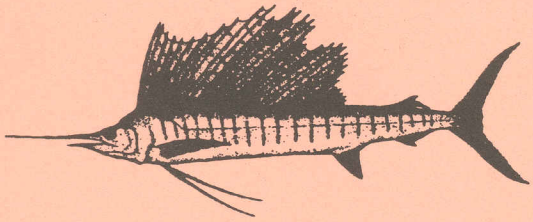
NOAA Technical Memorandum NMFS-SEFSC-339

1992/1993 REPORT OF THE SOUTHEAST FISHERIES SCIENCE CENTER BILLFISH PROGRAM



December 1993

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

NOAA Technical Memorandum NMFS-SEFSC-339

1992/1993 REPORT OF THE SOUTHEAST FISHERIES SCIENCE CENTER BILLFISH PROGRAM[1]

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

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
D. James Baker, Acting Under Secretary for Oceans and Atmosphere

NATIONAL MARINE FISHERIES SERVICE
Rolland A. Schmitten, Assistant Administrator for Fisheries

December 1993

[1] Contribution MIA-93/94-06 from the Southeast Fisheries Science Center, Miami Laboratory, Migratory Fishery Biology Division.

NOTICE

This report should be cited as follows:

National Marine Fisheries Service. 1993. 1992/1993 Report of the Southeast Fisheries Science Center Billfish Program. NOAA Technical Memorandum NMFS-SEFSC-339, 17 p.

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ACKNOWLEDGMENTS

The National Marine Fisheries Service (NMFS) is grateful to the recreational and commercial fishermen who voluntarily cooperated in the collection of billfish statistics, and to the numerous state, university, federal employees and private research organizations who lent their time and support to billfish programs. Additionally, we wish to thank those tournaments that provided NMFS samplers with transportation, hotel accommodations, and food. This assistance facilitated our being able to send NMFS scientists to personally attend their events in order to collect data and biological samples. Appendix I recognizes the people and organizations that were instrumental in supplying voluntary data and those that provided financial support.

We also recognize the cooperation of various international fisheries agencies who participated in the Enhanced Research Program for Billfish, conducted under the auspices of the International Commission for the Conservation of Atlantic Tunas (ICCAT).

INTRODUCTION

Scientists at the Southeast Fisheries Science Center (SEFSC) have been involved in billfish research since the early 1970's. As a result, the SEFSC's billfish database is one of the most comprehensive sources of scientific information on Atlantic blue marlin, white marlin, sailfish, and spearfish. Many different segments of the fishing community – recreational anglers, commercial fishermen, representatives of billfish tournaments, university researchers, state agents, federal employees, and private research organizations – have donated their time, effort, data, and funds to assist our research program over the past two decades.

Billfishes are often referred to as "fish without a country" because their movement patterns encompass virtually the entire ocean and intersect the boundaries of many different nations. Very recent information indicates blue marlin may be interoceanic as well as transoceanic. For this reason, this report provides a comprehensive presentation of research activities involving SEFSC scientists and includes work on billfish that occurs outside, as well as inside, United States jurisdictional waters.

Most Atlantic billfish information is gathered through three Programs: the Cooperative Game Fish Tagging Program (CGFTP) of the SEFSC, part of the newly established Cooperative Tagging Center (CTC); the Cooperative Recreational Billfish Survey (CRBS) of the SEFSC; and the Enhanced Research Program for Billfish (ERPB) conducted under the auspices of the International Commission for the Conservation of Atlantic Tunas (ICCAT), located in Madrid, Spain. The purpose of the original CGFTP, initiated in 1954, was a voluntary tagging program, comparatively narrow in scope, supported primarily in the western Atlantic Ocean and Gulf of Mexico. This program has expanded to become the CTC, which includes the CGFTP, which now documents many more target species, with a greatly increased volunteer participation by all segments of the fishing community, as well as a cooperative data storage and data manipulation capability for state, international, and private tagging agencies Atlantic-wide. The purpose of the CRBS is to collect data on the number of billfish hooked, boated, tagged, and released during tournament and non-tournament fishing trips and to collect data on length, weight, and sex of individual billfish landed. The goal of the ERPB is to collect the information that will lead to stock assessments of Atlantic billfishes, including: (1) improve the Atlantic-wide biostatistical fishery database for billfish; (2) maintain an international Atlantic billfish tagging program; and (3) assist in age and growth research. Besides these three major programs for billfish, the tuna and swordfish research programs at the SEFSC also provide data on the number of billfish caught incidentally, and released in the U.S. and by foreign fishing vessels operating within U.S. jurisdictional waters. A review of the data collected from this program is also presented in a separate section: Pelagic Longline Observer Program (PLOP).

This report includes through 1992 data from the CTC and the CRBS because data compilation for these programs are normally not completed until the year following data collection. Data for 1993 are presented for the ICCAT ERPB, other ICCAT Billfish related activities, and the voluntary billfish dock sampling survey that began in the fall of 1992. Some tagging information from 1993 is also included.

COOPERATIVE TAGGING CENTER (CTC)

Information on tagged billfish has been kept by the Cooperative Game Fish Tagging Program (CGFTP) since the 1950's, which is now part of the Cooperative Tagging Center (CTC). Tagging activities have increased each year, with an increase in tag-and-release awareness and the expansion of the geographic area in which anglers participate.

The CGFTP provides tagging kits free upon request to individual anglers. Each kit contains tags and self-addressed, postage-paid tagging report cards to be filled out by the angler and returned to the CGFTP when tags are used. Also included in the kit, and available free upon request, is the CTC annual newsletter. The newsletter provides a detailed, up-to-date account of tagging information for billfishes, tunas, tarpon, amberjack, cobia, king mackerel, and red drum. Interested persons may contact the CGFTP at the following address. Please include species of fish you wish to tag, along with your name, address, and phone number.

Cooperative Tagging Center
Cooperativ Game Fish Tagging Program
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, FL 33149

Toll free: (800) 437-3936

Tag Releases

Blue Marlin

In 1992, 1,668 blue marlin were tagged and released by program cooperators. This is a decrease of 7% from the 1991 total. The number of blue marlin releases by gear type is shown in Figure 1. Principal areas for blue marlin tagging are the U.S. Virgin Islands with 342 and Puerto Rico with 248 releases.

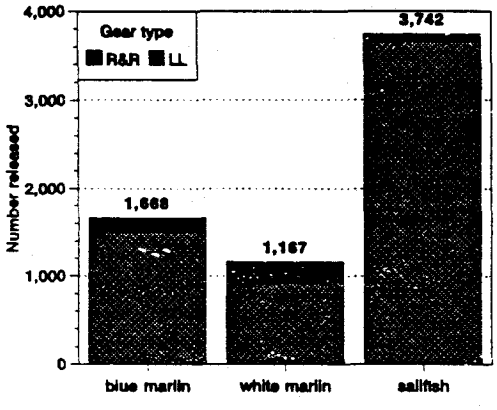


Figure 1. Number of releases reported in 1992, by species, for rod and reel (R&R) and longline (LL) gears. One sailfish release did not report gear type.

White Marlin

A total of 1,167 white marlin were tagged and released in 1992 (Figure 1), a decrease of almost 20% from 1991. The area with the greatest number of white marlin releases in 1992 was off the mid-Atlantic states (Cape Hatteras to Cape Cod) where 467 were tagged and released. There were 109 releases in the offshore U.S. east coast area.

Sailfish

There were 3,743 sailfish tagged and released in 1992 (Figure 1), an increase of nearly 17% over 1991. The majority of sailfish taggings in 1992 took place off the southeast coast of Florida (1,842). Some other areas with substantial tagging activities for sailfish include: Cancun/Cozumel, Mexico (1,171), off the coast of north Florida and the Carolinas (274), and off the mid-Atlantic states (99).

Tag Recaptures

There were 118 billfish recaptures reported to the CGFTP for 1992. The numbers of billfish recaptured are shown by area of release and recapture in Table 1. The numbers of recaptured billfish by gear type are illustrated in Figures 2, 4, and 5.

Blue Marlin

A total of 18 tagged blue marlin were recaptured in 1992 (Table 1). Recreational fishermen recaptured half of the total blue marlin recaptures for 1992 (Figure 2). This species has been known to periodically make transatlantic crossings. In 1992 there were two particularly interesting recaptures. A blue marlin, tagged with a South Carolina tagging program[1] tag off Charleston in May, 1992, was recaptured about 500 miles east of Natal, Brazil, by a Japanese longliner in January, 1993. This was the

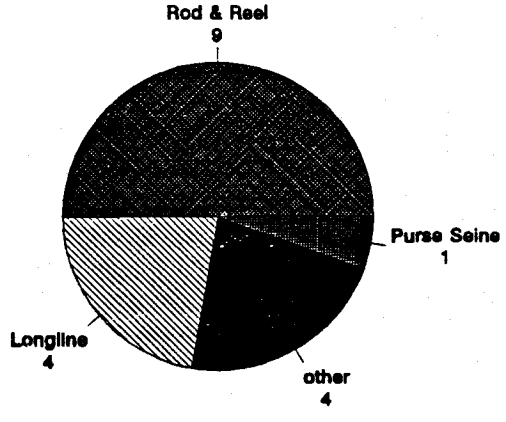


Figure 2. Blue marlin recaptures reported in 1992, by gear.

Table 1. Release area and number of recaptures reported by area for sailfish, blue marlin, and white marlin reported in the CGFTP for 1992.

Species	Release Area	Recapture Area	Number Recaptured
Blue Marlin	Virgin Islands	Virgin Islands	1
		West Africa	1
		Venezuela	1
	Puerto Rico	Puerto Rico	1
		Virgin Islands	1
	Florida panhandle	U.S. Gulf of Mex.	1
		Mexican Gulf of Mex.	1
	La Guaira	La Guaira	2
	N. Bahamas	Cumaná	1
		Mid-U.S. east coast	1
	Mid-U.S. east coast	<other>	1
		Indian Ocean	1
	Bermuda	Bermuda	1
	S.E. Florida	Mid-U.S. east coast	1
	Other Atlantic	Venezuela	1
		Cuban Waters	1
	<other>	<other>	1
			Total: 18
White Marlin	Mid-U.S. east coast	Mid-U.S. east coast	9
		W. Atlantic	1
		<other>	1
	La Guaira	Cumaná	4
		<other>	2
		Venezuela	2
		Mid-U.S. east coast	1
	Other Atlantic	Cumaná	3
	Florida panhandle	N. Bahamas	1
	Louisiana	Mid-U.S. east coast	1
	Hispaniola	Cumaná	1
	Virgin Islands	West Africa	1
			Total: 27
Sailfish	S.E. Florida	S.E. Florida	19
		Florida Keys	10
		Cozumel	2
		N. Bahamas	1
	Florida Keys	Florida Keys	15
		S.E. Florida	3
	Cancun/Cozumel	Cuban Waters	4
		Cancun/Cozumel	3
		S.E. Florida	2
		Venezuela	1
		<other>	1
	Other Atlantic	S.E. Florida	5
	N. Florida to Carolinas	S.E. Florida	2
		N. Florida to Carolina	1
		Mid-U.S. east coast	1
	La Guaira	La Guaira	2
	N. Bahamas	S.E. Florida	1
			Total: 73

first documented evidence of a blue marlin (or any billfish) making a transequatorial crossing (Figure 3a). Another blue marlin was recaptured in the Indian Ocean off of Mauritius, 3 years after being tagged with a CGFTP tag in Wilmington Canyon off the coast of Delaware (Figure 3b). Points of release and recapture (Figure 3b) are indicative of the minimum distance traveled and do not provide insight into the route traveled. This is the first record of a tagged blue marlin to have crossed both the Atlantic Ocean and the equator, as well as the first example for any species of fish in the 40-year history of the tagging program to demonstrate movement outside the confines of the Atlantic Ocean and adjacent seas. The minimum distance traveled for this fish was about 9,100 nm. Further, this is the longest documented distance traveled by any fish in the CTC's history.

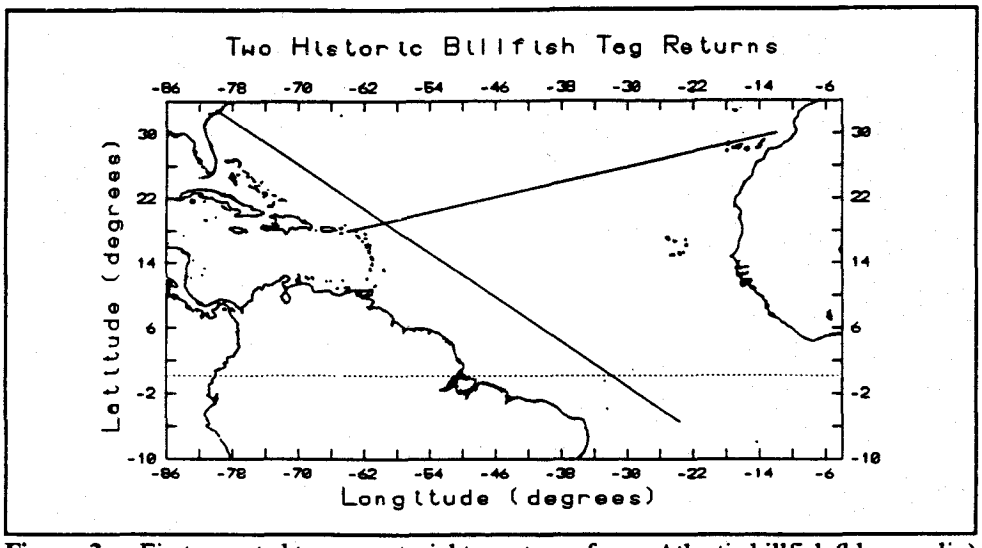


Figure 3a. First reported transequatorial tag returns for an Atlantic billfish (blue marlin) and a transatlantic white marlin tag return. See text for details.

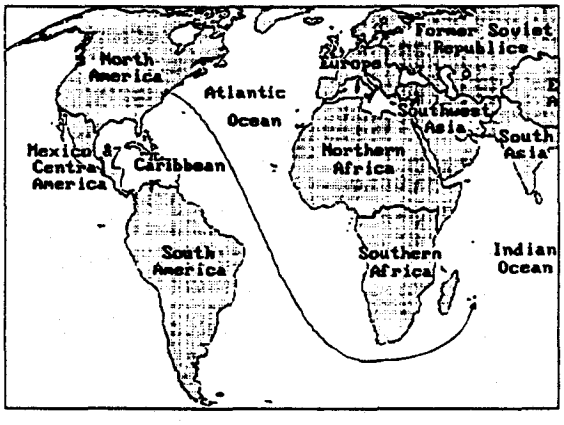


Figure 3b. First reported transoceanic tag return for an Atlantic billfish (blue marlin) – tagged off the coast of Delaware and recaptured 3 years later in the Indian Ocean off Mauritius.

White Marlin

A total of 27 tagged white marlin were recaptured (Figure 4) in 1992 (Table 1). Commercial fishermen accounted for 12 of these recaptures (44%), while recreational fishermen recaptured 9 (33%). Of historic note was the recapture of a white marlin that was tagged by an angler off St. Thomas, Virgin Islands, in January, 1991, and recaptured off Morocco in August, 1992 by a local drift fisherman (Figure 3a). This is the first documented evidence of a white marlin making a transatlantic crossing.

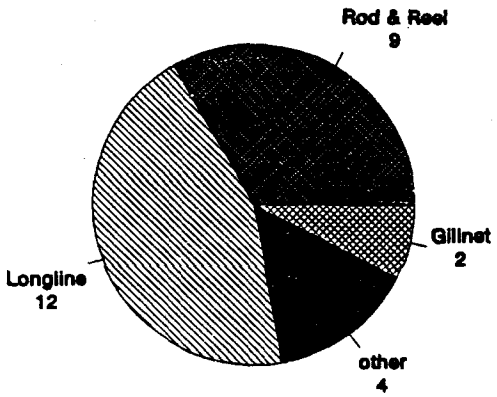


Figure 4. White marlin recaptures reported in 1992, by gear.

Sailfish

A total of 73 tagged sailfish were recaptured in 1992 (Table 1). Sailfish were recaptured almost exclusively by recreational fishermen (Figure 5) - 63 out of 73 (86%). Sailfish generally are considered to have a more coastal distribution compared to marlins, thus, a predominance of sailfish recaptures is to be expected from recreational anglers, who fish closer to shore than commercial fishermen.

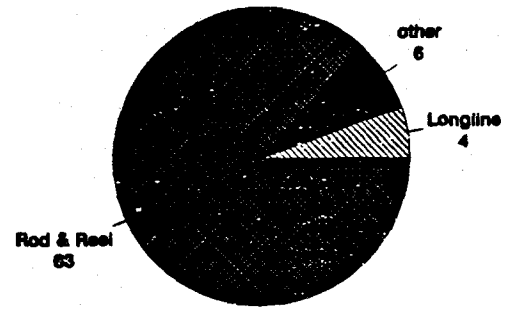


Figure 5. Sailfish recaptures reported in 1992, by gear.

Reporting Recaptures and Distribution of Rewards

"Save It For Science" Program

Recapturing a tagged billfish is indeed a rare event, and every fish has the potential of leading to a scientific breakthrough in our study of these species. By sacrificing a few fish for science now, we can gain critical knowledge that may help conserve the billfish for future generations. If a tag-recaptured billfish of legal size is caught, anglers should save the whole fish (by freezing if possible) and contact the Southeast Fisheries Science Center for further instructions at 1-800-437-3936. On weekends or at night call Dr. Eric Prince at 1-305-598-0944. *Collect calls are accepted.*

Tag Recapture Cards

In our efforts to continually improve the quality of data received in the CGFTP, a Tag Recapture Card was developed in 1991, printed on fluorescent orange paper and is available in Spanish as well as English (Figure 6). This card assists anglers in reporting all the necessary data from a tag-recaptured fish. The bright color of the card should make it easy to find among your boat papers when the rare event of catching a tagged billfish occurs. It has proved very useful in the first year of its distribution. We are looking forward to an increased return of these tag recapture cards in the years ahead.

OMB Approved No. 0648-0250 Expires 09/30/94

TAG RECAPTURE CARD

1. SPECIES: _____
2. TAG NUMBER: _____
3. DATE RECAPTURED: _____
4. LOCATION/COUNTRY RECAPTURED: _____
5. LENGTH (inches/centimeters): _____ (lower jaw fork length)
6. WEIGHT (pounds/kilograms): _____ SEX: Male ☐ Female ☐
7. FISHING GEAR: _____
8. NAMES OF BOAT AND CAPTAIN/ANGLER: _____
9. ADDRESS OF (8) ABOVE: _____
10. PHONE OF (8) ABOVE: _____
11. HAS FISH BEEN SAVED (FREEZING) SO IT CAN BE SAMPLED?

YES ☐ NO ☐

THERE IS AN EXTRA REWARD FOR A FROZEN FISH. CALL COLLECT

(305) 361-4248 (Daytime)

(305) 598-8944 (Night/Weekends)

12. COMMENTS: _____

Figure 6. New tag recapture cards are printed on fluorescent orange paper and are available in Spanish as well as English.

Recapture Incentives and Rewards

In the past, the CGFTP has offered a $5.00 reward to the angler reporting a tagged fish. The CGFTP now awards a gray embroidered hat, with the NMFS tagging flag emblem, to the person reporting the recapture of a tagged fish (monetary awards are available for king mackerel recaptures by special request only). The gray hats cannot be purchased; however, the same hat in either black or in various colors can be purchased for $10.00 ($2.00 of this charge goes towards a NMFS fund to buy the gray hats) from our new supplier:

Island Custom Embroidery
88511 Overseas Highway
Tavernier, FL 33070

(305) 852-6317 FAX (305) 852-9553

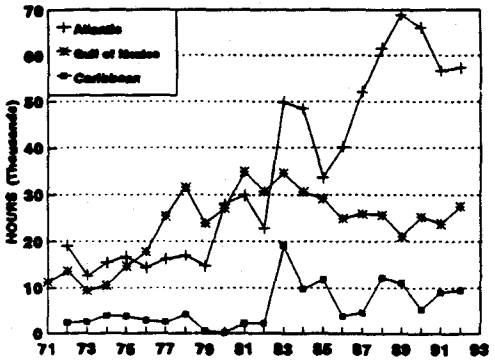
COOPERATIVE RECREATIONAL BILLFISH SURVEY

The Cooperative Recreational Billfish Survey (CRBS) of the SEFSC documented a total of 94,502 hours of fishing effort from 137 tournaments (86,388 hr) and 10 non-tournament (8,114 hr) locations throughout the western North Atlantic and Gulf of Mexico in 1992, up 4.1% from 1991 (Figure 7). The hours sampled by the survey represent an unknown fraction of the total hours fished by the many recreational anglers who target billfish in the Atlantic, Gulf of Mexico, and Caribbean Sea.

A total of 4,704 billfish (1,063 blue marlin, 904 white marlin, and 2,737 sailfish) were reported caught (i.e., boated, released, or tagged) in 1992, of which 4,114 (87.5%) were released (Figure 8, A-C). The percentage of all billfish reportedly caught, by area, was: U.S. East Coast - 19.5%; Gulf of Mexico - 13.6%; Florida East Coast and Keys - 41.5%; Caribbean - 19.2%; and Bahamas - 6.3%. The proportion of billfish which are released has generally increased for all three species (Figure 8, A-C), particularly over the last 10 years. This coincides with a progressive increase in conservation fishing ethics which has been self-imposed by the recreational billfishing community for more than a decade. In addition, the U.S. Fishery Management Plan for Atlantic Billfishes, enacted in 1988, also encourages releasing fish by imposing minimum size limits for each species of billfish (except for spearfish). These minimum sizes (in lower-jaw-fork-length) are:

blue marlin - 86 in
white marlin - 62 in
sailfish - 57 in.

FISHING EFFORT SAMPLED BY REGION



TOTAL FISHING EFFORT SAMPLED
ALL AREAS COMBINED

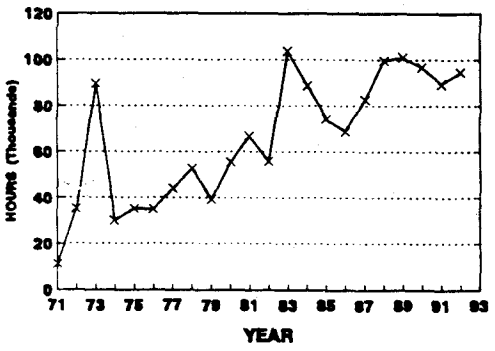
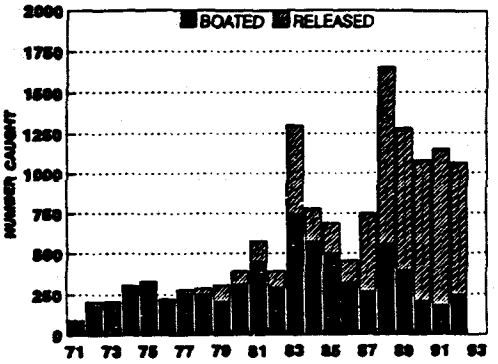
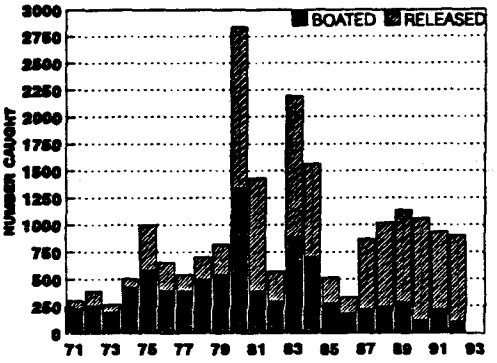


Figure 7. Yearly fishing hours sampled by region and for all areas combined, 1971-1992.

(A)
BLUE MARLIN



(B)
WHITE MARLIN



(C)
SAILFISH

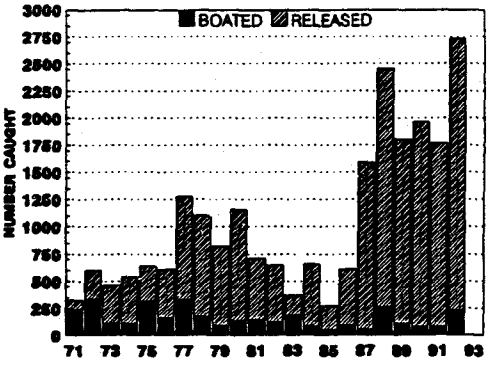


Figure 8. Numbers of billfish boated and released, all areas combined, for (A) blue marlin, (B) white marlin, and (C) sailfish, 1971-1992.

Average Size

Only a portion of all billfish landed are actually measured, weighed, and sexed by survey personnel. The overall average weight of blue marlin, white marlin, and sailfish reported from our survey in 1992 were 330.4, 57.3, and 46.8 pounds respectively. The largest blue marlin recorded during the 1992 survey weighed 828.0 lbs and was landed in the Bahamas in May. The largest white marlin reported was caught off Ocean City, Maryland in August and weighed 86.0 lbs. The largest sailfish weighed 80.0 lbs and was reported from the Gulf of Mexico.

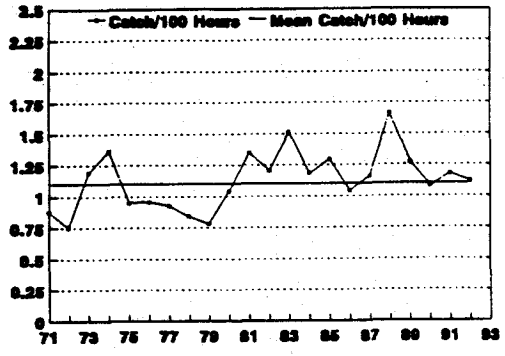
Catch-Rates and Fishing Effort

A measure of estimated relative abundance of billfish is computed from the number of fish caught per 100 hrs of fishing effort. In past reports we often presented hooked-per-unit-effort (HPUE) data for billfish. Although HPUE data has been considered by some scientists to be more desirable than CPUE data as an index of relative abundance for billfish, present stock assessment models use CPUE data because only this information is available for most areas outside U.S. waters. Therefore, CPUE information is emphasized in this report.

The overall catch-per-unit-effort (CPUE), for all areas combined, in 1992 for blue marlin, white marlin, and sailfish was 1.1, 1.0, and 2.9 fish per 100 hrs, respectively. Mean catch-rates indicate that since 1971, the average CPUE for blue marlin is 1.1, for white marlin is 1.9, and for sailfish is 2.2 fish per 100 hrs (Figure 9, A-C). Catch-rates have fluctuated over the 22 years of the survey. Recent trends have indicated relatively stable CPUE's for blue marlin over the past decade with a peak in 1988. The CPUE's for white marlin peaked in 1980 and then declined and stabilized, but well below the mean value since 1985. The historic sailfish catch-rates have been fairly stable (without discernible trend) during most of the time-series, and increased above the mean in 1992 for the first time in several years.

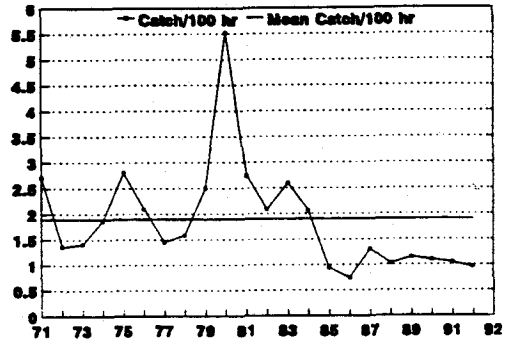
(A)

BLUE MARLIN



(B)

WHITE MARLIN



(C)

SAILFISH

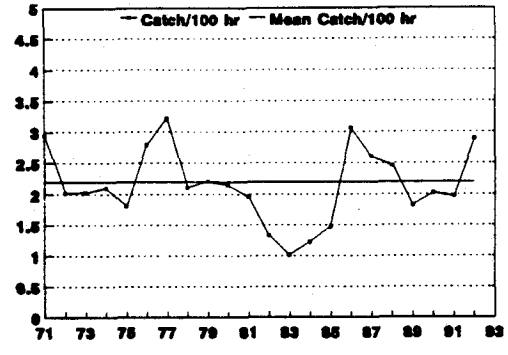


Figure 9. Catch per 100 hours of fishing effort for (A) blue marlin, (B) white marlin, and (C) sailfish, 1971-1991.

U.S. East Coast (North of Florida)

In 1992, a total of 27,161 hrs of fishing effort was sampled from 37 billfish tournaments from Cape Cod, MA, to Savannah, GA. Much of this information was provided through our volunteer program, and we thank all those individuals and organizations who contributed data this year (Appendix I). Catch-rates reported in 1992 for blue marlin, white marlin, and sailfish were 0.7, 2.5, and 0.2 fish per 100 hrs, respectively, changing little from 0.7, 2.1, and 0.2 fish per 100 hrs recorded in 1991. Of the 915 billfish reported caught from this area in 1992 (189 blue marlin, 684 white marlin, and 42 sailfish), 825 (i.e., 90%) were released. Monthly CPUE calculations indicated highest overall CPUE values for blue marlin and sailfish occurred in June, while CPUE values were highest for white marlin in September.

Florida East Coast and Keys

Along the Florida East Coast and Keys, a total of 19,530 hrs of fishing effort (6,995 hrs trolling and 12,535 hrs live-baiting) were reported. Of this total, 16,214 hrs (83%) of the effort sampled from this area was directed specifically toward sailfish. Over 98% of the billfish caught in this area were sailfish. Live-baiting effort produced a catch-rate of 12.3 fish per 100 hrs, while trolling effort resulted in a catch-rate of 5.9 fish per 100 hrs. Over 99% of the fish caught by live-baiting were sailfish. Catch-rates for blue marlin, white marlin, and sailfish reported in 1992 were 0.2, 0.03, and 9.8 fish per 100 hrs, respectively, compared with 0.2, 0.03, and 7.5 fish per 100 hrs reported in 1991.

Bahamas

In the Bahamas, 10,749 hrs of fishing effort from 13 tournaments was sampled in 1992. Of this total, 5,045 hrs (47%), were reported from the six tournaments in the Bahamas Billfish Championship Series. Catch-rates for blue marlin, white marlin, and sailfish in 1992 were 2.0, 0.4, and 0.4 fish per 100 hrs, respectively, changing little from 2.1, 0.4, and 0.5 reported in 1991. Of the 294 billfish reported caught in this area in 1992 (212 blue marlin, 40 white marlin, and 42 sailfish), 229 (i.e., 78%) were released. As previously noted, the largest blue marlin reported from the Bahamas in 1992 weighed 828.0 pounds and was caught off Walkers Cay in May. This fish was also the second largest blue marlin ever recorded caught in the Bahamas.

Caribbean

The Caribbean survey documented 9,513 hrs of fishing effort from 10 tournaments. Catch-rates for blue marlin, white marlin, and sailfish reported in 1992 were 3.6, 0.1, and 5.8 fish per 100 hrs, respectively, compared with 5.0, 2.3, and 0.2 fish per 100 hrs reported in 1991. Of the 904 billfish reported caught in this area in 1992 (340 blue marlin, 10 white marlin, and 554 sailfish), 686 (i.e., 76%) were released. The large increase in sailfish CPUE is attributed to the inclusion of the Spice Island Billfish Tournament (Grenada) for the first time, where sailfish catch-rates are very high. This year's Caribbean survey information was obtained from several different sources, including the U.S. Virgin Islands Division of Fish and Wildlife, Trinidad and Tobago Big Game Club, and the ICCAT billfish sampling program.

Gulf of Mexico

There were 26,825 net hours of trolling effort recorded in the northern Gulf of Mexico during 1992, representing a 6% increase from 1991. Catch-rates in the northeastern Gulf in 1992, compared to 1991, were: 0.9 vs 0.7 for blue marlin, 0.8 vs 0.7 for white marlin, and 0.4 vs 0.3 for sailfish. In the north central Gulf, the CPUEs in 1992, compared to 1991, were: 1.1 vs 1.6 for blue marlin, 0.4 vs 0.3 for white marlin, 0.1 vs 0.0 for sailfish. In the northwestern Gulf, these rates were: 1.2 vs 1.5 for blue marlin, 0.5 vs 0.9 for white marlin, and 2.3 vs 0.9 for sailfish. The reported percentage of billfish released throughout the northern Gulf of Mexico was 69% in 1992. Yearly fluctuations in CPUE's can reflect changes in intensity of our sampling program, angling technique, as well as habitat and environmental changes. Therefore, variations in catch-rates reported among years might not reflect true changes in stock abundance or availability.

Billfish Dock Sampling Survey

The NMFS, Miami Laboratory, implemented an on-going "voluntary" billfish landings survey in November, 1992. The purpose of this survey is to obtain statistics on the landings of sailfish and marlin from the Florida East Coast and Keys. Because there are many landing sites, and large numbers of boats targeting billfish in this region, monitoring this fishery has been difficult and prohibitively expensive. Therefore, the cooperation of marinas and fishing clubs has been of vital importance. To date, twenty-nine marinas from Key West to Cape Canaveral, FL have participated in this survey (Table 2). Participants were asked to record landings of sailfish or marlin on a "Billfish Landings Form", along with length, weight, and the date of capture. A total of 322 sailfish, 4 blue marlin, 2 white marlin, and 2 spearfish were reported landed from November 21, 1992 to July 31, 1993. A breakdown of landings, by location, is provided in Table 3. Billfish landings forms can be made available to any interested marina operator, fishing clubs, or individual fishermen by writing the NMFS, SEFSC, 75 Virginia Beach Drive, Miami, Florida, 33149 (attention R. Carter).

Billfish By-Catch

Billfish are hooked incidentally by U.S. longline vessels targeting swordfish and tuna in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, as well as by other fisheries. Since October, 1988, the U.S. Fishery Management Plan for Atlantic Billfishes has prohibited the retention of billfishes by commercial fishing vessels. The numbers of billfishes caught and released from this fishery, with associated effort, are recorded on mandatory log books and are shown in Table 4. Effort is recorded as the number of hooks reported fished from all longline sets.

Table 2. Marinas, locations, and individual participants who voluntarily submitted billfish landings data to the NMFS Dock Sampling Survey, 1992-1993

MARINA	LOCATION	PARTICIPANT
Galleon Marina	Key West	Patrick Conner / Fred Clark
Ocean Key House	Key West	Chris Savoy
Ocean Side Marina	Key West	David Harris
City Marina	Key West	Russ Clark
Hawks Cay Marina	Marathon	Jim Langer
Bud N' Marys	Islamorada	George Mitchell
Whale Harbor	Islamorada	Danny Burnham
Holiday Isle	Islamorada	Jane Ravella
Smugglers Cove	Islamorada	Harry Wimmer
Holiday Inn Resort	Key Largo	Joyce Ann Ingalls
Ocean Reef Club	Key Largo	Rob Wheeler
Crandon Marina	Miami	Frank Godwin
Castaways	Miami Beach	James Callahan
Haulover Marina	Miami Beach	George Kelley
Sea Legs Marina	Hollywood	Dot Rising
Bahia Mar	Ft. Lauderdale	Randy Johnson
The Cove Marina	Deerfield Beach	Rich Murry
Fish City Marina	Pompano Beach	Elsie Ferguson / Ben Orgain
Lighthouse Point Marina	Lighthouse Point	Wes Mitchell
Two Georges Marina	Boynton Beach	Captain George
Waters Edge Marina	Boynton Beach	Skip Ledingham
Sailfish Marina	Palm Beach Shores	Trish Marion
Cannonsport Marina	Palm Beach Shores	Elzana Mills
Sailfish Club	Palm Beach	Harold McAuley
Buccaneer Yacht Club	Palm Beach	Rich Bright
Old Port Yacht Club	North Palm Beach	Mark Lavery
N. Palm Beach Marina	North Palm Beach	Jerry Kelly
Summit Landings	Sebastian	Terry Wildey
Cape Marina	Cape Canaveral	Lisa Davis

Table 3. Number of billfish landings reported, by species and location, and number of marinas in each location from November 21, 1992 to July 31, 1993 from southeast Florida. (SAI = sailfish, BUM = blue marlin, WHM = white marlin, and SPF = spearfish). Locations are listed northward from Key West, Florida.

LOCATION	# OF MARINAS	# SAI	# BUM	# WHM	# SPF
Key West	4	14	1	1	0
Marathon	1	0	0	0	0
Islamorada	4	78	0	0	2
Key Largo	2	20	0	0	0
Miami	1	19	0	0	0
Miami Beach	2	0	0	0	0
Hollywood	1	2	0	0	0
Ft. Lauderdale	1	0	0	0	0
Deerfield Beach	1	5	0	0	0
Pompano Beach	1	18	0	0	0
Lighthouse Point	1	4	0	0	0
Boynton Beach	2	2	0	0	0
Palm Beach	6	149	3	1	0
Sebastian	1	11	0	0	0
Cape Canaveral	1	0	0	0	0
TOTALS	29	322	4	2	2

Table 4. Billfish reported caught by U.S. swordfish and tuna longline vessels in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea, 1989-1991. Effort is recorded as total hooks reported fished by longliners (Cramer, 1993).

YEAR	BLUE MARLIN	WHITE MARLIN	SAILFISH	HOOKS REPORTED
1989	3,173	2,928	1,544	7,941,675
1990	2,756	2,168	1,790	7,500,450
1991	3,294	2,372	2,781	7,735,397
1992	2,781	2,634	1,554	6,565,889

ICCAT RELATED ACTIVITIES

The 1993 Standing Committee on Research and Statistics (SCRS) Report on Billfish

During the 1993 November meeting of the ICCAT's Standing Committee on Research and Statistics (SCRS) in Madrid, Spain, scientists from the Miami Laboratory presented four working documents pertaining to billfish research activities. Bayley and Prince (SCRS/93/115) examined the effectiveness of the ICCAT Billfish Tagging Program (part of the Enhanced Research Program for Billfish, ERPB) with respect to increasing reporting rates of tag-recaptures. They found that for southeastern Caribbean areas covered by the ERPB, reports of marlin and sailfish tag-recaptures have nearly tripled since the inception of the ERPB. Carter and Farber (SCRS/93/101) detailed the results of a volunteer survey of billfish landings along the Florida East Coast and Keys (difficult to sample because of the many potential landing sites). The survey documented about 7 mt of sailfish landed that would have otherwise gone undocumented. U.S. recreational fishing success for sailfish was standardized using general linear model techniques by Farber (SCRS/93/100). Jones and Farber (SCRS/93/99) presented results of an exploratory assessment of sailfish in the western Atlantic Ocean, the first such assessment in over a decade. Their results indicated that West Atlantic sailfish are at least fully exploited and "could" be over exploited, particularly during the last 7 years of the time-series (1962-1992). However, these results would be more conclusive if: (1) spearfish were separated from sailfish in the landings from the offshore longline fisheries; and (2) standardized CPUE series are developed from offshore longline fleets other than Japan. Copies of these documents can be obtained upon request by writing the Migratory Fishery Biology Division, Southeast Fisheries Science Center, 75 Virginia Beach Drive, Miami, FL, 33149.

The 1993 SCRS report on billfish concluded that recent stock assessments for the marlins and West Atlantic sailfish indicate that these species are either fully or over-exploited and thus warrant consideration for development of methods to reduce billfish mortality at this time. Development of these types of management measures are particularly difficult since the major source of Atlantic billfish mortality is a result of off-shore longline fleets targeting tuna and swordfish (i. . any management measures to reduce billfish mortality in these fisheries risk affecting the target species as well). One possible approach to reduce currently high rates of billfish longline mortality is to release the billfish still alive when they are brought alongside longline vessels. About ¼ to ½ of these billfish appear alive when brought alongside the vessels. This type of management measure would first have to be implemented on an experimental and selective basis while additional research is conducted to determine survival rates of billfish caught and released off longline vessels. Other recommended research include evaluation of longline deployment methods to avoid or reduce the billfish by-catch. Management measures of this type would realistically have to be combined with an observer program to verify survival estimates and compliance. These types of management measures for the recreational fisheries component of Atlantic billfish seem unnecessary because of the current Atlantic-wide practice of volunteer release policies adopted by many participating countries.

ICCAT Enhanced Research Program for Billfish

Progress of some research activities for 1993 were delayed due to a shortage of funding, particularly at the beginning of the year. However, funding problems were resolved by mid-year. Highlights of 1993 research in the western Atlantic (as of October 1993) include a total of over 30 observer trips, for the second consecutive year, accomplished on Venezuelan industrial longline vessels targeting tuna and swordfish. In addition, biological sampling of swordfish was also accomplished on these trips; gonads from over 500 swordfish were obtained for a reproduction study. Progress on shore-based sampling in 1993 continued at a rapid pace with several thousand carcass measurements accomplished in 1993. In addition, progress in developing billfish field identification kits, expansion of tag release and recapture activities, acquisition of hardparts for billfish age and growth studies, and finalization of the ICCAT Billfish Workshop book were also accomplished in 1993.

Summary of Shore-Based Sampling

Shore-based sampling activities were initiated in 1987 to obtain size frequency of billfish landings from seven countries in the western North Atlantic Ocean (Barbados, Dominican Republic, Grenada, Jamaica, St. Maarten, Trinidad, and Venezuela). The intensity of sampling efforts has increased each year over the period 1987-1992. In 1992, a total of 6,309 billfish size measurements (blue marlin, white marlin, sailfish, and spearfish) were taken from shore-based sampling in the western North Atlantic and 185 measurements were taken from Las Palmas in the eastern North Atlantic. Large sample sizes have been consistently reported by Grenada, St. Maarten, and Venezuela (Table 5).

At-Sea Sampling in Venezuela

At-sea sampling was initiated in 1987 by placing biological technicians aboard Venezuelan industrial longline vessels fishing out of the port of Cumaná. Data obtained from the catches included size, sex, time of landings, and whether the fish were alive or dead when brought alongside the boat. The intensity of sampling efforts improved each year from 3 observer trips in 1987, to 32 trips in 1992 (Table 6). The database consists f fishing trips which are divided into sets. For purposes of reports, sets are categorized into seasons: winter (December - February), spring (March - May), summer (June - August), and fall (September - November). Trips are designated as targeting yellowfin tuna or swordfish, depending on the type of bait used (sardines or squid, respectively). In 1992, observers were present aboard 17 yellowfin longline trips, 14 swordfish longline trips, and 1 mixed longline trip (yellowfin and swordfish). The fleet of 28 boats (originally 19 in 1987) averaged about 8 sets per trip, ranging from 1 set to 24 sets per trip. In 1992, the sets consisted of a mainline of about 47 km (29 mi) and 1,000 hooks. A total of 358 billfish – 87 blue marlin, 92 white marlin, 148 sailfish, and 31 spearfish – were sampled in 1992, compared with 249 billfish in 1991 (Table 4). Billfish catch-rates were consistently higher in the winter and fall seasons. The mortality of billfish brought to the side of the boat ranged from 52-66%. All at-sea and shore-based sampling data are available upon request by writing the NMFS, SEFSC, 75 Virginia Beach Drive, Miami, Florida, 33149 (attention R. Carter).

Table 5. Number of billfish size measurements, by country and species, for shore-based sampling, 1987-1992. Note: BUM = blue marlin, WHM = white marlin, SAI = sailfish, and SPF = spearfish.

COUNTRY	BUM	WHM	SAI	SPF	TOTAL
BARBADOS	67	28	247	14	356
DOMINICAN REPUBLIC	48	304	38	0	390
GRENADA	191	9	1,712	1	1,913
JAMAICA	330	5	7	0	342
LAS PALMAS	77	44	60	4	185
ST. MAARTEN	70	1,065	153	4	1,292
TRINIDAD	115	131	194	142	582
VENEZUELA	1,032	3,625	4,928	86	9,671
TOTAL	1,930	5,211	7,339	251	14,731

Table 6. Numbers of trips and sets, average number of hooks-per-set and longline length-per-set (km), numbers of billfish caught, and estimated mortality of billfish brought alongside the boat for at-sea sampling in Venezuela, 1987-1992. Note: BUM = blue marlin, WHM = white marlin, SAI = sailfish, and SPF = spearfish.

	1987	1988	1989	1990	1991	1992	1993[a]	TOTAL
No. of trips[b]	3	3	3	7	16	32	15	74
No. of sets	23	37	34	43	99	265	166	667
Avg. hooks/set	1171	1225	2439	1552	1646	1036	1270	1305
Avg. length/set	57	58	42	46	39	47	57	49
No. BUM caught	38	13	11	34	59	87	39	281
No. WHM caught	144	60	47	69	60	92	58	530
No. SAI caught	30	7	18	19	94	148	28	344
No. SPF caught	0	0	0	8	36	31	15	90
% BUM mortality	68	40	64	76	67	52	39	59
% WHM mortality	55	55	65	56	57	65	49	57
% SAI mortality	50	67	72	68	78	66	61	68
% SPF mortality	N/A	N/A	N/A	75	67	61	67	66

[a] 1993 is incomplete and only includes trips completed as of August, 1993.

[b] Yearly trip numbers may be in slight disagreement to the total number of trips (1987-1993) because individual trips are counted twice in separate years if they begin in December and end in January.

AGE AND GROWTH RESEARCH

Sampling of hardparts from juvenile billfish collected out of the stomachs of larger predators (sponsored by The Billfish Foundation) continued in 1992 and 1993. A total of 37 sets of otoliths (ear bones) from juvenile swordfish were collected and sent to Dr. Chuck Wilson, Louisiana State University, in mid-1993. About ½ dozen juvenile sailfish were also collected by this program in 1992-93. Additional hardpart samples were obtained from a very large blue marlin (1199 pounds, courtesy of Dr. Brian Lukehurst) caught in Bermuda in July 1993.

PELAGIC LONGLINE OBSERVER PROGRAM

In early 1992, the NMFS, SEFSC, Miami Laboratory initiated the Pelagic Longline Observer Program (PLOP) providing observer coverage for the U.S. pelagic longline fishery as specified in the U.S. Swordfish Fishery Management Plan. Since then, PLOP observer personnel have been deployed aboard vessels targeting swordfish or tuna (yellowfin or bigeye).

Using the Pelagic Logbook longline set information from the previous year, a list of randomly selected vessels to be notified is generated for a geographical area and quarter for the current year. The purpose of the selection is to achieve a 5% minimum sampling of longline sets for each area and quarter. The chance of selecting an individual vessel depends on how much fishing that vessel reported from the previous year. Because information is needed for each quarter of the year and over all of the grounds fished by the fleet, the same vessel could be selected for observation as many as 4 times in a year. By the same procedure, a vessel might not be selected at all for the year.

For the 5 calendar quarters March, 1992, through June, 1993, a total of 70 vessels have had observers aboard. Some of these vessels have been sampled more than once during this time period, although not more than once during any given quarter. Observers spent 809 days at-sea aboard these vessels during this period in which 466 sets were observed. The average length of mainline set on a trip ranged from 6.3 to 40.0 nm. During the three quarters of 1992, a total of 80,426 hooks were set by vessels, while 188,678 hooks were recorded during the first two quarters of 1993. During this period, PLOP observer personnel observed and identified a total of 11,488 fish, marine mammals, and sea turtles. In some cases, fish were released or lost at the ocean surface (mostly sharks) which the observer could only identify to a general species group (382 fish and 1 sea turtle). A more detailed summary report of the PLOP activities will be available in late 1993 or early 1994. The PLOP wishes to thank the owners, captains, and crews of the vessels observed, because these kinds of observations and measurements would not be possible without their cooperation.

APPENDIX I

The following people and organizations were instrumental in 1993 in supplying voluntary data (A) or in providing support that enabled NMFS to personally collect billfish data and biological samples (B).

(A) INDIVIDUALS PROVIDING DATA:

Marc Anderson - Marathon Small Boat
Dr. Richard Appeldoorn - Univ. of Puerto Rico
Juan R. Ayala - Club Náutico (Boquerón, PR)
Craig Barshinger - USVI
Art Barton - Key West Marlin
Al Behrendt - Bahamas Billfish Championship
Kathleen Berry - South Jersey Marina
Jim Blalock - NEFMA Bluewater
Bailey Bobbitt - Bahamas Billfish Championship, Master's (Cancun), International Light Tackle, Pirates Cove, Bertram/Hatteras Shootout, Reef Cup
Barbara Brandon - Gold Cup
José Brignoni - Club Náutico (Rincon, PR)
Bobby Brown - Cape Fear
Laura Brumm - Islamorada Ladies
Eric Burnley - Virginia Beach Marlin (Cape Henry)
Pablo M. Cabán - Club Náutico (Arecibo, PR)
John Coleman - Hatteras Harbor
Lesa Crayne - Reef Cup
Ted D'Esposito - Islamorada SF (FKGC)
Rich Ferguson - Beach Haven Marlin and Tuna
Antonio Ferriol - Club Náutico (Arecibo, PR)
Eugenio García - Cangrejos Yacht Club (PR)
Eugenio García, Jr. - Club Náutico (Rincon, PR)
Mario García - 8th International (Mayaguez)
Cathy Garlington - Stuart SF Club
Carlos González - Club Náutico (La Parguera, PR)
Lloyd Goode - NC Ducks Unlimited
Francisco A. Guzmán - Internatnl. Light Tackle (PR)
Martha T. Guzmán - International Light Tackle (PR)
Bill Hall - Old Port Cove, Masters (Palm Beach)
Don Hammond - South Carolina
Dianne Harbaugh - Holiday Isle
Gustavo Hermida - Club Náutico (San Juan)
Dorothy Hironimus - Bucanneer Cup
Edna Hodgens - Ocean City Marlin Club
BW James - Eastern Shore Marlin Club
Nelson Johnson (NMFS) - Capt. Fannies, Big Rock
Georganna Johnston - Hatteras
Jody Lewis - Penny Turtle
Danny López - Asoc. de Pesca (Dorado, PR)
Gorgie López - Asoc. de Pesca (Dorado, PR)
Barry Martin - Pirates Cove, NC
Mickey McCullough - Savannah Sportfishing
Marlene McNally - Marathon SF Classic (FKGC)
Robert Meister - Treasure Cay International
Victor Montalvo - Club Náutico (Vega Baja, PR)
Jim Motsko - Ocean City White Marlin
Miguel A. Muñoz - Cangrejos Yacht Club (PR)

Andrés Nevarez - Club Náutico (San Juan)
Andrés R. Nevarez - 40th International (San Juan)
Roberto Nieto - Club Náutico (Mayaguez)
Jaime Pabón - Club Náutico (Boquerón, PR)
Jane Palmieri - Bertram/Hatteras Shootout
Michael Pauley - The Tropic Times
Luis M. Reyes - Club Náutico (Vega Baja, PR)
Michell Rexach - San Juan International
Dave Ritchie - Jamaica
Francisco Rodriguez - Club de Pesca (El Tuque, PR)
Roberto Sabater - International Light Tackle
Eddie Santiago - APDPR
Gloria Santiago - APDPR
Jorge A. Santiago - Club de Pesca (El Tuque, PR)
Luis A. Santos - Club Náutico (Mayaguez)
Alberto H. Serra - APDPR
Michael J. Serrallés - Club Náutico (Ponce, PR)
Jim Sharpe - Little Palm Island
Findlay Sinclair - Key West Marlin, Key West Sailfish
Greg Skomal - Massachusettes
John Spence - TBF Walkers
Walter Strassheim - Lighthouse Point
Dade Thornton - Peter Island, Biras Creek
Terry Timberlake - Poor Girls
Frank Timmons - Down the Hatch SF
Mickey Tirado - Club Náutico (La Parguera, PR)
Bob Traa - Thousand Fathom Club
Tom Twyford - Silver Derby SF
Luis Umpierre y esposa - APDPR
Luis Valdejulli - 40th International (San Juan)
Joan Vernon - IWFA
Ralph Vicente - APDPR, The Billfish Foundation
José A. Villamil - Club Náutico (Ponce, PR)
Charlie Wetterman - Key Largo Showdown (FKGC)
Michael Whalton - Key West Hemingway
Bobby Whitten - Virginia Beach Ducks Unlimited
Dianne Wieland - Cape May County
Dr. Lucy Williams - Univ. of Puerto Rico
Bill Wood - International Light Tackle
Diana Wood - Cheeca Lodge
Dave Workman - El Pescado Grande
Steve Wray - Virginia Beach Small Boat

Gulf of Mexico:

George Ballard
Bonnie Boozer
Don Green
Nancy Hanna
Jim Hubbard
Donnie Rozier
Bonnie Yaste

(B) GROUPS AND ORGANIZATIONS PROVIDING SUPPORT:

Bahamas Billfish Championship
Bimini Big Game Fishing Club
Bimini's Blue Water Ltd.
Cat Cay Club
Cheeca Lodge
Chub Cay Club
Cocoplum Yacht Club
Don Shula Celebrity Classic
Florida Keys Gold Cup
Ft. Lauderdale Semi-Annual
Greater Miami Annual Billfish
Pompano Beach Fishing Rodeo
The Billfish Foundation
Treasure Cay Resorts
Turks and Caicos International

Gulf of Mexico:

Bay Point Invitational
Blue Marlin Classic
East Pass Towers Tournament
Florida West Coast Championship
Fort Walton Beach Sailfish Tournament
Mobile Big Game Fishing Club
New Orleans Big Game Fishing Club
Pensacola Big Game Fishing Club
Poco Bueno Tournament

NOTE: The NMFS apologizes for any name or organization that was omitted. Please send any additions or corrections to the editor.

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END NOTE

1. Reported by Don Hammond, South Carolina Wildlife and Marine Resources Department Tagging Program.