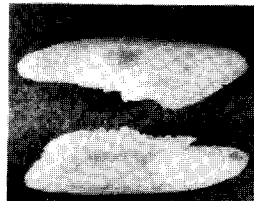
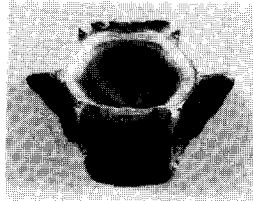
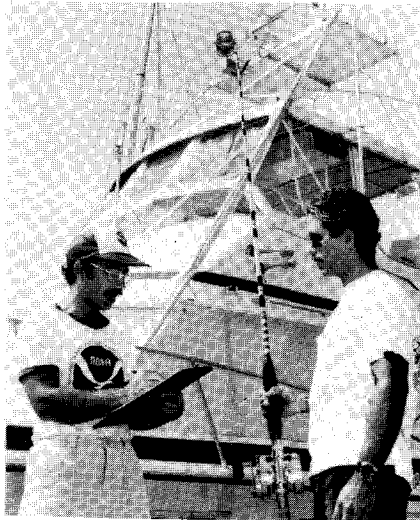


ANGLER PARTICIPATION IN SEFC OCEANIC PELAGIC PROGRAMS
1987



RESEARCH ON AGE AND GROWTH

Eric D. Prince and Dennis W. Lee



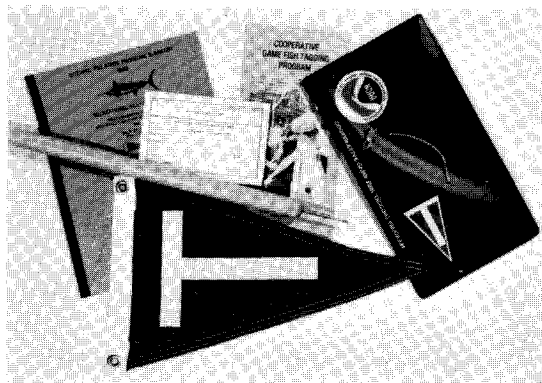
RECREATIONAL BILLFISH SURVEYS

GULF OF MEXICO

Paul J. Pristas

WESTERN NORTH ATLANTIC

Joseph P. Conillo



FEBRUARY 1989

COOPERATIVE GAMEFISH TAGGING

Edwin L. Scott and Joseph E. Tashiro
U.S. DEPARTMENT OF COMMERCE

William Verity, Secretary

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

William E. Evans, Administrator

NATIONAL MARINE FISHERIES SERVICE

James W. Brennan, Assistant Administrator for Fisheries



NOAA Technical Memorandum NMFS-SEFC-209

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Angler Participation in SEFC Oceanic Pelagic Programs, 1987

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PREFACE

The National Marine Fisheries Service (NMFS) Southeast Fisheries Center's Miami Laboratory has the responsibility of collecting and analyzing data on pelagic marine fishes¹. This is part of a commitment by the United States to develop national programs for conserving and managing these species through Regional Fishery Management Councils and with the International Commission for the Conservation of Atlantic Tunas (ICCAT). The ICCAT coordinates scientific investigations on stocks of tunas and tuna-like fishes, including billfishes, in the Atlantic Ocean and adjacent seas. Data collected through NMFS programs are used in the assessments of the status of stocks of Atlantic billfishes and tunas, and these results are presented to the Regional Fishery Management Councils and to the international scientific community at ICCAT.

The Oceanic Fisheries Division of the Miami Laboratory is responsible for providing comprehensive biological profiles of tunas and billfishes, and using these profiles to assess the status of these stocks. Three major activities associated with biological profiles which involve participation of the fishing community include research on age and growth, recreational billfish surveys, and cooperative gamefish tagging. This document covers information on all three activities in order to provide a comprehensive report of our work to the fishing public and recognize those who support these programs. We hope the information in this report will not only be useful but will encourage anglers to participate in various parts of our oceanic pelagic activities, particularly our new SAVE IT FOR SCIENCE program. News releases about significant events will continue to be issued as they occur throughout the year. An additional item included in the last section of the preface covers the newly formed ICCAT Enhanced Research Program for Billfish. The U.S. has taken the lead in developing the ICCAT billfish program, which is funded at the present time by the U.S. recreational fishing community.

Age and Growth

Research on age and growth of oceanic pelagic fishes was first initiated at the Miami Laboratory in 1974. Bluefin tuna were of particular interest at that time and more recently (1980), blue and white marlin have been targeted for studies on age and growth. Other species under consideration for studies on age and growth include sailfish and swordfish. Although the

¹The primary species covered in this report include blue marlin, Makaira nigricans; white marlin, Tetrapturus albidus; sailfish, Istiophorus platypterus; and bluefin tuna, Thunnus thynnus. Additional information is also given for Atlantic spearfish, Tetrapturus pfluegeri; broadbill swordfish, Xiphias gladius; yellowfin tuna, Thunnus albacares; and albacore, Thunnus

alalunga section on research currently emphasizes work on age and growth, the topic area of our research program can be expected to change over time as information needs on the biology of these fishes change. This type of research provides critical information necessary for the assessment of the status of these fish populations. This section was prepared by Eric D. Prince and Dennis W. Lee.

Recreational Billfish Surveys

Recreational billfish surveys have been conducted in the Gulf of Mexico since 1971 and in the Atlantic Ocean and Caribbean Sea since 1972 (Fig. 1). These surveys were initiated to monitor annual trends in recreational billfish catch, effort, and size of landed fish. A composite list of tournament and dock sampling sites arranged in chronological order is in Appendix Table I for all Atlantic, Gulf, and Caribbean areas that were included in the 1987 billfish survey. During 1987, 106 tournaments and 11 docks were monitored and 84,601 hours of effort were recorded. The recreational billfish survey section is presented in two parts. The first part is by Paul J. Pristas and covers the Gulf of Mexico. The second section on the western North Atlantic (U.S. east coast, Florida east coast and keys, Bahamas, and Caribbean Sea) is by Joseph P. Contillo.

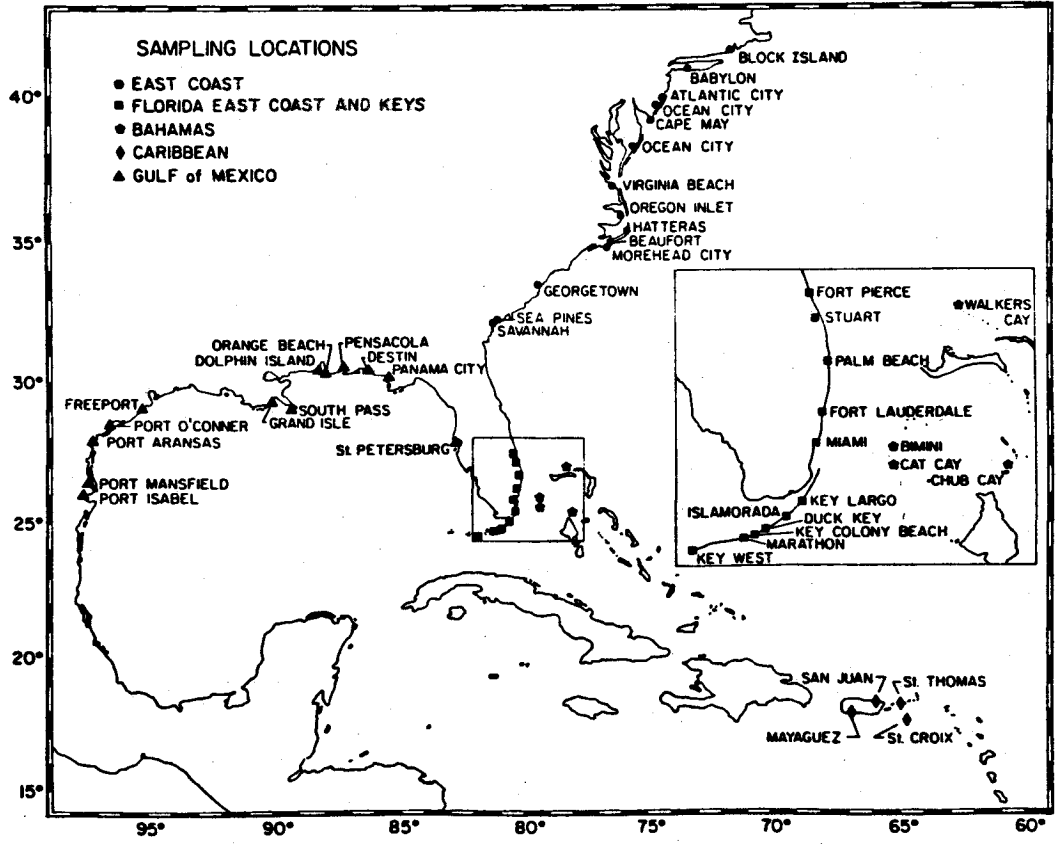


Figure 1 - Sampling locations for Recreational Billfish Surveys and general area of coverage for the Cooperative Gamefish Tagging Program and Research on Age and Growth of the Oceanic Pelagics Resources Division, Miami Laboratory.

Cooperative Gamefish Tagging Program

The Cooperative Gamefish Tagging Program was initiated at Woods Hole Oceanographic Institution in 1954 by Frank J. Mather, III. This program is a cooperative effort between recreational anglers, commercial fishermen, and fishery scientists to tag and release oceanic pelagic fishes and provide basic information on their movements and migrations in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea (Fig. 1). Beginning in 1973, the program was jointly funded and operated by Woods Hole and the National Marine Fisheries Service's Miami Laboratory. In 1980, the Miami Laboratory took over sole responsibility for the program. Since 1954, 118,607 fish of 78 different species have been tagged and released; 6,012 recaptures have been recorded. The Cooperative Gamefish Tagging section of this summary was prepared by project leader Edwin L. Scott and Joseph E. Tashiro.

ICCAT Enhanced Research Program For Billfish

Billfishes (marlin, sailfish, spearfish) are highly mobile species and as a consequence are harvested by many different nations in the Atlantic Ocean. Because of the international nature of the fisheries for billfishes, management of this species grouping necessitates that an international management agency be involved. Although ICCAT has had jurisdiction over billfish since its charter in 1969, management schemes have not yet been developed because of the lack of detailed information to conduct stock assessments. In response to this lack of detailed information, ICCAT started an Enhanced Research Program for Billfish in 1987. Several specific reasons contribute to the difficulty in obtaining detailed information on billfishes and these include: (1) the major portion of the billfish harvest in the Atlantic is made as an "incidental catch" by commercial longline and also by recreational fisheries, and, therefore, gathering information has had a lower priority than the tunas and swordfish; (2) billfishes do not form large schools, as do the tunas, and are considered to be a relatively "rare event" species--this makes billfishes comparatively unavailable for scientific study. The ICCAT billfish program is the Commission's first active attempt at research on this group. In fact, this is the only international research program in the world specifically directed at billfish.

The overall purpose of the program is to obtain the information necessary to conduct stock assessments on this species grouping in the Atlantic Ocean. The specific objectives of the program are: (1) to compile more complete detailed catch and effort statistics; (2) to develop an ICCAT tagging program specifically for billfish; (3) to advance studies on age and growth. Two major areas have been identified for intensive scientific study based on the abundance of billfishes and the importance of their fisheries: the Caribbean Sea, and the West Coast of Africa. At the present time, funding of this program has

relied entirely on the recreational fishing community in the United States. We would like to recognize the following groups for their financial contributions to this important program: (1) The Billfish Foundation; (2) Florida Conservation Association; (3) South Florida Classic and Fort Lauderdale Sailfish Tournament; (4) Key West Blue Marlin Tournament; (5) West Palm Beach Chapter of Florida Conservation Association. Quarterly highlight reports summarizing ICCAT billfish activities can be obtained by writing the NMFS Miami Laboratory.

Overall Program

All three NMFS activities (research, billfish surveys, and tagging), as well as the ICCAT billfish program, are closely associated and are generally being conducted simultaneously in the same geographical region (Fig. 1). For example, many of the billfish tagged for the cooperative gamefish tagging program occur during the tournaments that are also monitored by the billfish surveys. Conversely, tagged billfish that are recaptured after being at large for extended periods are sampled for skeletal structures to aid validation of the accuracy of our ageing studies. In addition, many of the fish sampled for age and growth studies are obtained at tournaments or from docks monitored by the billfish surveys. The ICCAT billfish program has research activities that parallel those of NMFS, such as billfish tagging and age and growth, and as such also fits into the region-wide effort to collect this important information. Accordingly, activities within the Oceanic Pelagics Resources Division are not only closely associated with each other but their success is highly dependent on cooperation from fishermen.

We extend our sincere appreciation to all cooperating parties for their help, and we hope the information provided in this report will be useful and encourage anglers to continue or start participating in the various program activities.

ERIC D. PRINCE

AGE AND GROWTH RESEARCH

Eric D. Prince and Dennis W. Lee

Age and growth research is an important component of fishery science. For example, to assess the well-being of an entire population of fish, it is often necessary to separate catch or landing statistics by age, so each year-class can be followed through the fishery as they get older. In this way, assessment models can be used to determine the health or general status of each component of the population and management recommendations can be adjusted accordingly.

One of the approaches we use to determine the age and growth rate of fish is analogous, in principle, to the methods used in estimating the age of trees. The number of concentric rings in the trunks of trees are generally representative of yearly growth (i.e. one ring is equal to one calendar year of life). The spacing between these rings is proportional in size to the rate of growth for that particular year; the larger this spacing, the faster the rate of growth. In temperate regions, faster growth usually occurs in summer and slowest growth in winter. In much the same manner, the age and growth rate of fishes are estimated by counting concentric rings or growth bands which form in their skeletal tissues, such as spines, fin rays, vertebrae, scales, or inner ear bones called otoliths. One problem in using this approach to age fish is that the time span between the formation of those rings in skeletal structures needs to be determined. This is referred to as validating the accuracy of age determination methods. It is a critical part of ageing studies, and is one of the major themes we address in this portion of this report.

Save It For Science Program

Several NMFS programs on oceanic pelagic fishes traditionally depend entirely on the cooperation of recreational and commercial fishermen. Specifically, the success of the Cooperative Gamefish Tagging Program and the Recreational Billfish Surveys are two examples where participating anglers and captains have played a significant role for many years. More recently, fishermen have been saving skeletal structures from tag-recaptured tuna and billfish (Table 1) and unusually small and large billfish (Table 2) for our studies on age and growth. These rare catches occur only a few times each year but when they do, fishermen who save these special fish for our program make significant contributions. In fact, in many cases the ONLY way we can validate the accuracy of our ageing methods, correctly interpret the growth bands on skeletal structures, or determine maximum longevity is to examine skeletal structures from tag-recaptured tuna and billfish, and very small and very large billfish.

Table 1. Tag-recaptured oceanic pelagic fishes where skeletal structures were recovered for age and growth studies, National Marine Fisheries Service, Southeast Fisheries Center's Miami Laboratory, 1980-87.

Species	Release Data				Release Data				Time at large	Skeletal structures recovered
	Date	Location	Size lb(kg)	Angler	Date	Location	Size lb (kg)	Angler		
White Marlin	9/26/70	Maryland	35 (15.9)	A. Yellot	7/10/82	New York	65 (29.5)	F. Muoid	11 yr, 6 mo	spines, vertebrae
	5/06/80	Mexico (Cozumel)	25 (11.4)	J. Rybovich	6/27/81	Louisiana	47 (21.4)	A. Stumpf	1 yr, 2 mo	spines, vertebrae otoliths
	10/31/81	Florida	50 (22.7)	D. Winter	9/19/82	Florida (Destin)	51.5 (23.4)	A. Stimson	10.5 mo	spines, vertebrae otoliths
	6/17/82	Louisiana	55 (25.0)	W. Billops	9/17/82	Florida (Destin)	60.5 (27.5)	B. Lloyd	4 mo	spines, vertebrae otoliths
	5/18/82	Florida	60 (27.3)	C. Griffith	11/12/85	Florida (Panama City)	45 (20.5)	C. Crockett	3 yr, 6 mo	spines, otoliths
	9/13/84	Florida	40 (18.2)	S. Saith	8/27/85	Mobile (Alabama)	41 (18.6)	L. Varley	11.5 mo	spines, otoliths
	10/04/85	Florida	60 (27.3)	C. Fox	9/17/86	New Orleans (Louisiana)	49 (22.3)	C. Rich	1 yr, 11 mo	spines, otoliths
	8/12/86	Florida	42 (19.1)	J. Rowe	7/03/87	Florida	42 (19.1)	J. Ward	11 mo	spines, otoliths
Bluefin Tuna	8/05/65	New Jersey	25 (11.4)	Canadian	5/28/81	Bahamas (Cat Cay)	493 (224.1)	K. Jenkins	15 yr, 8 mo	caudal vertebrae
	6/24/80	Virginia	25 (11.4)	U.S. Scientists	2/11/84	New Jersey	159 (72.3)	Japanese Longliner	3 yr, 8 mo	caudal vertebrae
	6/21/81	Virginia	40 (18.2)	A. Farrante	8/20/87	New York	360 (163.6)	White Dove Too	6 yr, 2 mo	vertebrae, otolith
	6/23/80	Virginia	25 (11.4)	Sea Rover	9/02/87	Mass.	545 (247.7)	A. Farrante	7 yr, 3 mo	vertebrae, otolith
	7/09/77	Virginia	25 (11.4)	White Dove	9/10/87	Mass.	645 (293.2)	E. Marie	10 yr, 2 mo	vertebrae, otolith
	7/04/77	Virginia	25 (11.4)	A. Farrante	9/10/87	Mass.	740 (336.4)	C. Jean	10 yr, 2 mo	vertebrae, otolith
	7/09/77	Virginia	30 (13.6)	White Dove	9/30/87	Mass.	443 (201.4)	B. Glynn	10 yr, 2 mo	vertebrae, otolith
Albacore	8/17/78	Spain	11 (5.0)	Spanish Scientists	12/30/84	New Jersey	51 (23.2)	Japanese Longliner	6 yr, 4 mo	spines, vertebrae otoliths
	6/23/80	France	11 (5.0)	French	12/31/84	New Jersey	42 (19.1)	Japanese	4 yr, 6 mo	spines, vertebrae
Sailfish	3/05/73	Florida (Islamorada)	40 (18.2)	W. Tindall	1/14/84	Florida (Boynton Bch)	54 (24.6)	R. Harrison	10 yr, 10 mo	spines, vertebrae otoliths
	1/--/84	Florida	50 (22.7)	E. Duda	1/19/86	Florida	45 (20.5)	R. Gurn	2 yr, 1 mo	spines, vertebrae otoliths
	1/25/86	Florida	50 (22.7)	D. Williams	4/27/86	Florida (Pt. Lauderdale)	34.5 (15.7)	M. Guilfayle	3 mo	spines, otoliths
	4/15/87	Florida	10 (4.6)	L. Coffee	11/08/87	Florida	24 (10.9)	P. Ross	6-7, mo	spines, otoliths
	1/01/87	Florida	55 (25.0)	P. Long	12/07/87	Florida	63 (28.6)	J. Magursky	11 mo	spines, otoliths

Age Validation

The use of skeletal structures from recaptured tagged tunas and billfishes for age and growth validation studies are based on the premise that these fishes, which have been at large for known periods, are essentially fish of known age. This condition usually exists only if the fish is tagged when it is very young or at a small size, where age can be more accurately predicted based only on size. Information from tagging records can then be accumulated to closely establish the fish's true age. If skeletal structures are recovered from these types of tag-recaptures, then they can be examined for growth bands and comparisons can be made between the age known from tagging records and age estimated from skeletal structure analysis. Thus, the relative accuracy of our ageing techniques can be established. Research in 1987 has emphasized age determination of young Atlantic blue marlin using otoliths (ear bones).

Table 2. Examples of some unusual size billfishes provided by anglers and other cooperators in the SAVE IT FOR SCIENCE PROGRAM, National Marine Fisheries Service, Southeast Fisheries Center's Miami Laboratory, 1987.

DATE/SPECIES	LOCATION	SIZE	ANGLER NAME	SKELETAL STRUCTURE RECOVERED
<u>Swordfish</u>				
2-10-84	Jamaica	20 in (50.8 cm)	NMFS agent	otolith
5-04-87	Bahamas	17 in (43.2 cm)	K. Northcutt	otolith
5-05-87	Bahamas	12 in (30.5 cm)	P. Constas	otolith
6-17-86	Florida	10 in (25.4 cm)	J. Konochik	otolith
7-23-87	Florida	18 in (45.7 cm)	S. Nielson	otolith
Summer	Florida	12.5 in (34.3 cm)	L. Dukehart	otolith
Summer	Florida	10.5 in (26.7 cm)	L. Dukehart	otolith
<u>White Marlin</u>				
4-23-87	Virgin Is.	147.5 lb (67.0 kg)	J. Miller	vertebrae, spines, otolith
10-25-87	Puerto Rico	13 lb (5.9 kg)	D. Rey	vertebrae, spines
<u>Blue Marlin</u>				
5-15-87	Florida	42 lb (19.1 kg)	J.T. Reese Taxidermy	spines, otolith
5-30-87	Jamaica	45 lb (20.5 kg)	G. Harvey	spines, otolith
5-30-87	Jamaica	43 lb (19.5 kg)	G. Harvey	otolith
6 17-87	Florida	1.5 in (3.8 cm)	L. Dukehart	otolith
7-29-87	Jamaica	10 in (25.4 cm)	C. Maxwell thru G. Harvey	otolith
8-01-87	New York	921 lb (418.6 kg)	NMFS agent	otolith
9-12-87	Florida	68 lb (30.9 kg)	J . Sharp	otolith
9-17-87	Florida	17 lb (7.7 kg)	Gray's Taxidermy	spines, otolith
11-01-87	Puerto Rico	18.5 lb (8.4 kg)	M. Suarez	vertebrae, spines, otolith
12-03-87	Puerto Rico	31 lb (14.1 kg)	R. Walters	otolith
<u>Sailfish</u>				
8-21-87	Virginia	15 in (38.1 cm)	J. Ruhl and crew	otolith
9-09-87	Florida	3.5 lb (1.6 kg)	Gray's Taxidermy	otolith
9-27-87	Florida	11 lb (5.0 kg)	Gray's Taxidermy	otolith

How You Can Help

Anglers capturing a tagged tuna or billfish or an unusually small or large billfish (see Table 3 for size categories by species) should contact us immediately BEFORE DISPOSING OF THE FISH. This is the most critical step in our SAVE IT FOR SCIENCE PROGRAM. An example of some of the unusually small and large billfishes we have been able to sample during the last five years are given in Table 2. We will accept collect calls at any time, day or night, and make whatever arrangements are necessary to obtain these fish. Contact Dr. Eric Prince or Mr. Dennis Lee at

Table 3. Size categories of interest for age and growth studies of blue marlin, white marlin, sailfish, and swordfish, National Marine Fisheries Service, Southeast Fisheries Center's Miami Laboratory, 1987.

Species	Size Categories of Interest	
	Small Sizes lb (kg)	Large Sizes lb (kg)
Blue Marlin	50 (22.7)	500 (227.3)
White marlin	30 (13.6)	90 (40.9)
Sailfish	20 (9.1)	80 (36.4)
Swordfish	10 (4.6)	500 (227.3)

the Southeast Fisheries Center's Miami Laboratory at (305) 361-4248, 361-4225, or Dr. Prince at his home (305) 598-0944 at night or weekends. In many cases, fishermen catching tagged fish or very small fish are releasing them and valuable scientific data are being lost. In other instances, tagged fish or very large fish are being eaten or mounted as trophies and the skeletal structures we use in our ageing studies are being thrown away. Our sampling methods will not interfere with taxidermy procedures, nor will the sampling affect the amount of edible flesh. We prefer to sample the fish ourselves. However, if the fish can't be sampled by Miami Laboratory personnel, the following procedures should be followed for marlin, sailfish, tuna, and swordfish:

Sampling Marlin and Sailfish

1. SAVE ENTIRE FISH if it has a tag (cut out tag) or if fish is an UNUSUALLY SMALL OR LARGE SPECIMEN (as indicated in Table 3) and provide information below:

- o DATE, LOCATION caught;
- o LOWER JAW FORK LENGTH in inches or centimeters (Fig. 2);
- o TOTAL WEIGHT (round weight) in pounds or kilograms;
- o Determine SEX as shown in Figure 3 or cut a small 2-4 inch piece of gonad cross section and include with the sample;
- o The FIRST 6 DORSAL SPINES are one of the most important hardparts for ageing marlin and sailfish. These can be taken by grabbing the tallest spine, pulling forward to spread the spine system, and cutting the tissue separating spines 6 and 7. Continue making a parallel cut 4-6 inches deep along each side of the spine down to the spine roots so the entire perimeter of the spines has been encircled. This will release the spine system so they can be pulled out by hand. DO NOT CUT THE SPINES AT THE SKIN SURFACE since the spine roots (Fig. 2) are important to us;

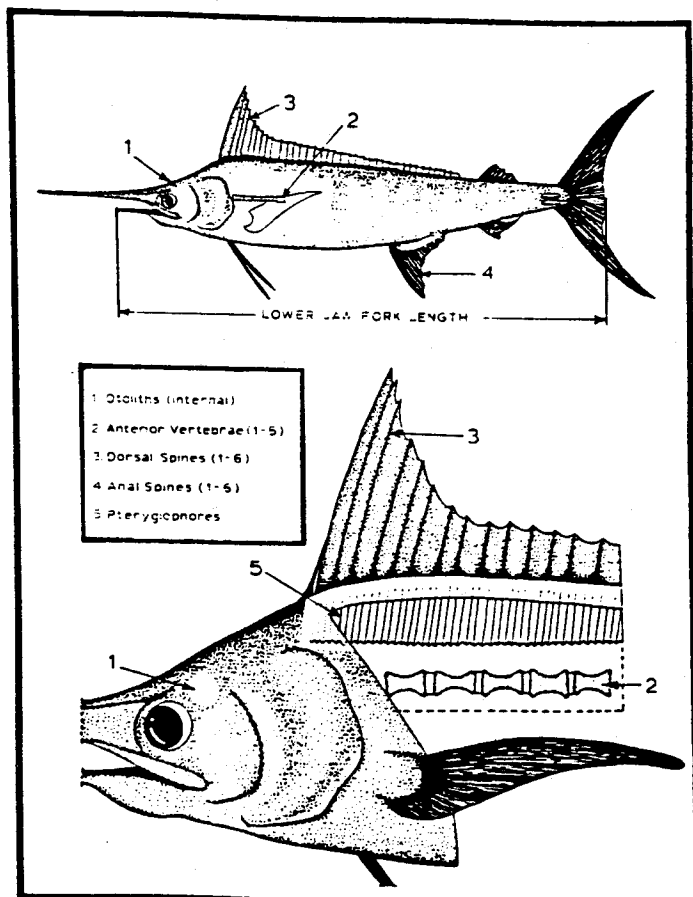


Figure 2—Skeletal structures and measurements necessary from billfish for age and growth studies, National Marine Fisheries Service, Miami Laboratory. See text for explanation of procedures.

SEX DETERMINATION—MARLIN

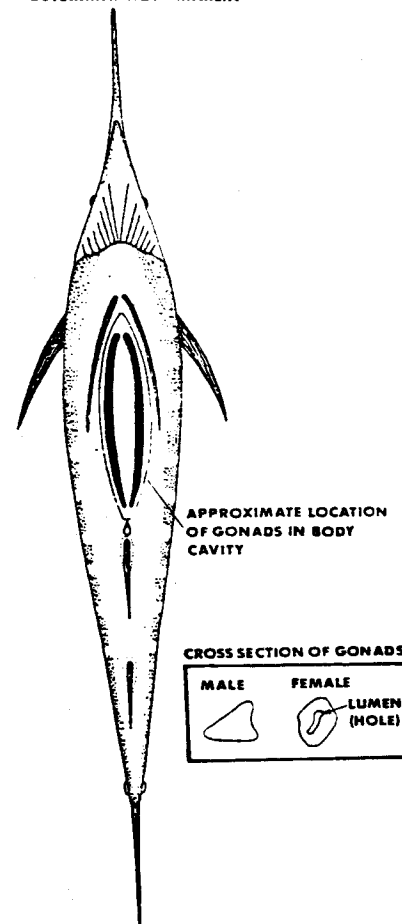


Figure 3—Schematic showing the location of gonads and sex determination in Atlantic billfish. Sex determination in Atlantic tunas can be taken in a similar manner. If sex is in doubt, cut out a small piece of gonad and save it with the rest of the sample.

o The HEAD UNIT illustrated in Figure 2 has 3 kinds of hardparts -- DORSAL SPINES, OTOLITHS (inner ear bones inside the skull), and ANTERIOR VERTEBRAE (1-6). All these parts can be conveniently taken in ONE unit by cutting off the bill at the nostrils, filleting the meat away from the backbone to the 6th vertebrae, and separating this from the rest of the body (Fig. 2). The lower jaw and bill can be removed and discarded to save storage space.

2. All samples need to be FROZEN or REFRIGERATED.

Sampling Swordfish

1. SAVE ENTIRE FISH if it has a tag (cut out tag) or if fish is an UNUSUALLY SMALL OR LARGE SPECIMEN (as indicated in Table 2) and provide information below:

- o DATE, LOCATION caught;
- o LOWER JAW FORK LENGTH in inches or centimeters (as indicated for marlin in Fig 2);
- o TOTAL WEIGHT (round weight) in pounds or kilograms;
- o Determine SEX as shown for billfish in Figure 3 or cut a small 2-4 inch piece of gonad cross section and include with the sample;

o The FIRST 6 ANAL SPINES are one of the most important skeletal hardparts for ageing swordfish (see Fig. 2). These can be taken by grabbing the tallest spine, pulling forward to spread the spine system, and cutting the tissue separating spines 6 and 7. Continue making a parallel but shallow cut just beneath the skin surface, along each side of the spine so the entire perimeter of the spine has been encircled. This will release the spines so they can be pulled out by hand;

o OTOLITHS (inner ear bones) are inside the skull and the head can be taken by cutting the bill off at the nostrils and cutting the head off behind the gill plates. The head can be trimmed by cutting off the lower jaw and gills so that only the skull (area between the eyes) is left.

2. All samples need to be FROZEN or REFRIGERATED.

Sampling Tuna

1. SAVE ENTIRE FISH if it has a tag (cut out tag) and provide information below:

- o DATE, LOCATION caught;
- o FORK LENGTH in inches or centimeters (Fig. 4);
- o TOTAL WEIGHT (round weight) in pounds or kilograms;

o Determine SEX as shown for billfish in Figure 3 or cut a small 2-4 inch piece of gonad cross section and include with the sample;

o Cut off HEAD behind gills;

o Cut off CAUDAL PEDUNCLE (tail) at sixth finlet as shown in Figure 4.

2. All samples need to be FROZEN or REFRIGERATED.

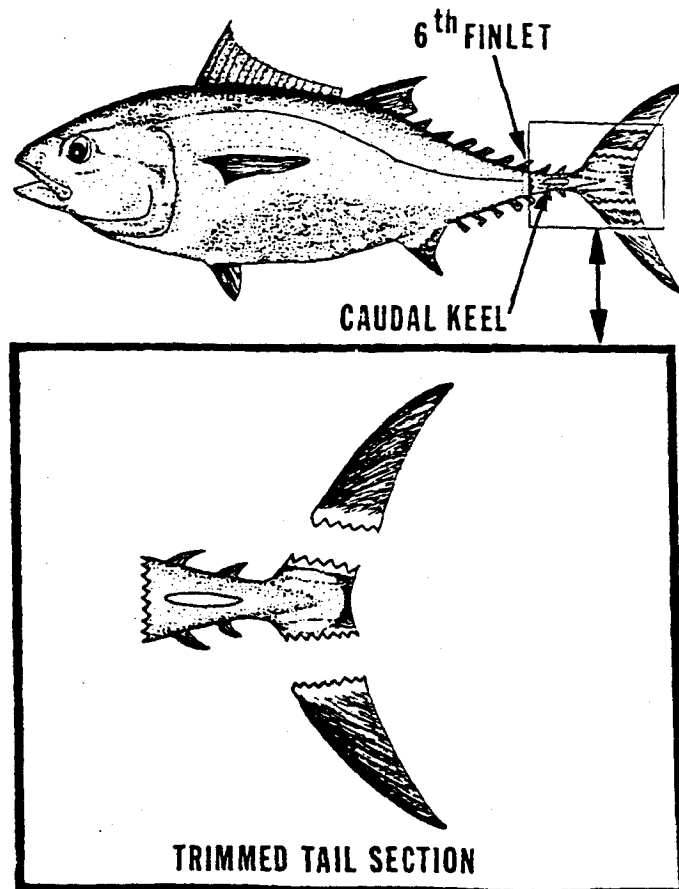


Figure 4 - Removing the caudal peduncle (containing vertebrae) from Atlantic bluefin tuna for age and growth studies. The head (containing otoliths) should also be saved by cutting behind the gill covers and fork length taken in inches or centimeters by measuring from the tip of the nose to the fork of the tail.

Shipping Samples

It is possible that funds can be made available for reimbursement of costs incurred while providing these samples. However, clearance of these costs would have to be made in advance through the Miami Laboratory. Please contact us ANY TIME day or night (we will accept collect calls):

Dr. Eric Prince or Dennis Lee
National Marine Fisheries Service
Southeast Fisheries Center, Miami Lab
75 Virginia Beach Drive
Miami, Florida 33149

Phone (office) (305) 361-4248 commercial
or 361-4225 commercial
350-1248 FTS

Phone (home) (305) 598-0944
on weekends or after 5:00 pm

RECREATIONAL BILLFISH SURVEY

GULF OF MEXICO

Paul J. Pristas

In 1970, personnel at the NMFS Laboratory in Panama City, Florida, began a survey of the billfish recreational fishery by hiring personnel to conduct on-site interviews at key billfishing ports across the northern Gulf of Mexico. This is the 17th consecutive year of the survey, and cooperation from the fishing community has been excellent, with many clubs, tournaments, and individuals expending extra effort to report on fishing activity not covered by our field personnel. In appreciation for their cooperation, the season's results are summarized in a way that will hopefully benefit the fishing community. Major geographical areas and their respective ports are listed. For the northwestern Gulf, the area from the Texas-Louisiana border to Freeport, TX, comprises east Texas; Port O'Connor to Corpus Christi, TX, comprises central Texas; and Port Mansfield, TX, to the Mexican border comprises south Texas. Results of the survey for the northcentral and northeastern Gulf are reported by key billfishing ports.

Catch and Effort

The amount of trolling effort reported during the season was 25,951 hours (Table 4), an increase of 4 percent (1,046 hours) over 1986. However, this increase may be more indicative of our sampling effort than actual fishing effort, because we started sampling earlier in the 1987 season than in the 1986 season. Even though during both seasons we did not have a full complement of sampling personnel, the total effort recorded in 1987 was 13 percent above the average amount recorded during the previous 16 years. This amount of effort should therefore be a representative measure of the fishery.

Table 4. Hours trolled and billfishes raised (R), hooked (H), and boated/released (B/R) in the northern Gulf of Mexico 1987.

	Hours trolled	Blue marlin			White marlin			Sailfish			Swordfish			Spearfish			All Species Combined		
		R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R	R	H	B/R
Northeastern Gulf	13,063	424	360	114/63	513	379	111/117	37	32	16/4	1	1	1/0	0	0	0/0	975	772	242/184
St. Petersburg	1,699	33	30	15/0	20	20	7/0	12	11	8/0	0	0	0/0	0	0	0/0	65	61	40/0
Panama City	1,594	55	48	14/5	94	72	27/15	4	4	2/0	0	0	0/0	0	0	0/0	153	124	43/20
Destin	4,018	166	123	41/23	222	116	29/53	9	7	1/2	1	1	1/0	0	0	0/0	398	247	72/78
Pensacola	3,001	85	77	23/15	121	115	32/38	9	7	5/0	0	0	0/0	0	0	0/0	215	199	60/43
Mobile	2,751	85	82	21/20	56	56	16/21	3	3	0/2	0	0	0/0	0	0	0/0	144	141	37/43
Northcentral Gulf	9,283	337	278	60/86	192	131	31/55	1	1	1/0	0	0	0/0	0	0	0/0	530	410	93/141
South Pass	5,802	210	166	29/62	97	59	14/24	1	1	1/0	0	0	0/0	0	0	0/0	308	226	44/86
Grand Isle	3,481	127	112	31/24	95	72	18/31	0	0	0/0	0	0	0/0	0	0	0/0	222	184	49/55
Northeastern Gulf	3,605	107	103	41/21	187	177	88/42	69	65	46/6	0	0	0/0	0	0	0/0	363	345	175/69
East Texas	390	16	16	8/5	8	8	7/0	1	1	1/0	0	0	0/0	0	0	0/0	25	25	16/5
Central Texas	2,359	53	50	20/7	162	153	70/40	44	42	30/5	0	0	0/0	0	0	0/0	259	245	120/52
South Texas	856	38	37	13/9	17	16	11/2	24	22	15/1	0	0	0/0	0	0	0/0	79	75	39/12
Total all areas	25,951	868	741	215/170	892	687	231/214	107	98	63/10	1	1	1/0	0	0	0/0	1,868	1,527	510/394

During the season, 993 billfishes were reported caught (boated or released) while trolling, and 45 percent (444 fishes) of these were released (Tables 4 and 5). This was a considerable increase over the previous 3 years, during which 34 percent (1986), 26 percent (1985) and 32 percent (1984) of the catches were reported as released. These results are indicative of an overall trend towards conservation of the resource, as anglers continue to release fishes not wanted for mounting or food. In the northcentral Gulf, releases outnumber boated billfish: 60 percent (141) of the catches were released compared to 40 percent (95) being boated. Nearly half (46 percent) of the catches were released in the northeastern Gulf, and almost one third (30 percent) were released in the northwestern Gulf. By species, blue marlin accounted for 42 percent (414 fish), white marlin for 50 percent (497 fish), and sailfish for 8 percent (81 fish) of the reported billfish catches. Forty-four percent (184 fish) of the blue marlin were released, while 50 percent (250 fish) of the white marlin and 12 percent (10 fish) of the sailfish were released.

Table 5. Numbers of billfishes reported as boated or released (/) with no accompanying data on fishing hours in the northern Gulf of Mexico, 1987.

	Number					All species combined
	Blue marlin	White marlin	Sailfish	Swordfish	Spearfish	
Northeast Gulf	7/7	11/31	3/0	0	0	21/38
St. Petersburg	0	0	0	0	0	0
Panama City	0	0	0	0	0	0
Destin	4/0	5/0	3/0	0	0	12/0
Pensacola	3/7	6/31	0	0	0	9/38
Mobile	0	0	0	0	0	0
Northcentral Gulf	2/0	0	0	0	0	2/0
South Pass	0	0	0	0	0	0
Grand Isle	0	0	0	0	0	0
Western Louisiana	2/0	0	0	0	0	2/0
Northwestern Gulf	6/7	5/5	5/0	0	0	16/12
East Texas	4/1	0	0	0	0	4/1
Central Texas	0/2	2/0	4/0	0	0	6/2
South Texas	2/4	3/5	1/0	0	0	6/9
Total all areas	15/14	16/36	8/0	0	0	39/50

Hook-per-unit-effort (HPUE) is our preferred measure to estimate fishing success and is defined as the number of billfish hooked per hour of trolling. Figure 5 shows the HPUE for marlins and sailfish recorded during the 17 years of this study. The HPUE (0.029) for blue marlin has remained about the same during the past 4 years. The rate continues to remain above the 17-year average (0.027) and indicates a certain amount of stability in the fishery during this time period. The HPUE for blue marlin in the three areas of the Gulf were nearly equal (Table 4), with the northcentral Gulf HPUE (0.030) slightly higher than the northeastern rate (0.028) and the northwestern rate (0.029).

The HPUE (0.026) for white marlin decreased slightly (4 percent) from 1986 (Fig. 5). White marlin HPUE was below the 17 year average (0.041) for the past 3 years, and has been generally declining during the last 5 years. Anglers in the northwestern Gulf experienced the highest HPUE rate (0.049) in 1987 (Table 4). In 1986, anglers in the northwestern Gulf experienced the greatest increase in HPUE (43 percent) compared to the previous season, even though the northeastern Gulf had the highest HPUE (0.040) that year. This season the HPUE (0.029) for white marlin in the northeastern Gulf decreased 28 percent from 1986, while in the northcentral Gulf, the HPUE for white marlin decreased 13 percent (0.014 vs. 0.016) from the previous season.

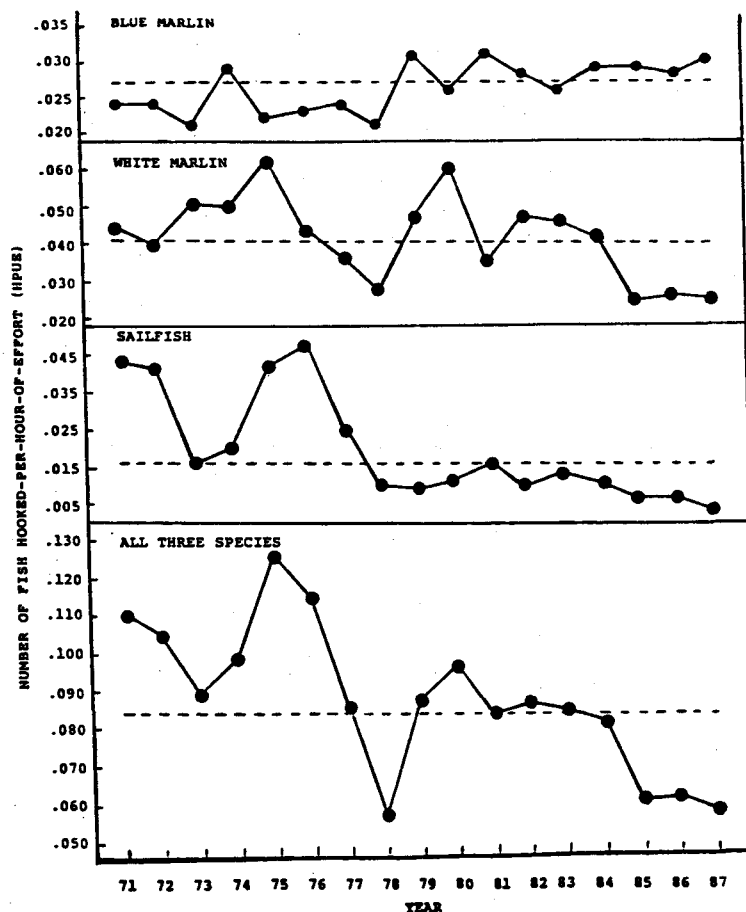


Figure 5 -Number of billfishes hooked-per-hour-of-effort (HPUE) in the northern Gulf of Mexico, 1971-1987. Dashed line indicates 17-year average of each category.

Sailfish HPUE decreased 43 percent in 1987 compared to 1986, and was the lowest on record (Fig. 5). The yearly HPUE for sailfish has remained below or at the accumulative yearly average for the past 10 years. Since the peak HPUE (0.048) in 1976, there has been a general decline in the apparent availability of this species to the sport fishery in the northern Gulf. The 1987 HPUE for sailfish decreased in two (northcentral and northwestern) of the three Gulf areas and remained the same in the other (northeastern) area compared to the preceding season.

During the 1987 season, the HPUE (0.059) for marlins and sailfish combined decreased 5 percent from the rate (0.062) in 1986, and almost equaled the record low of (0.058) in 1978 (Fig. 5). The northwestern Gulf (Table 4) was the only area in which an increase (0.095 vs. 0.084) occurred compared to the previous year. The northeastern Gulf experienced a 6 percent decrease (0.059 vs. 0.063), while the northcentral Gulf experienced an 8 percent increase (0.044 vs. 0.048). Since 1980, a declining trend in HPUE of billfishes (all species combined) has been apparent in the northern Gulf.

Whenever possible, data on driftfishing and livebait fishing were recorded in conjunction with trolling effort. These activities generally occur infrequently and, because of a different target species or fishing method, are not included in this report's catch rate analyses. To document these activities, however, we have included fishing effort and catches (including releases) in this report. In 1987, 376 hours of driftfishing were reported, which was 136 hours (57 percent) more than reported in 1986. However, only three swordfish were taken while driftfishing compared to nine the preceding year. Eighty-three percent of the total effort and all three catches were recorded in the northeastern Gulf. The northcentral and northwestern areas accounted for 15 percent and 2 percent of the effort, respectively. Only 53 hours of livebait fishing were reported during the season, all in the northwestern Gulf. Two blue marlin were reported boated in conjunction with this fishing activity.

Size Composition

Measurements (weight, length) were made, whenever possible, on billfishes brought into port. For documentation, weight data for fishes caught while trolling, driftfishing, and livebaiting are summarized in Table 6 and shown in Figure 6. The yearly average weights of marlins and sailfish, as well as, the 17-yr accumulative average weight of landings for each species are given. Recent weight data are affected by the minimum size regulations that have been imposed at many fishing events. These regulations have the overall affect of increasing the average size of the landings and likely had a significant influence on these results in 1986.

In contrast to the preceding 2 years when the largest marlins were reported from the northeastern Gulf, the largest (703.5 lb/319.8 kg) blue marlin and white marlin (100.0lb/45.5 kg) were recorded in the northwestern Gulf (Table 6). The largest (85.4 lb/38.9 kg) sailfish was also recorded in the northwestern Gulf, in contrast to 1986, when the largest sailfish was reported in the northeastern Gulf. Compared to preceding years, the average weight for blue marlin increased considerably in 1987 (Fig. 6), most likely reflecting the minimum size regulations mandatory during many fishing tournaments. The blue marlin average weight (289.4 lb/131.6 kg) in 1987 was almost 33.0 lb (15.0 kg) above the 17-yr average weight (256.5 lb/116.6 kg). Although many fishing events have a minimum size restriction for

white marlin, the average weight (53.5 lb/24.3 kg) in 1987 increased only slightly compared to 1986 and was only 0.5 lb (.02 kg) above the 17-yr average (Fig. 6). For sailfish, this was the second consecutive year in which the average weight decreased from the previous season (Fig. 6). However, this season's average weight (43.5 lb/19.8 kg) was 1.0 lb (0.5 kg) heavier than the 17-yr average weight and may not reflect the minimum size regulations some tournaments imposed for this species -- sailfish are basically infrequently caught in the Gulf and are generally not the directed target of most billfishing activity.

Table 6. Weights (lb/kg) of billfishes recorded in conjunction with fishing effort in the northern Gulf of Mexico 1987.

	St. Petersburg	Panama City	Destin	Pensacola	Mobile	South Pass	Grand Isle	East Texas	Central Texas	South Texas	All Areas
Blue marlin											
Largest	499.0/226.8	413.7/118.0	589.5/268.0	646.5/295.2	551.0/250.5	682.0/310.0	525.3/238.8	703.5/319.8	665.4/302.5	406.5/184.8	703.5/319.7
Smallest	206.0/ 93.6	122.5/ 55.7	86.4/ 37.1	125.2/ 56.9	112.0/ 50.9	78.7/ 35.8	141.0/ 64.1	120.0/ 54.5	66.3/ 30.1	123.5/ 56.1	66.3/ 30.1
Average	323.7/147.1	247.3/112.5	296.5/134.8	320.7/145.8	321.4/146.1	315.3/142.3	241.9/110.0	299.9/136.3	265.3/120.6	256.2/116.5	289.4/131.5
White marlin											
Largest	61.0/ 27.7	71.2/ 32.4	74.4/ 33.8	73.0/ 33.2	74.8/ 34.0	83.2/ 37.8	78.2/ 35.5	74.0/ 33.6	100.0/ 45.5	64.3/ 29.2	100.0/ 45.5
Smallest	43.0/ 19.6	38.0/ 17.3	41.0/ 18.6	44.3/ 20.2	47.5/ 21.6	44.8/ 20.4	34.5/ 15.7	36.5/ 16.6	8.0/ 3.6	40.0/ 18.2	8.0/ 3.6
Average	51.4/ 23.4	61.1/ 27.8	53.4/ 24.3	53.8/ 24.5	57.9/ 26.3	56.3/ 25.6	53.8/ 24.5	51.9/ 23.6	50.9/ 23.1	51.1/ 23.2	53.5/ 24.3
Sailfish											
Largest	55.0/ 25.0	59.2/ 26.9	39.3/ 17.9	60.5/ 27.5		0 34.0/ 15.5		0 55.5/ 25.2	85.4/ 38.8	53.2/ 24.2	85.4/ 38.8
Smallest	27.0/ 12.3	44.3/ 20.1	39.3/ 17.9	6.2/ 2.8		0 34.0/ 15.5		0 55.5/ 25.2	25.0/ 11.4	3.8/ 1.7	3.8/ 1.7
Average	42.8/ 19.5	51.8/ 23.5	39.3/ 17.9	39.4/ 17.9		0 34.0/ 15.5		0 55.5/ 25.2	46.0/ 20.9	39.2/ 17.8	43.5/ 19.8
Swordfish											
Largest	0	0	65.5/ 29.8	0	5.5/ 2.5	0	0	0	0	0	65.5/ 29.8
Smallest	0	0	9.4/ 4.3	0	5.5/ 2.5	0	0	0	0	0	5.5/ 2.5
Average	0	0	32.8/ 14.9	0	5.5/ 2.5	0	0	0	0	0	26.0/ 11.8

*No spearfish were reported landed during the season in the northern Gulf of Mexico in 1987.

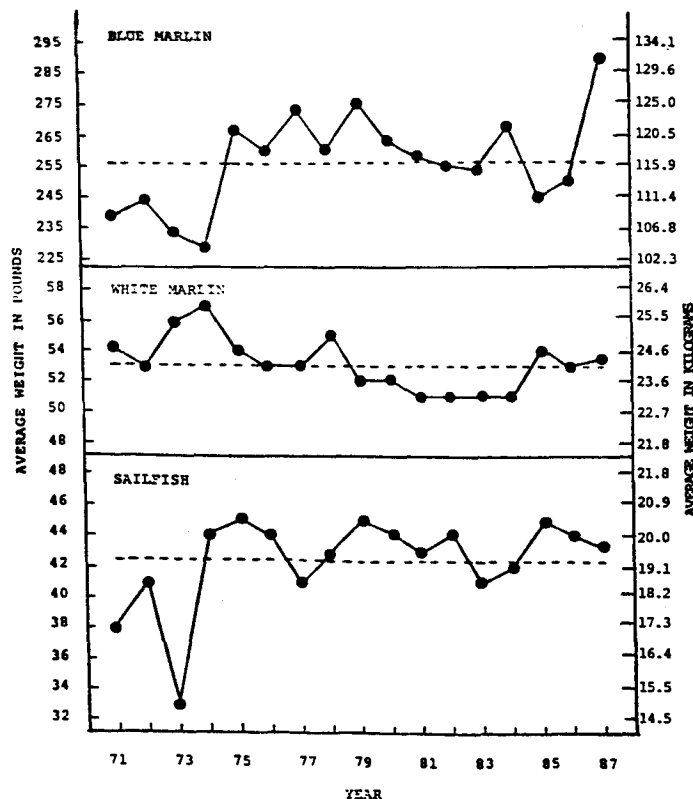


Figure 6 -Average weight(lb/kg) of billfishes in the northern Gulf of Mexico, 1971-1987. Dashed lines indicate 17-year average for each species

Bait Preference

Data collected on various baits used in trolling for billfishes and the resulting hook rates are summarized in Table 7. We assume striking at a bait is our best indicator of feeding activity and use HPUE as a measure of this rate. However, we recognize other factors may be involved. In 1987, trolling with dead baits only and artificial baits (lures) only decreased 26 and 0.4 percent, respectively, compared to 1986. Trolling with live baits only, and natural and artificial baits simultaneously increased 161 and 30 percent, respectively, from 1986. The use of artificial baits only was the predominant method 87 percent of the time. Artificial and natural baits were used simultaneously 9 percent of the time, dead baits only were used 3 percent of the time, and live baits were used only 1 percent. The use of dead baits only resulted in the highest hook rate (0.097) in the northern Gulf and in two (northeastern and northwestern) of the three areas. In the northcentral Gulf, artificial baits only were used almost exclusively. Fishing with the other baits or bait combinations was so infrequent that a valid comparison could not be made. When both natural and artificial baits were trolled at the same time, it was of interest that artificial baits had the higher HPUE in two of the three areas and for the entire northern Gulf.

Table 7. Hours trolled and numbers of billfishes hooked-per-unit-of-effort (HPUE) with various baits fished in the northern Gulf of Mexico, 1987.

	Dead bait only		Live bait only		Artificial bait only		Both simultaneously		
	Hours trolled	HPUE	Hours trolled	HPUE	Hours trolled	HPUE	Hours trolled	Nat. HPUE	Art. HPUE
Northeastern Gulf	323	0.074	237	0.042	10,761	0.059	1,742	0.016	0.044
Northcentral Gulf	2	0	15	0	9,257	0.044	9	0	0
Northwestern Gulf	404	0.116	116	0.112	2,644	0.05	434	0.028	0.058
All three areas	729	0.097	368	0.063	22,662	0.057	2,185	0.018	0.047

Fishing Areas

One of the most frequent questions encountered during the survey was "Where was the action?" Figures 7-9 are provided as a general guide to show where the fishing activity and results occurred. Three of four major tournaments off the west coast of Florida, near St. Petersburg, were surveyed this season. However, offshore charts for this area were not available in time for these surveys and, consequently, fishing activity for this region is not shown. Squares outlined in heavy black lines represent areas in which 10 hours or more of trolling effort were recorded. The numbers of billfishes raised-per-hour-of-trolling are given with indices of low, mid, and high abundances. Blank squares indicate that no fishes were raised.

Figure 7 shows reported fishing activity for the northeastern Gulf. As in the previous two seasons, some infrequent fishing activity was reported south of our chart's boundary (28°30'N lat) when "good blue water" could not be located closer inshore. Both the area fished and the percentage of that area in which billfishes were raised declined compared to 1986. In 1987, the area fished decreased 10 percent and the "successful" (i.e., squares with raised fishes) fishing areas decreased 7 percent from 1986. However, the percentages of high value and mid value squares increased 5 percent and 8 percent, respectively, while the percentage of low value squares decreased 17 percent from 1986. Anglers apparently enjoyed "better" fishing closer inshore this season, as 50 percent of the high value squares was north of 29°10'N latitude, in contrast to the occurrence of all of the high value squares south of this latitude in 1986.

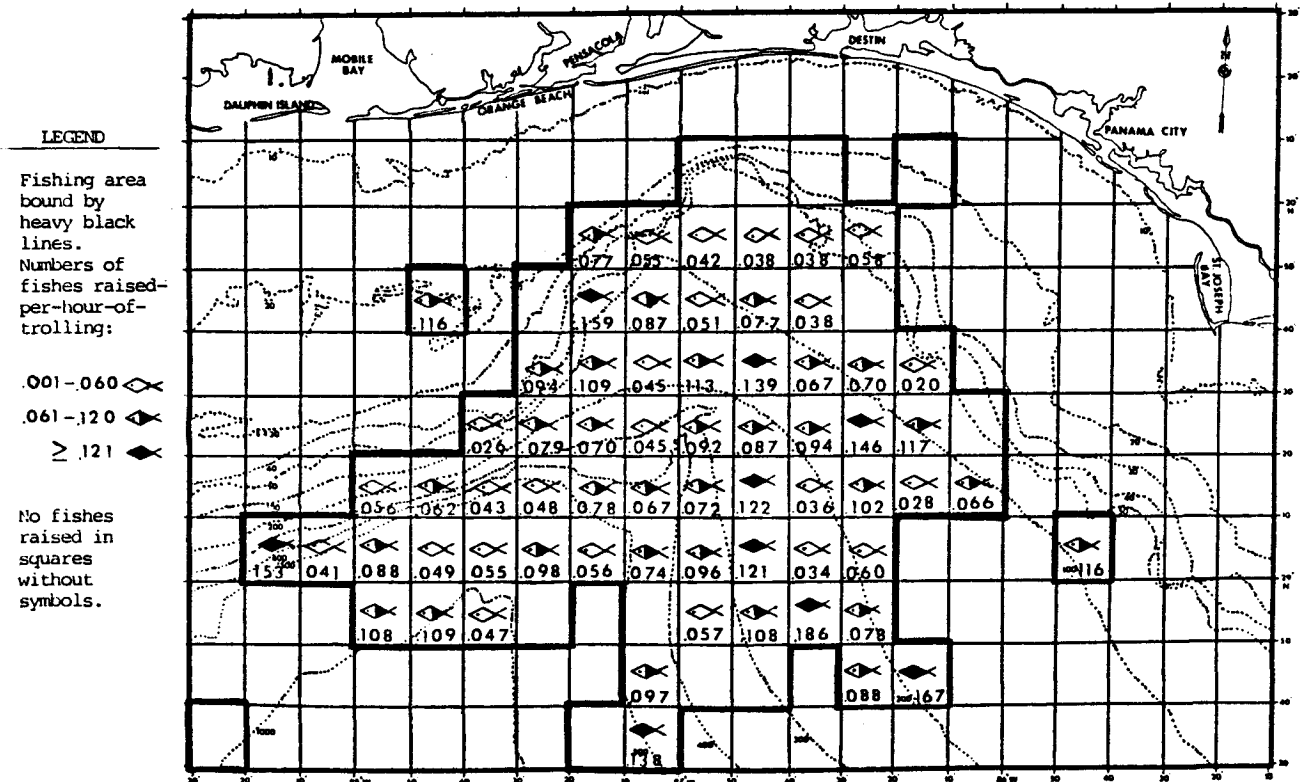


Figure 7 -Numbers of billfishes raised-per-hour-of-trolling in the northeastern Gulf of Mexico by 10-min squares, 1987.

The fishing activity for the northcentral Gulf is indicated in Figure 8. During the season, fishing occurred in an area similar in size to the 1986 area fished. The two high value squares occurred in areas that had comparatively little recorded

effort (<30 hours). As mentioned earlier, there was an 8 percent decrease in HPUE for the northcentral Gulf. The high percentage (68 percent) of low value squares this year, compared to the 28 percent of low value squares in 1986, is also indicative of a decrease in fishing success. It appears that billfishes were not as abundant and not as evenly distributed in the northcentral Gulf in 1987 as they were in 1986.

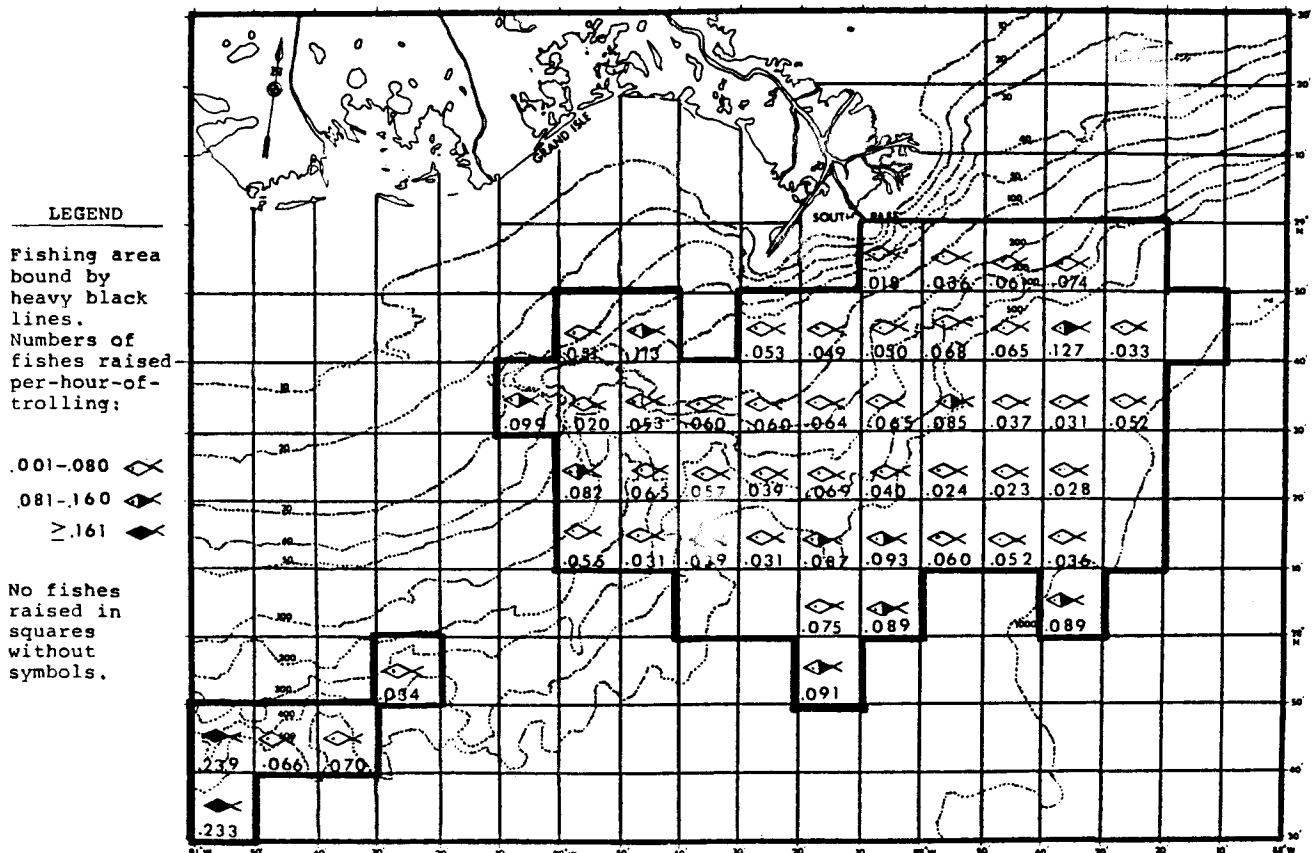


Figure 8 -Numbers of billfishes raised-per-hour-of-trolling in the northcentral Gulf of Mexico by 10-min squares, 1987.

The fishing activity for the northwestern Gulf is given in Figure 9. Although we did not have a port sampler located in south Texas, reporting by local volunteers and data collections by a NMFS fishery reporting specialist provided reports on billfishing activity from this area. A 21 percent decrease was reported for the northwestern Gulf area fished in 1987 (61 squares) compared to 1986 (48 squares). Not having a port sampler in south Texas during the season affected the survey. For example, compared to 1986, the percentage decrease in areas fished for south Texas (i.e., south of 27°N latitude) was almost twice (30 percent vs. 17 percent) the percentage decrease reported for areas fished farther north. Although the northwestern Gulf was the only area that experienced a higher

HPUE (Table 7) in 1987 compared to 1986, the percentages of high and mid value squares decreased 3 percent and 24 percent, respectively, from the 1986 percentages. Correspondingly, the percentage of low value squares in the northwestern Gulf increased from 44 to 63 percent, while the percentage of blank squares increased from 8 percent to 17 percent from 1986 to 1987. The increased HPUE values over a smaller fishing area in conjunction with a decrease in the percentages of high and mid value squares, indicate that billfishes may have been more concentrated in localized areas during the 1987 season than they were the previous year.

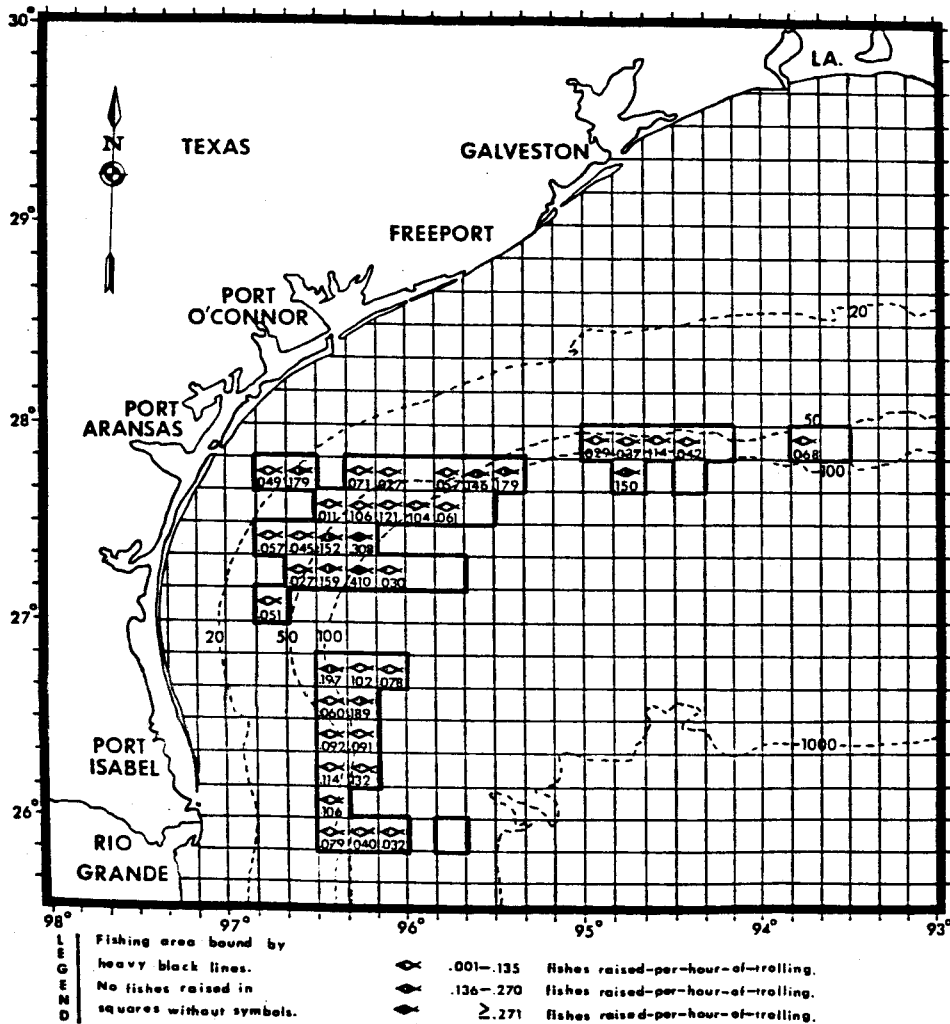


Figure 9—Numbers of billfishes raised-per-hour-of-trolling in the northwestern Gulf of Mexico by 10-min squares, 1987.

Related Observations

1. The first reported catch of a billfish in 1987 came from the crew of the "Defense Rests." On January 1, they brought a 362.0 lb (164.6 kg) blue marlin into South Padre Island, TX.

2. Two "Grand Slams" (i.e., catches of a blue marlin, white marlin, and sailfish in a one-day trip) were recorded during the season. On August 1, the crew of the "Blues Chaser" reported tagging and releasing a blue marlin and catching two white marlin (45.8 lb/20.8 kg) and 60.4 lb/27.5 kg) and one sailfish (33.8 lb/15.4 kg) during the Texas International Fishing Tournament, South Padre Island, TX. On September 12, the crew of the "Yellow Rose" reported releasing a blue marlin and a white marlin, and brought in a 57.0 lb (25.9 kg) white marlin and a 48.0 lb (21.8 kg) pound sailfish to Port Aransas, TX.

Acknowledgments

Cooperation and support from the recreational fishing community are vital to the success of the billfish survey. Through direct and indirect financial support, recreational fishery constituents provided the means for the successful completion of this survey in times of reduced budget and manpower. I deeply appreciate the assistance given by the following tournaments: Bay Point International Tournament, Panama City, FL; Blue Marlin Classic Tournament, Peridido Key, FL; East Pass Towers Tournament, Destin, FL; Fort Walton Beach Sailfish Club, Ft. Walton Beach, FL; Golden Meadow Big Game Fishing Club, Golden Meadow, LA; Lower Alabama Wildgame Disorganized Tournament, Orange Beach, AL; Mobile Big Game Fishing Club, Mobile, AL; New Orleans Big Game Fishing Club, New Orleans, LA; and Pensacola Big Game Fishing Club, Port O'Connor, TX.

For their special efforts in the reporting of fishing activities, I sincerely thank the following individuals: George Ballard, Pensacola, FL; Kit Doncaster, Port Isabel, TX; Nancy Hanna, Pensacola, FL; Jim Hubbard, Houston, TX; Mary Rozier, Pensacola, FL; Teresa Rutherford, Pensacola, FL; Michael Sean Stuermer, Port Isabel, TX; and Betty Tubbs, San Benito, TX.

About 2,882 interviews were conducted by our 1987 samplers. For a job well done, I would like to thank the following port samplers: Anna Avrigian, Panama City, FL; Michael Denison, Port Aransas, TX; Myron Fischer, Grand Isle, LA; Richard Kersten, Destin, FL; Peggy Lane, Mobile, AL/Pensacola, FL; and Joe Yurt, South Pass, LA.

RECREATIONAL BILLFISH SURVEY

Western North Atlantic

Joseph P. Contillo

This is the 16th consecutive year that the Southeast Fisheries Center has conducted recreational billfish surveys in the western North Atlantic. This region is divided into four geographical areas: (1) East Coast of the United States (Maine-Georgia), (2) Florida east coast and Keys, (3) Bahamas, and (4) Caribbean Sea. Data were collected in the field this year by NMFS biologists and fishery reporting specialists, by State and University personnel, and by cooperating fishing clubs and tournament committees.

Data collected from these surveys included hours of fishing effort; the number of billfish (by species) hooked and caught; length, weight, and sex of landed fish; the types of bait used; and various environmental data associated with each fishing trip. Hook-per-unit-effort (HPUE) was calculated by dividing the number of billfish hooked by the number of hours spent fishing, and catch-per-unit-effort (CPUE) was calculated by dividing the number of billfish caught by the number of hours spent fishing. A fish recorded as caught can be one that is boated, released, or tagged. Calculations of HPUE and CPUE for different baits--natural (dead), artificial (lures), both trolled simultaneously, as well as live bait, are also discussed. A total of 53,881 hours of tournament fishing effort were documented for the western North Atlantic in 1987, compared to 36,527 hours of effort in 1986.

This year we obtained over 29,990 hours of billfish tournament fishing effort (compared to 10,090 hours in 1986) from sources outside the NMFS. This "volunteered data" is very valuable to our survey because it not only expands our coverage, which makes our survey much more comprehensive, but it also reduces our cost of operation. Our initial experience with receiving tournament information from outside sources in 1986 was very positive. This year's survey, however, documented the highest number of tournament fishing hours in the history of our sampling program, largely due to the inclusion of these data. We certainly encourage anyone affiliated with billfish tournaments in our study area (western North Atlantic) to contact NMFS Southeast Fisheries Center's Miami Laboratory if you would like to help. We thank all those who assisted us in the volunteer program this year (Table 8).

We observed an overall increase in the numbers of tournament caught billfish released and tagged/released in 1987 (Table 9). One of the more significant observations noted in this year's survey was the fact that, with very few exceptions, almost every billfish tournament we sampled this year had adopted some type of

Table 8. Tournament names, dates, locations, and contact persons for data voluntarily submitted to NMFS western North Atlantic billfish survey, 1987.

Tournament Name	Location	Dates	Dates Provided By
North/South Midwinter Sailfish	Palm Beach, FL	1/2/87-1/4/87	Clint Allen
Annual Islamorada Bartenders Open	Islamorada, FL	1/12/87	M. "Skippy" Pasteur
Holiday Isle Open Sailfish Tournament	Islamorada, FL	1/17/87-1/18/87	M. "Skippy" Pasteur
IBL - Palm Beach	Palm Beach, FL	1/22/87-1/24/87	Linda Baron
International Womens Fishing Association	Palm Beach, FL	1/28/87-1/30/87	Cathy Williams
40th Annual Ocean City Light Tackle Derby	Palm Beach, FL	2/03/87-2/06/87	J. Joseph Barse
Islamorada Ladies Sailfish Tournament	Islamorada, FL	2/04/87-2/05/87	Angie Moret/Carol Burdsall
Bertram-Hatteras-Ocean	Palm Beach, FL	2/19/87-2/21/87	Clint Allen
Bertram-Hatteras Shootout	Walkers Cay, Bahamas	4/02/87-4/04/87	Godfrey Waugh/ Morty Lopez
Walkers Cay Billfish (2nd Leg Bah Cha)	Walkers Cay, Bahamas	4/06/87-4/10/87	Godfrey Waugh
Bohicket-Seabrook Billfish	Charleston, SC	5/07/87-5/09/87	Don Hammond
Anglers Invitational	Club Cay, Bahamas	5/18/87-5/22/87	Jim McDonald
Georgetown Blue Marlin	Georgetown, SC	5/21/87-5/23/87	Don Hammond
4th Annual Treasure Cay International Billfish	Treasure Cay, Bahamas	5/25/87-5/29/87	Karen Roberts
Treasure Cay Championship (5th Leg Bah Cha)	Treasure Cay, Bahamas	6/02/87-6/05/87	Ginger Horn
Tolers Cove Open Billfish	Hilton Head, SC	6/26/87-6/27/87	Don Hammond
Ocean City White Marlin, Tuna & Mako Shark	Ocean City, MD	6/26/87-6/28/87	Ebna Hodgans
10th Annual White Marlin Open	Cape May, NJ	7/09/87-7/11/87	Cathy Barry
Martha's Vineyard White Marlin	Martha's Vineyard	7/15/87-7/17/87	Greg B. Skomal
Block Island Billfish	Block Island, RI	7/21/87-7/24/87	Harry Upton
1st Annual Ocean Owners	Cape May, NJ	7/24/87-7/26/87	Cathy Barry
Challenge Cup	Ocean City, MD	7/25/87-7/26/87	Ebna Hodgans
Nantucket Billfish	Nantucket, MS	7/27/87-7/31/87	Greg B. Skomal
Mid-Atlantic Handicap	Ocean City, MD	7/31/87-8/02/87	Ebna Hodgans
Manufacturers Marlin Roundup	Cape May, NJ	8/07/87-8/08/87	Cathy Barry
Marlin Mardi Gras-Fish For Life	Cape May, NJ	8/23/87-8/26/87	Cathy Barry
29th Annual White Marlin Open	Ocean City, MD	9/03/87-9/06/87	Ebna Hodgans
Ft. Lauderdale Semi-Annual Billfish Tournament	Ft. Lauderdale, FL	4/24/87-10/25/87	Stephanie Boyd
14th Annual DalGuercio /Tripod Sailfish	Duck Key, FL	11/11/87-11/14/87	M. "Skippy" Pasteur/ Bailey Bobbitt
20th Annual Bill King One Day Billfish	Marathon, FL	11/16/87	Bailey Bobbitt
30th Annual Key Colony Beach Sailfish	Key Colony Bch, FL	11/18/87-11/22/87	Bailey Bobbitt/ M. "Skippy" Pasteur
34th Annual Stuart Light Tackle Sailfish	Stuart, FL	12/09/87-12/13/87	Bill Sowden

release format. These regulations were usually in the form of minimum retention weights, but also included release or tag release options. Exceptions to these regulations included allowing the boating of a billfish if it was the first fish caught by the angler or if it was to be mounted. This reflects a concern for and willingness to conserve billfish on the part of tournament fishermen.

Table 9. Number of billfish (by species) hooked, boated, lost, released, and tagged by geographical area in the western North Atlantic, 1987.

Species	Florida			
	U.S. East Coast	East Coast & Keys ¹	Pahamas	Caribbean
Blue Marlin				
Hooked	72	49	359	491
Boated	29	17	58	63
Lost	28	18	120	212
Released	13	7	147	168
Tagged	2	7	34	147
White Marlin				
Hooked	575	10	71	6
Boated	90	7	17	3
Lost	6	0	14	0
Released	312	2	33	0
Tagged	167	1	7	3
Sailfish				
Hooked	3	1703	41	0
Boated	1	134	9	0
Lost	1	68	5	0
Released	0	1207	24	0
Tagged	1	294	3	0
Overall				
Hooked	650	1762	471	497
Boated	120	158	84	66
Lost	35	86	139	213
Released	325	1216	204	60
Tagged	170	302	44	150

¹Includes data from the greater Daytona Beach Striking Fish Tournament and Pompano Beach Fishing Rodeo.

East Coast of the United States

For the first time since 1984, the east coast of the United States tournament data include information from Virginia Beach, VA, northward. Most of these data were voluntarily submitted by cooperating tournament personnel in the northeastern United States (Table 8). Biologists from NMFS sampled billfish tournaments held in North Carolina, while data from South Carolina were provided by the South Carolina Wildlife and Marine Resources Department.

A total of 12,907 hours of fishing effort was reported from the east coast of the United States (Maine-Georgia) in 1987. This represents a large increase in sampling over last years 2,834 hours of effort. Most of these data were reported as catch-per-unit-effort (CPUE) rather than HPUE. This means that only those billfish actually caught (boated, released or tagged) are counted statistically. Data involving HPUE are reported for those tournaments from which it is available (Table 10).

Table 10. Hooked-per-unit-effort (HPUE) of billfishes by species and geographical area recorded by NMFS recreational billfish surveys in the western North Atlantic in 1987.

Species	Florida			
	U.S. East Coast	East Coast & Keys	Bahamas	Caribbean
Blue Marlin	0.024 ¹	0.012 ²	0.026	0.107
White Marlin	0.007 ¹	0.000 ³	0.005	0.001
Sailfish	0.0021	0.045 ³	0.003	0.000
Overall	0.033 ¹	0.050 ³	0.034	0.109
Hours of Fishing Effort	1,760 ¹	6,047 ³	14,027	4,572

¹Data were from South Carolina only.

²Data were from Key West Blue Marlin and World Class Angler Billfish tournaments only.

³Data were from Key West Blue Marlin, World Class Angler Billfish, Palm Beach Masters, Islamorada Sailfish, Islamorada Bartenders Open, Holiday Isle Open and Islamorada Ladies Sailfish tournaments only.

Overall HPUE (all species combined) for 1987, calculated from 1,760 hours of fishing effort, was 0.033, which is an increase from last years' value of 0.028 (Table 10). The individual HPUE for blue marlin, white marlin, and sailfish are also shown in Table 10. Overall CPUE (all species combined) for the east coast of the United States in 1987 was 0.050, compared with 0.016 in 1986 and 0.025 in 1985. The previous 15 year average CPUE for the east coast of the United States (1972-86) is 0.059. The CPUE for blue marlin in 1987 was 0.003 compared with 0.006 reported in 1986 and 0.005 in 1985. White marlin CPUE was 0.044 in 1987, compared with 0.009 in 1986 and 0.019 in 1985. Sailfish CPUE values were not calculated because so few were reported caught.

The average weight of blue marlin caught off the east coast of the United States during our 1987 survey was 315.5 lb (143.4 kg) (Table 11). This was a substantial increase from last year (280.6 lb/127.6 kg). This increased average weight is not necessarily an indication that the fish are getting bigger, but more a reflection of the minimum retention weights which were adopted by many of the marlin tournaments for the first time in 1987. East coast blue marlin have had the highest overall average weights in our four sampling areas for 14 of the 16 years of the survey (Fig. 10). The largest blue marlin we measured in 1987 weighed 599.9 lb (272.7 kg). However, a 1,020 lb (463.6 kg) blue marlin was one of six over 700 lb (318.2 kg) blue marlin reported boated off Oregon Inlet, NC in August. The average weight of white marlin (55.5 lb/25.2 kg) was higher compared to last years average weight of 45.3 lb (20.6 kg). More than 100 blue and white marlin and sailfish were used to compute average weights for 1987, while 1986 average weights were calculated from only 19 individuals.

Table 11. Number, largest, smallest and average weights (lb/kg) of boated billfish by species (both sexes combined) and geographical area, recorded in western North Atlantic recreational billfish surveys, 1987.

Species	Florida			
	U.S. East Coast	East Coast & Keys ¹	Bahamas	Caribbean
Blue marlin				
Number Boated	29	17	58	63
Largest	599.0/272.3	520.0/236.4	768.0/349.1	705.0/320.5
Smallest	68.0/ 30.9	42.0/ 19.1	71.0/ 32.3	88.0/ 40.0
Average	315.5/143.4	183.7/ 83.5	303.5/138.0	266.7/121.2
White marlin				
Number Boated	90	7	17	3
Largest	115.0/ 52.3	96.0/ 43.6	94.0/ 42.7	60.0/ 27.3
Smallest	37.0/ 16.8	40.0/ 18.2	46.0/ 20.9	50.0/ 22.7
Average	55.5/ 25.2	58.6/ 26.6	54.9/ 25.0	53.8/ 24.5
Sailfish				
Number Boated	1	134	9	-
Largest	37.0/ 16.8	85.0/ 38.6	63.0/ 28.6	-
Smallest	37.0/ 16.8	5.0/ 2.3	16.0/ 7.3	-
Average	37.0/ 16.8	40.9/ 18.6	38.0/ 17.3	-

¹Includes data from Greater Daytona Beach Striking Fish Tournament and Pompano Beach Fishing Rodeo.

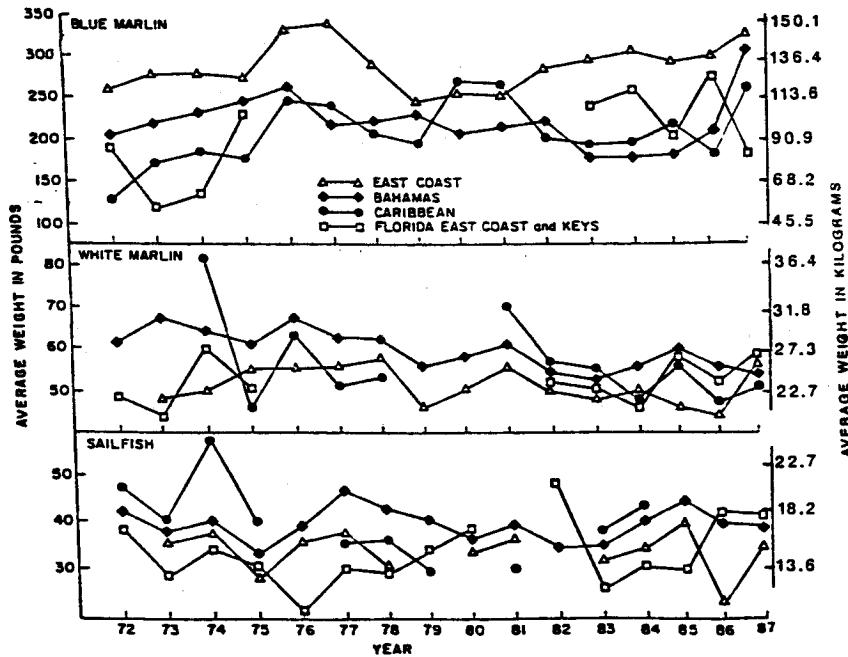


FIGURE 10 Average weights (lb/kg) of billfishes (both sexes combined) from the U.S. east coast (Δ), Bahamas (●), Caribbean (■), and Florida east coast and Keys (□), 1972-1986.

The Florida East Coast and Keys

The 22,375 hours of fishing effort sampled from the Florida east coast and Keys in 1987 represent a 27 percent increase over last year's 16,370 hours of effort, and is the most effort we have ever documented for this area in the 16 year history of our survey. Much of the data were provided by individuals outside NMFS, and we again thank all who helped in this effort (Table 8). Data from an additional 9,259 hours of fishing effort were not complete enough to be used in our catch/effort calculations, but are included in this years catch results summary (Table 9) and weight table (Table 11).

We documented 2,426 hours of effort from two marlin tournaments in 1987: the Key West Blue Marlin and the World Class Angler Billfish Tournaments. This amount of effort was about half of last year's total of 4,142 hours from four tournaments. Blue marlin HPUE for 1987 (0.012) was up slightly from last year (0.011). There were not enough data to calculate an HPUE for white marlin again this year, while HPUE for sailfish hooked during marlin tournaments was 0.008, up from 0.006 reported in 1986 (Table 10).

The average weight of all boated blue marlin sampled from the Florida east coast and Keys in 1987 was 183.7 lb (83.5 kg), which is a decrease from the 275.5 lb (125.2 kg) average reported in 1986 (Fig. 10). This average weight includes individuals from four billfish tournaments, two of which had 300 lb (136.5 kg) minimum retention weights for boated blue marlin, and two that had no minimum retention weights. An average weight of 395.7 lb (179.9 kg) was computed from the 2 tournaments with a 300 lb (136.4 kg) minimum weight, while two which had no minimum retention weights, resulted in an average weight of only 128.4 lb (58.4 kg). The largest blue marlin reported from this area in 1987 weighed 520 lb (236.4 kg) and was caught during the 6th annual Key West Blue Marlin Tournament.

The average weight of white marlin (58.6 lb/26.6 kg) increased from last year (54.6 lb/24.8 kg), while the average weight of sailfish (40.9 lb/18.6 kg) decreased slightly from the 41.9 lb (19.0 kg) average reported in 1986 (Table 11). The largest sailfish from our survey this year weighed 85.0 lb (39.6 kg); also a new tournament record) and was caught during the 22nd Annual Pompano Beach Fishing Rodeo, in May (Table 11).

We documented 19,950 hours of tournament fishing hours directed toward sailfish in 1987, which is a 39 percent increase in sampling effort from 1986. As in 1986, these data will, for the most part, be reported as CPUE, rather than HPUE. This means that in order for a sailfish to count statistically, it would have to be listed as caught (boated, released, or tagged). By using this approach, we have been able to include many more sailfish tournaments in our survey, and greatly expand our coverage by utilizing volunteered data. Sailfish HPUE is reported for those Florida east coast and Keys tournaments from which it is available (Table 10).

In 1986, we observed an increase in the use of live bait during sailfish tournaments along the Florida east coast and Keys. Most sailfish tournaments we sampled now permit the use of live bait. Some, like the Palm Beach Invitational Gold Cup Team Tournament, which permitted live bait for the first time in 1987, also allow bonus points for sailfish caught on dead bait.

In 1987, anglers spent 3,453 hours trolling dead bait for sailfish (compared to 3,748 hours in 1986) and caught 186 sailfish and one white marlin. The overall CPUE (all species combined) was 0.054, compared to last year's value of 0.060. A total of 16,947 hours of livebaiting effort (compared with 8,480 hours in 1986) was reported in 1987, resulting in 1,346 sailfish, 3 white marlin and 2 blue marlin being caught. Overall CPUE for billfish caught while livebaiting was 0.082, which is up considerably from the value (0.038) reported in 1986. An explanation of these results is given in the bait preference section.

Bahamas

A total of 14,027 hours of effort from 14 tournaments was documented in the Bahamas this year. Biologists from NMFS attended tournaments held in Bimini, Cat Cay, Chub Cay, and Grand Turk, while Aqualife biologist Godfrey Waugh, stationed at Walkers Cay, sampled tournaments held there. Karen Roberts and Ginger Horn provided tournament data from Treasure Cay.

Overall HPUE for all billfish species in the Bahamas in 1987 was 0.034 (Table 10) which, while up from last year's all time low of 0.023, is still below the previous 15 year average of 0.047. The HPUE for blue marlin (0.026), increased from last years all time low value of 0.015, while individual HPUE's for white marlin (0.005), and sailfish (0.003) were the same as those reported in 1986 (Table 10).

The minimum weights for tournament-caught billfish, which were established in the Bahamas for the first time in 1986, continued to influence both the numbers of billfish released (Table 9) and the overall average weights of boated billfish in 1987 (Table 11). All billfish tournaments we sampled in the Bahamas in 1987 had minimum retention weights for boated billfish. Although these varied according to individual tournament rules, most tournaments we sampled in 1987, including the Bahamas Billfish Championship Series, set minimum weights at 200 lb (90.9 kg) for blue marlin, 50 lb (22.7 kg) for white marlin, and 25 lb (11.4 kg) for sailfish.

The average weight for blue marlin boated in the Bahamas in 1987 was 303.5 lb (138 kg) (Table 11), which is an increase from the 1986 (with a 100 lb (45.5 kg) minimum) average of 222.8 lb (101.3 kg). This is the highest average weight for boated blue marlin that we have reported from the Bahamas in the 16 year history of our survey (Fig. 10). Again, this increased weight is not an indication that the fish are getting bigger, but rather a direct result of the increased minimum weight restrictions for

blue marlin boated at tournaments. Although this year's weight limits for white marlin and sailfish remained the same as last year's, average weights for white marlin (54.9 lb/25.0 kg) and sailfish (38.0 lb/17.3 kg) both decreased slightly from those reported in 1986 (Table 11). The largest blue marlin reported from our survey of the Bahamas in 1987 weighed 768.0 lb (349.1 kg) and was caught at Treasure Cay in May (Table 11).

We continued to observe an increase in the numbers of billfish released and tagged/released in the Bahamas in 1987. Of the 332 billfish reported caught in the Bahamas this year, 248 (75 percent) were released, and of these, 44 were tagged (Table 9). Last year, 51 percent of all tournament-caught billfish were released (23 tagged). Before the implementation of minimum weight restrictions in 1985, only 8 percent were released (one tagged).

Caribbean

A total of 4,572 hours of fishing effort from four tournaments was documented in 1987, which is a 19 percent increase over the 3,735 hours recorded in 1986. Biologist Marielle Brandon, from the U.S. Virgin Islands, Division of Fish and Wildlife, sampled two St. Thomas tournaments, while NMFS biologists from the Southeast Fisheries Center's Miami Laboratory attended billfish tournaments held in San Juan, Puerto Rico, and Virgin Gorda, British Virgin Islands.

The 1987 tournament fishing season in the Caribbean was generally regarded as one of the best in recent years. Several tournament records were set, including most blue marlin caught during a tournament (131) and from a single boat (7) during a single tournament day. Overall HPUE (0.019) from the Caribbean was the highest of all areas sampled again this year (Table 10). This is generally attributed to the high concentration of blue marlin in the area during the tournament season; white marlin and sailfish make up a minor portion of the catch (Table 9). The HPUE for blue marlin this year was 0.107, an increase from the 1986 HPUE of 0.079. The HPUE for white marlin (0.001) was the same as the value reported in 1986. There was not enough data to calculate an HPUE for sailfish this year, as was the case in 1986.

Two of the longest running billfish tournaments in the Caribbean, the (24th) Annual July 4th Open Tournament and the (34th) Annual San Juan International Billfish Tournament, established a 200 lb (190.9kg) minimum weight for blue marlin for the first time in 1987. The average weight of blue marlin from our 1987 Caribbean survey was 266.7 lb (121.2kg Table 11) and is the highest overall average weight for blue marlin reported from this area in the entire 16 year history of our survey (Fig. 10). The average weight of white marlin this year was 53.2 lb (24.2kg), an increase from 47.7 lb (21.7kg) reported in 1986. There were no sailfish reported boated in 1987. The largest blue marlin boated during our Caribbean survey weighed 705 lb (320.5kg), and was caught during the San Juan International Tournament in September (Table 11).

This year, we observed an increase in the numbers of billfish released and tagged/released in the Caribbean. Of the 293 billfish (mostly blue marlin) reported caught in 1987, 218 (74 percent) were released. Of these, 150 were tagged (Table 9). In 1986, 155 billfish were reported caught and 41 (26 percent) were released, with 35 tagged.

HPUE For All Areas Combined

When the data from all areas are combined, a yearly HPUE value can be calculated for each species for the entire western North Atlantic region. Figure 11 illustrates the yearly fluctuations in HPUE for marlins and sailfish over the past 16 years of our survey. Blue marlin and sailfish had higher HPUE values in 1987 than in 1986, while white marlin HPUE decreased slightly (Fig. 11). The largest increase in HPUE was shown for blue marlin (0.025 in 1986 to 0.040 in 1987). This is the highest HPUE we have reported for blue marlin since our survey began in 1972, and reflects the increased HPUE values reported for blue marlin from all four geographical areas in 1987 (Table 10). Although HPUE for white marlin decreased in 1987, we feel that the low number of hours of effort (1,760 hours) sampled along the east coast of the United States this year, which is our principle source of white marlin statistics, makes these data questionable. The east coast CPUE data for 1987, which was derived from 12,907 hours of fishing effort, is probably more reflective of any trends in the white marlin fishery. Overall, total HPUE (all species, all areas) increased from the all time low of 0.036 reported in 1986 to 0.050 in 1987. This value, while still below the 16 year mean (0.095), is the first increase in overall HPUE that we have reported since 1983.

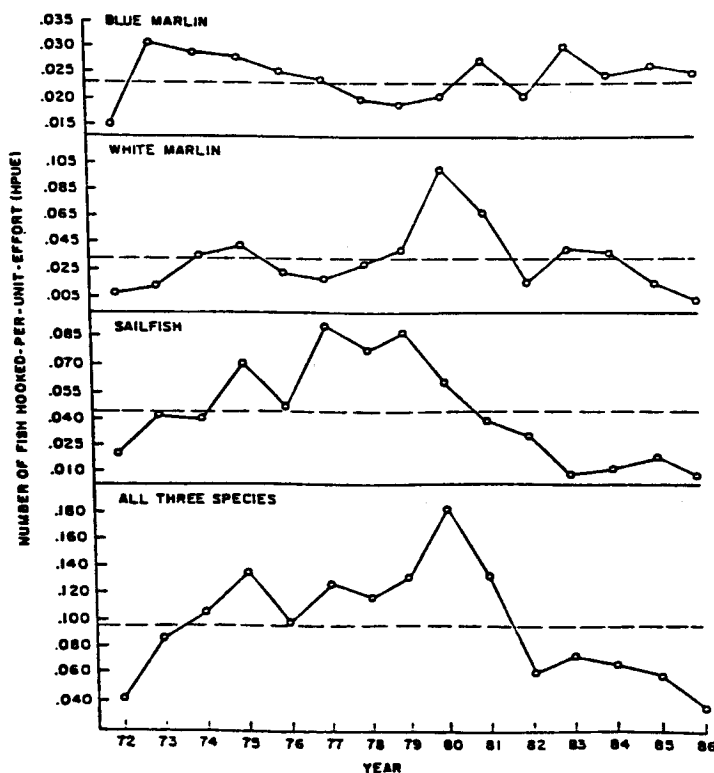


FIGURE 11. Number of billfish hooked-per-unit-effort (HPUE) in the four geographical areas of the western Atlantic, 1972-1986. Dashed line indicates 15 year average for each category.

Bait Preference

The effectiveness of each bait type, in terms of HPUE and CPUE for billfish (all species combined), in the four geographical areas of our survey, are given in Table 12. Bait categories include natural (dead), artificial (lures), and both (natural and artificial) trolled simultaneously. An additional section is included again this year comparing the CPUE values for live and dead bait from sailfish tournaments held along the Florida east coast and Keys (Table 12).

Table 12. Hours trolled, hook-per-unit-effort (HPUE), catch-per-unit-effort (CPUE), and percent fish caught for three types of trolling baits (natural, artificial and both simultaneously), and to a lesser extent, live bait, in the four geographical areas of the western North Atlantic, 1987. Live and dead bait information for the Florida east coast and Keys is also included.

Bait	Hours Fished	HPUE	CPUE	Percent Fish Caught
<u>United States East Coast¹</u>				
Natural	882	0.055	0.023	42
Artificial	419	0.033	0.007	21
Both Simultaneously	1,271	0.028	0.013	46
Live	16	0.250	0.063	25
<u>Bahamas</u>				
Natural	5,243	0.037	0.027	73
Artificial	2,136	0.026	0.017	65
Both Simultaneously	813	0.033	0.012	36
Live	83	0.030	0.000	0
<u>Caribbean</u>				
Natural	108	0.157	0.111	71
Artificial	600	0.193	0.095	49
Both Simultaneously	748	0.184	0.110	60
<u>Florida East Coast & Keys¹</u>				
Natural	198	0.051	0.030	59
Artificial	1,644	0.018	0.007	39
Both Simultaneously	315	0.013	0.013	100
<u>Florida East Coast & Keys²</u>				
Live	16,497	-	0.082	-
Dead	3,453	-	0.054	-

¹Data from Key West Blue Marlin and World Class Angler Billfish Tournaments only.

²Data from Florida east coast & Keys sailfish tournaments only.

In general, natural baits were most popular (in terms of hours fished) with anglers fishing in the Bahamas, while Florida east coast and Keys anglers fished more hours using artificials than naturals or both simultaneously. Anglers fishing along the east coast of the United States and Caribbean fished most of their hours trolling both simultaneously. In 1987, we documented for the first time live baiting effort in the Bahamas and the east coast of the United States, but the low amount of hours of effort makes these results unreliable (Table 12).

The 1987 survey indicates that natural baits are most effective in hooking billfish along the east coast of the United States, Florida east coast and Keys, and in the Bahamas. Artificial baits hooked more billfish in the Caribbean. As in

past years, trolling both baits (naturals and artificials) simultaneously was generally most effective in hooking blue marlin in the Caribbean. This has been attributed to the methods of preserving and rigging natural baits in the Caribbean, which can be trolled at the higher speeds normally associated with lure fishing. Of the 204 billfish reported hooked (from all four geographical areas) while trolling both baits simultaneously, 125 (61 percent) took artificial baits, while 79 (39 percent) hit the natural baits. Natural baits were generally more effective than artificials in catching billfish once they were hooked.

Last year we presented CPUE statistics for live bait and dead bait used during sailfish tournaments along the Florida east coast and Keys, which indicated that trolling dead baits (and to a lesser extent) artificials was more effective than live baiting in catching sailfish.

The 1987 data are more representative of the actual fishing effort than that reported in 1986, and includes the important data for live bait from Palm Beach, FL, which was absent from our 1986 survey (Appendix Table I). This year, we documented almost twice the hours of live baiting effort (16,497 hours) as reported in 1986 (8,480 hours), while dead bait effort decreased from 3,748 hours in 1986 to 3,453 hours in 1987 (Table 12).

The live bait CPUE value for sailfish caught along the Florida east coast and Keys in 1987 was 0.082, compared with 0.038 reported in 1986. Dead bait CPUE for 1987 was 0.054 compared with 0.060 reported in 1987.

Acknowledgments

The success of this program is dependent upon the information collected from recreational fishermen. A great deal of gratitude is extended to all of the anglers, captains, and crew members, as well as tournament directors and officials, for their cooperation and support.

In addition to those people already mentioned, I especially thank the following organizations and individuals for their support: the Bimini Big Game Fishing Club, Biminis Blue Water Ltd., the Cat Cay Club, the Chub Cay Club, Club Nautico de San Juan, Bill Allan, Art Barton, Al and Tamea Behrendt, Cathy Berry, Bailey Bobbitt, Bob and Barbara Brandon, Don deSylva, Larry Dukehart, Edna Hodgens, Ginger Horn, Bill Kelley, M. "Skippy" Pasteur, Dick Raffo, Mary Jo Spence, Dade Thornton, Godfrey Waugh and Norm Wood.

COOPERATIVE GAME FISH TAGGING PROGRAM

Edwin L. Scott and Joseph Tashiro

Program cooperators and scientists tagged and released 8,115 fish of 33 species in 1987 in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea. A total of 4,627 billfish were tagged and released: 1,986 sailfish, 1,341 blue marlin, 1,021 white marlin, and 279 swordfish. Also, 355 tunas were tagged and released: 190 yellowfin, 65 bluefin, and 100 miscellaneous tunas. Recreational fishermen tagged and released 587 tarpon. There were 1,169 king mackerel tagged and released: 1,026 by scientists and 143 by recreational fishermen. There were 168 red drum tagged and released by recreational fishermen. In addition, 1,209 fish were tagged and released of 20 miscellaneous species.

Sailfish

Of the 1,986 sailfish tagged and released in 1987, 1,953 were by recreational fishermen and 33 by commercial fishermen. As in past years, the east coast of Florida was the leading tagging area with 1,120 releases, 576 off Cancun, Mexico, 148 off Cozumel, Mexico, 43 in the Bahamas, 42 off Venezuela, 20 in the Gulf of Mexico, 12 off the west coast of Africa, 9 off the U. S. Virgin Islands, 6 off the Middle Atlantic States (North Carolina to New Jersey), 4 off Vitoria, Brazil, South America, 3 off Puerto Rico, and 1 each off the Cayman Islands, Cuba, and the Dominican Republic.

There were 39 sailfish recaptures in 1987: 32 by recreational fishermen and 7 by commercial fishermen (Appendix Table II). Of the 16 recaptures of fish released off Palm Beach, FL, 10 were recaptured in the same general area of release: 5 off the Florida Keys and 1 off Bimini, Bahamas. There were 6 recaptures of sailfish released in the Florida Keys: 4 in the same general area of release and 2 off Palm Beach. Four sailfish were tagged off Miami, FL; 1 was recaptured in the same area of release, 2 in the Florida Keys, and 1 off Ft. Pierce, FL. There were 2 recaptures of sailfish released off Cancun, 1 in the same general area of release and 1 off the coast of Venezuela. There were 2 recaptures of sailfish released off Cozumel: 1 in the same general area of release and 1 off Cancun. This is the first recapture of a sailfish from Cozumel recaptured in Cancun. Because Cozumel and Cancun are concurrent fisheries, we would expect more recaptures of fish released in Cozumel to be recaptured in Cancun and vice versa. Until this recapture, however, this has not been the case. We expect that as tagging in these areas increases, we will learn more about this fishery.

A sailfish tagged and released by a commercial fisherman in the Straits of Florida was recaptured south of the Dominican

Republic. Another sailfish tagged off Ft. Pierce, was recaptured off Palm Beach, FL. A sailfish tagged off Cape Canaveral, FL, was recaptured off Palm Beach. A sailfish tagged off Eluthera, Bahamas, was recaptured off Cape Canaveral. A sailfish tagged off La Guaira, Venezuela, was recaptured in the same general area of release. There were 2 sailfish recaptures from 1986 reported in 1987; 1 was released off Palm Beach and recaptured in the same general area. The other sailfish was tagged off La Guaira, and was recaptured in the same area. There were 2 recaptures reported that did not have release data.

Twenty-five sailfish were recaptured that had been at large for less than 1 year: 7 for 1-2 years, 2 for 3 years, and 1 for over 3 years. The 2 sailfish that were recaptured in 1986 were at large for less than a year.

The longest distance traveled by a sailfish in 1987 was one tagged off Cancun, and recaptured off the coast of Venezuela, a distance of about 1,500 miles.

White Marlin

There were 1,021 white marlin tagged and released in 1987, a 14 percent increase over last year when 876 were tagged. Recreational fishermen tagged 865 white marlin, commercial fishermen tagged 136, NMFS observers aboard Japanese longline vessels tagged 20. The leading tagging area was the Gulf of Mexico with 374 releases, Two hundred fifty-two were tagged off the area south of Nantucket, MA, 178 off the Middle Atlantic States, 73 off La Guaira, 48 in the Bahamas, 32 off St. Thomas, U.S. Virgin Islands, 14 off the east coast of Florida, 9 off Puerto Rico, 9 off Cancun, 6 off Cozumel, 4 off the Dominican Republic, 4 off Bermuda, 2 off the Cayman Islands, and 16 in the western North Atlantic.

There were 17 white marlin recaptures reported in 1987 (Appendix Table II). Nine were recaptured from releases off the Middle Atlantic States: all were recaptured in the same general area of release. There were 2 recaptures from releases in the northeast Gulf of Mexico: 1 was recaptured in the same general area of release and 1 was recaptured in the Straits of Florida. One recapture was reported from each of the following areas: Nantucket, (recaptured near the same area of release): Walkers Cay, Bahamas (recaptured northeast of Oregon Inlet, NC) and Jacksonville, FL (recaptured off Havana, Cuba). There were two 1986 recaptures reported in 1987; both were tagged off La Guaira and were recaptured in the same general area of release. There was one recapture reported that did not have release information available.

There were 8 white marlin at large for less than 1 year, 1 for 1-2 years, 2 for 2-3 years, 1 for 4-5 years, 1 for 5-6 years, and 1 for 6 years. The 2 recaptures from 1986 were at large for

less than 1 year. The longest distance traveled by a white marlin was from a release in the northeast Gulf of Mexico, and recaptured northeast of Grand Bahama, Bahamas, a distance of about 800 miles.

Blue Marlin

There were 1,341 blue marlin tagged and released in 1987: 1,272 by recreational fishermen, 66 by commercial fishermen, and 3 by NMFS observers aboard Japanese fishing vessels. This is the most blue marlin tagged in a single year, and was due, in part, to the amount of blue marlin tagged off St. Thomas, U.S. Virgin Islands, where 767 blue marlin were tagged and released. Other areas of tagging were: 198 in the northeast Gulf of Mexico, 133 in the Bahamas, 62 off Puerto Rico, 43 off the Dominican Republic, 43 off the east coast of Florida, 39 off the Azore Islands, Portugal, 17 off the Middle Atlantic States, 9 off Bermuda, 8 off Jamaica, 8 off the Cayman Islands, 6 off the Ivory Coast, West Africa, 3 off La Guaira, 2 in the western north Atlantic, 2 in the Pacific Ocean, and 1 off Cozumel.

A significant increase in tagging occurred off the Azores in 1987. This number will increase in 1988 as more recreational fishermen from the United States fish in this area.

There were 2 blue marlin recaptured in 1987 (Appendix Table II). A blue marlin tagged and released by a recreational fishermen off St. Thomas was recaptured 186 days later by a Venezuelan longliner off Curacao, Netherlands Antilles. A blue marlin tagged and released off La Guaira, by a recreational fishermen, was recaptured 636 days later by another recreational fishermen off San Juan.

Swordfish

There were 279 swordfish tagged and released in 1987: 164 by commercial fishermen, 111 by observers aboard Japanese longline vessels, and 4 by recreational fishermen. Number and areas of fish tagged were: 145 in the western North Atlantic, 36 in the Gulf of Mexico, 30 off the U.S. Virgin Islands, 21 off the east coast of Florida, 21 off the Bahamas, 12 off the northeast coast of the United States, 10 off the Middle Atlantic States, and 4 off the Canadian coast.

There were 4 swordfish recaptures in 1987 (Appendix Table II); all of the releases and recaptures were made by American longliners. There were 3 recaptures from the northern Gulf of Mexico releases: 1 was recaptured in the same area of release, 1 was recaptured off Ft. Pierce, and the other was recaptured off the northern Bahamas. The remaining recapture was from a swordfish tagged and released southeast of Charleston, NC, and was recaptured in the same general area of release. Three of the fish were at large for less than 1 year, and the other fish was at large for 1 year and 9 months. The longest distance traveled

by a swordfish was by a fish tagged and released in the northeastern Gulf of Mexico, and was recaptured almost 600 miles east-southeast of Charleston.

Bluefin Tuna

There were 65 bluefin tagged and released in 1987: 40 were tagged and released off the Middle Atlantic States, 17 in the Gulf of Mexico, 6 in the northeastern United States (New York to Cape Cod, MA), 1 off the east coast of Florida, and 1 in the western North Atlantic (over 200 miles east of the Middle Atlantic States). Recreational fishermen tagged and released 45, and commercial fishermen tagged and released 20.

There were 10 bluefin recaptures in 1987 (Appendix Table II). Commercial fishermen reported 6 recaptures and recreational fishermen, 4. There were 6 recaptures from bluefin tagged off the Middle Atlantic States; all were recaptured in the northeastern United States. Two bluefin were recaptured in the same general area of release: 1 was recaptured southeast of its release point, and 1 was recaptured in Cape Cod Bay. Two bluefin were at large for less than 1 year, 1 for 1-2 years, 1 for 2-3 years, 2 for 6-7 years, 3 for 7-8 years, and 1 for over 10 years. The longest distance traveled by a bluefin was from a release southeast of Ocean City, MD, and recaptured in Cape Cod Bay, a distance of over 350 miles.

Skeletal structures from 5 of the bluefin tuna recaptured after more than 7 years at large were saved for age and growth analysis.

Other Tunas

There were 190 yellowfin tuna tagged and released in 1987. Recreational fishermen tagged and released 166, and commercial fishermen tagged and released 24. The major tagging area was off the Middle Atlantic States, where 128 yellowfin were tagged: 42 in the northern Gulf of Mexico, 6 in the Bahamas, 4 off Bermuda, 4 off the east coast of Florida, 4 off the U.S. Virgin Islands, and 2 off the Georges Bank, southeast of Nantucket, MA.

There were 8 yellowfin tuna recaptures reported in 1987. The first 2 transatlantic migrations of yellowfin tuna occurred this year. A yellowfin tagged and released on September 12, 1985, at lat 40°01'N, long 68°50'W, or about 270 east of Point Pleasant, NJ, was recaptured 534 days later at lat 27°25'N, long 15°40'W (Canary Islands). The yellowfin weighed 20 to 25 lb (9.1 to 11.4 kg) at release and at recapture weighed 63.5 lb (28.9 kg). A yellowfin tagged and released at lat 28°15'N, long 90°00'W, (Grand Isle, LA) was recaptured 814 days later at lat 03°28'N, long 20°24'W, about 750 miles southeast of Monrovia, Liberia, West Africa. Weight information was not available at release; at recapture the fish weighed 140 lb (63.6 kg). There

were 3 recaptures from releases off the Middle Atlantic States: 2 were recaptured in the same general area of release; and 1 was recaptured off Montauk, NY. One other yellowfin from a Gulf of Mexico release, was recaptured in the same general area of release. There were 2 yellowfin at large for less than 1 year, 1 for 1-2 years, and 3 for 2-3 years.

There were 2 yellowfin tuna recaptures from 1986 reported in 1987; 1 was released at Montauk, and was recaptured 59 days later off the Hudson Canyon. The other recapture was from a yellowfin released off Grande Isle, LA and recaptured 714 days later, about 60 miles from its release point.

There were 15 blackfin tuna tagged and released in 1987: 8 off the northern coast of Bermuda, 4 off the east coast of Florida, 2 off the Middle Atlantic States, and 1 off Bimini, Bahamas. There were 7 blackfin tuna recaptures reported in 1987; all had been tagged, released, and recaptured off the north coast of Bermuda.

There were 40 albacore tuna tagged and released: 37 off the Middle Atlantic States, 2 off the east coast of Florida, and 1 off Montauk. No albacore were recaptured.

Tarpon

There were 587 tarpon tagged and released in 1987. The majority of the releases (344) were off the west coast of Florida: 183 were released off the Florida Keys and Miami, 58 in the northern Gulf of Mexico, 1 off northern Florida, and 1 off Bermuda.

There were 7 tarpon recaptured in 1987. Five of the recaptures were from tarpon tagged and released at Boca Grande, FL: 3 were recaptured in the same area of release, 1 was recaptured in the lower Florida Keys, and the remaining recapture was the first occurrence of a tarpon migrating from the Gulf of Mexico to the Atlantic coast. This tarpon was tagged at Boca Grande, FL, on June 5, 1987, and was recaptured 107 days later at Bulls Bay, Charleston. The tarpon was 73-1/4 inches (186.1 cm) long and weighed 107 lbs (48.6 kg). This is not the first long migration of an adult tarpon. On June 6, 1985, another tarpon tagged off Boca Grande was recaptured 422 days later at Southeast Pass in the Mississippi River. This fish weighed 126 lbs (57.3 kg) and had been at large for 420 days. There was a recapture of a tarpon tagged and released off the Bahia Honda Bridge, Florida Keys, and recaptured off Hutchinson Island, FL. A tarpon tagged and released at Chassahowitzka, FL, was recaptured 9 days later in the same area of release. There were 6 tarpon at large for less than 1 year and 1 at large for 718 days.

King Mackerel And Red Drum

Red drum and king mackerel were added to the target species in 1986. In this report only the recreational associated releases and recaptures will be discussed. We will issue a report of scientific taggings at a later date.

There were 143 king mackerel tagged and released in 1987 by recreational fishermen: 101 were tagged off Texas and 42 off the east coast of Florida. There were 41 recaptures by recreational fishermen; 38 of these recaptures were from mackerels tagged by scientists and 3 tagged by recreational fishermen. Of the 3 recreational recaptures, 1 was recovered off the coast of Texas, 1 off Florida, and 1 off North Carolina. All recaptures were made in the same general area of release. Of the 38 recaptures of kingfish tagged and released by scientists, 22 were off Ft. Pierce, 9 of these were recaptured in the same general area of release and 13 were recaptured off the coast of North Carolina. There were 8 recaptures of kingfish tagged off Beaufort, NC: 6 were recaptured in the same general area of release, and 2 were recaptured off Palm Beach, FL. One kingfish tagged off St. Augustine, FL, was recaptured off Ft. Pierce. There were 7 recaptures from kingfish tagged off Panama City, FL; all were recaptured in the same general area of release.

There were 168 red drum tagged by recreational fishermen in 1987. The majority of these (150) were tagged in the northern Gulf of Mexico and 18 off the east coast of Florida. There were 40 recaptures by recreational fishermen from kingfish tagged by scientific staff: 20 off the coast of Texas, and 15 off the coast of Louisiana. All were recaptured off Louisiana and in the same general area of release.

Bait Box

For 7 years we have examined the tagging data concerning the use of live bait and its possible effect on the mortality of sailfish. In 1981, we had data on 175 releases that provided information on bait use. By 1987, data providing information of bait use increased to 837 reports. During this period the use of live bait has shown a dramatic increase. This increase is probably due to improved reporting techniques (Appendix Table II). Forty-three percent reported using live bait in 1981; anglers reporting the use of live bait increased to 87 percent by 1987. From 1981 to 1982, the recapture rate was greater for dead bait (Table 13). In 1983, the recapture rate was the same for both baits, and for the period 1984-87, the recapture rates have been greater for live bait. This pattern continues to support our contention, based on tagging data, that there does not appear to be increased mortality of sailfish tagged and released using live bait compared to dead bait.

Table 13. Use of dead and live bait listed by years.

	1981		1982		1983		1984		1985		1986		1987	
	DB*	LB*	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB	DB	LB
Released	100	75	174	236	229	285	253	372	218	624	111	726	111	788
Recaptured	17	5	14	8	4	6	4	13	3	10	2	26	2	27
Recapture Rate	0.17	0.07	0.08	0.03	0.02	0.02	0.02	0.03	0.01	0.02	0.02	0.04	0.02	0.03

*DB = dead bait, LB = live bait.

Tagging Awards

In 1987, six major conservation organizations sponsored special awards for the captains who were responsible for tagging and releasing the most blue marlin, white marlin, sailfish, bluefin tuna, yellowfin tuna and bigeye tuna, and king mackerel. The Cooperative Game Fish Tagging Program sponsors a trophy to the commercial captain who tags the most fish.

The blue marlin trophy, sponsored by the National Coalition for Marine Conservation, was won by Captains O.B. O'Bryan and Dan Timmons; each tagged and released 51 blue marlin. Captain O'Bryan (Pompano Beach, FL), operates the "Knightlines", a 60 foot Jim Smith. He fished 58 days at St. Thomas and caught 85 blue marlin out of 193 strikes.

Captain Timmons (Ft. Lauderdale, FL) has been fishing since 1970 and now operates the "Beastmaster."

The white marlin trophy, sponsored by The Billfish Foundation, was also won by Captain Timmons. He tagged and released 44 white marlin.

Captain Brad Simonds tagged and released 155 sailfish to win the sailfish trophy, sponsored by the Sport Fishing Institute. He is currently the captain of the "MissGuided".

Captain Robin Lehman tagged and released 8 bluefin tuna to win the bluefin tuna trophy, sponsored by the International Game Fish Association. Captain Lehman, of New York City, NY, is a film producer by profession.

The yellowfin and bigeye tuna trophy, sponsored by AFTCO Manufacturing Company, Irvine, CA, was won by Captain Pete Barrett of Brick, NJ. He tagged and released 27 yellowfin tuna. Captain Barrett is also a well known writer and lecturer in the northeast.

The trophy for king mackerel, sponsored by the Florida League of Anglers, was won by Captain Mark Puryear of Humble, TX. He tagged and released 59 king mackerel off the Texas Coast. Captain Puryear started fishing in 1982, and in 1987 he started fishing professionally.

The Cooperative Game Fish Tagging Program trophy is given to the commercial captain who tags and releases the most fish. The trophy was won by Captain Wade Bailey of Santa Rosa, FL, who tagged and released 144 billfish and tuna. Captain Bailey and crew operate the tuna longliner "Heavy Set," in the northern Gulf of Mexico. Captain Bailey tags and releases all billfish caught.

The CGFTP extends its congratulations to the winning captains and to the sponsoring organizations for their effort and cooperation in the conservation of our great natural resources. We extend our appreciation to the anglers and other program cooperators.

Tagging Box

We began to acknowledge participants of the CGFTP in 1976. Program participants are acknowledged again this year (see Tables 14 and 15). We cannot give participants credit for fish tagged and released unless we receive the tag-release cards. We send you acknowledgment cards as a check to ensure that we have received the release cards and to inform participants that we have received the tagging information. Due to operational changes, tag acknowledgement cards will only be sent to the captains. If a name and address is not listed for a captain, acknowledgment cards will be sent to the anglers. If you want an acknowledgment card to be sent to both angler and captain, please note this in the remarks section on the release report card. If you do not receive an acknowledgement card, please inform us as soon as possible. The tag-release cards are occasionally lost in the mail, and if we can find out about the loss before too much time passes, there may be a possibility that we can work together and retrieve the lost data. We also think that it would be a good idea to keep a log of tagging information so that you can provide us with accurate information in case the tag release card is lost in the mail.

If you wish to tag fish in the Pacific Ocean or to tag fish not in our program, please contact the following:

Sharks - Atlantic Ocean
 Cooperative Shark Tagging Program
 Mr. Jack Casey
 NOAA/NMFS
 Northeast Fisheries Center
 Narragansett Laboratory
 P. O. Box 522A
 Narragansett, RI 02882

Unrestricted Species (angler pays nominal fee for tags)
 American Littoral Society Fish Tagging Program
 American Littoral Society
 NOAA/NMFS
 Sandy Hook Laboratory
 Highlands, NJ 02882

Table 14. Captains who made outstanding contributions to CGTP in 1987 by assisting in the tagging of 10 or more blue marlin (BM), white marlin (WM), sailfish (SF), tunas (TN), and swordfish (SW). Angler column signifies fish tagged by captains while fishing as anglers and they are included in the total.

Captains	Species					Total	Tagged as Angler
	BM	WM	SF	SW	TN		
Brad Simonds	43	4	154	0	0	202	0
Wade Bailey	24	74	2	15	29	144	0
Albert E. Wadsworth	0	0	138	0	0	138	0
Dan Timmons	51	44	18	0	0	113	0
Al Johnston, IV	17	18	4	55	8	102	0
Robert "Bobby" Kolb	0	0	74	0	0	74	0
Skeet Warren	31	25	10	0	0	66	0
Ray Walters	50	5	4	0	0	59	0
Ross Clark	23	1	34	0	0	58	0
Hank Halliger	9	14	13	10	10	56	0
Randy Jandersee	46	0	6	0	0	52	0
O. B. O'Bryan	51	1	0	0	0	52	0
James Roberts	2	21	28	0	0	51	2
John B. Dudas	0	1	44	0	0	45	0
Rafael De La Parra	0	1	41	0	0	42	0
Bob Grant	38	1	1	0	0	40	1
Richard Sachs	35	3	0	0	0	38	0
Joe Lopez	34	3	0	0	0	37	0
John Sabonis	15	2	0	0	0	37	0
John Stranz	11	0	1	23	2	37	0
Bob Tautz	31	0	5	0	0	36	0
Fred Riffe	1	29	5	0	0	35	0
Pete Barrett	0	0	0	0	34	34	6
Mark Montoya	28	5	0	0	0	33	1
Russell "Rusty" Albury	16	0	15	0	0	31	3
Donald Merten	29	0	0	1	0	30	0
Larry Nickal	0	27	0	0	1	28	0
Tommy Sealy	0	3	24	0	0	27	0
Frank "Skip" Smith	27	0	0	0	0	27	0
Randolph "Bouncer" Smith	0	0	27	0	0	27	0
George Brooks	0	4	22	0	0	26	1
Carlos Diego	0	0	26	0	0	26	0
Ben Orgain	4	6	9	6	0	25	0
Oscar Acevedo Young	0	0	25	0	0	25	0
Timothy J. Hyde	0	18	6	0	0	24	2
Carlos Austin	0	0	23	0	0	23	1
Timothy B. Lecky	0	22	0	0	1	23	0
Fred Rushin	0	5	7	0	11	23	8
R. H. "Dick" Peeples	14	1	7	0	0	22	1
Robin Lerman	0	0	0	0	20	20	0
Bill Noll	0	0	20	0	0	20	1
Dave Reagle	1	12	1	0	6	20	0
Robert Edsberg	0	0	19	0	0	19	0
Abner Konick	0	0	19	0	0	19	0
Mike Lemon	17	1	1	0	0	19	0
Jimbo Barnes	5	0	13	0	0	18	1
Phillip Cacciatore	3	13	2	0	0	18	3
Bill Gamber	12	0	6	0	0	18	0
Don Hamilton	18	0	0	0	0	18	0
Andy Potter	12	1	4	0	0	17	0
Melvin "Red" Bailey	9	3	4	0	0	16	0
Rick Defeo	16	0	0	0	0	16	0
William C. Harrison	16	0	0	0	0	16	0
Rick Oyle	0	1	15	0	0	16	0
Tod Habib	0	1	14	0	0	15	0
Paul Johnson	1	1	13	0	0	15	1
Ron Mitchem	0	0	15	0	0	15	5
Louis Pilotti	15	0	0	0	0	15	0
Frank Pitale	0	0	15	0	0	15	0
Bill Bechtold	0	14	0	0	0	14	0
Brian Manchester	0	0	14	0	0	14	7
Jerry Woodard	0	8	6	0	0	14	0
Morris Bevis	10	0	3	0	0	13	0
Lester D. Collier	6	3	0	0	4	13	1
Allen De Silva	8	2	0	0	3	13	2
Gene Frost	0	1	12	0	0	13	0
Jim Hawthorn	0	0	13	0	0	13	5
Joseph "Spike" Herbert	12	1	0	0	0	13	0
John R. "Hoppy" Hopwood	1	0	12	0	0	13	0
Waldo A. Roberts, Jr.	0	3	0	0	10	13	4
Ted Sorg	0	1	12	0	0	13	0
Gregory Warhan	2	8	2	1	0	13	0
Mel Williams	13	0	0	0	0	13	0
Gilbert Burchell	0	12	0	0	0	12	0
Dick Deason	0	1	11	0	0	12	0
Herb Evans	0	1	0	8	3	12	0
Brent G. Meadors	0	0	0	0	12	12	1
Al Marcier	0	0	1	10	1	12	0
Al Petrosky	12	0	0	0	0	12	0
Thomas Zsak	0	0	12	0	0	12	0
Bill Ogden	0	11	0	0	0	11	0
Jack Dooley	0	11	0	0	0	11	0
George Ellison	2	2	7	0	0	11	0
Thomas J. Hutchison	1	1	9	0	0	11	0
Steve Kaiser	0	11	0	0	0	11	5
Mitch Pierson	0	0	11	0	0	11	0
Sunny Sebaugh	0	0	0	11	0	11	1
B. R. "Benji" Stansky	2	7	1	0	1	11	0
Glenn Curder	0	5	3	2	0	10	0
Bob Hollinger	0	0	10	0	0	10	0
William Lewis	0	1	0	0	9	10	2
Al Nielson	10	0	0	0	0	10	0
Carl Roby	3	7	0	0	0	10	0
Robert E. Rowan	0	0	0	0	10	10	0
Nick Smith	0	0	10	0	0	10	5

Table 15. Anglers who made outstanding contributions to CGFTP in 1987 by assisting in the tagging of 10 or more blue marlin (BM), white marlin (WM), sailfish (SF), tunas (TN), and swordfish (SW). Captain column signifies fish tagged by anglers while fishing as captains and they are included in the total.

Anglers	Species					Total	Tagged as Captain
	BM	WM	SF	SW	TN		
Mark Shackelford	0	0	126	0	0	126	0
Russ Hensley	39	23	13	0	0	75	0
Charles E. Bouchard	0	0	52	0	0	52	24
J. Richard Jeck	0	0	19	0	24	43	1
Katie Riffe	2	27	3	0	0	32	0
Earl Burke	0	2	25	0	0	27	0
Thomas O. Cornell	2	5	18	0	0	25	0
Roland Dixon	0	0	24	0	0	24	0
Ralph Christiansen	18	1	0	0	0	19	0
Anette M. "Maudi" Lopez	5	7	2	0	0	14	0
Ronald L. Ellis	0	0	13	0	0	13	0
Harvey Lamm	0	11	2	0	0	13	0
Carlos Arruza	12	0	0	0	0	12	0
Donald S. Leas, III	0	0	12	0	0	12	0
Adrienne Sorg	0	1	11	0	0	12	0
Lyman B. Dickerson	6	0	5	0	0	11	0
Linda Hopkins	0	0	11	0	0	11	0
William Spolar	9	1	1	0	0	11	0
Carlos Bernard	0	6	4	0	0	10	0
Jack Braden	0	0	10	0	0	10	2
Humberto Donato	9	1	0	0	0	10	3
Paul Novicki	0	10	0	0	0	10	0
John Stadler	4	0	6	0	0	10	0

Billfishes - Pacific Ocean
 Cooperative Marine Game Fish Tagging Program
 Mr. James L. Squire, Jr.
 NOAA/NMFS
 La Jolla Laboratory
 P. O. Box 271
 La Jolla, CA 92027

All Species Recognized by IGFA - Australia
 New South Wales State Fisheries
 Box N211
 Grosventor St. Post Office
 Sydney, NSW 2000, Australia

Appendix Table I. Tournaments and docks sampled by oceanic gamefish personnel or by personnel from cooperating agencies, 1987.

Tournament	Location	Dates	Hours Fished	Numbers					
				BM	WM	SF	SW	BFT	YFT
3rd Annual North-South Midwinter Billfish	Palm Beach, FL	Jan 2-Jan 4	1903:23 ²	0	2 ¹	332 ¹	0	0	0
25th Annual Masters Invitational Sailfish	Palm Beach, FL	Jan 12-Jan 17	915:08	0	0	77	0	0	0
6th Annual Islamorada Bartenders Open	Islamorada, FL	Jan 12-Jan 12	225:00 ²	0	0	18	0	0	0
6th Annual Lighthouse Point Sailfish	Ft. Lauderdale, FL	Jan 15-Jan 16	567:00	0	1 ¹	11 ¹	0	0	0
1st Annual Holiday Isle Open Sailfish	Islamorada, FL	Jan 17-Jan 18	281:00 ²	0	0	30	0	0	0
15th Annual Invitational Gold Cup Team	Palm Beach, FL	Jan 21-Jan 24	139:00	0	0	8 ¹	0	0	0
	Livebait		880:45	0	0	151 ¹	0	0	0
IBL Palm Beach	Palm Beach, FL	Jan 22-Jan 24	432:00 ²	0	0	109 ¹	0	0	0
International Womens Fishing Association	Palm Beach, FL	Jan 28-Jan 30	175:34	0	0	9 ¹	0	0	0
South Padre Island	Port Isabel, TX	Feb 3-May 13	78:20	5	0	0	0	0	1
40th Annual Ocean City Light Tackle Derby	Palm Beach, FL	Feb 4-Feb 6	162:00 ²	0	0	66 ¹	0	0	0
3rd Annual Islamorada Ladies Sailfish	Islamorada, FL	Feb 4-Feb 5	670:00	0	0	39	0	0	0
1st Annual Bertram-Hatteras-Ocean Billfish	Palm Beach, FL	Feb 19-Feb 21	48:00	0	0	4 ¹	0	0	0
	Livebait		1091:40	0	0	196 ¹	0	0	0
8th Annual Bacardi Billfish	Bimini, Bahamas	Mar 9-Mar 13	952:45	25	7	0	0	0	0
	Livebait		4:30	0	0	0	0	0	0
Ernest Hemingway Billfish (Bah. Cha) ³	Bimini, Bahamas	Mar 23-Mar 27	1348:28	34	14	0	0	0	0
Bertram-Hatteras Shootout	Bimini, Bahamas	Apr 2-Apr 4	1211:22	30	15	2	0	0	6
5th Annual Greater Miami Billfish Tournament ⁵	Miami, FL	Apr 3-Apr 5	2072:05 ²	2	0	123 ¹	0	0	0
17th Annual Walkers Cay Billfish (Bah. Cha) ³	Walkers Cay, Bahamas	Apr 6-Apr 10	2324:00	53	9	1	0	0	27
44th Ft. Lauderdale Semi-Annual Billfish ⁵	Ft. Lauderdale, FL	Apr 24-Nov 25	5626:01	0	1 ¹	160 ¹	0	0	0
Annual His and Hers Billfish	Chub Cay, Bahamas	Apr 27-May 1	588:00	9	2	7	0	0	0
Bimini Championship (Bah. Cha) ³	Bimini, Bahamas	Apr 27-Apr 30	1332:26	28	4	3	0	0	0
	Livebait		7:30	0	0	0	0	0	0
Gulf Coast Largest Tournament	Pensacola, FL	May 2-May 2	40:50	1	0	0	0	0	0
South Texas BGFC First	Port Isabel, TX	May 2-May 3	84:00	5	0	0	0	0	0
Members Only Billfish	Chub Cay, Bahamas	May 18-May 22	476:09	29	2	6	0	0	0
4th Annual Bohicket-Seabrook Billfish	Charleston, SC	May 7-May 9	782:55	19	6	1	0	0	0
New Orleans Big Game Fishing Club First	South Pass, LA	May 8-May 9	408:25	6	1	0	0	0	17
Cat Cay Billfish (Bah. Cha) ³	Cat Cay, Bahamas	May 11-May 15	956:05	9	2	2	0	0	0
22nd Annual Pompano Beach Fishing Rodeo ⁵	Pompano Beach, FL	May 15-May 16	3859:00	2 ¹	0	76 ¹	0	0	0
Angler's Invitational (Formerly Jerry Isan)	Chub Cay, Bahamas	May 18-May 22	625:13	26	6	10	0	0	0
20th Annual Georgetown Blue Marlin	Georgetown, SC	May 21-May 23	729:59	15	6	1	0	0	0
11th Annual Greater Daytona Bch Striking Fish	Daytona Beach, FL	May 22-May 24	5400:00	16	3	14	0	0	0
Mobile Big Game Fishing Club Memorial Day	Orange Beach, AL	May 23-May 24	708:25	13	5	0	0	0	5
	Drifting		52:45	0	0	0	1	0	0
Pensacola International Billfish	Orange Beach, AL	May 23-May 24	21:00	0	0	0	0	0	5
South Pass Memorial Day	South Pass, LA	May 23-May 24	567:40	19	1	0	0	0	17
South Texas BGFC Second	Port Isabel, TX	May 23-May 24	70:05	4	2	0	0	1	4
4th Annual Treasure Cay International Billfish	Treasure Cay, Bahamas	May 25-Jun 29	1186:12	37	7	2	0	0	2
	Drifting		11:00	0	0	0	0	0	0
Baton Rouge Big Game Fishing Club Second	South Pass, LA	May 29-May 30	117:00	3	0	0	0	0	1
Treasure Cay Championship (Bah. Cha) ³	Treasure Cay, Bahamas	Jun 2-Jun 5	1113:17	38	10	0	0	0	0
Cajun Classic (Formerly Golden Meadow Invt.)	Grand Isle, LA	Jun 5-Jun 6	503:05	22	4	0	0	0	21
	Drifting		15:15	0	0	0	0	0	0
New Orleans Big Game Fishing Club Tag & Release	South Pass, LA	Jun 5-Jun 6	422:27	7	2	0	0	0	9
Baton Rouge Big Game Fishing Club Invt.)	South Pass, LA	Jun 11-Jun 13	435:04	9	1	0	0	0	9
Liollio's Warmup Tournament	Destin, FL	Jun 12-Jun 13	417:30	16	9	0	1	0	2
	Drifting		32:58	0	0	0	0	0	0
Chub Cay Blue Marlin (Bah. Cha) ³	Chub Cay, Bahamas	Jun 15-Jun 19	1211:24	22	2	5	0	0	11
New Orleans Big Game Fishing Club Invt.)	South Pass, LA	Jun 18-Jun 20	1153:50	29	8	0	0	0	11
Liollio's Summer Open (Formerly Destin)	Destin, FL	Jun 19-Jun 20	509:08	16	7	0	0	0	5
Watermelon Open	Freeport, TX	Jun 20-Jun 21	17:00	0	0	0	0	0	1
Fort Aransas Masters Billfish	Fort Aransas, TX	Jun 20-Jun 21	153:00	1	0	5	0	0	0
Bimini Summer Billfish Tournament	Bimini, Bahamas	Jun 22-Jun 26	401:20	3	0	3	0	0	0
	Livebait		20:25	1	0	0	0	0	0
Ocean City White Marlin & Tuna	Ocean City, MD	Jun 26-Jun 28	273:00	1 ¹	1 ¹	0	0	0	0
2nd Annual Tolers Cove Open	Sea Pines, SC	Jun 26-Jun 27	238:45	5	0	1	0	0	0
	Livebait		15:35	4	0	0	0	0	0
Kalb's Cove Billfish Tournament	St. Petersburg, FL	Jun 26-Jun 28	520:45	7	2	3	0	0	0
	Drifting		23:59	0	0	1	1	0	0
Texas Championship Billfish	Fort Aransas, TX	Jun 26-Jun 27	282:18	8	5	2	0	0	6
July Fourth Billfish Jamboree	Freeport, TX	Jun 28-Jul 4	166:30	9	4	1	0	0	3
	Livebait		24:00	2	1	0	0	0	0
24th Annual US Virgin Islands July 4 Open	St. Thomas, VI	Jul 3-Jul 5	578:50	44	2	0	0	0	2
Pensacola International Billfish	Pensacola, FL	Jul 3-Jul 4	930:20	24	35	2	0	0	20
General Ray Huff Billfish	South Pass, LA	Jul 3-Jul 4	623:04	18	9	0	0	0	12
	Drifting		9:15	0	0	0	0	0	0
Deep Sea Roundup	Port Aransas, TX	Jul 7-Jul 9	162:00	2	2	5	0	0	0
South Jersey White Marlin	Cape May, NJ	Jul 9-Jul 11	1644:35	2 ¹	37 ¹	0	0	0	36 ¹
Bay Point Invitational	Panama City, FL	Jul 10-Jul 11	1074:35	29	41	2	0	0	8

Appendix Table I. (continued)

Tournament	Location	Dates	Hours Fished	Numbers Hooked						
				FM	WM	SF	SW	BFT	YFT	
4th Annual Martha's Vineyard White Marlin	M Vineyard, MA	Jul 15-Jul 17	1211:00	0	12 ¹	0	0	0	0	0
Dauphin Island Deep Sea Rodeo	Dauphin Island, AL	Jul 17-Jul 18	59:15	1	1	0	0	0	0	0
Port Aransas Outboard	Port Aransas, TX	Jul 18-Jul 19	82:30	1	0	1	0	0	0	0
Poco Bueno	Port O'Connor, TX	Jul 19-Jul 19	284:25	12	6	3	0	0	0	13
Block Island Billfish	Block Island, RI	Jul 21-Jul 24	1224:00	0	3 ¹	0	0	0	0	0
1st Annual Ocean Owners	Cape May, NJ	Jul 24-Jul 26	861:00	4	14	0	0	0	0	29
Grand Isle Tarpon Rodeo	Grand Isle, LA	Jul 23-Jul 25	1564:11	46	48	0	0	0	0	16
East Pass Towers	Destin, FL	Jul 24-Jul 25	754:58	30	19	0	0	0	0	1
Dean Hawn Memorial Billfish	Port Aransas, TX	Jul 24-Jul 25	414:00	10	9	6	0	0	0	4
Challenge Cup	Ocean City, MD	Jul 25-Jul 26	130:00	2 ¹	16 ¹	0	0	0	0	0
Oyster Bar Small Boat Billfish	Pensacola, FL	Jul 25-Jul 26	360:15	9	15	1	0	0	0	1
19th Annual Nantucket Billfish Tournament	Nantucket, MA	Jul 27-Jul 31	1750:40	1 ¹	171 ¹	0	0	0	0	0
20th Ann. Mid-Atlantic White Marlin Handicap	Ocean City, MD	Jul 31-Aug 2	247:00	0	10 ¹	0	0	0	0	0
Annual Fort Walton-Destin Billfish	Destin, FL	Jul 31-Aug 1	906:40	29	25	2	0	0	0	2
	Drifting		38:59	0	0	0	1	0	0	0
Texas International Fishing	Port Isabel, TX	Jul 31-Aug 1	488:50	17	13	21	0	0	0	15
Mobile Big Game Fishing Club Ladies	Orange Beach, AL	Aug 1-Aug 2	331:45	12	13	0	0	0	0	1
2nd Annual Turks and Caicos Billfish	Grand Turk, Bahamas	Aug 3-Aug 7	300:00	15	1	0	0	0	0	4
15th Annual St. Thomas International Open (Boy Scouts)	St. Thomas, VI	Aug 6-Aug 10	728:54	202	4	0	0	0	0	0
5th Annual Manufacturers Marlin Roundup	Cape May, NJ	Aug 7-Aug 8	501:12	3 ¹	28 ¹	0	0	0	0	0
Pirate Cove Blue Marlin	Grand Isle, LA	Aug 7-Aug 8	195:45	9	5	0	0	0	0	1
Pensacola Ladies	Pensacola, FL	Aug 8-Aug 9	562:45	12	30	2	0	0	0	1
Mako Outboard	Port Aransas, TX	Aug 8-Aug 8	9:00	0	0	0	0	0	0	0
Empire-South Pass Fishing Rodeo	Grand Isle, LA	Aug 13-Aug 15	365:45	6	7	0	0	0	0	5
Blue Marlin Classic	Pensacola, FL	Aug 21-Aug 22	1003:11	23	24	1	0	0	0	6
	Drifting		38:24	0	0	0	0	0	0	0
Island Moorings Professional Billfish Tournament	Port Aransas, TX	Aug 22-Aug 23	208:15	1	14	2	0	0	0	0
5th Annual Marlin Mardi Gras-Fish For Life	Cape May, NJ	Aug 23-Aug 26	2210:09	7 ¹	124 ¹	0	0	0	0	26 ¹
1st Annual Biras Creek Billfish	Virgin Gorda, BVI	Aug 24-Aug 28	138:30	18	0	0	0	0	0	0
Indian Rocks Tackle Billfish Finale	St. Petersburg, FL	Aug 28-Aug 30	727:50	10	15	6	0	0	0	0
	Drifting		112:30	0	0	0	1	0	0	0
Harbor Docks Blue Marlin	Destin, FL	Aug 28-Aug 29	186:30	9	3	0	0	0	0	0
	Drifting		2:00	0	0	0	1	0	0	0
Galveston Blue Marlin Open	Freeport, TX	Aug 29-Aug 30	181:40	2	3	0	0	0	0	0
	Livebait		30:00	0	0	0	0	0	0	0
34th Annual San Juan International Billfish	San Juan, PR	Sep 2-Sep 6	3125:30	227	0	0	0	0	0	0
29th Ann. Ocean City Annual White Marlin Open	Ocean City, MD	Sep 3-Sep 6	283:07	3 ¹	26 ¹	0	0	0	0	4 ¹
Alabama International	Orange Beach, AL	Sep 4-Sep 5	700:05	13	13	0	0	0	0	26
	Drifting		3:00	0	0	0	0	0	0	0
New Orleans Big Game Fishing Club Labor Day	South Pass, LA	Sep 5-Sep 6	291:05	12	10	0	0	0	0	14
Texas Womens Billfish	Port Aransas, TX	Sep 5-Sep 6	204:00	2	29	1	0	0	0	4
Poor Man's Shootoff At Panama City	Panama City, FL	Sep 9-Sep 12	203:00	5	8	2	0	0	0	2
Sandestin Billfish (Formerly Marlborough)	Destin, FL	Sep 11-Sep 12	750:20	9	28	2	0	0	0	15
12th Annual Oregon Inlet Billfish Release	Oregon Inlet, NC	Sep 15-Sep 18	828:00	8 ¹	121 ¹	1 ¹	0	0	0	0
New Orleans Big Game Fishing Club September	South Pass, LA	Sep 18-Sep 19	253:00	3	3	0	0	0	0	0
Orange Beach Invitational	Orange Beach, AL	Oct 2-Oct 3	222:30	6	3	0	0	0	0	0
3rd Annual World Class Angler Billfish Classic	Marathon, FL	Oct 14-Oct 17	373:30	2	0	7	0	0	0	0
	Livebait		128:30	0	0	9	0	0	0	0
6th Annual Key West Blue Marlin	Key West, FL	Oct 20-Oct 24	1923:47	27	3	4	0	0	0	2
14th Annual delGuercio-Tripod ⁴	Marathon, FL	Nov 11-Nov 14	784:55 ²	0	0	39 ¹	0	0	0	0
20th Annual Bill King One Day Billfish	Marathon, FL	Nov 16-Nov 16	144:00 ²	0	0	3 ¹	0	0	0	0
4th Annual Captain Mate Tournament	Deerfield Bch, FL	Nov 17-Nov 17	75:04 ²	0	0	3 ¹	0	0	0	0
30th Annual Key Colony Beach Sailfish ⁴	Key Colony Bch, FL	Nov 18-Nov 22	693:49 ²	0	0	44 ¹	0	0	0	0
Islamorada Sailfish ⁴	Islamorada, FL	Dec 2-Dec 6	1530:34 ²	0	0	86	0	0	0	0
34th Annual Stuart Light Tackle Sailfish	Stuart, FL	Dec 9-Dec 13	1533:01	0	0	85	0	0	0	0
Dock Sampling										
Padre Island Docks	Trolling	Jan 1-Jan 28	172:15	6	1	1	0	0	0	11
South Pass Docks	Trolling	Mar 2-Oct 17	1060:24	38	13	0	0	0	1	11
Grand Isle Docks	Trolling	Apr 18-Aug 29	938:55	29	8	0	0	0	0	8
	Drifting		33:30	0	0	0	0	0	0	0
Pensacola Docks	Trolling	Apr 26-Dec 6	191:30	8	11	1	0	0	0	0
Mobile Docks	Trolling	May 6-Sep 26	770:10	37	21	3	0	0	11	11
Panama City Docks	Trolling	May 15-Oct 19	347:20	14	23	0	0	0	0	0
Destin Docks	Trolling	May 23-Nov 14	557:44	14	25	3	0	0	0	1
Western Louisiana Docks	Trolling	May 23-May 23	12:00	0	0	1	0	0	0	0
Galveston Docks	Trolling	May 23-Jul 5	34:05	3	0	0	0	0	0	0
Port Aransas Docks	Trolling	May 23-Oct 18	634:05	13	88	17	0	0	0	4
	Drifting		6:00	0	0	1	0	0	0	0
St. Petersburg Docks	Trolling	Aug 8-Aug 8	11:00	1	0	0	0	0	0	0

¹Indicates Number Caught²Indicates Livebait Hours Only³Tournament Part of Bahamas Championship Series⁴Tournament Part of Florida Keys Triple Crown Series⁵Tournament Part of Gold Coast Triple Crown Series

Appendix Table II. Tagged oceanic pelagic fishes recaptured during 1987 as part of the Cooperative Gamefish Tagging Program, National Marine Fisheries Service, Miami Laboratory. Method of fishing is rod and reel (R/R), longline (LL), purse seine (PS), handline (HL), and gill net (GIL). Country abbreviations are: Japan (JAP), Mexico (MX), United States (US), Dominican Republic (DR), Virgin Islands (VI), Cuba (CU), Puerto Rico (PR), Granada (GN), Bahamas (BA), and Venezuela (VE).

Location and Release Date	Location at Recapture Date	Days at Large	Tagger Captain	Method	Finder Captain	Method
Sailfish						
No Release Information	Port Canaveral, FL 6-20-87	-	—	—	M. Frink —	R/R
No Release Information	Islamorada, FL 1-19-87	-	—	—	T. D'Esposito —	R/R
Miami Beach, FL 6-6-87	Governier, FL 6-13-87	7	B. Behr B. Smith	R/R	J. Arnold —	R/R
Jupiter, FL 2-18-87	Palm Beach, FL 2-28-87	12	J. Marple T. Mechlin	R/R	M. Spivey —	R/R
Isla Mujeres, MX 5-3-87	Boqueron Iglesia, MX 5-15-87	12	M. Shackelford A. Wadsworth	R/R	R. Bonfill —	MX HL
Jupiter, FL 1-24-87	Jupiter, FL 2-7-87	14	L. Foster B. Herzog	R/R	T. Hill —	R/R
Jupiter, FL 1-23-87	Palm Beach, FL 2-10-87	18	T. O'Connell H. Vermillion	R/R	L. D. Dickerson —	R/R
Ft. Laud., FL 8-12-86	Hillsboro Inlet, FL 12-30-87	25	M. Wydin A. Winchel	R/R	D. Kim —	R/R
Jupiter, FL 1-2-87	Ocean Reef, FL 2-21-87	50	P. Einhorn J. Motta	R/R	D. Burd —	R/R
Marathon, FL 10-16-87	Islamorada, FL 12-8-87	53	E. Schaumhoffel D. Aldridge	R/R	S. Antonich —	R/R
Palm Beach, FL 2-10-87	St. Lucie, FL 4-8-87	54	L.B. Dickerson R. Jendersee	R/R	M. Madero D. H. Willing	R/R
Cozumel, MX 4-30-87	21°35'W, 88°55'W 7-21-87	82	M. Shackelford A. E. Wadsworth	R/R	A. M. Samsones —	MX GIL
Ft. Laud., FL 1-26-87	Rompano Bch., FL 4-22-87	86	T. Zsak —	R/R	D. Baggett —	R/R
26°30'N 79°30'W 7-14-87	20°05N, 71°45'W 10-17-87	95	B. Huff B. Orgain	US LL	H. Brenes —	DR R/R
Islamorada, FL 1-15-87	Hillsboro, FL 4-30-87	105	D. Margulies C. Deuel	R/R	B. Bender —	R/R
Islamorada, FL 1-1-87	Islamorada, FL 5-21-87	140	P. Long J. Hopwood	R/R	G. Houghton J. Magursky	R/R
Juno, FL 9-20-86	Palm Beach, FL 2-11-87	144	N. Smith A. Durante	R/R	M. L. Kalas —	R/R
Hillsboro Inlet, FL 1-4-87	Bimini, BA 10-12-87	159	L. Miller D. Miller	R/R	B. Jenkins —	R/R
La Guaria, VE 9-29-86	12°10'N, 61°40'W 3-27-87	171	S. Smith S. Smith	R/R	C. Hutton —	GN LL
Ft. Laud., FL 10-24-86	Elliott Key, FL 5-4-87	192	W. L. Turner D. Turner	R/R	J. Pohl —	R/R
Marathon, FL 4-15-87	Islamorada, FL 11-8-87	207	L. Coffee B. Taute	R/R	P. Ross —	R/R
Jupiter, FL 9-24-86	Boynton Bch., FL 5-1-87	219	A. Molle A. Molle	R/R	A. LeBrun —	R/R
Cape Canaveral, FL 4-26-86	Boynton Bch., FL 1-12-87	261	G. L. Henshall, Jr. R. R. Hayes	R/R	S. Mahoney —	R/R
Isla Mujeres, MX 5-8-86	12°07'N 61°50'W 2-17-87	285	V. Roberson B. Hart	R/R	R. Ashton —	GN LL
Islamorada, FL 1-17-87	Palm Beach, FL 12-3-87	320	B. Edgar D. Parlo	R/R	T. Smith —	R/R
St. Lucie, FL 12-26-86	Hillsboro Inlet, FL 11-13-87	322	R. D. Davis C. Waring	R/R	J. Mumford —	R/R
Ft. Pierce, FL 2-20-86	Jupiter, FL 1-26-87	340	D. C. Brown H. F. Brown	R/R	S. Albaum B. Sutton	R/R
Stuart, FL 2-16-86	St. Lucie Inlet, FL 2-17-87	366	W. K. Blair G. Dickson	R/R	E. C. Phelps —	R/R

Appendix Table II (continued).

Location and Release Date	Location and Recapture Date	Days at Large	Tagger Captain	Method	Finder Captain	Method
Islamorada, FL 12-8-86	Marathon, FL 12-27-87	384	K. Ochan W. Kardias	R/R	D. Gurguolo	R/R
Boca Raton, FL 12-12-85	Islamorada, FL 1-24-87	408	R. S. Levin J. Garrity	R/R	D. Scula D. Kossmann	R/R
Boca Raton, FL 12-15-87	Islamorada, FL 2-10-87	422	T. Leo T. Leo	R/R	L. C. Dukehart —	R/R
Eleuthra, BA 4-22-86	Cape Canaveral, FL 9-4-87	500	T. Bussey T. J. Hyde	R/R	A. Billingsley —	US LL
Palm Beach, FL 1-25-86	Islamorada, FL 11-23-87	670	S. Tuppen B. Tuppen	R/R	M. Clark D. Clark	R/R
Boca Raton, FL 12-28-85	Elliott Key, FL 12-12-87	714	B. Beard P. Roepnack	R/R	R. Marx —	R/R
Stuart, FL 11-17-84	Jupiter, FL 1-24-87	798	B. Levine B. Pelosi	R/R	J. Anderson —	R/R
Jupiter, FL 1-26-84	Palm Beach, FL 1-17-87	1087	S. Bundy C. E. Bouchard	R/R	D. Lassiter —	R/R
Cozumel, MX 4-5-84	Cancun, MX 5-10-87	1130	C. Lawton L. Alonzo	R/R	V. Soto G. Martinez	MX R/R
Palm Beach, FL 10-25-86	Boca Raton, FL 11-22-86*	28	L. Sudbrink C. Sudbrink	R/R	J. Anderson —	R/R
La Guaira, VE 11-10-86	12°15'N, 64°35'W 12-12-86*	32	J. Morrow S. Smith	R/R	A. Carrasco —	VE LL

*1986 Recaptures reported in 1987.

White Marlin

No Release Information	Nomans, MA 6-15-87		— —	—	R. Mello —	R/R
Nantucket, MA 7-31-87	Nomans, MA 8-9-87	9	S. Pasmort G. Burchell	R/R	D. R. Kidd —	R/R
38°35'N 73°10'W 8-14-87	39°00'N 72°00'W 9-5-87	22	W. A. McGuire G. W. Bacon	R/R	P. Chike —	US LL
Norfolk Canyon 8-14-87	Oregon Inlet, NC 10-5-87	52	K. Riffe F. Riffe	R/R	M. Merritt —	R/R
Hatteras, NC 6-17-87	Baltimore Canyon 8-12-87	56	L. Carter B. Christian	R/R	L. Phillips —	R/R
Walkers Cay, BA 5-18-87	36°10'N 74°35'W 3-14-87	88	J. Chapple —	R/R	J. Bayliss —	R/R
29°15'N 87°15'W 9-13-86	23°55'N, 80°35'W 5-15-87	244	H. Estes T. Carson	R/R	S. C. Mott —	US LL
29°25'N, 87°00'W 8-12-86	29°30'N, 86°40'W 7-3-87	325	J. Rowe —	US LL	J. Ward —	R/R
Norfolk Canyon 8-1-86	Poor Mans Canyon 7-14-87	347	E. G. Hall A. D. Morris	R/R	S. Wallace —	R/R
36°40'N, 77°40'W 7-28-85	36°15'N, 74°35'W 7-18-87	720	F.D. Gottwald M. Finch	R/R	F. J. Delamain —	R/R
Nantucket, MA 8-9-85	Montauk, NY 8-11-87	732	D. Lindley —	R/R	G. Boros —	R/R
39°35'N, 70°11'W 8-21-85	Oregon Inlet, NC 10-11-87	781	Scientific Staff —	JA LL	G. Keech —	R/R
29°40'N, 80°10'W 8-21-82	Havana, CU 1-3-87	1,596	E. Graham —	R/R	D. Manday —	CU HL
Hatteras, NC 8-28-82	Norfolk Canyon 9-8-87	1,837	B. Edwards C. R. Potter	R/R	L. Klar —	R/R
Virginia Bch., VA 8-29-81	38°30'N, 73°35'W 9-3-87	2,196	J. W. Webb, Jr. J. M. Leach, Jr.	R/R	T. Baldwin —	R/R
La Guaira, VE 10-9-86	La Guaira, VE 10-16-86*	7	B. Tyson M. Show	R/R	M. C. Joyce —	R/R
La Guaira, VE 8-3-86	12°15'N, 64°36'W 12-19-86*	133	S. N. Campbell B. Garnsey	R/R	A. Carrasco —	VE LL

*1986 recaptures reported in 1987.

Appendix Table II (continued).

Location and Release Date	Location and Recapture Date	Days at Large	Tagger Captain	Method	Finder Captain	Method
Blue Marlin						
St. Thomas, VI 9-14-86	10°55'N 66°55'W 3-19-87	186	M. Dyes K. Bailey	R/R	J. Rocha —	VE LL
La Guaira, VE 10-28-85	San Juan, PR 7-26-87	636	Stewart Campbell B. Garnsey	R/R	R. F. O'Ferral —	R/R
Swordfish						
26°49'N 90°59'W 5-26-87	Ft. Pierce, FL 10-20-87	147	W. Bailey —	US LL	R. H. Shearer, Jr. —	US LL
28°54'N, 86°29'W 11-19-86	29°08'N, 86°39'W 6-19-87	212	S. Sebaugh —	US LL	D. Kidd —	US LL
32°39'N, 70°00'W 7-13-86	32°31'N, 70°00'W 6-10-87	332	H. Evans —	US LL	J. McCallum —	US LL
29°01'N, 87°00'W 10-28-85	27°25'N, 77°50'W 3-12-87	642	M. Barnett J. S. Rowe	US LL	M. Foley —	US LL
Bluefin Tuna						
Shinnecock, NY 9-7-87	40°00'N, 73°00'W 9-14-87	7	J. R. Scott —	R/R	P. Clay —	R/R
41°30'N, 70°30'W 7-31-86	39°49'N, 67°34'W 1-28-87	181	D. Cortis A. E. Cortis	R/R	A. Furukawa —	JA LL
40°50'N, 71°55'W 8-30-85	38°40'N, 67°10'W 1-28-87	515	K. Ullberg W. Kappenberg	R/R	K. Ishikawa —	JA LL
Montauk, NY 8-13-84	40°08'N, 73°35'W 9-30-87	778	L. Maransky F. Braddick	R/R	F. Moore —	R/R
36°42'N, 75°20'W 6-21-81	40°56'N, 70°20'W 8-20-87	2,251	Scientific Staff —	US PS	C. Genovese —	US PS
Virginia Bch., VA 6-20-81	42°00'N, 72°00'W 9-10-87	2,273	J. M. Mason M. Conrad	R/R	S. Ingrande —	US PS
36°23'N, 75°31'W 6-24-80	41°10'N, 71°41'W 8-1-87	2,594	Scientific Staff —	US PS	M. Fillippino —	R/R
36°33'N, 75°30'W 6-23-80	40°00'N, 72°00'W 9-2-87	2,627	Scientific Staff —	US PS	L. Ingrande —	US PS
36°27'N, 75°43'W 6-21-80	42°00'N, 72°00'W 9-10-87	2,637	Scientific Staff —	US PS	L. Vargas —	US PS
38°03'N, 74°49'W 7-9-77	Cape Cod Bay, MA 9-30-87	3,735	Scientific Staff —	US PS	A. Glynn —	R/R