable since foreign vessels fishing alongside them (outside the EEZ) may not only retain all the billfishes they catch, but also sell them in the U.S. to markets denied our own fishermen.

The question is largely academic anyway since at the present time there are virtually no billfish being imported into the U.S. from the stocks being managed by this FMP. Table 8 lists all billfish imports since 1984. Only 2,300 pounds of billfish from Antigua would have been affected by this measure. Two hundred pounds of billfish from Costa Rica might have been from the management unit and thus affected by this measure. The remaining 434,300 pounds of imported billfish came from Ecuador and are presumably from the Pacific Ocean.

Therefore, to achieve the objectives of this FMP, to permit dockside enforcement, to prevent additional markets from encouraging expanded foreign fishing effort on billfish stocks,

Table 6. Billfish catches recorded by observers on 21 domestic longline trips, Mar 1985 - Sep 1987.

Area	Blue Marlin		White Marlin		Spearfish		Sailfish		All Billfish	
	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive
Atlantic	1	4	0	3	0	0	6	4	7	11
(4 Trips)	20%	80%	0%	100%	0%	0%	60%	40%	39%	61%
Caribbean	5	18	0	4	0	0	0	0	5	22
(2 Trips)	22%	78%	0%	100%	0%	0%	0%	0%	23%	77%
Gulf	10	20	28	23	0	2	4	1	42	46
(15 Trips)	33%	67%	55%	45%	0%	100%	80%	20%	48%	52%
Total	16	42	28	30	0	2	10	5	52	76
(21 Trips)	28%	72%	48%	52%	0%	100%	67%	33%	41%	59%

(Source: Domestic Longline Observer Program, SEFC, NMFS.)

Table 7. Summary of foreign longline observer data on billfish, 1982-1986*.

Year Days Fished	Condition	Blue Marlin No.	Percent	White Marlin No.	Percent	Spearfish No.	Percent	Sailfish No.	Percent	Unc. Billfish No.	Percent	All Billfish No.	Percent
1982	Alive	18	51%	43	20%	5	23%	1	33%	6	55%	73	26%
917	Dead	17	49%	170	80%	17	77%	2	67%	5	45%	211	74%
	Total	35		213		22		3		11		284	
1983	Alive	4	67%	36	31%	1	100%	0	-	0	-	41	34%
303	Dead	2	33%	79	69%	0	0%	0	-	0	-	81	66%
	Total	6		115		1		0		0	-	122	
1984	Alive	16	53%	66	27%	2	67%	0	0%	3	43%	87	30%
340	Dead	14	47%	182	73%	1	33%	1	100%	4	57%	202	70%
	Total	30		248		3		1		7		289	
1985	Alive	43	45%	118	34%	1	20%	2	100%	0	-	164	36%
595	Dead	53	55%	234	66%	4	80%	0	0%	0	-	291	64%
	Total	96		352		5		2		0		455	
1986	Alive	16	43%	125	46%	1	33%	2	40%	2	50%	146	45%
399	Dead	21	57%	147	54%	2	67%	3	60%	2	50%	175	55%
	Total	37		272		3		5		4		321	
Totals	Alive	97	48%	388	32%	10	29%	5	45%	11	50%	511	35%
2553	Dead	107	52%	812	68%	24	71%	6	55%	11	50%	960	65%
	Total	204		1200		34		11		22		1471	

* Does not include billfish whose condition was unknown
(Source: NMFS foreign observer program)

Table 8. Billfish imports by country for 1984-87.

1984

No Billfish imports recorded

1985

No Billfish imports recorded

1986

Weekly Report	1000's lb	Origin
6/18/86	4.7	Ecuador
8/13/86	0.5	Ecuador
11/5/86	0.4	Ecuador
11/12/86	1.6 (fillets)	Ecuador
12/10/86	0.7	Ecuador
1986 Total	=7.9	

1987

Weekly Report	1000's lb	Origin
1/7/87	1.6	Ecuador
2/4/87	3.6	Ecuador
2/25/87	1.6	Ecuador
5/6/87	3.3	Ecuador
5/13/87	5.3	Ecuador
5/20/87	26.6	Ecuador
6/24/87	10.9	Ecuador
7/1/87	8.3	Ecuador
7/8/87	8.4	Ecuador
7/15/87	13.2	Ecuador
7/22/87	15.3	Ecuador
7/29/87	9.6	Ecuador
8/5/87	4.7	Ecuador
8/12/87	8.4	Ecuador
8/19/87	28.0	Ecuador
8/26/87	24.8	Ecuador
9/2/87	18.2	Ecuador
9/9/87	5.5	Ecuador
9/16/87	11.1	Ecuador
9/23/87	8.0	Ecuador
	0.2	Costa Rica
9/30/87	22.6	Ecuador
10/7/87	24.9	Ecuador
10/14/87	18.2	Ecuador
10/21/87	26.0	Ecuador
10/28/87	30.4	Ecuador
11/4/87	23.6	Ecuador
11/12/87	37.4	Ecuador
11/18/87	22.3	Ecuador
11/25/87	4.0	Ecuador
	1.0	Antigua
12/2/87	2.7	Ecuador
12/9/87	5.8	Ecuador
12/16/87	1.3	Antigua

1987 Totals			
	Ecuador	=	434.3
	Antigua	=	2.3
	Costa Rica	=	0.2
1987 Grand Total	=		436.8

(Source: Rodney C. Dalton, NMFS-SERO from NMFS Fishery Market News Reports, 1984-1987)

and to remove the inequity between domestic and foreign commercial fishermen, billfish taken from the presumed stock (i.e., blue and white marlin from the North Atlantic, sailfish from the west Atlantic and spearfish from the entire Atlantic) may not be sold in the U.S. Billfish originating elsewhere must carry a paper trail specifying when and where caught, by what vessel, port of offloading, etc.

The importation of billfish parts for taxidermy purposes would constitute sale, trade or barter and would thus be prohibited unless they came from a different stock of fish and carried a paper trail so specifying.

Commercial fish dealers having frozen or processed billfish in storage will be given a 90 day grace period following publication of the final rule in the *Federal Register*, in which to sell or otherwise dispose of these fish.

Impacts: In 1986 there were 7,607,909 pounds (dressed weight) of swordfish, and 9,514,127 pounds (whole weight) of tuna landed by U.S. longliners (Table 4). In contrast 204,215 pounds of billfishes were landed. The total value of the billfish catch was $134,716 or 0.4 percent of the total value of the combined tuna and swordfish catch ($36,677,153). Clearly, billfish represent an insignificant amount of the total income from longlining.

In 1987 there were approximately 625 commercial swordfish permits issued. Not all of these permits are issued to longliners, but the great majority are. If we assume that there are conservatively 500 active longliners, and that reported billfish landings came only from longliners and that the bycatch is evenly distributed among vessels, then the impact on the domestic longline fishery of the no sale provision would be an annual loss of approximately $134,716/500 vessels = $269 per vessel.

In southern New England, there is a small, seasonal (late summer) harpoon fishery for white marlin. Accurate landings figures for this fishery are not available but together the harpoon and rod and reel fishery is believed to take 250-500 fish annually. If we assume an average weight of 80 pounds each (personal communication, Everett Poole, Poole's Fish Market, Martha's Vineyard) then the annual catch is between 20,000 and 40,000 pounds. These fish are worth approximately $1.50 per pound, thus their value would be $30,000 to $60,000. Participants in the harpoon fishery are primarily quasi-recreational fishermen (i.e., recreational fishermen who sell their catch). The number of boats participating in this fishery is not known, but is believed to be several hundred. However, the majority of the harpoon landings reportedly come from fewer than twelve boats (probably fewer than six). Unlike in the Caribbean artisanal fishery, these fish represent a significant amount of income for few if any of the participants.

The recreational billfish fishery was estimated to have generated at least $100 million in expenditures in 1977-78. In the Mid-Atlantic states alone, it was estimated that boat owners spent over $40 million in 1983 for marlin and tuna fishing and an additional $2 million was spent on charter fees. It has been estimated that it may cost $10,000 on average to catch a blue marlin. Although total economic activity associated with recreational fishing certainly cannot be directly

compared to ex-vessel commercial value, these values are cited to indicate that there are probably order of magnitude differences in value of the resource to the two user groups.

In an economic survey of big game fishing in New Jersey it was estimated that the average charter boat trip in 1986 for marlin/tuna cost $922. The average entry fee per angler for marlin/tuna tournaments was $1,254. This is in addition to per trip expenses of approximately $300 and seasonal operating expenses of approximately $5,000 per boat. If the average tournament fee is representative of billfish tournaments generally, then the average tournament with 25 boats entered, having two anglers per boat, would generate approximately $68,000 in entry fees. There are more than 300 billfish tournaments listed in the NMFS file. If these tournaments are held annually, they would generate at least $20 million in entry fees alone.

Although estimating the value of a billfish to the recreational fishery is perhaps impossible, it is clear that participants in this fishery are willing to spend very large amounts of money in pursuit of these species. While it is impossible to know how many more billfish will be available to the recreational fishery because of this management measure, how much additional benefit will accrue to society by this increase or at what point the recreational fishery would decline or collapse without this measure, it is clear that the value of the billfish resource to the recreational fishery is several orders of magnitude greater than it is to the commercial fishery. In this sense, the very small impact on the commercial sector would seem far outweighed by the potential benefits to the recreational sector.

Extending the scope of this regulation to fish caught outside the EEZ by foreign vessels will have virtually no additional impact because in 1987, at most, only 2,500 pounds of billfish from the management unit were imported into the U.S. (2,300 lb from Antigua and 200 lb from Costa Rica) (Table 8). The only other country that exported billfish to the U.S. in 1987 was Ecuador. These imports would be permitted but would have to carry a paper trail certifying that they were not caught in the North Atlantic Ocean, and specifying where, when and by what vessel they were caught. While this requirement would represent a small inconvenience, the economic impact would be negligible.

No other less burdensome alternative could preclude a commercial market from developing for these species, minimize commercial fishing mortality and minimize the potential for a decline or collapse of the recreational fishery.

9.2.2 Management Measure #2: Minimum Sizes

Rationale: The intent of this management measure is to significantly reduce billfish mortality in the recreational fishery. The more billfish that are released alive, the greater will be their availability to be caught again by the recreational fishery, thus helping accomplish the plan's principal objective. A complete ban on retention would presumably make even more fish available to the recreational fishery, but would not allow one of the more traditional recreational activities associated with billfish fishing and that is competitive fishing tournaments. It is estimated that over

$20 million are spent by billfish anglers annually just on tournament entry fees. It would make little sense to reserve these fish for the recreational fishery and then promulgate management measures that precluded one of the most socially and economically important recreational uses of the resource. Thus, this measure represents a compromise that serves a resource conservation objective, accommodates the objectives of the plan and optimizes the social and economic benefits to the nation by permitting the small mortality necessary for fishing tournaments, one of the more economically important activities associated with billfish fishing.

Cumulative percent size frequency distributions for blue marlin, white marlin and sailfish retained in the recreational fishery are shown in Table 9. Sailfish size frequency distributions for each year 1970-74 and 1983-86 are shown in Figure 2. Size frequency distributions for blue and white marlin for 1983-86 are shown in Figure 3.

From Table 9 any desired percent reduction in mortality can be related to a particular size. In other words, the percentage of the catch that was that size and under is the percentage that mortality would be reduced if that was the minimum size for possession. The intent was to find a management measure that would minimize mortality while still allowing traditional, competitive fishing tournaments to continue and allow for trophy and/or world record fish to be legally landed and weighed. It was also felt that reductions should reflect the general status of the stocks. In other words, the species most in need of management should have the greatest reduction in mortality. Thus, 50 percent reductions were selected for blue and white marlin. For sailfish, whose population is generally considered to be in the best condition, a 30 percent reduction was selected. These reductions were then referred to Table 9 for the appropriate minimum sizes. Although minimum sizes were calculated from weight frequency distributions and thus initially expressed in pounds, they were subsequently converted to lower jaw-fork length. Minimum sizes are thus expressed only in length, and to be retained, fish must equal or exceed the minimum length for that species, regardless of its weight. For blue marlin, 50 percent reduction equates to 195 pounds. This was rounded to 200 pounds for calculating the minimum length. The actual reduction in mortality would therefore be slightly higher than 50 percent. For sailfish and white marlin, the size equating to the desired percent reductions were rounded to the nearest five pounds before converting to lower jaw-fork length. The conversions from weight to length were calculated from the regression equations shown on Table 10. For both these species, the rounding procedure resulted in somewhat less of a reduction in mortality than the target levels. The minimum sizes expressed in lower jaw-fork length are:

blue marlin: 86 inches (equivalent to 200 pounds whole weight)

white marlin: 62 inches (equivalent to 50 pounds whole weight)

sailfish: 57 inches (equivalent to 30 pounds whole weight)

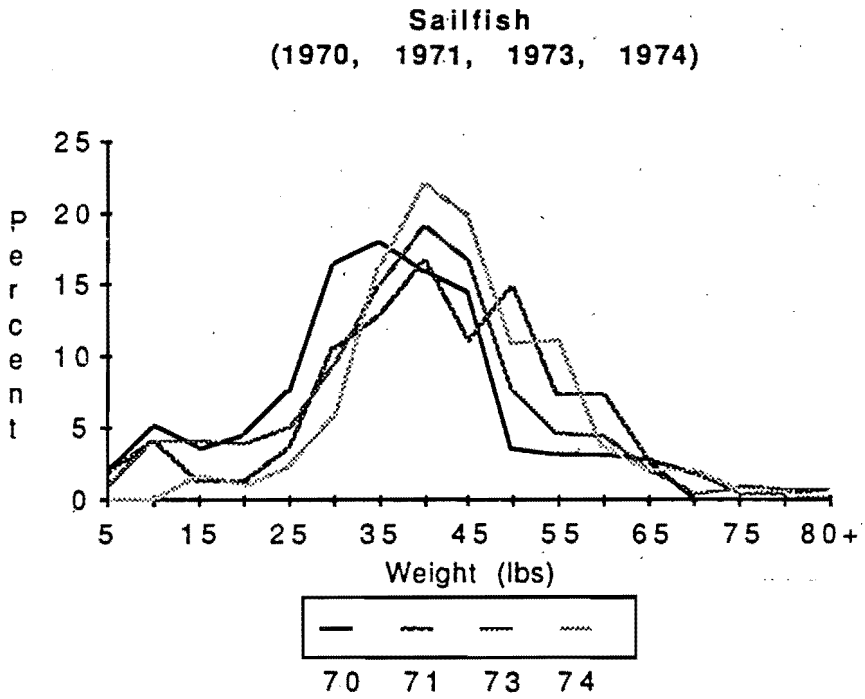
Possession would be legal only if the fish exceeded the minimum length measurement for that species (Figure 4).

Table 9. Percent of catch by weight for blue marlin, white marlin and sailfish.

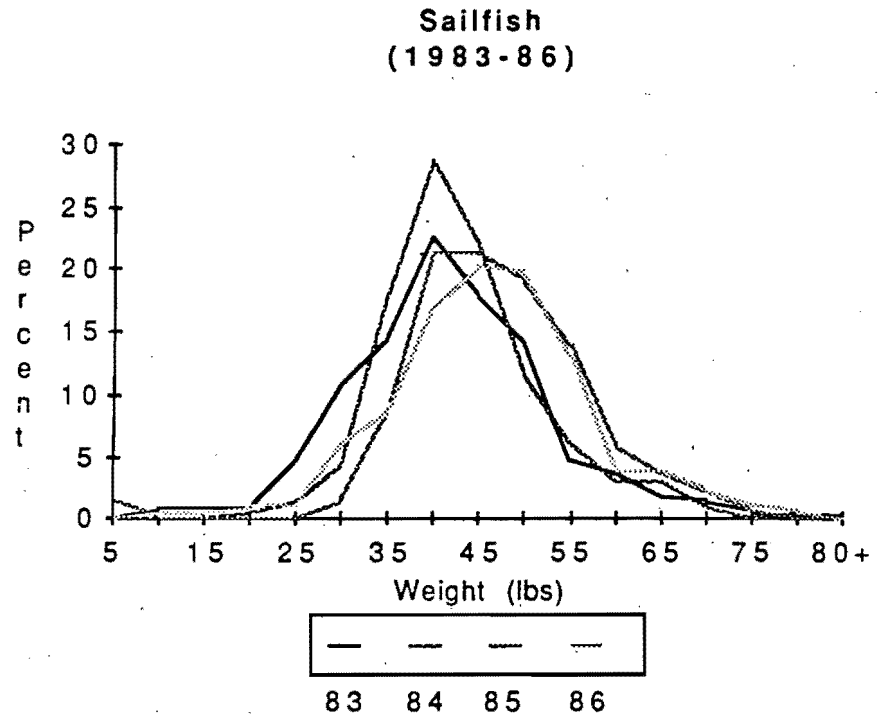
Percent of Catch	Blue Marlin[1] (pounds)	White Marlin[1] (pounds)	Sailfish[2] (pounds)
5	86	40.0	12.0
10	105	42.0	20.0
15	117	43.7	25.0
20	129	45.0	28.5
25	142	46.8	30.0
30	151	48.0	32.0
35	160	49.0	33.5
40	171	50.0	35.0
45	181	50.7	36.5
50	195	52.1	38.0
55	208	53.2	39.0
60	220	54.5	40.5
65	240	56.0	42.0
70	257	57.2	43.5
75	287	59.0	45.5
80	320	61.8	48.0
85	360	64.2	51.0
90	422	66.5	55.0
95	520	78.5	60.0

[1] Data is from 1986 NMFS recreational billfish survey, and is based on a sample size of 476 blue marlin and 270 white marlin.

[2] Data provided by Ed Irby, Florida Department of Natural Resources from surveys conducted in 1970 to 1980. Sample size was 1151.



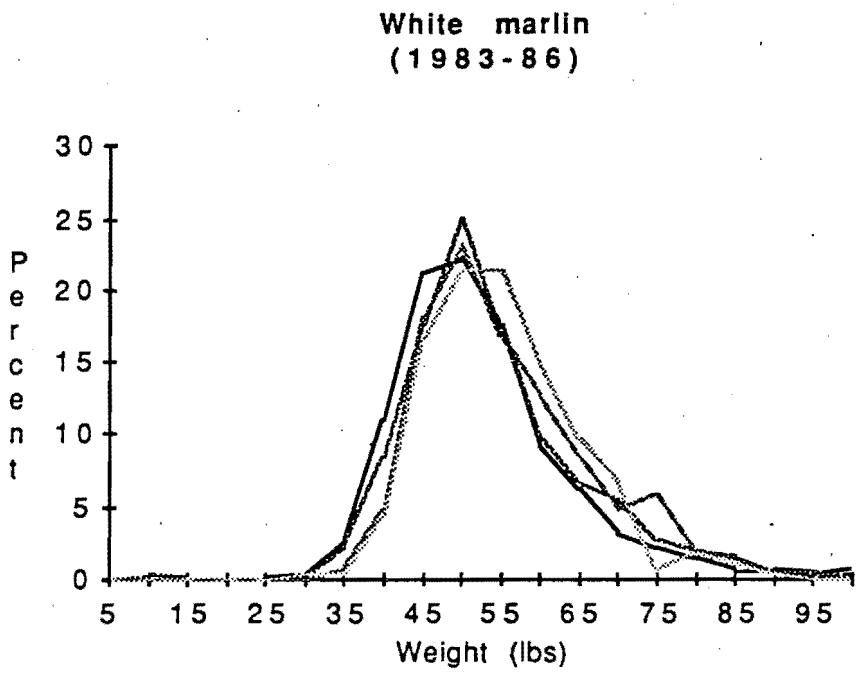
Weight (lbs)	Number 1970	1971	1973	1974
0 - 5	4	4	4	0
6 - 10	10	9	18	0
11 - 15	7	3	18	5
16 - 20	9	3	17	3
21 - 25	15	8	22	7
26 - 30	32	23	41	17
31 - 35	35	28	65	48
36 - 40	31	36	83	65
41 - 45	28	24	72	58
46 - 50	7	32	33	32
51 - 55	6	16	20	33
56 - 60	6	16	19	11
61 - 65	5	6	9	6
66 - 70	0	4	2	6
71 - 75	0	1	4	2
76 - 80	0	1	3	1
80+	0	2	3	1
Total	195	216	433	295



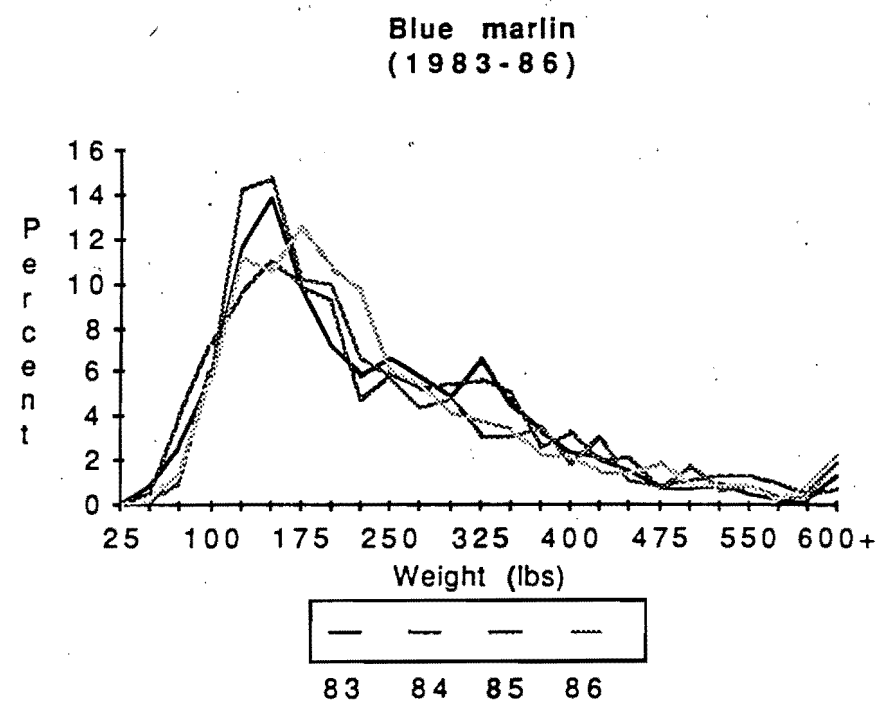
Weight (lbs)	Number 1983	1984	1985	1986
0 - 5	0	0	2	0
6 - 10	3	0	0	1
11 - 15	3	0	0	1
16 - 20	0	1	0	2
21 - 25	17	3	0	2
26 - 30	39	10	2	11
31 - 35	52	41	12	16
36 - 40	81	66	29	31
41 - 45	64	51	29	37
46 - 50	51	27	26	36
51 - 55	17	14	19	24
56 - 60	13	7	8	7
61 - 65	6	7	5	7
66 - 70	5	2	3	4
71 - 75	2	0	1	2
76 - 80	1	1	0	1
80+	1	0	0	0
Total	358	230	136	182

Figure 2. Annual size frequency distributions of sailfish caught and retained by recreational fishermen, 1970-74, and 1983-86.

(Source: E. Irby, Florida Dept. Natl. Res. (1970-74); NMFS, SEFC, Miami, FL (1983-86))



Weight (lbs)	Number 1983	1984	1985	198(
0-5	0	0	0	0
6-10	0	0	1	0
11-15	0	0	0	0
16-20	0	0	0	0
21-25	1	0	0	0
26-30	4	2	0	1
31-35	25	19	3	1
36-40	103	67	17	12
41-45	201	139	65	45
46-50	210	199	83	58
51-55	166	138	60	58
56-60	87	78	45	40
61-65	58	52	30	26
66-70	29	43	17	18
71-75	20	21	21	2
76-80	13	14	7	5
81-85	5	12	5	3
86-90	6	4	1	1
91-95	4	0	2	0
95+	9	3	0	0
Total	941	791	357	276



Weight (lbs)	Number 1983	1984	1985	198(
0-25	0	0	0	0
26-50	8	4	1	1
51-75	25	31	7	7
76-100	52	56	41	27
101-125	107	73	97	53
126-150	128	84	101	50
151-175	91	75	70	60
176-200	66	70	68	51
201-225	53	36	45	46
226-250	61	45	39	29
251-275	53	40	30	26
276-300	45	42	33	20
301-325	61	43	21	18
326-350	41	38	21	16
351-375	31	20	24	11
376-400	22	25	12	10
401-425	19	15	21	7
426-450	14	16	7	7
451-475	7	6	5	9
476-500	7	8	12	4
501-525	9	10	4	4
526-550	4	10	6	4
551-575	1	7	2	1
576-600	2	3	3	4
601-600+	12	6	13	11
Total	919	763	683	476

Figure 3. Annual size frequency distributions of blue and white marlin caught and retained by recreational fishermen, 1983-86.
(Source: NMFS, SEFC, Miami, FL)

Table 10. Length - weight and length - length conversions for blue marlin, white marlin and sailfish.

SAILFISH*

$WT\ (kg) = 0.00001146\ TKL\ (cm)^{2.950}$

$LJFL\ (cm) = 1.09 + 1.25\ TKL\ (cm)$

WHITE MARLIN**

$***WT\ (kg) = 0.000003019\ LJFL\ (cm)^{3.1355}$

$WT\ (lb) = 0.0038895\ EF\ (in)^{2.37515}$

$EF = -0.78628 + 0.87262\ LJFL\ (in)$

BLUE MARLIN**

$WT\ (lb) = 0.00014250\ EF\ (in)^{3.28222}$

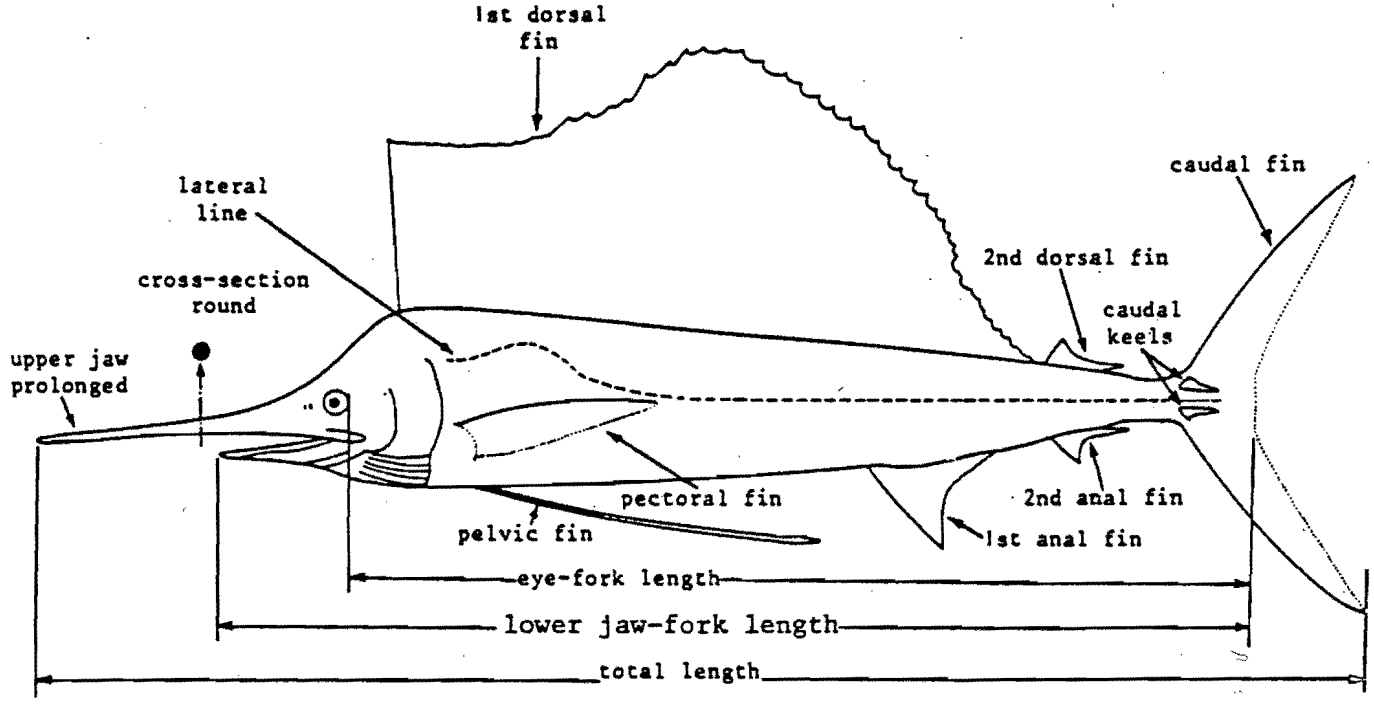
$EF\ (in) = -0.74597 = 0.88352\ LJFL\ (in)$

Where: WT = Total Weight LJFL = Lower Jaw-Fork Length
EF = Eye-Fork Length
TKL = Trunk Length (posterior edge of orbit to origin of caudal keels)

Source: *Jolley, 1974; 1977
**Baglin, 1979
***Lenarz and Nakamura, 1974

Note: For white marlin, the two weight - length conversions give slightly different results. Using the Baglin formula, 50 lb equates to 61 inches BL; using the Lenarz and Nakamura relationships, 50 lb equates to 63 inches BL. The mean (62 in) was used in the FMP.

FIGURE 4. Length measurements referred to in FMP.



Fortuitously, these minimum sizes are all at or above the reported size at maturity. Also, all are less than existing worlds records for all line classes, 6 kilogram (12 lb) test and greater for all species.

These minimum sizes are considered to be the most restrictive possible that will still allow tournament fishing.

Impacts: The impacts of this specific measure will be limited to the recreational fishery, and associated industries. The most obvious impact of this measure will be that approximately 50 percent of the recreational catch of blue and white marlin and 30 percent of the catch of sailfish that would otherwise have been retained will now be released. While clearly this will have a positive impact on the resource, it may have a negative impact on the charter and taxidermy industries.

Charter boats generally release all billfish unless the angler intends to have the catch mounted. Although the major taxidermists now have the technology to create a replica out of fiberglass, and do not need anything other than length, girth and estimated weight to make a mount, many taxidermists still use the bill and other parts of the fish. Because it is believed that many anglers want at least some part of their mounted fish to be real, it is expected that, at least initially, there may be a reduced demand for mounted fish. The actual impact realized by the taxidermy industry is impossible to predict. However, based on information provided by one of the major marine taxidermists, the theoretical maximum impact can be estimated. Based on his 1986-87 records, he stated that 14 percent of the sailfish he mounted from north of Daytona Beach, Florida, and 22 percent from Palm Beach south were under the proposed minimum size. For white marlin, 67 percent in the north and 62 percent in the south were under the proposed minimum size. For blue marlin, 48 percent in the north and 72 percent in the south were less than the proposed minimum size. It is not possible from these figures to assess the actual impact, but this taxidermist estimates that one third to one half of his business is billfish and of this, one half is sailfish and the other half consists of blue and white marlin. If we assume that this is representative of marine taxidermists generally, then between 33 percent and 50 percent of their revenue is from billfish mounts. Of this, half, or 16.5 percent to 25 percent, is from sailfish mounts and half from blue and white marlin. For sailfish, the straight average of the northern and southern areas' percentage less than the minimum size is 18 percent. Therefore, the range of potentially lost business due to the minimum size for sailfish is between 3 percent and 4.5 percent of their overall revenue (18% of 16.5% to 18% of 25%). For blue and white marlin, the simple mean percent less than the minimum sizes are 60 percent and 64.5 percent respectively. Thus, if revenue from marlin mounts are evenly divided between blue and white marlin, then the overall mean percent under the minimum size would be 62.3 percent and the maximum percentage of lost revenue would be between 10.3 percent and 15.6 percent. Summing all billfish, the maximum loss would be between 13.3 percent and 20.1 percent of total revenue (actually it would be somewhat less than this because the cost of a mount is directly related to fish size. Smaller fish are less costly to mount). However, there are several factors that will tend to ameliorate these impacts.

First, while most taxidermists presently use the bill and other parts of the real fish if available, they all agreed that fiberglass facsimile mounts could be made from available molds. Thus, theoretically, all billfish under the minimum size could be provided to the angler as facsimile mounts. Realistically, this is as unlikely as is the other extreme scenario in which no billfish under the minimum size are mounted. The actual impact will be between 0 percent and 20 percent of total taxidermy revenue, but exactly where within this range cannot be predicted. The acceptability of facsimile mounts will be at least in part determined by the industry's ability to promote them and educate the angling public. It has been suggested that an affidavit, signed by the vessel captain, attesting to the catch and certifying its length, would ultimately replace the need for the actual carcass as an incentive to have the fish mounted. To whatever extent this is accepted by the angling public, the impact on the industry would be reduced proportionately.

Further, the management plan is expected to increase the availability of billfishes to recreational fishermen thus increasing the number of billfish caught and presumably the number mounted. Additionally, the minimum sizes should, over time, result in an increase in mean size, thus decreasing the present percentages of undersized fish in the catch. These factors, while not quantifiable, further reduce the impacts on the taxidermy industry.

Charter boats generally receive some percentage of the cost of the mount as a commission so they may also be impacted to some extent should the demand for mounts decrease as a result of the minimum sizes. There are no data available from which to predict the actual amount of impact. The number of charter boats that received commissions for having had fish under the proposed minimum sizes mounted is unknown, the dependence of charter boats on this source of revenue is unknown, and the number of lost mount commission cannot be predicted.

It is unlikely that people will stop chartering boats for billfishing because of minimum size regulations. Most anglers either release their catch, keep it for mounting or retain the fish to take pictures. None of these activities will be precluded by minimum sizes. Pictures will have to be taken at sea, while the fish is still alive unless it is above the minimum size. More boats are beginning to carry video cameras to record the entire experience from hook-up to release. It is anticipated that this practice will become more common with the implementation of this measure.

Some tournaments will have to change their format. The Councils consider this a benefit of this measure. Already, total kill tournaments are disappearing in many areas. Partial kill tournaments in which only fish above a minimum size are counted, are becoming increasingly common. No decline in participation rates have been reported as a result of these modified formats. This measure will merely reinforce this trend.

A recent study by East Carolina University funded by the South Atlantic Fishery Management Council suggested that the number of fish landed in a tournament is of little importance as long as the competitive aspect of fishing can be retained and a winner declared. Minimum sizes will have very little impact on the tournament format other than to reduce the number of fish that are entered into competition. It is not anticipated that any billfish tournaments

will be cancelled because of this management measure. The economic activity generated by billfish tournaments is substantial, but is not directly related to the number of fish brought to the dock. There should be no adverse economic impacts on tournaments as a result of this measure.

The Councils recognize that it is difficult to measure a live fish as large as a marlin alongside the boat to determine if it exceeds the minimum size, and that, especially for blue marlin, doing so may be quite dangerous. However, based on advice from the SAFMC Advisory Panel, it was felt that experienced billfish anglers and captains would have little difficulty in estimating the size of these fish quite accurately. Since it is the intent of this plan to encourage the release of all billfishes not needed for tournament competition or of trophy size, and since tournament anglers would generally have no difficulty estimating fish size and trophy fish would be substantially in excess of the minimum sizes, this is not expected to be a major problem. All possible alternatives were considered, and although this problem was recognized, it was not considered sufficiently serious to outweigh the benefits of this management measure.

9.2.3 Management Measure #3: No Possession By Longliners & Drift Net Vessels

Rationale: This measure is intended to maximize the release of live billfish by those commercial vessels that would routinely catch them in the course of their commercial fishing operation. Since the objective of this plan is to maximize the availability of billfishes to the recreational fishery, any measure which results in the release of live billfish will help accomplish that objective.

Approximately 59 percent of the billfish caught by longliners are alive. If possession were legal, there would be no way to ensure that only dead billfish were retained. Thus, it must be assumed that allowing commercial possession would result in at least some additional mortality.

A recreational fisherman generally does not catch a billfish, so most trips he will not have the option of retaining one. Longliners on the other hand, fish so much gear that they would almost certainly catch at least one billfish, which if legal, they would retain. By allowing longliners to possess even one billfish the Councils felt that this would virtually assure that each vessel would retain one per trip. With at least 500 longline vessels in the swordfish fishery, if each vessel takes even 10 trips per year, there would be 5,000 billfishes retained. If longliners were permitted one of each species, even assuming only blue and white marlin would be caught, they could potentially retain 10,000 billfishes annually. By comparison, the recreational fishery in 1983 (the most recent year for which complete data are available) kept a total of 4,755 blue and white marlin. Considering the extremely great value that these 5,000 (or 10,000) fish represent to the recreational fishery, it is considered an inefficient use of the resource and an unnecessary source of additional mortality.

Impacts: Since the sale of billfishes is prohibited, there is very little additional impact associated with this measure. It may be perceived by commercial fishermen as inequitable that recreational fisherman can retain any number of billfish above the minimum size while longliners

cannot retain any. However, so few recreational trips ever result in the capture of even one fish above the minimum size that multiple captures are extremely unlikely. In contrast, commercial longliners with their much greater fishing power will very often catch fish above the minimum size. It is not the individual that is being discriminated against, it is the gear itself. Everyone is given the same opportunity to catch and retain these fish with rod and reel. Considering the great value of these fish to the recreational fishery, allowing commercial longline vessels to retain them, thus reducing, even if only marginally, their availability to the recreational fishery, is considered inconsistent with the plan's objectives.

While it is recognized that there will be some waste associated with this and other management measures, it was felt that this was unavoidable, and that the positive impact on the recreational fishery outweighed the slight negative impact on the commercial fishery.

The maximum number of swordfish/tuna vessels using drift nets never exceeded six to ten. While the number of vessels presently using this gear is not known, it is believed to be less than 6. The number of billfish taken by these vessels is not known, but because use of these nets generally has been limited to the New England area where billfish are not common, it is not believed to be many. A small number of observer trips taken aboard drift net vessels in 1984 did not observe any billfish caught by these nets. Thus the impact of this measure is expected to be negligible.

King mackerel drift gill net vessels were estimated to have caught 419 sailfish in 1987. All of these fish were discarded because it is illegal to sell sailfish in the state of Florida. Thus, this measure will have no additional impact on these fishermen.

9.2.4 Management Measure #4: Data Reporting Requirements

Data reporting requirements consist of a recommendation for the continuation of the existing logbook requirement and voluntary observer program as specified in the swordfish FMP and mandatory reporting of catch and effort data for recreational fishing tournaments. This latter program is the only new data reporting requirement specified by this plan.

9.2.4.1 Logbooks

Rationale: Logbooks are the only way to collect billfish bycatch data from the swordfish and tuna longline fishery. Information on catch, effort, species composition, and percent alive and dead are necessary to estimate this source of mortality and for evaluating the effectiveness of the management regime. Since possession will be illegal, this information can only be obtained at sea from logbooks or by observers.

Impacts: Since mandatory logbooks are already required by the swordfish FMP, there will be no additional impact. This plan will require the same information already being collected through the swordfish plan. If a statistically valid sampling design is developed by NMFS that is acceptable to the Councils, this will suffice in lieu of 100 percent coverage.

9.2.4.2 Observers

Rationale: Logbooks may not provide accurate information on billfish bycatch because of the concern of the commercial fishery that this information may be used to further restrict their fishing activity. To ensure the validity of the information recorded in the logbooks, to collect biological information, and to determine the fishing characteristics of particular gear and fishing methods, will require onboard observers. This information may ultimately suggest fishing methods or gear types that reduce the billfish bycatch. If so, this would provide a way of reducing incidental fishing mortality, thereby further helping to achieve the plan's objectives.

The cost of an observer program is high and policy regarding mandatory placement of observers aboard domestic vessels remains uncertain. Until such time as mandatory observer coverage can be accomplished, a voluntary program, as is already approved in the swordfish FMP, will suffice. The level of coverage should be sufficient to at least obtain a statistically valid estimate of the total billfish bycatch (by species) in the longline fishery and to validate logbooks.

Impacts: Since this program is already contained in the swordfish FMP there are no additional impacts.

9.2.4.3 Mandatory Tournament Reporting

Rationale: It is believed that most recreational effort and landings of billfish are during fishing tournaments. If this is true, then mandatory tournament reporting may provide an inexpensive way to estimate total catch and effort for the recreational fishery. Since total catch and effort is the most fundamental piece of fisheries data, and since to date, this most basic information has not been available, mandatory tournament reporting will be required. At a minimum, these data should include number of boats, number of anglers, total number of hours fished, number and weight of each species landed and or number and estimated weight of each species released (if a no kill or partial no kill tournament), and description of any specific rules that might have affected the results (e.g., line test restrictions, minimum entry weights, bait restrictions, etc.).

In the Gulf of Mexico, many tournaments voluntarily provide their catch and effort data to NMFS. Since the Councils do not want to disrupt this voluntary system, tournament reporting will be mandatory only for those tournaments selected by NMFS. However, it is the Councils' intent that coverage be 100 percent.

Impacts: The Councils recognize that mandatory reporting is burdensome. However, the importance of acquiring reliable catch and effort data for monitoring the status of the resource and fishery and for evaluating the management regime override this concern. Since these data are already recorded by virtually every billfish tournament, this measure will merely require that the data be transcribed or photocopied and mailed to NMFS. There are approximately 315 tournaments listed in the NMFS billfish tournament file. If this regulation requires 2 man-hours to transcribe the results onto forms to be provided by NMFS, there will be a total of 630 man-hours

involved. If the transcriber is paid $5 per hour, the cost associated with this requirement will be $3,150 per year. However, this reporting is expected to reduce the need for NMFS tournament samplers to be present at tournaments and should result in a net savings. The cost per tournament, $10, is negligible.

9.2.4.4 Develop a Methodology to Estimate Total Recreational Catch and Effort

Rationale: The present recreational billfish survey conducted annually by NMFS is not designed to allow an estimate of total billfish catch and effort. These data, then, while useful for comparing CPUE among years do not provide estimates of total catch, level of participation, total effort, indicators of the economic value of the fishery, etc. This information is needed for stock assessment and for monitoring the effectiveness of this FMP. The mechanics of the system will be developed by NMFS in consultation with the Councils. Developing and implementing a program to estimate recreational catch and effort is not, strictly speaking, a management measure nor is it merely a recommendation. Rather, it should be interpreted as a charge to the NMFS. The Councils strongly recommend that a methodology similar to that developed by the State of New Jersey, which is being successfully used by the SEFC to estimate these parameters for the Mid-Atlantic states, be adopted in other areas, pending the outcome of the pilot program initiated by NMFS for the Southeast region.

Impacts: Until the system is designed, it is obviously impossible to estimate the costs involved. However, it is quite possible that the tournament reporting system, combined with the survey procedure recommended above will allow the necessary data to be collected for the same or less cost than the present NMFS tournament sampling program. Therefore, until the details of the program are available we will assume that there will be no additional cost associated with this data collection program.

9.2.5 Management Measure #5: Puerto Rican Handline Exemption

Rationale: A traditional, artisanal handline fishery in Puerto Rico has a small bycatch of billfishes, primarily blue marlin. The capture of a billfish in this small-scale fishery is a rare, but fortuitous event for the few artisanal fishermen in Puerto Rico. There are an estimated 26 such fishermen in Puerto Rico (personal communication Graciela Garcia-Moliner, CODREMAR, Mayaguez, Puerto Rico). Their actual billfish catch is not known, but is believed to range between one and three billfish per fisherman per year. Although the existence or extent of this fishery has never been documented, it has been under discussion for at least 5 years. Since this measure provides the only exemption to the no sale provision, greatly complicating enforcement, and providing a potential loophole through which illegally harvested billfish may enter commercial markets, the following restrictions are placed on this exemption:

A. Only fish caught on handlines having fewer than six hooks may be retained for sale.

B. A vessel retaining billfish for sale may not have a fishing rod and reel aboard.

C. A maximum of 100 billfish per year can be landed and sold under this exemption.

D. Fish taken under this exemption can be sold only in Puerto Rico.

E. All existing handline fishermen in Puerto Rico wishing to retain billfish for sale must obtain a permit.

F. The Caribbean Fishery Management Council in cooperation with the Government of Puerto Rico is to develop and implement a method of tracking billfish landed under this exemption.

G. All billfish landed under this exemption must carry a paper trail with the permit number of the exempted fisherman.

H. If more than 100 billfish per year are landed under this exemption, it will be considered evidence that fish are being sold illegally and the Councils will consider removing the exemption by Regulatory Amendment.

I. This exemption will not be in effect until the permitting and tracking systems are operative (implementation of exemption pending approval by the five involved Councils).

During public hearings, testimony was received asserting the existence of a similar artisanal fishery in the U.S. Virgin Islands. This was the first time the Councils had heard reference to this fishery, and are thus reluctant to extend the exemption solely on the basis of unsubstantiated public testimony. The Councils will reconsider an exemption for this fishery if and when its existence is documented and its size and landings quantified.

Impacts: In Puerto Rico, recreationally caught billfish are commonly sold. In 1985 there were 11,077 pounds of billfish reported landed in Puerto Rico worth $16,394. Some of these were sold by the artisanal handline fishery which would be exempt from this regulation. If we assume that there are 100 recreational fishing boats in Puerto Rico that accounted for this catch, then the impact would be, at most, a loss of $164 per vessel annually. Considering the cost of maintenance, fuel, bait, fishing tackle, etc. this cannot represent a significant loss of income.

Until the Caribbean Council and/or Puerto Rican government develops the permitting and tracking system for the artisanal fishery, the cost of the program cannot be estimated. However, if the fishery is limited to 25-30 boats, and fewer than 100 fish, the cost should be modest.

9.2.6 Foreign Measures

As previously mentioned, no additional measures pertaining to foreign fishing are contained in this plan beyond those already approved through the PMP. It should be noted, however, that the Gulf closure approved in the PMP is to be held in reserve (as is presently the case) as long as the voluntary agreement by the Japanese tuna fishermen not to fish in the Gulf of Mexico is continued. Should the need for the Gulf closure arise, it would be implemented by Notice Action. Should this or any other aspect of this voluntary agreement be significantly altered,

the Councils would reconsider their position and take further action as warranted, presumably by Regulatory Amendment.

9.3 Alternatives Considered and Rejected

9.3.1 Foreign Measures

Over the ten years during which this plan evolved, many of the earlier management measures proposed pertained to regulating foreign fishing. Since these measures were first considered, foreign longlining in the EEZ has ceased in the Gulf of Mexico, Caribbean and South Atlantic region (south of Cape Lookout). Since 1982, the Japanese tuna fishermen have voluntarily agreed not to longline in the Gulf of Mexico and have expressed their intent not to fish in the Caribbean EEZ. In 1985 and 1986, only ten vessel permits were requested by Japan to fish for tunas within the EEZ, but at no time were there more than three vessels inside our EEZ. Considering this circumstance, the previous effort limiting formulas and phase out formulas considered by the Councils are, for the time being, moot.

9.3.2 Domestic Measures

9.3.2.1 Reject "No Sale" Provision

Rationale: Over the recent history of the development of this plan, this has been the single most contentious issue among the Councils.

It has always been recognized that a prohibition on the sale of billfish would be the most direct and effective means of preventing a commercial fishery from developing, and hence was the most effective measure to accomplish the principal objective of the plan. However, the following concerns were raised prompting the consideration of this alternative:

A. The legality of prohibiting the sale of billfishes was uncertain.

B. The measure was considered an excessively burdensome means to achieve the objectives of the plan.

C. The benefits could not be quantified and thus one could never establish that the benefits outweigh the costs.

D. It was not justified biologically.

E. It was inequitable since U.S. vessels fishing alongside foreign vessels (outside the EEZ) could not retain and sell these fish, but foreign vessels could.

F. It was wasteful because many billfish are dead when brought alongside; allowing their retention and sale would not impact the stock or the recreational fishery.

G. Releasing fish will just make them available to foreign boats.

Most of these objections are discussed under the rationale for the no sale provision, so they will be discussed only briefly here.

A. Legal opinion was recently received from both the Northeast and Southeast NOAA regional attorneys that the no sale provision is both legal and appropriate. Thus the Councils rejected this argument.

B. An analysis of present commercial billfish landings and value indicated that the revenue from the sale of billfish is insignificant to commercial longliners, New England quasi-commercial/recreational harpooners and Caribbean recreational fishermen. The only fishermen to whom a no sale provision was thought to be possibly burdensome was the small-scale handline fishermen in Puerto Rico, and they have been exempted from this provision. The Councils therefore rejected this contention.

C. The benefits cannot be quantified, but the generally poor understanding of the status of the stocks, the biology of the species, their population dynamics or stock structure, preclude quantifying the impacts of any management measure. While we cannot quantify the effects of this or other management measures, we do know that prohibiting sale is the most direct and effective means for preventing a commercial market and fishery from developing.

The costs of implementing a no sale provision are considered very small. The negative impact on the longline and quasi-recreational fishery is insignificant and the cost of enforcement is very low because all enforcement can be dockside and/or at fish houses, greatly reducing costs.

Our inability to quantify benefits is a shortcoming of the available scientific and economic data. The Councils do not believe that a resource or fishery should be jeopardized because of poor data.

D. This measure or any other proposed management measure cannot be justified biologically because we do not have sufficient knowledge of the status, population dynamics or biology of the resource. We do know that any reduction in mortality will increase, however slightly, the population size and thus availability to the recreational fishery.

The basis for the concern that this and other management measures could not be justified biologically was the extremely low tag recapture rate. An analysis done by NMFS-SEFC indicated that the probability of recapturing a tagged billfish was very low. These data have been questioned, however, citing tag shedding, tag-related mortality, non-reporting, etc. as reasons for the extremely low return rate. While these concerns were discussed at length, the benefits, however uncertain, were considered to outweigh the slight costs. This argument was therefore rejected.

E. The inequity created by foreign vessels being able to retain and sell their billfish catch while U.S. vessels are prohibited from doing so is addressed, at least in part, by the measure prohibiting sale of imports. The Magnuson Act limits the scope of

the Council's authority and regulations promulgated through this management plan are constrained by these limitations. However, by prohibiting sale of all billfish from the stock, whether caught by foreign or domestic vessels, we will at least reduce this inequity. This is all the Councils' authority will allow.

F. Concern over discards is not unique to this particular measure. Measures in the PMP require the Japanese to release all billfish and swordfish, whether dead or alive, when fishing in our zone; regulations promulgated as a result of ICCAT recommendations which impose incidental catch quotas for bluefin tuna result in considerable discarding in the Gulf of Mexico; and size limits for any species and many closed season restrictions result in discards. However, without a means of verifying that fish retained were in fact dead when brought alongside, it is assumed that all billfish, including those that are alive, would be retained if they could be sold. The relatively small economic loss to the commercial fishery resulting from this regulation is outweighed by the decreased mortality and increased availability to the recreational sector that will result from the release of live billfish.

While recognizing the discard problem, the Councils rejected this argument since it was felt that the potential benefits outweighed the relatively small costs.

G. Encouraging the release of billfish through this or any other provision, does make those fish available to more than just domestic recreational fishermen. Foreign vessels may receive some of the benefits of our conservation efforts. However, as stated above, the Councils are limited in their authority, and can impose resource conservation measures only within their jurisdiction. Concurrent with this domestic effort, the Councils are encouraging international cooperation in reducing fishing mortality on the stock outside of our jurisdiction.

The Councils rejected this argument because they felt that failure to take conservation measures would serve neither the domestic fishery nor the stock. If some benefits of domestic constraint are realized by foreign vessels, then this is still preferable to no benefits accruing to anyone.

In summary, the alternative of allowing the sale of billfish, even if in conjunction with very restrictive possession limits, was rejected because this would reduce the ability of the plan to achieve its objectives. While we cannot quantify the benefits of the no sale provision or this alternative, it is clear that the less the incentive to retain live fish, the more the plan's objectives are accomplished. Since rejecting the no sale provision will allow possession and commercial marketing, it will encourage retention and increase mortality. For this reason, this measure was rejected in favor of the no sale provision which was considered more likely to accomplish the plan's objectives.

9.3.2.2 Reject Puerto Rican Handline Exemption

The Puerto Rican handline exemption was supported by all five Councils throughout the development of the plan. However, numerous attempts were made to obtain data documenting the number of participants and total billfish catches in this fishery without success. Because of this, the exemption was reconsidered, but ultimately accepted because the Councils felt that it would be unfair to disadvantage the few subsistence fishermen because of the inability of others to document their fishery. Therefore this alternative was rejected.

9.3.2.3 Bag Limits

Bag limits were considered as a mechanism to restrict recreational fishing mortality. The NMFS recreational billfish survey data base was accessed and analyzed to determine the impact of various bag limits. It was found that catching even a single billfish was a sufficiently rare event that a daily bag limit of even one fish per boat would have a negligible impact, reducing retention of blue marlin by only 7 percent, of white marlin by 15 percent and of sailfish by 9 percent. Even a limit of one fish per boat per year would decrease retention by only 39 percent for blue marlin, 43 percent for white marlin and 33 percent for sailfish.

To reduce mortality as much as size limits would require annual bag limits of less than one fish per person (the rates given above are per boat). This alternative was rejected because it would preclude traditional format tournament fishing, severely impact charter boats, would be extremely expensive to implement, and difficult and expensive to enforce. The alternative, minimum sizes, was considered far more practical, cost effective, less burdensome and more easily fine-tuned to obtain any desired reduction in mortality.

9.3.2.4 Alternative Minimum Sizes

Several alternative minimum sizes were considered, including:

a) Minimum sizes to be based on size at maturity.

b) Minimum sizes to be determined separately for each Council area based on size distribution of billfish in that area.

c) Minimum sizes to be arbitrary based on input from Advisory Panel.

Basing the minimum size on size at maturation was considered because this approach provides an objective biological criterion. The published sizes at maturation are:

blue marlin:	males	76 - 97 lb
	females	103 - 135 lb
white marlin:	females	44 - 59 lb
sailfish:	males:	22 lb
	females:	30 - 40 lb

Since recruitment is not known to be a problem for any of these species, and the size at maturation, especially for blue marlin is so small, this alternative was rejected as not providing a sufficient reduction in mortality for blue marlin and perhaps white marlin as well.

Non-uniform size limits were considered because fish size varies markedly by geographic area. This is most pronounced for blue marlin, where, for example, the average size in the Caribbean in 1986 was 183 pounds while the average size in the Gulf of Mexico was 250 pounds and on the U.S. East Coast it was 281 pounds.

Non-uniform size limits were ultimately rejected because they were considered too difficult to enforce and unnecessary because, in general, the biggest size differences were at the extreme end of the range, where fish were large and uncommon. The differences in average size in the major fishing areas were relatively small. Since the size limits were weighted by abundance, it was felt that the overall sizes thus calculated would largely reflect the size distribution in the major fishing areas. This measure would require that enforcement personnel determine where the fish was caught before a case could be established, thus greatly inhibiting dockside enforcement. For these reasons, this alternative was rejected.

Other minimum sizes were proposed and rejected because they did not accomplish the objectives of the plan as well as the approved minimum sizes (in general, the alternative sizes proposed were so small as to have no impact on reducing mortality).

9.3.2.5 Allow Limited Commercial Retention

Several variations were proposed including one billfish per trip, one billfish of each species per trip, and unlimited possession above the minimum size. All were rejected for the same reason, that is, that none achieved the objectives of the plan as well as the preferred alternative. If sale is prohibited, then possession is considered unnecessary and inconsistent with the plan's objectives since at least some of the retained billfish could have been released alive. The objective of the plan is to reserve as many billfish as possible for the recreational fishery. Allowing commercial retention of even a limited number of fish reduces the plans ability to achieve that objective.

9.3.2.6 Separate Management Regime for New England Area

Rationale: Throughout the development of the billfish management plan the New England Council has been opposed to the prohibition on sale and other provisions of the plan. They felt that many measures, in particular the no sale provision, were excessively burdensome, indefensible and could not be justified relative to the benefits derived. Since all elements contained in the management plan had to be approved by all five Atlantic Coast Councils before the plan could be submitted, the Councils were at an impasse. In an effort to find a solution to this dilemma, the New England Council suggested an alternative management regime that would apply only to their area.

In essence this regime would have allowed retention and sale of one billfish of each species per trip for both recreational and commercial fishermen in the New England area. This alternative was rejected by the other Councils because it was probably in violation of the National Standards (which requires that management measures shall not discriminate between residents of different states), impossible to enforce, and inappropriate to achieve the objectives of the plan. This alternative became moot when the New England Council adopted the no sale provision as their preferred alternative.

9.3.2.7 Prohibit All Possession

This alternative was suggested as a way of eliminating the perceived inequity between allowing recreational possession and a total prohibition on commercial possession. Although this alternative would further decrease mortality by requiring all billfish to be released, it would severely restrict the traditional recreational activity of competitive fishing tournaments. Since the resource is being reserved for the recreational sector, it would be counter productive to deny this sector one of its principal uses of the resource. To the extent that this alternative restricted tournaments, it would reduce the social and economic benefits that accrue from the recreational use of the resource. The preferred alternative attempts to balance stock conservation considerations against the social and economic benefits derived from the consumptive use of the resource thereby maximizing returns to society.

9.3.2.8 Recreational Possession Limits in Combination With Size Limits

A possession limit in combination with size limits was proposed. However, it was shown that to further reduce mortality it would be much easier and less burdensome to merely increase the minimum size than to add another regulation. Nevertheless, the Councils are aware that both white marlin and sailfish may occasionally be available in relatively dense concentrations. At these times, multiple captures above the size limit are not uncommon, and the potential for multiple retentions would be eliminated by a bag limit. In addition, a bag limit of one fish of each species per boat would be consistent with state regulations in Massachusetts and Florida (proposed). While the Councils support this measure in principle, available data suggest that a bag limit of one fish per boat per day in conjunction with size limits would only reduce mortality an additional 3.7 percent for blue marlin and 7.6 percent for white marlin. However the Councils recognize that retention patterns may change following implementation of this FMP, and will thus reconsider bag limits in the first amendment to the plan.

9.3.2.9 Prohibit Drift Entanglement Nets

This measure was submitted twice under the swordfish FMP. It was rejected on both occasions by the Secretary of Commerce citing insufficient data to justify prohibition of the gear. There is no additional data on the fishery characteristics of the gear or incidental catch and no

indication that its use has become more widespread. Therefore, it is pointless to resubmit the same measure through the billfish FMP. However, the Councils remain very concerned about the use of this gear anywhere billfishes or threatened or endangered species might be encountered, and intend to monitor this situation very closely.

9.3.2.10 Designate Billfishes As Gamefish

This measure was discussed at great length during plan development. It was ultimately rejected because it was determined that the no sale provision accomplished the same thing and therefore this measure would be redundant.

9.3.2.11 All Tournaments Will Be "No Kill" Tournaments

The main reason for landing billfish in tournaments is to record their weight. Many tournaments have successfully adopted release or partial release formats suggesting that this alternative may be viable. Since most recreationally caught marlin are believed to be caught in tournaments, this alternative could have a significant impact on reducing billfish mortality. The Councils ultimately rejected this alternative, though, because they felt it would be very disruptive to the many tournaments whose scoring requires that fish be landed and weighed. There is little point in reserving billfish for recreational fishermen and then imposing a regulation that might preclude one of their most important recreational uses. The Councils therefore rejected this alternative as being unnecessarily burdensome at this time. However, the Councils strongly recommend that all tournaments adopt the no kill format, and if the present trend towards no kill tournaments does not continue, the Councils will reconsider this alternative in the first amendment but in no case later than 2 years after implementation of the plan.

9.4 No Action Alternative

The results of no action would be the loss of benefits that would accrue from the proposed actions. The proposed management regime serves largely to prevent the development and expansion of the commercial market and fishery for billfishes. Thus, it is not possible to know what the ultimate loss of benefits will be if this plan is not implemented and the commercial fishery allowed to develop. However, due to the relative scarcity of billfishes, it is unlikely that this action will preclude the development of a significant commercial fishery whose value could ever approach the value of the recreational fishery. Even if the commercial fishery could increase its production by 1000 percent (relative to 1986), it would still be worth only $1.44 million ex-vessel at present prices. Even at this level, billfish would still represent less than four percent of the combined value of the tuna and swordfish catch. However, at this level of fishing intensity, it must be assumed that the recreational fishery would all but collapse (as happened to the recreational swordfish fishery). The billfish fishery by comparison is conservatively estimated to be worth at least $100 million per year in total economic activity.

Short of a total collapse, and in the absence of actual data, we must assume that the growth of a commercial fishery will be at the expense of the recreational fishery and roughly proportional (at least beyond some threshold). The precise nature of the relationship is unknown and further analysis would be purely conjectural, and is therefore not presented. The substantial differential between the commercial value of a billfish sold for food and its recreational value would argue strongly, that almost regardless of the exact nature of the relationship between increased commercial harvest and decreased recreational activity, the no action alternative involves a considerable loss of benefits.

There are biological benefits to the stock in the form of reduced mortality that will also result from the proposed management regime. Although these cannot be quantified, they would be lost as a result of no action.

9.5 Benefit/Cost Analysis

Potential benefits must be weighed against the likely costs. However, because of extreme limitations in the available economic and sociological data on billfish and the recreational billfish fishery, the benefits cannot be readily quantified. It will therefore be necessary to compare costs which can be quantified against a qualitative assessment of benefits.

The primary costs of the FMP are:

Sunk Costs:

Plan development costs amounted to approximately: $559,437, South Atlantic; $163,603 as of 8/82, Gulf of Mexico; $_____, Mid-Atlantic; $_____, New England; $_____, Caribbean.

Annual Costs

- o Annual plan administration (includes one Inter-Council Committee meeting annually to evaluate FMP) - $15,000
- o Data collection and analysis - $5,000
- o Enforcement - $175,000

9.6 Recommendations to Other Governmental Entities

A. The Councils urge the states to implement the management measures proposed in this plan, where appropriate, within their jurisdiction.

Rationale: Having different regulations in the EEZ and the territorial seas would be confusing and cause problems in enforcement.

B. The Councils strongly recommend that an international plan for management of billfishes be implemented under the auspices of an international organization such as the International Commission for the Conservation of Atlantic Tunas (ICCAT).

Rationale: Billfish range well beyond the EEZ of the U.S. where they are harvested by foreign longline tuna fisheries and by recreational fisheries of other nations. The availability of billfishes within the EEZ as well as the long-term productivity of these resources will depend on

effective management of the stocks throughout their range. International management should complement, not replace, management by the U.S. in the EEZ.

C. The Councils urge all U.S. anglers to release billfishes which are not needed for tournament competition or as trophies. In addition, the Council recommends that released fish be tagged under the auspices of the National Marine Fisheries Service cooperative game fish tagging program.

Rationale: This recommendation is for the purpose of conserving the stocks and improving the information base. This information is needed for age and growth studies and to help define stock structure.

D. The Councils strongly urge that fishing tournament directors make advance arrangements for the useful disposition of any billfish brought to the dock for tournament competition. Donation to public institutions, prisons, schools, etc. for use as food is strongly recommended.

The Councils further recommend that all billfish tournaments adopt the release format. This was not adopted as a management measure at this time because of the potential for disrupting existing tournaments which would result in lost economic benefits to local communities. However, should the present trend towards "no kill" tournaments not continue, the Councils will reconsider this measure in the future.

Rationale: The Councils' desire is to minimize billfish mortality and eliminate waste of the resource to the greatest extent possible.

9.7 Summary of Regulatory Impacts of Proposed Measures

The benefits of this FMP derive from protection and enhancement of the recreational fishery, which has been determined to be the best use of the billfish resource. Although reliable statistics documenting the value of this fishery are not available, its value is at least $100 million annually, as well as substantial intangible recreational and social benefits. As described in the No Action Alternative (Section 9.4), continuing lack of management of the domestic fishery will allow expansion of commercial billfish harvest, adversely affecting the recreational fishery and decreasing the net value to the nation of the billfish resource. In addition, limitations on billfish mortality from all domestic users contributes to rebuilding the stocks. Increasing abundance will increase recreational catch rates which will lead to increasing value returned to the nation from the resource.

The proposed measures will:

1. Prohibit the sale of billfishes taken from the management unit.
2. Prohibit the possession of billfishes aboard longline and drift net vessels in the EEZ.

3. Impose minimum sizes for recreational possession as follows:

   blue marlin: 86 inches lower jaw-fork length
   white marlin: 62 inches lower jaw-fork length
   sailfish: 57 inches lower jaw-fork length

4. Require mandatory tournament reporting and support continuation of mandatory logbooks aboard longline vessels.

5. Exempt the Puerto Rican artisanal handline fishery.

Measures 1-3 are designed to reduce billfish mortality and to maximize billfish availability to the recreational fishery. Measure 4 is designed to collect necessary statistics for monitoring the effectiveness of the management regime and to increase our understanding of the fishery and the resource. Measure 5 will allow the small-scale, Puerto Rican handline fishery to continue to sell the few billfish they take as a bycatch.

Costs to implement this FMP include increased data collection costs, estimated at $3,150 for tournament reporting. Logbooks are already required through the swordfish FMP and will not involve additional expense. The NMFS recreational billfish sampling program will have to be modified However, it is not anticipated that there will be any additional cost associated with the modified program.

The commercial longline fishery will lose an estimated $134,716 in billfish sales as a result of the prohibition on sale. This is estimated to represent 0.4 percent of their total gross income.

Enforcement costs are estimated to be $175,000. Enforcement can take place at fish houses or dockside. Size limits will also be enforced dockside. Since most billfish are taken during tournaments, enforcement of this regulation can concentrate on these events, further simplifying enforcement.

There may be some initial negative impact on taxidermy businesses because fish under the minimum size cannot be retained. Based on information provided by a taxidermist, the maximum loss resulting from this measure would be between 13 and 20 percent of total revenue, if no fish under the minimum size are mounted. However, it is expected that replica fiberglass mounts which require only a length measurement to construct will become widely accepted within a short time. The additional availability of billfishes to the recreational fishery, resulting in increased catches may offset the reduction in demand for mounts that is expected to result from the minimum size regulation. It is impossible to quantify these impacts, but they are not expected to be significant.

9.8 Regulatory Flexibility Act (5 U.S.C. 601 et seq.)

The proposed management measures result in positive economic impacts for small American business entities associated with the billfish fishery. Virtually all the domestic business associated with the billfish fishery are classified as small businesses, and will consequently receive all of the economic gains resulting from the proposed measures. The benefits to the domestic

fishery, and regional and national economies, as well as the number of fishermen affected by the proposed measures is discussed above and in Sections 9.2, 9.4, and Appendix I of this plan.

10.0 RESEARCH NEEDS

10.1 Short-term Research and Data Needs

The most critical short-term data needs are:

1. Determine survival rate of the released billfish.
2. Determine the total recreational catch of each species of billfish.
3. Determine the bycatch of billfish in directed swordfish and tuna longline fisheries.
4. Determine mortality of billfish caught recreationally as well as on longlines.
5. Develop and implement a program to assess the recreational value of billfish fishing.
6. Determine total landings, stock-wide.

10.2 Long-term Research Needs

The most critical long-term research needs are:

1. Determine stock structure.
2. Determine stock status of each species of billfish.
3. Determine age, growth, natural and fishing mortality rates for each species.
4. Investigate ways of reducing billfish bycatch in the longline fishery through time/area closures or through changes in gear or fishing methods.

11.0 MONITORING PROCEDURES

The South Atlantic Council, in cooperation with the New England, Mid-Atlantic, Gulf of Mexico and Caribbean Fishery Management Councils, will review and monitor the plan on a continuing basis to assess the effectiveness of the management measures in attaining the objectives of this plan. Performance monitoring will be conducted by each of the five Councils concerned in its area of jurisdiction, in consultation with appropriate research, management and enforcement agencies and its Advisory Panel and Scientific and Statistical Committee. Public hearings may be conducted, as necessary, to receive public opinion on the effectiveness of the FMP and to determine the need for revisions. Any changes in foreign fishing effort or practices will be evaluated and may require additions to the regulatory regime.

It is hoped that analysis of logbook and observer data may suggest gear or fishing practices which reduce the incidental catch or mortality of billfishes. If so, the Councils would consider modifying the management regime accordingly.