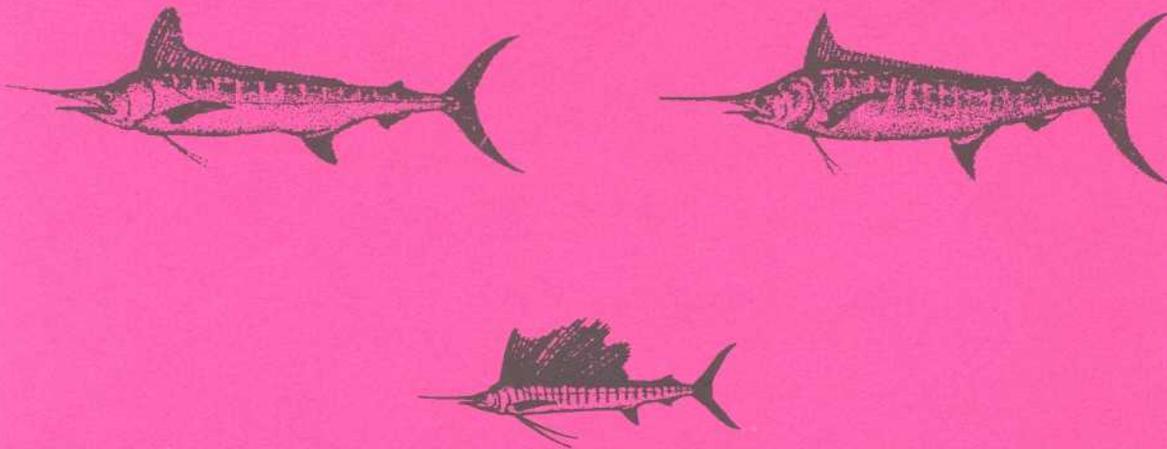


NOAA Technical Memorandum NMFS-SEFSC-374



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GULF OF MEXICO
DURING 1993



Anna M. Avrigian and Paul J. Pristas

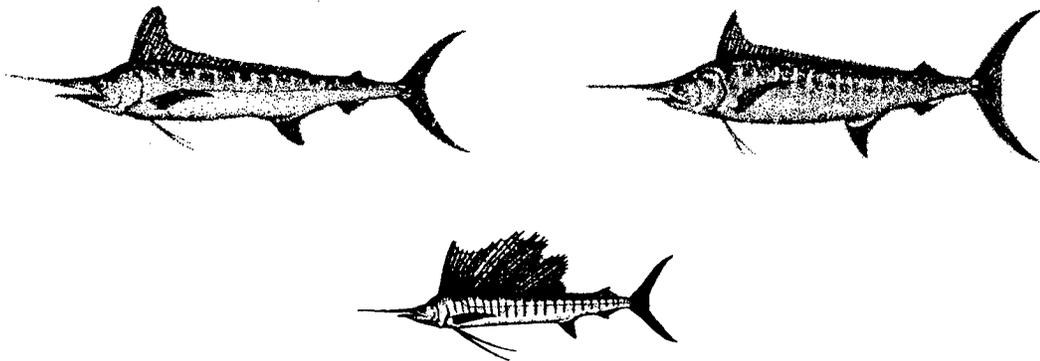
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, FL 33149

October 1995



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U.S. DEPARTMENT OF COMMERCE
Ronald H. Brown, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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NATIONAL MARINE FISHERIES SERVICE
Rolland A. Schmitten, Assistant Administrator for Fisheries

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INTRODUCTION

Prior to the mid-1950's billfishes (i.e., blue marlin, *Makaira nigricans*; white marlin, *Tetrapturus albidus*; sailfish, *Istiophorus platypterus*; swordfish, *Xiphias gladius*; and longbill spearfish, *Tetrapturus pfluegeri*) were a relatively unrecognized resource by recreational anglers. The U.S. Fish and Wildlife Service, while doing exploratory longline for tunas in the northern Gulf of Mexico, reported the occurrence of marlins and sailfish in their catches. This discovery prompted the advent of big game fishing in the Gulf. Fishing for billfishes gained popularity and resulted in big game fishing clubs being organized beginning in the early 1960's. To learn more about this relatively new recreational fishery, scientists at the National Marine Fisheries Service (NMFS) laboratory at Panama City, Florida (formerly the U.S. Bureau of Sport Fisheries) began studies on this fishery. Information on catch rates (indices of abun-

dance), as well as biological and ecological data on these species, was obtained through a Recreational Billfish Survey beginning in 1971.

From St. Petersburg, FL to Port Isabel, TX, on-site interviews are conducted by port samplers at major ports throughout the billfishing season (May through September). Data are obtained from recreational anglers fishing for billfishes who also voluntarily report, by phone or mail, information regarding their big game fishing trips. Analyses are generally summarized for the northwestern, northcentral, and northeastern regions of the Gulf (Figure 1). The northwestern Gulf (Texas) is divided into three sections: eastern (Freeport, TX to the Texas-Louisiana border), central (Port O'Connor to Corpus Christi), and southern (Port Mansfield to the Texas-Mexico border).

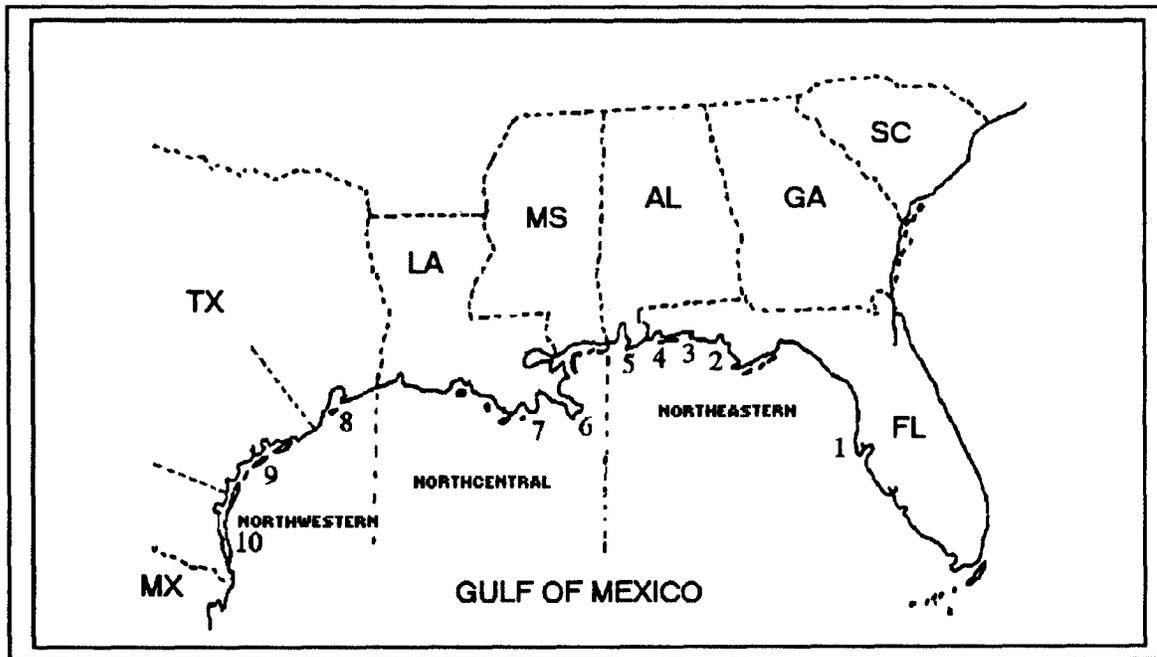


Figure 1. Primary sampling ports of the Recreational Billfishing Survey in the northern Gulf of Mexico, 1994: (1) St. Petersburg; (2) Panama City; (3) Destin; (4) Pensacola; (5) Mobile; (6) South Pass; (7) Grand Isle; (8) East Texas; (9) Central Texas; and (10) South Texas.

CATCH AND EFFORT

Beginning in 1993, our sampling was restricted to tournament fishing, non-tournament catch and effort data were generally not obtained. Analyzing tournament and non-tournament (i.e., dock) hook-up rates (HPUE's) separately for the years 1972-92 showed that tournament collected HPUE were below dock sampled HPUE in most of the 21 yrs that both tournament and dock data were collected. Therefore, for year-to-year compatibility, the HPUE comparisons in this report are based on data collected from tournaments only. Catch and effort data from dock sampling that had been included in reports prior to 1993 are not included in the HPUE analysis in this report.

Data on billfishing catches and effort (i.e., number of hours trolled for billfishes) were obtained from on-site tournament interviews with the anglers. Catches with effort other than trolling (i.e. driftfishing and livebaiting) and catches with no effort information (referred to collectively as catch-only), were also recorded to better estimate the numbers of boated billfishes. These latter catches are represented by numbers in parenthesis in Table 1. Voluntary reporting by mail or phone is essential to total land-

ings estimates. In 1993, the Billfish Survey has started placing Landing Sheets at marinas that billfishing boats frequent, to further promote the reporting of boated billfishes that were not recorded in our tournament sampling.

During the 1993 season, 15,701 hr of net trolling effort were recorded from tournament fishing (Table 1). Net trolling hours are based on hours trolled minus fighting time. About 50% of the effort was recorded in the northeastern Gulf, 30% in the northcentral Gulf, and 20% in the northwestern Gulf. These values may reflect sampling intensity, as well as fishing activity. There were 484 billfishes recorded as caught in 1993 - 107 boated and 377 released (Table 1). Of the 484 billfishes caught in the northern Gulf of Mexico in 1993, 107 were boated. Blue marlin accounted for 64% (309 fish), white marlin 25% (123 fish), and sailfish 11% (52 fish) of the catches, respectively. These numbers include catch-only landings data where no effort was recorded, or effort was other than trolling.

Since 1985, the percentage of the billfish catch boated has decreased annually from about 75% to 50% in 1988 and about 22% in 1993 (Figure 2). This indi-

ALL BILLFISH GULF OF MEXICO, 1971-93

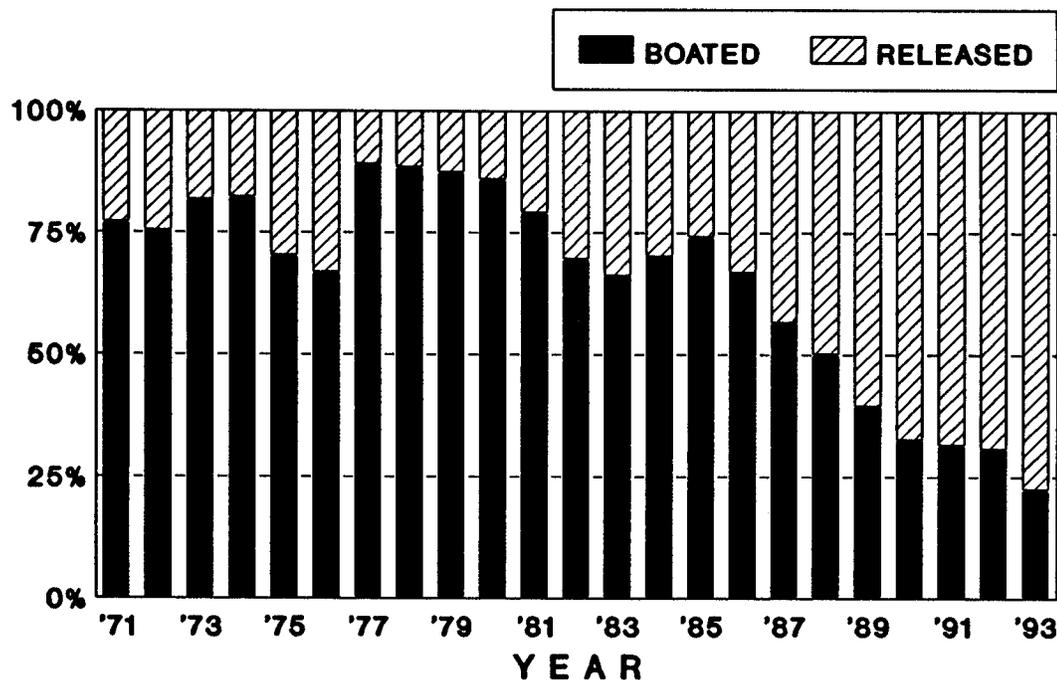


Figure 2. Percentage of billfish boated vs. released, including catches with no effort recorded or effort other than trolling, in the northern Gulf of Mexico, 1971-93.

Table 1. Hours trolled and billfishes Hooked (H), Boated (B) and Released (R) in the northern Gulf of Mexico during 1993. Numbers in parenthesis represent boated or released billfishes with no effort recorded or effort other than trolling. One spearfish was reported as hooked and lost. No sampling was done in East Texas. Hours trolled are based on net hours with fighting time excluded.

REGIONS	Hours trolled	Blue Marlin			White Marlin			Sailfish			TOTAL BILLFISHES		
		H	B	R	H	B	R	H	B	R	H	B	R
Northeast Gulf	7,861	145	(10) 32	(30) 40	83	(5) 22	(24) 29	10	(4) 3	(2) 2	238	(19) 57	(56) 71
St. Petersburg	151	0	0	0	2	0	0	3	0	0	5	0	0
Panama City	1,610	49	13	10	30	9	8	5	3	0	84	25	18
Destin	510	7	1	2	3	0	1	1	0	1	11	1	4
Pensacola	2,795	56	14	16	35	9	14	1	0	1	92	23	31
Mobile	2,795	33	4	12	13	4	6	0	0	0	46	8	18
Northcentral Gulf	4,678	111	(3) 2	(24) 50	27	(0) 0	(6) 11	3	(0) 1	(2) 2	141	(3) 3	(32) 63
Grand Isle, LA	1,001	17	0	9	8	0	2	1	0	1	26	0	12
South Pass, LA	3,677	94	2	41	19	0	9	2	1	1	115	3	51
Northwest Gulf	3,162	106	(7) 10	(49) 52	24	(0) 2	(3) 21	32	(0) 6	(8) 22	162	(7) 18	(60) 95
Central Texas	535	42	7	15	2	0	1	11	1	8	55	8	24
South Texas	2,627	64	3	37	22	2	19	21	5	14	107	10	70
ALL AREAS TOTAL	15,701	362	(20) 44	(103) 142	134	(5) 24	(33) 61	45	(4) 10	(12) 26	541	(29) 78	(148) 229

cates a genuine concern for the resource by sport anglers, as well as the enactment of various federal and state fishing laws. In 1993, the northcentral Gulf had the highest percentage of the catches released

(94%), followed by the northwestern Gulf (86%) and the northeastern Gulf (63%). The northeast boated 76 billfishes, more than twice the 31 billfish boated in the other two areas combined (Figure 3).

RELEASES BY AREA, 1993

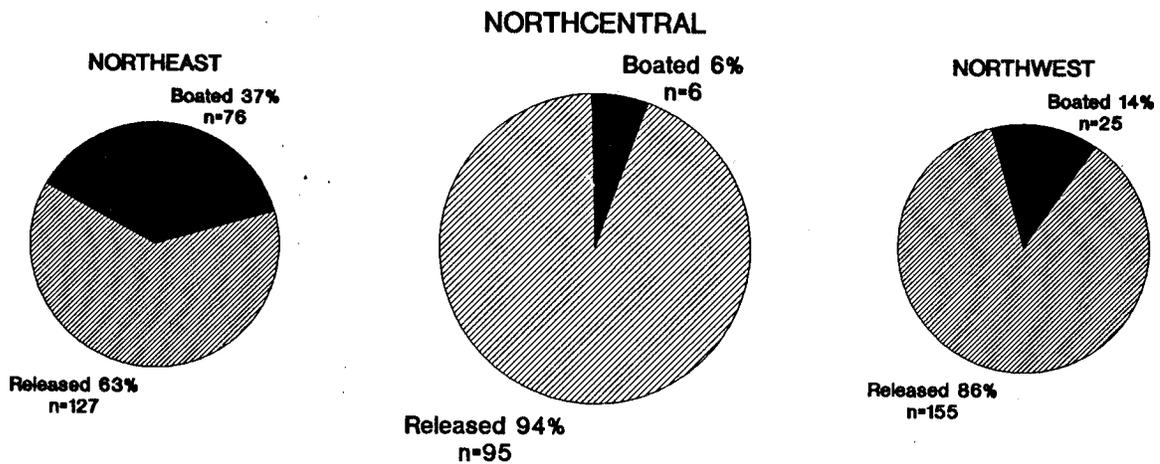


Figure 3. Billfish releases by area, including catches with no effort recorded or effort other than trolling, in the northern Gulf of Mexico, 1993. Note: n=numbers of billfishes caught.

INDICES OF RELATIVE ABUNDANCE

The HPUE (hooked-per-unit-effort) index used to indicate apparent relative abundance is calculated by dividing the number of billfishes hooked (includes lost fishes plus caught fishes) by the number net hours trolled (unit-effort). Net hours are used in this report when calculating HPUE. Only trolling-effort during tournament billfishing data are used in calculating the HPUE index of relative abundance. The HPUE index is considered by some a better indicator of abundance than catch-per-unit-effort (CPUE) because hooked fishes are often lost and, therefore, not counted in the catches, though they are actually available to the fishery.

In 1993, the HPUE for blue marlin caught during tournament fishing was 2.3 fish per 100-hrs-trolling (Figure 4a), increasing slightly from 2.1 fish per 100-hrs-trolling in 1992 tournaments. There has been a slightly increasing trend in tournament HPUE for

blue marlin since 1991 which followed a decreasing trend over the period of 1987-1990.

The white marlin HPUE of 0.85 fish per 100-hrs-trolling in 1993 was below the 1992 tournament HPUE of 1.1 fish per 100-hrs-trolling (Figure 4b). Tournament HPUE for white marlin have remained below 1.3 fish per 100-hrs-trolling since 1989, following a severe decline over the period of 1983-1989.

Sailfish tournament HPUE of 0.3 fish per 100-hrs-trolling in 1993 was below the 1992 HPUE of 0.68. Tournament HPUE for sailfish over the period of 1978-93 has remained relatively stable at a very low level (less than 1.4 fish per 100-hrs-trolling) with no distinct trend (Figure 4c). These low catch rates for sailfish may be attributed to anglers targeting the larger marlins during tournaments by fishing farther off-shore at faster speeds with larger baits.

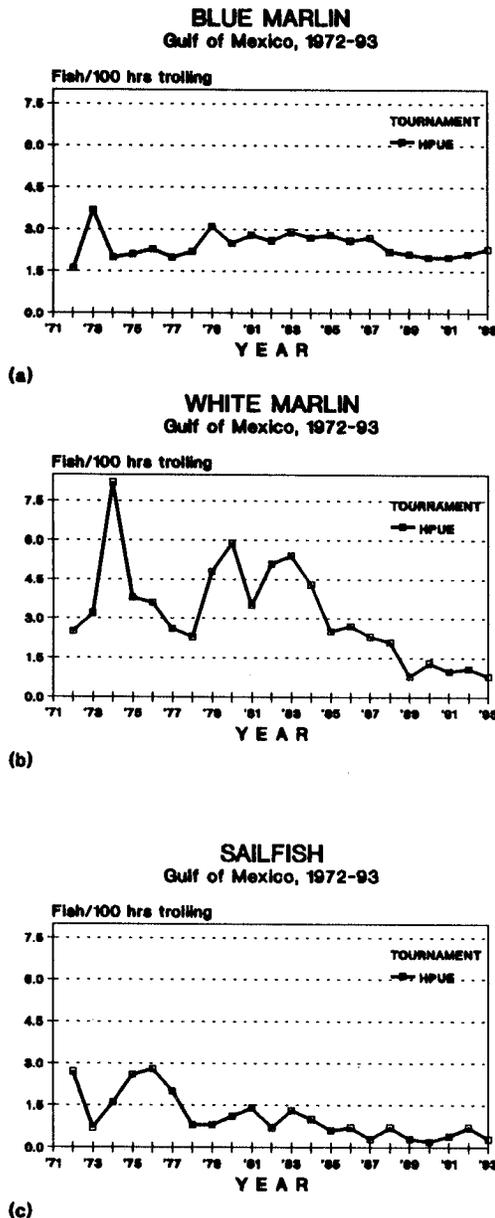


Figure 4. Number of billfishes hooked per-100 hrs-trolling (HPUE) for, (a) blue marlin, (b) white marlin, and (c) sail-fish from tournament sampling in the Gulf of Mexico, 1972-93. No tournament data were sampled in 1971.

AVERAGE WEIGHTS

Size data, in conjunction with other analyses, may be useful in analyzing the health or general status of a fishery. Federal and state regulations, in addition to size limits imposed by many tournaments, strongly influence the size of fishes brought to the docks. Therefore, when interpreting size data, one needs to be mindful of bias that may result from these

restrictions. Table 2 includes weight data recorded from all fishing methods in 1993. The yearly average weights for marlins and sailfish over the period 1971-93 are shown in Figure 5.

The largest blue marlin sampled in 1993 was 660.3 lbs from Pensacola, FL (Table 2). The average weight for the 46 blue marlin landed and weighed in 1993 was 337.4 lbs, a slight decrease from the 1992 season (Figure 5a). This decrease in overall average weights followed an increasing trend that occurred over the period of 1986-92. Federal minimum size regulations were established in 1988 reinforcing the trend begun in 1985. Of the 22 weights recorded for white marlin, the largest was 80.2 lbs reported from Mobile, AL (Table 2). Although this fish was slightly smaller than the largest (81.3 lbs) recorded in 1992, the average weight for white marlin increased from 54.6 lbs in 1992 to 57.8 lbs in 1993 (Figure 5b). Only seven sailfish weights were recorded during the 1993 season (Table 2), compared to 54 recorded in 1992. The average weight (45.5 lbs) of this small number of fish was 0.5 lbs heavier than in 1992 (Figure 5c).

BAITS

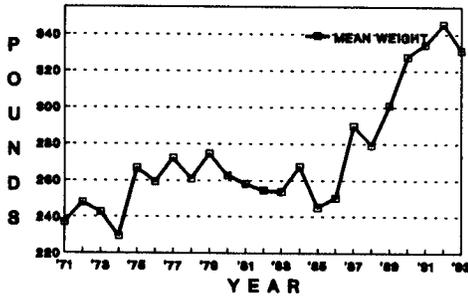
Trolling with natural baits at slower speeds less than 9-10 knots was the dominant fishing method in the northern Gulf, prior to the late 1970's. Comparatively fast trolling ($\geq 9-10$ knots) with artificial baits (i.e., lures) has become the prevalent method of fishing for billfishes since the early 1980's. These changes in baits and fishing methods could influence hook-up and catch rates, which would affect estimates of apparent relative abundance (e.g. low sailfish HPUE's after 1977 as noted above).

A net total of 15,701 hr of trolling effort using various types of baits and the resulting HPUE's are shown in Table 3. Trolling only artificial baits was the dominant fishing method in 1993 accounting for 87% (13,686 hr) of the fishing effort. Both bait types (i.e., natural plus artificial) fished simultaneously accounted for 11% of the effort. When fished independently of each other (Table 3a), dead baits represented only 2% of the effort but had the highest HPUE (3.7 fishes per 100-hrs-trolling). When both baits were trolled simultaneously (Table 3b), artificial baits had the higher HPUE in all three regions and for the overall northern Gulf of Mexico (3.3 fishes per 100-hrs-trolling). Livebaiting and driftfishing are considered separate methods of fishing and are not included in these catch and effort analysis.

Table 2. Number of billfishes and weights (lbs) recorded in the northern Gulf of Mexico during 1993. Data includes trolling, drifting and live-baiting effort. There were three blue marlin, four white marlin, and two sailfish that were boated but not weighed, which are not included in the totals. No billfishes were weighed in St. Petersburg, Grand Isle, or East Texas. No spearfish were caught.

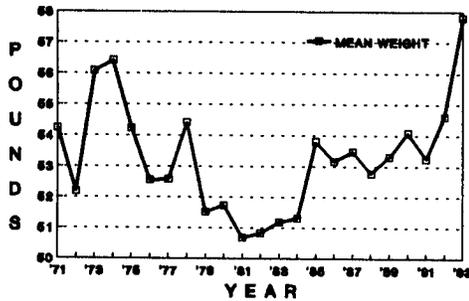
	Panama City	Destin	Pensacola	Mobile	South Pass	Central Texas	South Texas	All Areas Combined
Blue Marlin # Weighed	15	1	14	4	2	7	3	46
Largest	646.5	264.6	660.3	372.0	540.5	382.5	589.0	660.3
Smallest	190.3	264.6	226.5	223.8	312.5	223.8	371.0	190.3
Average	340.3	264.6	326.2	330.5	426.5	295.8	446.0	337.4
White Marlin # Weighed	8	1	9	4	0	0	0	22
Largest	66.0	57.0	61.0	80.2	-	-	-	80.2
Smallest	49.8	57.0	48.0	53.0	-	-	-	48.0
Average	57.6	57.0	54.3	66.3	-	-	-	57.8
Sailfish # Weighed	3	0	0	0	1	1	2	7
Largest	45.0	-	-	-	37.1	43.3	56.9	56.9
Smallest	35.5	-	-	-	37.1	43.3	56.0	35.5
Average	41.8	-	-	-	37.1	43.3	56.5	45.5

BLUE MARLIN



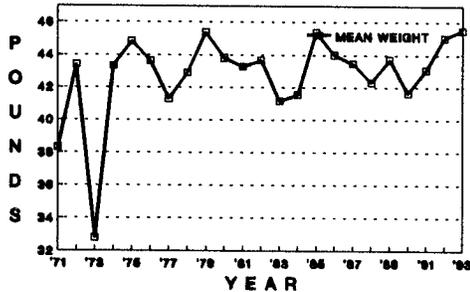
(a)

WHITE MARLIN



(b)

SAILFISH



(c)

Figure 5. Mean weights (lbs) for (a) blue marlin, (b) white marlin, and (c) sailfish from sampling in the northern Gulf of Mexico, 1971-93.

RELATED OBSERVATIONS

1. The first reported billfish catch of the season came from Galveston, TX. The crew on the boat "MEMORY MAKER" landed a 415 lb blue marlin on February 14, 1993.
2. No "Grand Slams" (i.e., catches of a blue marlin, white marlin, and sailfish on a one-day trip) were reported during the 1993 season.

ACKNOWLEDGMENTS

The National Marine Fisheries Service's billfishing survey has received considerable support from the recreational fishing community. Recreational fishery constituents have provided both indirect and direct assistance to assure a successful outcome of this study. This support is gratefully appreciated, and we thank those who helped (Appendix 1). We apologize if we have missed any names.

Approximately 1,704 interviews were conducted during the 1993 season. For a job WELL DONE, we thank: Julie Callais, Grand Isle, LA; Wm. "Hank" Geier, Jr., South Padre Island, TX; R. Jora Scaggs, Destin, FL; Craig Martin, Pensacola, FL/Mobile, AL; and Joe Yurt, South Pass, LA.

The authors thank Dr. Mark Farber of the Miami Laboratory for reviewing this document and making many helpful suggestions.

Table 3. Net hours trolled and number of billfishes hooked per 100-hrs-trolling (HPUE) with various baits trolled independently (a) or combinations of baits trolled simultaneously (b) in the northern Gulf of Mexico, 1993.

(a)

Gulf of Mexico Areas	Baits trolled independently			
	Dead bait		Artificial bait	
	Hours trolled	HPUE	Hours trolled	HPUE
Northeastern	315	3.7	6,362	2.8
North Central	0	0.0	4,584	3.1
Northwestern	8	12.5	2,740	5.1
All areas combined	323	3.7	13,686	3.4

(b)

Gulf of Mexico Areas	Baits trolled simultaneously			
	Hours trolled	Natural ¹ HPUE	Artificial HPUE	Combined HPUE
Northeastern	1,189	1.0	3.3	4.3
North Central	89	0.0	0.0	0.0
Northwestern	414	1.4	4.1	5.6
All areas combined	1,692	1.1	3.3	4.4

¹ Natural bait includes both dead and live baits.

Appendix 1. Persons and tournament organizations that actively assisted the National Marine Fisheries Service, Recreational Billfishing Survey in the northern Gulf of Mexico during the 1993 fishing season.

NAME	LOCATIONS
George Ballard	Pensacola, FL
Baton Rouge Big Game Fishing Club	Baton Rouge, LA
Bay Point Invitational Tournament	Panama City, FL
Blue Marlin Classic Tournament	Perdido Key, FL
Florida West Coast Championship Tournaments	Tierra Verde, FL
Fort Walton Beach Sailfish Club	Ft. Walton Beach, FL
Don Green	San Marcos, TX
Jim Hubbard	Houston, TX
Mobile Big Game Fishing Club/Ladies	Mobile, AL
New Orleans Big Game Fishing Club/Ladies	New Orleans, LA
Pensacola Big Game Fishing Club/Ladies	Pensacola, FL
Poco Bueno Tournament	Port O'Connor, TX
Donnie Rozier	Pensacola, FL
Bonnie Yaste	Pensacola, FL
