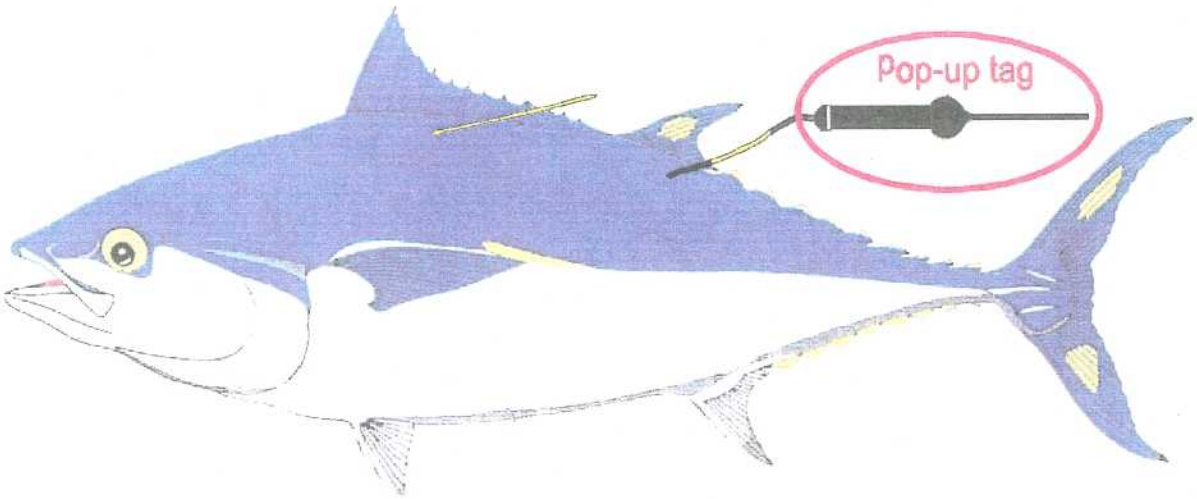
NOAA Technical Memorandum NMFS-SEFSC- 423

Cooperative Tagging Center Annual Newsletter: 1998



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U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Southeast Fisheries Science Center
75 Virginia Beach Dr.
Miami, FL 33149

April, 1999

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by

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U.S. DEPARTMENT OF COMMERCE
William M. Daley, Secretary

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

NATIONAL MARINE FISHERIES SERVICE
Penelope D. Dalton, Assistant Administrator for Fisheries

April, 1999

NOTICE

Contribution SFD-98/99-47 from the Southeast Fisheries Science Center, Miami Laboratory, Migratory Fishery Biology Division.

This report should be cited as follows:

National Marine Fisheries Service. 1999. Cooperative Tagging Center Annual Newsletter: 1998. NOAA Technical Memorandum NMFS-SEFSC-423, 23p.

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Cover: Atlantic bluefin tuna with pop-up satellite tag. A $ 500.00 reward is offered for return of pop-up tags on bluefin tuna.

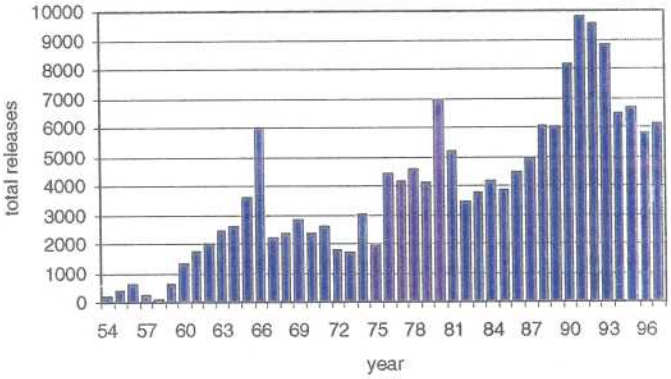
Cooperative Tagging Center:

Annual Newsletter - 1998

The National Marine Fisheries Service's (NMFS) Southeast Fisheries Science Center (SEFSC) formed the Cooperative Tagging Center (CTC) in 1992 in response to the recent expansion of tag release and recapture activities, data requests from other tagging agencies, and domestic and international tagging research needs. The CTC encompasses a variety of functions and responsibilities including volunteer and scientific tagging activities, as well as other research projects, such as tag development and tag performance research. While NMFS tagging activities are the main subject of this newsletter, other tagging efforts within or related to the CTC are also presented in this report. Visit the CTC on the World Wide Web at **http://www.sefsc.noaa.gov/public/tag.html.**

CTC Historical Activities

The Cooperative Tagging Center (CTC) is a joint research effort by scientists, recreational and commercial fishers. It is designed to provide information on the movements and biology of marine fish species in the Atlantic Ocean, Gulf of Mexico, and the Caribbean Sea through the direct participation of the public in scientific research. Formerly known as the Cooperative Gamefish Tagging Program, the CTC began in 1954 with its focus on tagging bluefin tuna. Almost immediately, in response to growing concerns about other highly migratory species, the program expanded to encompass blue marlin, white marlin, sailfish, spearfish, and swordfish. As time went by, and exploitation affected a larger number of fisheries, other species of fish were added to the program. At the same time, public awareness of over-exploitation of fisheries increased and the attitude toward tagging programs began to gain widespread popularity. In recent years, the adoption of certain conservation practices has contributed towards the willingness of the public to participate in non-consumptive fisheries that include tag-release and recapture programs. Today, there are over 34,000 registered participants contributing to the program, from virtually every segment of both the recreational and commercial fishing communities. The CTC tagging program, in terms of total targeted tunas and billfishes released, has been exceptional in the last few years (Figure 1). The total tag recaptured tunas and billfishes are presented in Figure 2 and these results mirror release efforts.



per year by participants of the Cooperative Tagging Center, 1954-1997. Target species are sailfish, blue marlin, white marlin, swordfish, bluefin tuna, and yellowfin tuna.

Figure 1. Number of target species tagged

The Billfish Foundation Tagging Program

In 1990, the CTC entered into an agreement with The Billfish Foundation (TBF) to develop a better tagging

Inside:

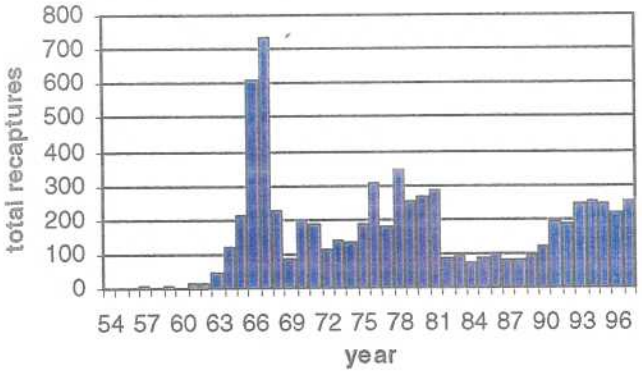


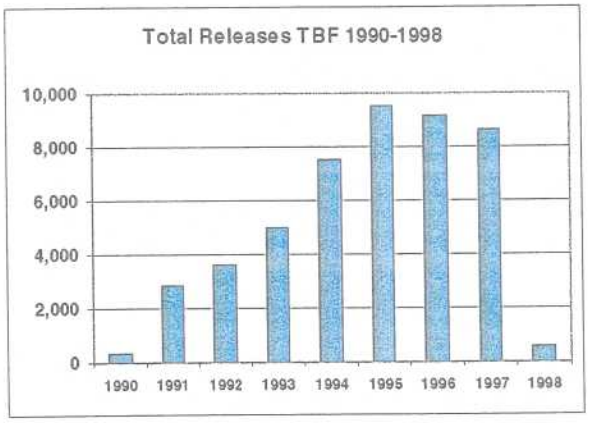
Figure 2. Number of tagged target species recaptured per year by participants of the Cooperative Tagging Center, 1954-1997. Target species are sailfish, blue marlin, white marlin, swordfish, bluefin tuna, and yellowfin tuna.

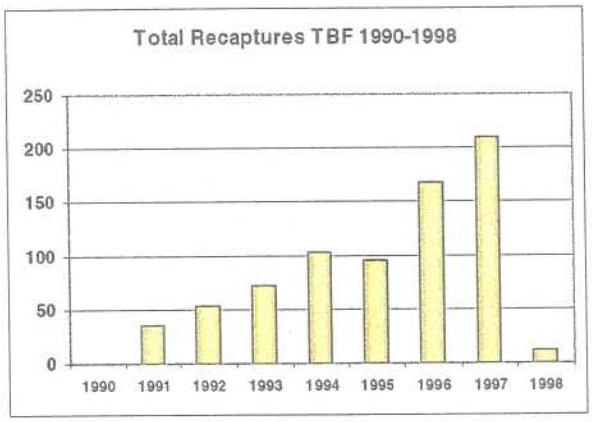
system. In addition, TBF initiated its own tagging program at this time, which was developed to augment CTC efforts on billfish. The agreement included timely transfer of TBF's tagging database to NMFS and mutual exchange of tagging technology so both tagging programs used the same equipment. The TBF tagging program was intended to provide tags and equipment to those tagging participants who could not get enough equipment to meet their needs from the CTC.

A section of this newsletter has been dedicated to review TBF tagging activities from 1990 through 1998. Table 1 and Figures 3 and 4 provide a summary of the total number of tagged billfish (marlin, sailfish, spearfish, and swordfish) released and recaptured from 1990 through 1998 (1998 data are incomplete). Clearly, the TBF tagging program has rapidly expanded and in recent years is comparable to the CTC tagging effort. It should be noted that the TBF tagging results include tagging activity outside the Atlantic ocean, while the CTC program is restricted to the Atlantic. Angler's interested in obtaining tagging equipment from TBF can call OFFSHORE ANGLER at **(800) 463-3746** or the TBF office **(800) 438-8247**.

Table 1. Tag releases and recaptures from The Billfish Foundation (TBF) program by year for all billfish including swordfish (* preliminary data)

Year	Releases	Recaptures
1990	321	0
1991	2,832	35
1992	3,609	54
1993	5,009	72
1994	7,509	103
1995	9,511	96
1996	9,170	167
1997	8,613	210
1998*	555	12
Total	**47,129**	**749**





Figures 3 and 4. Total number of tagged billfish (marlins, sailfish, spearfish, and swordfish) released and recaptured from 1990 through 1998 (1998 data are incomplete).

The Boat/U.S. Nearshore Tagging Program

Due to limited resources within the CTC, the BOAT/U.S. Clean Water Trust and the National Marine Fisheries Service approved an agreement in 1996 to develop a tagging program for near-shore species (i.e. snappers, groupers, drum, and striped bass) in the western Atlantic. The program is run and administered by BOAT/U.S. in much the same way that the TBF program is operated, including the transfer of release and recapture data to NMFS. This cooperative agreement will provide anglers with an alternative source of tagging materials for many of the near-shore species that the CTC will no longer handle.

A section of this newsletter summarizes the BOAT/U.S. tagging activities for their primary target species for 1996 and 1997 (Table 2). For the first two years of tagging activities, the BOAT/U.S. tagging program resulted in 1,581 releases and 32 recoveries. About half of the releases were striped bass, followed by tarpon, snook, red drum, and a number of other species. Striped bass also represented the vast majority of recaptured fish. Anglers interested in obtaining information on participating in the BOAT/U.S.

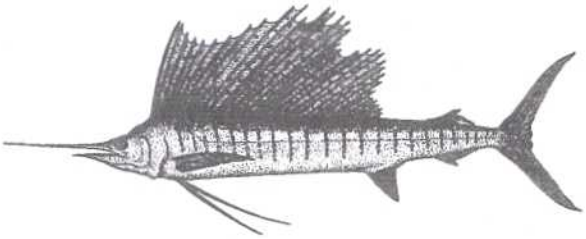
tagging program can use their toll free phone number **(800) 262-8872.**

Table 2. Tag releases and recaptures from Boat/U.S. tagging program by species for the years 1996 and 1997 (# of tags).

Species	1996		1997	
	Rel	Cap	Rel	Cap
Striped Bass	239	7	480	15
Snook	0	0	164	2
Tarpon	30	0	160	1
Red drum	52	0	112	6
Blue fish	29	1	69	1
Spot	13	0	0	0
Speckled Trout	10	0	65	0
Other species	43	1	115	1
Total	**416**	**9**	**1165**	**26**

1996-1997 Releases and Recaptures: Target Species

Sailfish



A total of 2,511 sailfish were tagged and released: 1,322 in 1996 and 1,189 in 1997. Of the total releases, 2,375 releases were by rod and reel fishers, 101 by longline fishers and 35 by unspecified sources. As in previous years, a majority of sailfish tag releases (1,449) took place off the southeast coast of Florida. Other areas where sailfish were tagged are listed in Table 3. There were 64 tagged sailfish recaptured: 33 in 1996 and 31 in 1997. There were 51 recaptured by rod and reel fishers, 10 by longline fishers, and in 3 cases the type of fisher was not reported. The release and recapture locations of recaptured sailfish are given in Table 4, and a graph showing the years at-large is presented in Figure 5.

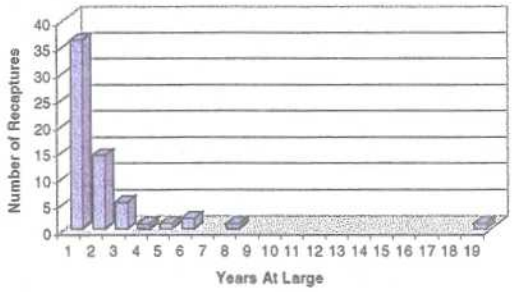


Figure 5. Years at-large for 1996-1997 sailfish recaptures.

Table 3. Location of 1996-1997 sailfish tag releases.

Release Location	Total Tagged
SOUTHEAST FLORIDA	1449
N. FLORIDA AND CAROLINAS WATERS	277
COZUMEL , MEXICO	137
UNSPECIFIED WATERS	146
LA GUAIRA, VENEZUELA	110
CANCUN, MEXICO	84
MASS TO VIRGINIA WATERS	68
TEXAS WATERS	50
NORTHERN BAHAMAS	39
GULF OF MEXICO	30
FLORIDA PANHANDLE	27
PUERTO RICO	18
WEST FLORIDA	17
VIRGIN ISLANDS	13
WESTERN ATLANTIC	13
BARBADOS	9
CUMANA, VENEZUELA	6
LOUISIANA	6
NORTHERN BRAZIL	5
MEXICAN WATERS	2
SOUTHERN BAHAMAS	2
COSTA RICA AND PANAMA	1
HISPANIOLA WATERS	1
N.E. UNITED STATES	1

The longest straight-line distance traveled (a minimum estimate of movement which provides no insight into the true route taken) by a recaptured sailfish was 1,350 nm. The fish was released 9/3/94 off Cape Canaveral, Florida, and recaptured 759 days later on 10/1/96 off La Guaira, Venezuela (Figure 6). Selected movements for 1996-1997 recaptured sailfish are also presented in Figure 6. The longest time at-large for a recaptured sailfish was 6,568 days (about 19 years) for a fish released 4/7/79 off Cozumel, Mexico and recaptured off La Guaira, Venezuela on 3/31/97. Because some recapture locations were not reported, tables summarizing release-recapture areas may contain fewer fish than the total number recaptured.

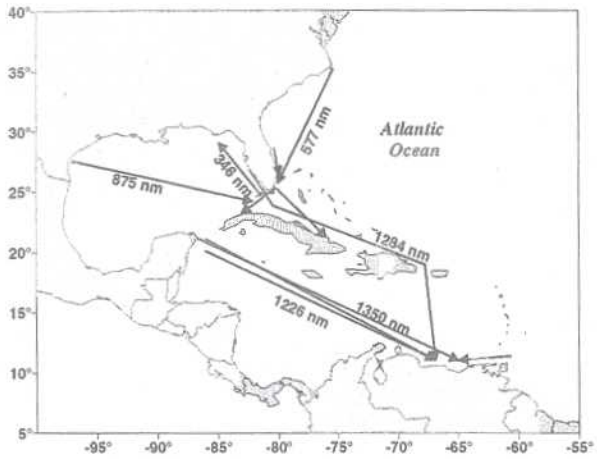
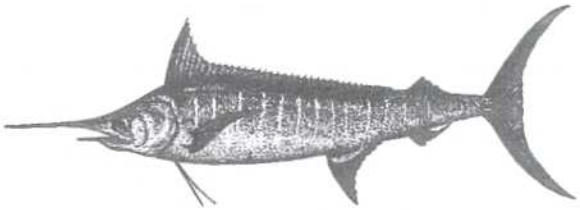


Figure 6. Movements of selected 1996-1997 tag-recaptured sailfish.

Table 4. Release and recapture areas for sailfish recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
BARBADOS	CUMANA, VENEZUELA	1
CANCUN, MEXICO	CUMANA, VENEZUELA	1
	LA GUAIRA, VENEZUELA	1
COZUMEL, MEXICO	LA GUAIRA, VENEZUELA	1
LA GUAIRA, VENEZ.	LA GUAIRA, VENEZUELA	6
MASS TO VIRGINIA	SOUTHEAST FLORIDA	2
N. FLORIDA AND	CUBAN WATERS	1
CAROLINAS WATERS	LA GUAIRA, VENEZUELA	1
	SOUTHEAST FLORIDA	3
SOUTHEAST FLORIDA	CUBAN WATERS	2
	FLORIDA PANHANDLE	1
	N. FLORIDA AND CAROLINAS WATERS	2
	SOUTHEAST FLORIDA	38
	UNSPECIFIED WATERS	1
TEXAS WATERS	SOUTHEAST FLORIDA	1
UNSPECIFIED WATERS	SOUTHEAST FLORIDA	1
WEST FLORIDA	LA GUAIRA, VENEZUELA	1

Blue Marlin



A total of 1,715 blue marlin were tagged and released: 938 in 1996 and 777 in 1997. Of the total releases, 1,501 were by rod and reel fishers, 139 by longline fishers, and 75 by unspecified sources. A majority of blue marlin tag releases took place off Puerto Rico (223) and the Virgin Islands (223). Other areas where blue marlin were tagged and released are listed in Table 5. There were 39 tagged blue marlin recaptured: 20 in 1996 and 19 in 1997. There were 19 recaptured by rod and reel fishers, 19 by longline fishers, and in 1 case the gear type was not reported. The release and recapture locations of recaptured blue marlin are given in Table 6, and a graph showing the years at-large is presented in Figure 7.

Table 5. Location of 1996-1997 blue marlin tag releases.

Release Location	Total Tagged
PUERTO RICO	223
VIRGIN ISLANDS	223
LOUISIANA	205
NORTHERN BAHAMAS	174
LA GUAIRA, VENEZUELA	173
N. FLORIDA AND CAROLINAS	113
MASS TO VIRGINIA WATERS	96
TEXAS WATERS	84
FLORIDA PANHANDLE	81
UNSPECIFIED WATERS	69
GULF OF MEXICO	68
WESTERN ATLANTIC	49
BERMUDA	38
SOUTHERN BAHAMAS	30
SOUTHEAST FLORIDA	20
HISPANIOLA WATERS	17
CANCUN, MEXICO	16
BARBADOS	7
COZUMEL, MEXICO	7
VENEZUELAN WATERS	7
JAMAICA	5
CUMANA, VENEZUELA	4
NORTHERN BRAZIL	2
WEST FLORIDA	2
CUBA	1
N.E. UNITED STATES	1

The longest straight-line distance by a recaptured blue marlin was 1,600 nm. The fish was released 7/25/94 north of Trujillo, Honduras and recaptured 715 days later on 7/9/96 off Barbados. Selected movements for 1996-1997 recaptured blue marlin are presented in Figure 8. The longest time at-large for a recaptured blue marlin was 2,235 days. This fish was released 2/18/91 off La Guaira, Venezuela and recaptured near the same location on 4/2/97.

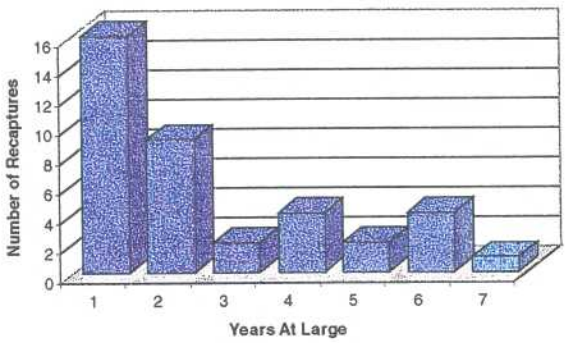


Figure 7. Years at-large for 1996-1997 blue marlin recaptures.

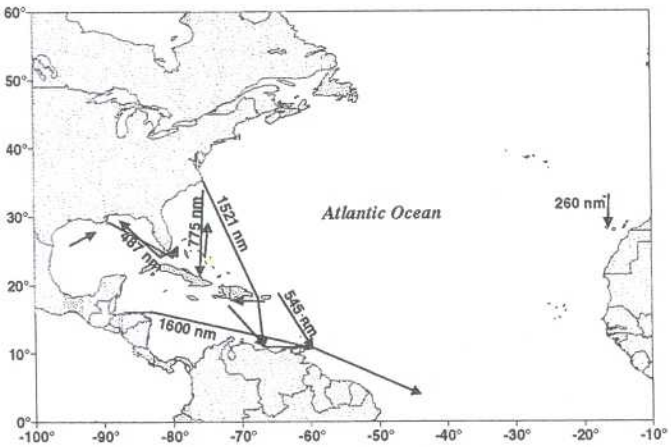
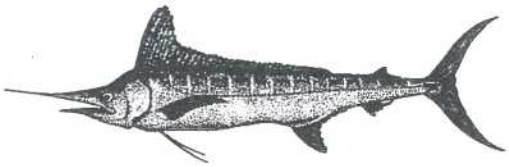


Figure 8. Movements of selected 1996-1997 tag-recaptured blue marlin.

Table 6. Release and recapture areas for blue marlin recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
BARBADOS WATERS	LA GUAIRA,VENEZUELA	1
BELIZE WATERS	BARBADOS WATERS	1
CUMANA, VENEZUELA	LA GUAIRA,VENEZUELA	2
HISPANIOLA	LA GUAIRA,VENEZUELA	1
LA GUAIRA,VENEZUELA	LA GUAIRA,VENEZUELA	12
	NORTHERN BRAZIL	1
	VENEZUELAN WATERS	1
LOUISIANA WATERS	GULF OF MEXICO	2
	NORTHERN BAHAMAS	1
MASS TO VIRGINIA	LA GUAIRA,VENEZUELA	1
N. FLORIDA AND CAROLINAS WATERS	CUBAN WATERS	1
NORTHERN BAHAMAS	FLORIDA PANHANDLE	1
	SOUTHEAST FLORIDA	1
	WESTERN ATLANTIC	1
PUERTO RICO	BARBADOS WATERS	1
	HISPANIOLA WATERS	1
	LA GUAIRA,VENEZUELA	2
	PUERTO RICO	1
TEXAS WATERS	GULF OF MEXICO	1
UNSPECIFIED WATERS	UNSPECIFIED WATERS	2
VIRGIN ISLANDS	BARBADOS	1
	LA GUAIRA,VENEZUELA	1
	TRINIDAD AND TOBAGO	1
	VIRGIN ISLANDS	1

White Marlin



A total of 1,346 white marlin were tagged and released: 628 in 1996 and 718 in 1997. Of the total releases, 1,168 were released by rod and reel fishers, 147 by longline fishers, and 31 by unspecified sources. A majority of white marlin tag releases (557) took place off the Mass. to Virginia waters. Other areas where white marlin were tagged and released are listed in Table 7. There were 38 tagged white marlin recaptured: 27 in 1996 and 11 in 1997. There were 16 recaptured by rod and reel fishers, 18 by longline fishers, and in 4 cases the type of fisher was not reported.

A graph showing the years at-large is presented in Figure 9. The release and recapture locations of recaptured white marlin are given in Table 8.

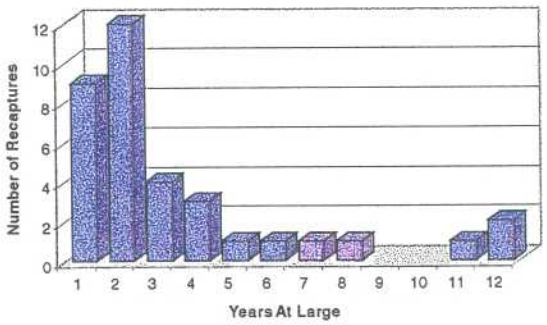


Figure 9. Years at-large for 1996-1997 white marlin recaptures.

Table 7. Location of 1996-1997 white marlin tag releases.

Release Location	Total Tagged
MASS TO VIRGINIA WATERS	557
LA GUAIRA, VENEZUELA	197
FLORIDA PANHANDLE	128
N. FLORIDA AND CAROLINAS	84
LOUISIANA	64
WESTERN ATLANTIC	58
NORTHERN BAHAMAS	55
TEXAS WATERS	41
GULF OF MEXICO	24
PUERTO RICO	22
UNSPECIFED WATERS	19
CANCUN, MEXICO	18
COZUMEL, MEXICO	16
VIRGIN ISLANDS	16
BERMUDA	11
N.E. UNITED STATES	11
SOUTHEAST FLORIDA	10
HISPANIOLA	7
NORTHERN BRAZIL	3
VENEZUELA	2
CUBA	1
CUMANA, VENEZUELA	1
WEST FLORIDA	1

The longest straight-line distance by a recaptured white marlin was 3,519 nm. The fish was released in the western Atlantic Ocean on 7/23/95 near Hudson Canyon and recaptured 474 days later off Sierra Leone, West Africa on 11/8/96. Selected movements for 1996-1997 recaptured white marlin are presented in Figure 10.

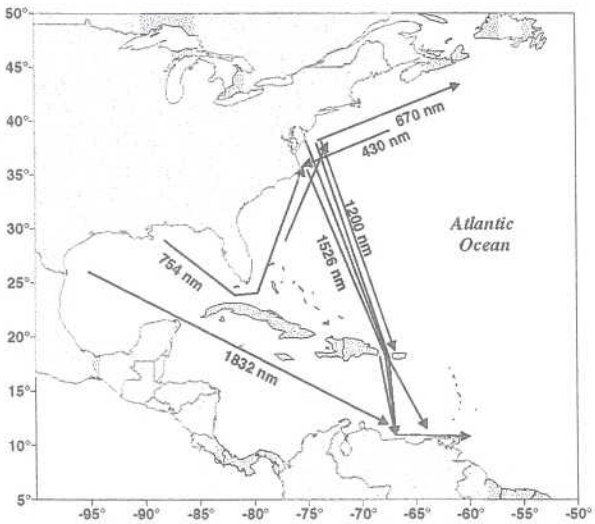


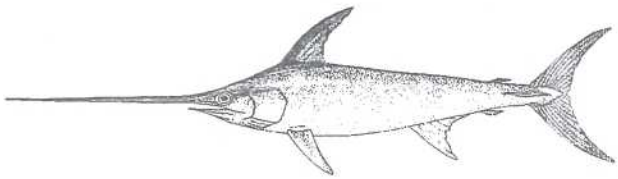
Figure 10. Movements of selected 1996-1997 tag-recaptured white marlin.

The longest time at-large for a recaptured white marlin was 4,040 days. This fish was released 10/21/85 off La Guaira, Venezuela and recaptured 11/12/96 in the same area.

Table 8. Release and recapture areas for white marlin recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
COZUMEL, MEXICO	UNSPECIFIED WATERS	1
HISPANIOLA WATERS	LA GUAIRA,VENEZUELA	1
	VENEZUELAN WATERS	1
LA GUAIRA,VENEZUELA	CUMANA, VENEZUELA	5
	LA GUAIRA,VENEZUELA	9
	UNSPECIFIED WATERS	2
LOUISIANA WATERS	MASS TO VIRGINIA	1
MASS TO VIRGINIA	CANADIAN WATERS	1
	CUMANA, VENEZUELA	1
	HISPANIOLA WATERS	1
	LA GUAIRA,VENEZUELA	3
	MASS TO VIRGINIA	3
	N. FLORIDA AND CAROLINAS WATERS	2
	UNSPECIFIED WATERS	2
PUERTO RICO	VENEZUELAN WATERS	1
TEXAS WATERS	LA GUAIRA,VENEZUELA	1
UNSPECIFIED WATERS	MASS TO VIRGINIA	1
WESTERN ATLANTIC	MASS TO VIRGINIA	2

Swordfish



A total of 1,100 swordfish were tagged and released: 524 in 1996 and 576 in 1997. Of the total releases, 1,057 were released by longline fishers, 42 by recreational fishers, and one by unspecified sources. A majority of swordfish tag releases (294) took place off North Florida and the Carolinas. Other areas where swordfish were tagged are listed in Table 9. There were a total of 50 tagged swordfish recaptured: 25 in 1996 and 25 in 1997. There were 34 recaptured by longline fishers and16 by rod and reel fishers.

A graph showing the years at-large is presented in Figure 11. The release and recapture locations of recaptured swordfish are given in Table 10. The longest straight-line distance by a recaptured swordfish was 2,645 nm. This fish was released 4/26/95 offshore, east of Barbados and recaptured 861 days later on 9/3/97 off Cadiz, Spain.

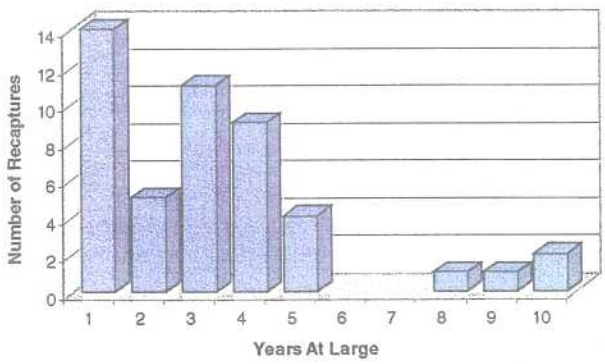


Figure 11. Years at-large for 1996-1997 swordfish recaptures.

Table 9. Location of 1996-1997 swordfish releases.

Release Location	Total Tagged
N. FLORIDA AND CAROLINAS	294
GULF OF MEXICO	245
WESTERN ATLANTIC	234
SOUTHEAST FLORIDA	73
UNSPECIFIED WATERS	41
MASS TO VIRGINIA WATERS	31
HISPANIOLA WATERS	24
CANCUN, MEXICO	19
N.E. UNITED STATES	19
VENEZUELA	19
CUMANA, VENEZUELA	18
NORTHERN BRAZIL	18
LA GUAIRA, VENEZUELA	15
VIRGIN ISLANDS	15
PUERTO RICO	10
FLORIDA PANHANDLE	9
LOUISIANA	5
NORTHERN BAHAMAS	5
CUBA	3
GUYANA	2
SOUTHERN BAHAMAS	1

Table 10. Release and recapture areas for swordfish recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
CANADIAN WATERS	CANADIAN WATERS	1
FLORIDA PANHANDLE	SOUTHEAST FLORIDA	1
GULF OF MEXICO	FLORIDA PANHANDLE	1
	GULF OF MEXICO	2
	NORTHERN BAHAMAS	1
	SOUTHEAST FLORIDA	1
	WESTERN ATLANTIC	1
MASS TO VIRGINIA	CANADIAN WATERS	1
	CANCUN, MEXICO	2
	MASS TO VIRGINIA	2
	SOUTHEAST FLORIDA	2
	WESTERN ATLANTIC	6
N. FLORIDA AND CAROLINAS WATERS	CANCUN, MEXICO	1
	N. FLORIDA AND CAROLINAS WATERS	4
	SOUTHEAST FLORIDA	1
N.E. U.S. WATERS	BERMUDA WATERS	1
	MASS TO VIRGINIA	1
NORTHERN BAHAMAS	N. FLORIDA AND CAROLINAS WATERS	1
SOUTHEAST FLORIDA	N. FLORIDA AND CAROLINAS WATERS	2
	SOUTHEAST FLORIDA	1
UNSPECIFIED WATERS	WESTERN ATLANTIC	1
VENEZUELAN WATERS	WESTERN ATLANTIC	1
VIRGIN ISLANDS	VIRGIN ISLANDS	1
WESTERN ATLANTIC	CANADIAN WATERS	1
	MASS TO VIRGINIA	1
	N.E. U.S. WATERS	1
	SOUTHERN BAHAMAS	2
	VIRGIN ISLANDS	2
	WESTERN ATLANTIC	7

Other selected movements for 1996-1997 recaptured swordfish are presented in Figure 12. The longest time at-large for a recaptured swordfish was 3,487 days. This fish was released on 11/10/86 in the western Atlantic Ocean near Hydrographer Canyon and recaptured 5/28/96 in the western Atlantic Ocean near Veach Canyon.

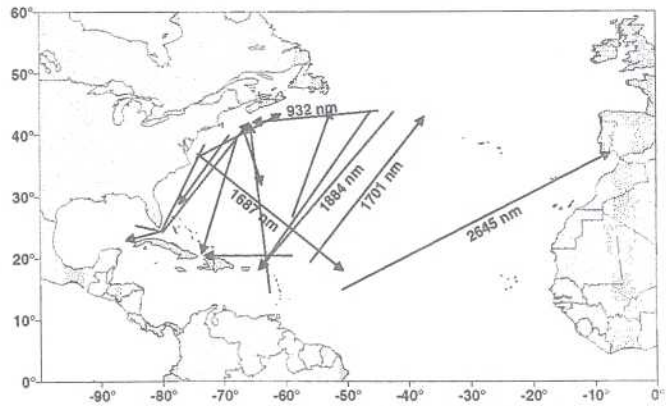
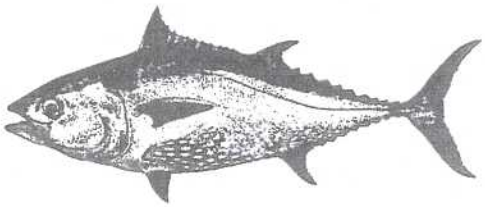


Figure 12. Movements of selected 1996-1997 tag-recaptured swordfish.

Bluefin Tuna



A total of 4,796 bluefin tuna were tagged and released: 2,161 in 1996 and 2,635 in 1997. Of the total releases, 4,639 were released by rod and reel fishers, 110 by

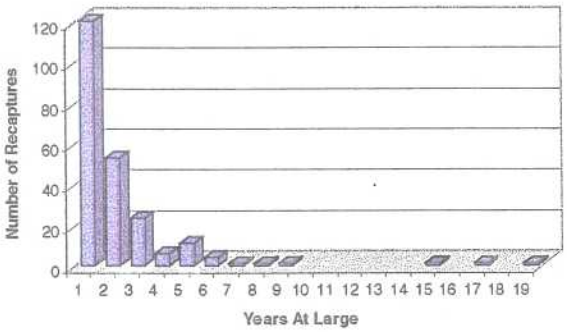
longline fishers, and 47 by unspecified sources. A majority of bluefin tuna tag releases took place off the Mass. to Virginia waters (3,459). Other areas where bluefin tuna were tagged are listed in Table11. There were a total of 222 tagged bluefin tuna recaptured: 86 in 1996 and 136 in 1997.

Table 11. Location of 1996-1997 bluefin tuna releases.

Release Location	Total Tagged
MASS TO VIRGINIA WATERS	3,459
N. FLORIDA AND CAROLINAS	900
N.E. UNITED STATES	361
WESTERN ATLANTIC	24
UNSPECIFIED WATERS	23
WEST FLORIDA	11
SOUTHEAST FLORIDA	10
TEXAS	3
BERMUDA	2
NORTHERN BAHAMAS	2
CUBA	1

There were 185 recaptured by rod and reel fishers, 36 by longline fishers, and in one case the type of gear was not reported. A graph showing the years at-large is presented in Figure 13. The release and recapture locations of recaptured bluefin tuna are given in Table 12. The longest straight-line distance by a recaptured bluefin tuna was 4,220 nm. The fish was released 3/20/94 off Lookout Shoals, North Carolina and recaptured 811 days later on 6/8/96 in the Mediterranean Sea off Pantelleria, Italy. Other significant movements for 1996-1997 recaptured bluefin tuna are presented in Figure 14. The longest time at-large for a recaptured bluefin tuna was 6,250 days. This fish was released 6/22/80 off Nags Head, North Carolina and recaptured 17 years later off Gloucester, Massachusetts on 8/2/97.

Figure 13. Years at-large for 1996-1997 bluefin tuna recaptures.



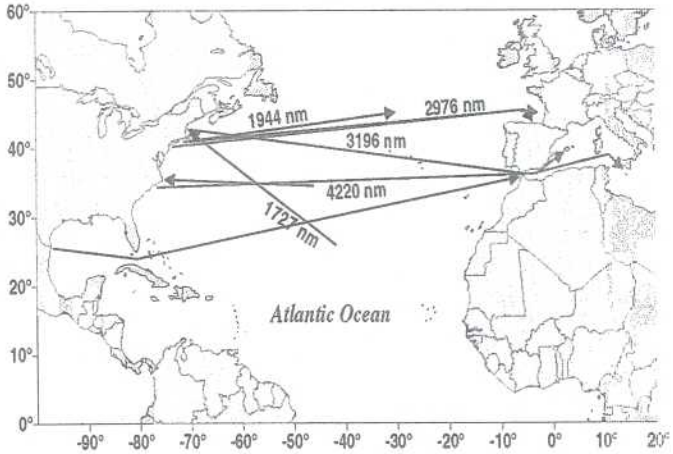
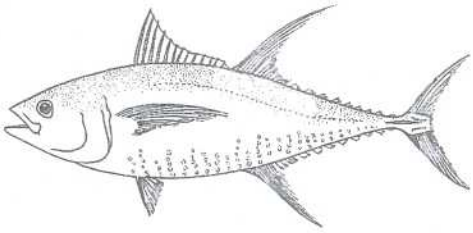


Figure 14. Movements of selected 1996-1997 tag-recaptured bluefin.

Table 12. Release and recapture areas for bluefin tuna recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
MEXICAN WATERS	UNSPECIFIED WATERS	1
MASS TO VIRGINIA	CANADIAN WATERS	5
	MASS TO VIRGINIA	106
	N.E. U.S. WATERS	26
	N. FLORIDA AND CAROLINAS WATERS	8
	UNSPECIFIED WATERS	14
	WESTERN ATLANTIC	5
N.E. U.S. WATERS	MASS TO VIRGINIA	4
	N.E. U.S. WATERS	6
	UNSPECIFIED WATERS	2
N. FLORIDA AND CAROLINAS WATERS	MASS TO VIRGINIA	22
	N.E. U.S. WATERS	11
	N. FLORIDA AND CAROLINAS WATERS	4
	UNSPECIFIED WATERS	1
	WESTERN ATLANTIC	1
WESTERN ATLANTIC	MASS TO VIRGINIA	3
	N.E. U.S. WATERS	2
	UNSPECIFIED WATERS	1

Yellowfin Tuna



A total of 460 yellowfin tuna were tagged and released: 228 in 1996 and 232 in 1997. Of the total releases, 389 were released by rod and reel fishers and 65 by longline fishers, and in 6 cases the gear type was not reported. A majority of yellowfin tuna tag releases (154) took place off the Mass. to Virginia waters. Other areas where yellowfin tuna were tagged are listed in Table 13.

Table 13. Location of 1996-1997 yellowfin tuna releases.

Release Location	Total Tagged
MASS TO VIRGINIA WATERS	154
UNSPECIFIED WATERS	66
N. FLORIDA AND CAROLINAS	55
LOUISIANA	48
BERMUDA	43
WESTERN ATLANTIC	36
GULF OF MEXICO	25
TEXAS	15
N.E. UNITED STATES	11
VIRGIN ISLANDS	3
BARBADOS	1
CANCUN, MEXICO	1
COSTA RICA AND PANAMA	1
NORTHERN BAHAMAS	1

There were a total of 41 tagged yellowfin tuna recaptured: 21 in 1996 and 20 in 1997. There were 31 recaptured by rod and reel fishers, 9 by longline fishers, and in one case the type of gear was not reported. A graph showing the years at-large is presented in Figure 15. The release and recapture locations of recaptured yellowfin tuna are given in Table 14.

Table 14. Release and recapture areas for yellowfin tuna recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
BERMUDA	BERMUDA	8
GULF OF MEXICO	GULF OF MEXICO	1
LOUISIANA WATERS	LOUISIANA WATERS	1
MASS TO VIRGINIA	MASS TO VIRGINIA	17
	N.E. U.S. WATERS	1
	UNSPECIFIED WATERS	9
N.E. U.S. WATERS	UNSPECIFIED WATERS	1
UNSPECIFIED WATERS	UNSPECIFIED WATERS	3

The longest straight-line distance by a recaptured yellowfin tuna was 5,186 nm. The fish was released 4/1/94 off Hatteras, North Carolina and recaptured 808 days later on 6/17/96 off Gabon, West Africa. Other selected movements for 1996-1997 recaptured yellowfin tuna are presented in Figure 16. The longest time at-large for a recaptured yellowfin tuna was 1,266 days. This fish was released on 8/4/92 off Vermillion, Louisiana and recaptured 1/22/96 in the western Gulf of Mexico.

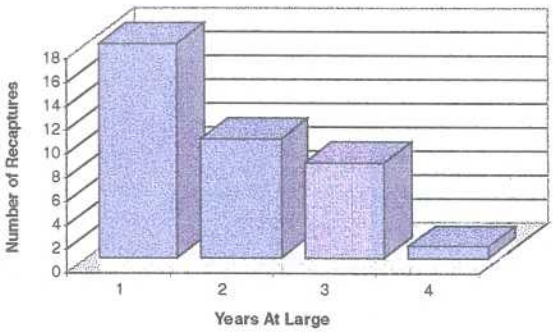
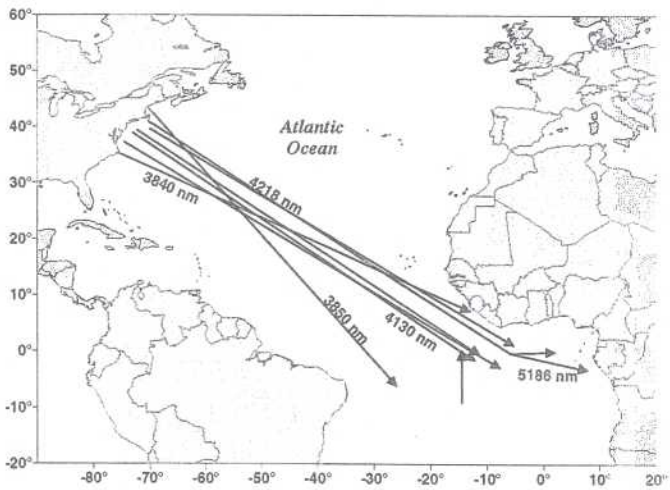


Figure 15. Years at-large for 1996-1997 yellowfin tuna recaptures.

Figure 16. Movements of selected 1996-1997 tag-recaptured yellowfin tuna.



Other Tunas

Although the CTC mainly targets bluefin and yellowfin, all other species of tunas are also tagged. Of all the other tuna species tagged only one fish was recaptured. This was an albacore that was released 9/3/94 off Montauk, New York and was recaptured 1,106 days later on 9/13/97 near Veach Canyon in the western Atlantic Ocean. Table 15 lists the other important tunas that were tagged and released as well as recaptured in 1996 and 1997.

Table 15. Numbers of releases and recaptures of other target tuna species during 1996 and 1997.

Tuna Species	Number Released	Number Recaptured
Albacore	23	1
Bigeye	115	0
Blackfin	42	0
Skipjack	7	0
Unspecified	7	0
Totals	**194**	**1**

1996-1997 Releases and Recaptures:

Non-Target Species

Historically, program participants have tagged many species other than the primary target species of billfishes and tunas. Until recently, the Cooperative Tagging Center provided tags and encouraged cooperators to tag inshore and reef species. Although the number of target species has been reduced, (*see page 2, "Boat/U.S. Nearshore Tagging Program"*) summaries of several of the most important non-target species for 1996-1997 are given below. This is the last year the CTC Newsletter will provide information on non-target species.

Amberjack

A total of 79 amberjack were tagged and released: 72 in 1996 and 7 in 1997. Of the total releases, all 79 were by rod and reel fishers. A majority of amberjack tag releases (33) took place off the Florida Panhandle. Other areas where amberjack were tagged are listed in Table 16. There were a total of 49 tagged amberjack recaptured: 38 in 1996 and 11 in 1997. Of the total recaptures, 44 were by rod and reel fishers, 2 by longline fishers, and one by speargun.

A graph showing the years at-large is presented in Figure 17. The longest time at-large for a recaptured amberjack was 2,041 days. This fish was released on 9/12/91 Virginia Beach, Virginia and recaptured 4/14/97 near Islamorada, Florida.

Table 16. Location of 1996-1997 amberjack releases.

Release Location	Total Tagged
FLORIDA PANHANDLE	33
SOUTHEAST FLORIDA	23
MASS TO VIRGINIA WATERS	20
LOUISIANA WATERS	1
N. FLORIDA AND CAROLINAS	1
TEXAS WATERS	1

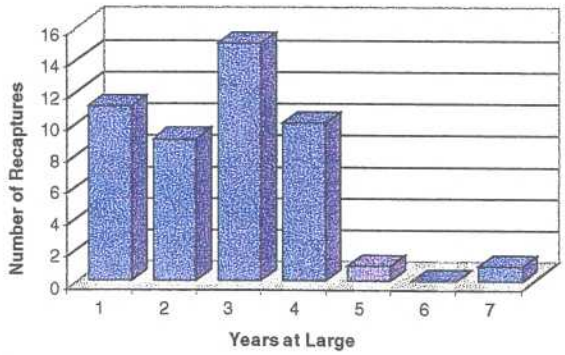


Figure 17. Years at-large for 1996-1997 amberjack recaptures.

The release and recapture locations of recaptured amberjack are given in Table 17. The longest straight-line distance by a recaptured amberjack was 907 nm. The fish was released 7/4/94 off Virginia Beach, Virginia and recaptured 627 days later on 3/22/96 near Havana, Cuba. Other selected movements for 1996-1997 recaptured amberjack are presented in Figure 18.

Table 17. Release and recapture areas for amberjack recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
FLORIDA PANHANDLE	FLORIDA	14
	LOUISIANA WATERS	2
MASS TO VIRGINIA	CUBAN WATERS	2
	FLORIDA	1
	MASS TO VIRGINIA	7
	N. FLORIDA AND CAROLINAS	2
	SOUTHEAST	6

SOUTHEAST FLORIDA	N. FLORIDA AND	2
	CAROLINAS	2
	SOUTHEAST	8
	WEST FLORIDA	1
TEXAS WATERS	TEXAS WATERS	1
UNSPECIFIED WATERS	SE FLORIDA	1

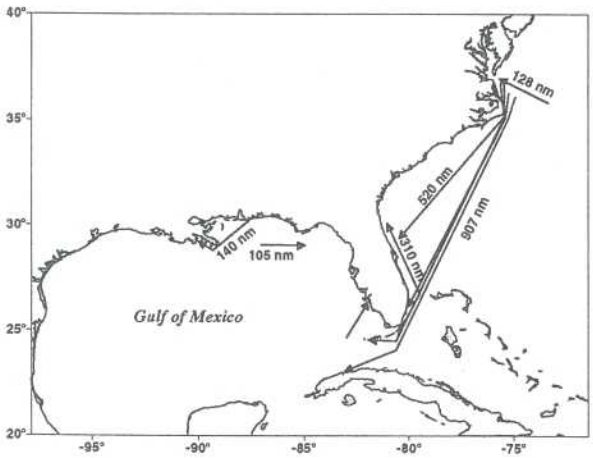


Figure 18. Movements of selected 1996-1997 tag-recaptured amberjack.

Cobia

A total of 75 cobia were tagged and released: 51 in 1996 and 24 in 1997. Rod and reel fishers released all of the fish. A majority of cobia tag releases (20) took place off of the Florida Panhandle. Other areas where cobias were tagged are listed in Table 18. There were a total of 16 tagged cobia recaptured: 12 in 1996 and 4 in 1997. All recaptures were by rod and reel fishers. A graph showing the years at-large is presented in Figure 19.

Table 18. Location of 1996-1997 cobia releases.

Release Location	Total Tagged
FLORIDA PANHANDLE	20
N. FLORIDA AND CAROLINAS	18
LOUISIANA WATERS	16
SOUTHEAST FLORIDA	10
MASS TO VIRGINIA WATERS	6
SOUTHERN BAHAMIAN WATERS	3
PUERTO RICO	1
UNSPECIFIED WATERS	1

The release and recapture locations of recaptured cobia are given in Table 19. The longest straight-line distance by a recaptured cobia was 686 nm. The fish was released near Port Canaveral, Florida on 3/15/92 and recaptured 1,570 days later on 7/2/96 near Lambert Bayou, Louisiana. Other significant movements for 1996-1997 recaptured cobia are presented in Figure 20.

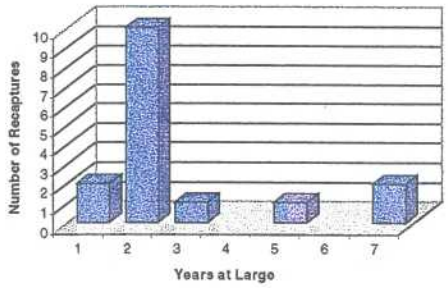


Figure 19. Years at-large for 1996-1997 cobia recaptures.

Table 19. Release and recapture areas for cobia recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
FLORIDA PANHANDLE	FLORIDA PANHANDLE	1
	LOUISIANA WATERS	1
	WEST FLORIDA	2
LOUISIANA WATERS	LOUISIANA WATERS	2
MASS TO VIRGINIA	MASS TO VIRGINIA	5
N. FLORIDA AND CAROLINAS	FLORIDA PANHANDLE	2
	MASS TO VIRGINIA	1
	TEXAS WATERS	1
SOUTHEAST FLORIDA	WEST FLORIDA	1

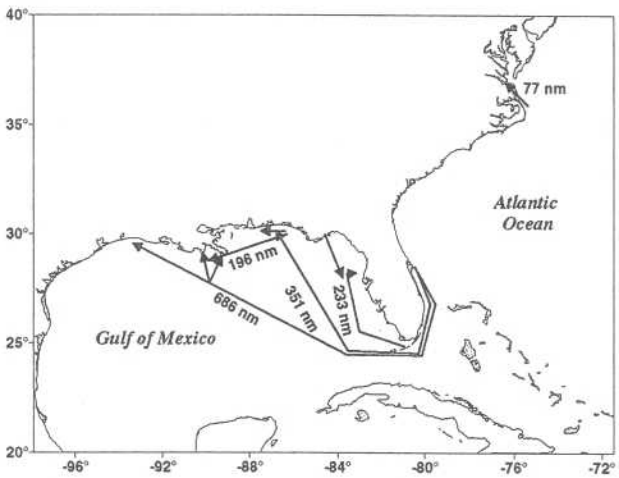


Figure 20. Movements of selected 1996-1997 tag-recaptured cobia.

King Mackerel

A total of 246 king mackerel were tagged and released: 224 in 1996 and 22 in 1997. Of the total releases, 244 were by recreational rod and reel fishers, and 2 by unspecified sources. A majority of king mackerel tag releases (213) took place off Texas. Other areas where king mackerel were tagged are listed in Table 20.

There were a total of 30 tagged king mackerel recaptured: 19 in 1996 and 11 in 1997. Of the total recaptures, 25 were by rod and reel fishers, 2 by hand line and 3 by longline fishers. A graph showing the years at-large is presented in Figure 21. The longest time at-large for a recaptured king mackerel was 1,595 days. This fish was released on 2/15/93 off Ft. Pierce, Florida and recaptured 6/29/97 off Vero Beach, Florida.

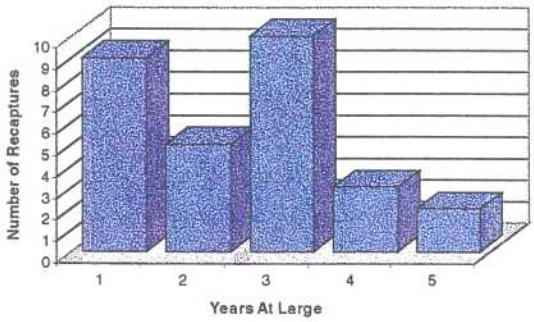


Figure 21. Years at-large for 1996-1997 king mackerel recapture.

Table 20. Location of 1996-1997 king mackerel releases.

Release Location	Total Tagged
TEXAS	213
N. FLORIDA AND CAROLINAS	10
WEST FLORIDA	7
FLORIDA PANHANDLE	5
MASS TO VIRGINIA WATERS	5
SOUTHEAST FLORIDA	4
LOUISIANA	1
UNSPECIFIED WATERS	1

The release and recapture locations of recaptured king mackerel are given in Table 21. The longest straight-line distance by a recaptured king mackerel was 553 nm. The fish was released on 6/28/96 off Port Aransas, Texas and recaptured 200 days later on 1/14/97 near Campeche, Mexico. Other selected movements for 1996-1997 recaptured king mackerel are presented in Figure 22.

Table 21. Release and recapture areas for king mackerel recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
LOUISIANA WATERS	LOUISIANA WATERS	1
N. FLORIDA AND CAROLINAS WATERS	N. FLORIDA AND CAROLINAS WATERS	3
	SOUTHEAST FLORIDA	3
SOUTHEAST FLORIDA	N. FLORIDA AND CAROLINAS WATERS	1
	SOUTHEAST FLORIDA	12
TEXAS WATERS	MEXICAN WATERS	1
	TEXAS WATERS	7
	UNSPECIFIED WATERS	1
WEST FLORIDA	UNSPECIFIED WATERS	1

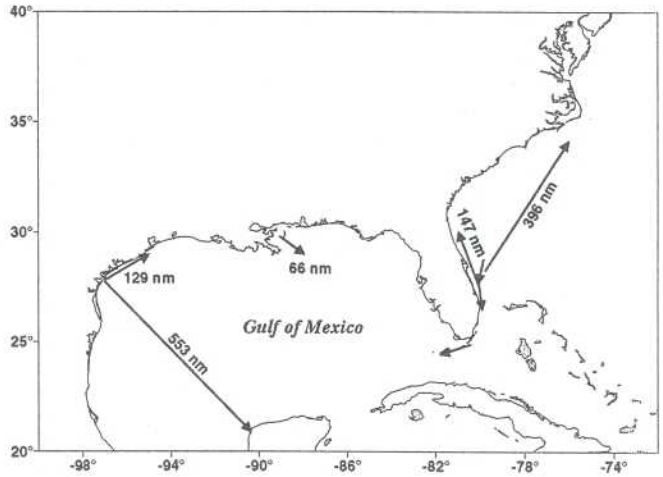


Figure 22. Movements of selected 1996-1997 tag-recaptured king mackerel.

Red Drum

A total of 287 red drum were tagged and released: 239 in 1996 and 48 in 1997. Rod and reel fishers released all 287. A majority of red drum tag releases (122) took place between North Florida and the Carolinas. Other areas where red drums were tagged are listed in Table 22.

There were a total of 145 tagged red drum recaptured: 128 in 1996 and 17 in 1997. Rod and reel fishers recaptured 139, 5 were by trammel net and one recapture's gear was not reported. A graph showing the years at-large is presented in Figure 23. The longest time at-large for a recaptured red drum was 1,715 days. This fish was released on 12/5/92 in the Banana River, Florida and recaptured off Merritt Island, Florida 8/16/97. The release and recapture locations of recaptured red drum are given in Table 23.

Table 22. Location of 1996-1997 red drum releases.

Release Location	Total Tagged
N. FLORIDA AND CAROLINAS	122
LOUISIANA WATERS	43
FLORIDA PANHANDLE	36
SOUTHEAST FLORIDA	33
MASS TO VIRGINIA WATERS	25
WEST FLORIDA	17
TEXAS WATERS	7
CUBAN WATERS	2
N.E. U.S. WATERS	1
UNSPECIFIED WATERS	1

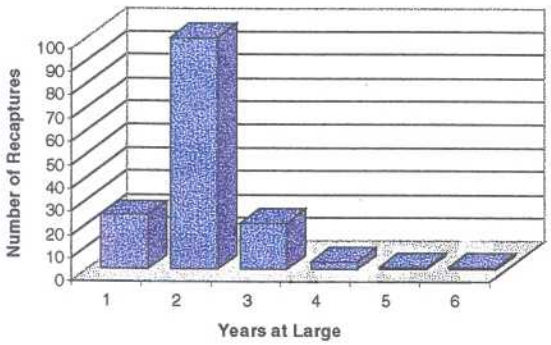


Figure 23. Years at-large for 1996-1997 red drum recaptures.

Table 23. Release and recapture areas for red drum recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
FLORIDA PANHANDLE	FLORIDA PANHANDLE	1
	LOUISIANA WATERS	1
	N. FLORIDA AND CAROLINAS	1
LOUISIANA WATERS	LOUISIANA WATERS	1
MASS TO VIRGINIA	N. FLORIDA AND CAROLINAS	3
N. FLORIDA AND CAROLINAS	N. FLORIDA AND CAROLINAS	111
	UNSPECIFIED WATERS	5
	SOUTHEAST FLORIDA	1
	WESTERN ATLANTIC	1
SOUTHEAST FLORIDA	SOUTHEAST FLORIDA	2
TEXAS WATERS	TEXAS WATERS	3
WEST FLORIDA	N. FLORIDA AND CAROLINAS	1
	UNSPECIFIED WATERS	1
	SOUTHEAST FLORIDA	1
	FLORIDA PANHANDLE	1
	WEST FLORIDA	11

The longest straight-line distance by a recaptured red drum was 564 nm. The fish was released 11/25/95 off Nags Head, North Carolina and recaptured 77 days later on 2/10/96 in Mosquito Lagoon, Florida. Other selected movements for 1996-1997 recaptured red drum are presented in Figure 24.

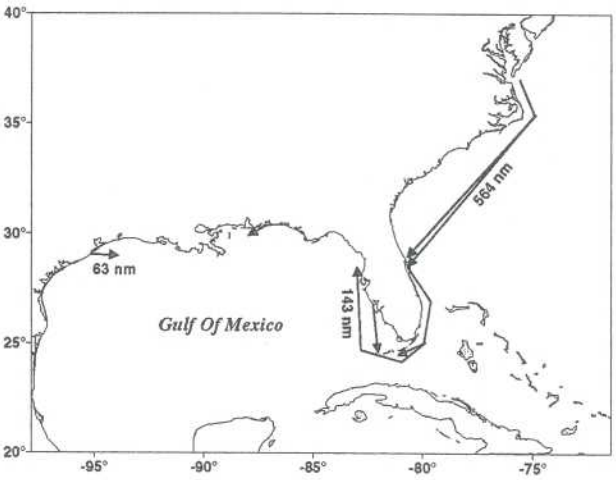


Figure 24. Movements of selected 1996-1997 tag-recaptured red drum.

Tarpon

In the past, the Florida League of Anglers had managed distribution and sale of tags for tarpon. They provided tags to those people who requested them by purchasing the tags with donations made to them by clubs and individuals. However, BOAT/U.S. has taken over this program, and tarpon tags can now be obtained by contacting Boat U.S./Clean Water Trust at **(800) 262-8872.**

A total of 1,037 tarpon were tagged and released: 634 in 1996 and 403 in 1997. Rod and reel fishers released 1,004 and 33 fish did not have the gear reported. A majority of tarpon tag releases (713) took place off west Florida waters. Other areas where tarpon were tagged are listed in Table 24.

Table 24. Location of 1996-1997 tarpon releases.

Release Location	Total Tagged
WEST FLORIDA	713
LOUISIANA WATERS	135
SOUTHEAST FLORIDA	132
N. FLORIDA AND CAROLINAS	26
UNSPECIFIED WATERS	10
FLORIDA PANHANDLE	7
MASS TO VIRGINIA WATERS	4
PUERTO RICO	4
TEXAS WATERS	4
WESTERN ATLANTIC	2

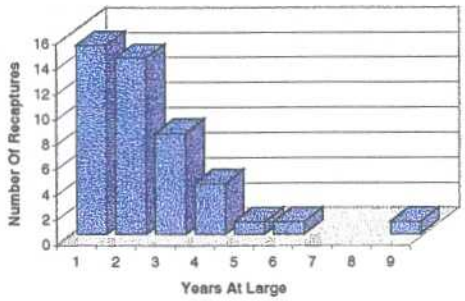


Figure 25. Years at-large for 1996-1997 tarpon recaptures.

There were a total of 43 tagged tarpon recaptured: 17 in 1996 and 26 in 1997. All of the recaptured fish were by rod and reel fishers. A graph showing the years at-large is presented in Figure 25. The longest time at-large for a recaptured tarpon was 2,985 days. This fish was released on 5/25/88 off Bahia Honda, Florida and recaptured 7/27/96 off Galveston, Texas.

The release and recapture locations of recaptured tarpon are given in Table 25. The longest straight-line distance by a recaptured tarpon was 800 nm. This fish was released 7/31/94 off Ocracoke, North Carolina and recaptured 669 days later on 5/30/96 off Havana, Cuba. Other significant movements for 1996-1997 recaptured tarpon are presented in Figure 26.

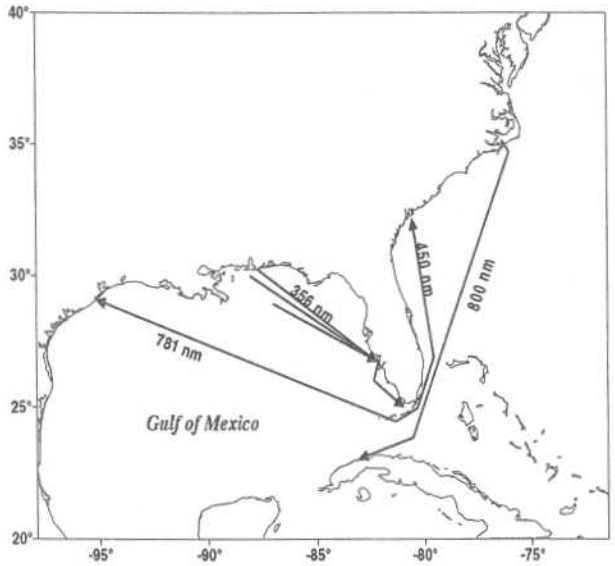


Figure 26. Movements of selected 1996-1997 tag-recaptured tarpon.

Table 25. Release and recapture areas for tarpon recaptured during 1996 and 1997.

Release Location	Recapture Location	Total
FLORIDA PANHANDLE	WEST FLORIDA	2
LOUISIANA WATERS	LOUISIANA WATERS	1
	WEST FLORIDA	1
MASS TO VIRGINIA	CUBAN WATERS	1
SOUTHEAST FLORIDA	N. FLORIDA AND CAROLINAS	1
	SOUTHEAST FLORIDA	18
	TEXAS WATERS	1
	WEST FLORIDA	2
WEST FLORIDA	UNSPECIFIED WATERS	2
	SOUTHEAST FLORIDA	2
	WEST FLORIDA	12

Commercial Participation

Longline fishers contribute significantly to our tagging program. This is particularly true for swordfish and bigeye tuna but also includes other species. The largest group of fishers involved in our program is the Blue Water Fishermen's Association [BWFA] (Table 26), although non-BWFA fishers make substantial contributions. For example, all longline participants tagged and released 747 swordfish during 1996-1997. Of these, BWFA accounted for 341 of all releases. In addition, BWFA participants tagged and released 35 of the bigeye tuna, 21 of the yellowfin tuna, and 71 of the white marlin during this time period. The BWFA members, and all other longline fishers, are important participants of the Cooperative Tagging Center.

Federation of Japan Tuna Fisheries

As part of an international tagging program initiated under the auspices of ICCAT, the Federation of Japan Tuna Fisheries (FJTF) started its volunteer tagging activities for billfish from their high seas longline operations in 1996. During its first year of tagging activities, the FJTF tagged and released a total of 78 billfish and tuna in the Atlantic. The species breakdown includes 18 blue marlin, 16 white marlin, 24 sailfish, 17 spearfish, one swordfish, and 2 big eye tuna. At the time of publishing this report, 1997 tagging records were incomplete but indicated 2 blue marlin and 3 spearfish had been tagged as of August 1997. We are encouraged by this initial tagging effort and hope this program will be expanded in future years.

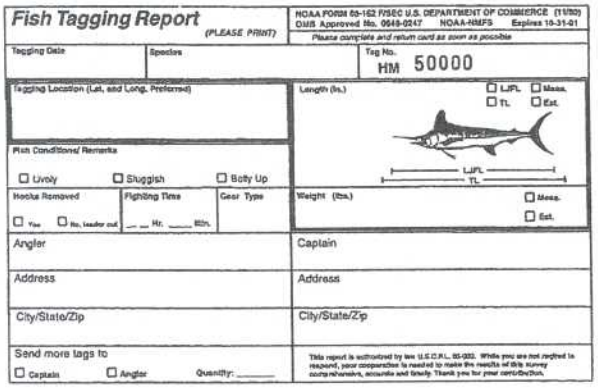
Table 26. Longline fishers, including *Blue Water Fishermen's Association* members tagging 30 or more fish for the CTC during 1996-1997.

Captain	Number Fish Tagged
T. Baker Dunn	300
Robert Burcaw	234
Larry Horne	132
Mitch Bodick	38
Becky Clodfelter	38
Michael Conners	37
Paul O'Donnell	37
Eric Burcaw	30

Fish Tagging Report

Conscientious fishers are essential to the tagging program. Release cards are often missing from our files when a recaptured fish is reported to our office. When participants do not take the time to properly complete and return the release cards, data received from the fish when it is recaptured are compromised. One major problem associated with missing release cards is when a participant issued tags with specific identification numbers gives these tags to someone else for use. This practice eliminates the programs ability to track specific tags to individuals and greatly compromises the integrity of the tagging program. Please do not lend tags issued to you to anyone else. Instead, we ask that you have people contact our office to get their own tags.

To make the tagging program work, it is necessary to properly fill out the tag release card and return it to the CTC as soon as possible. We prefer to receive release cards within a week of the release since many tagged fish are recaptured during the first month they are at large.


Fish Tagging Report (PLEASE PRINT)
NOAA FORM 88-162 F/SEC U.S. DEPARTMENT OF COMMERCE (11/90)
OMB Approved No. 0648-0247 NOAA-NMFS Expires 10-31-91
Please complete and return card as soon as possible
Tagging Date
Species
Tag No. HM 50000
Tagging Location (Lat. and Long. Preferred)
Length (in.)
LJFL Meas.
TL Est.
LJFL
TL
Fish Conditions/ Remarks
Lively
Sluggish
Belly Up
Hooks Removed
Fighting Time
Gear Type
Weight (lbs.)
Meas.
Est.
Angler
Captain
Address
Address
City/State/Zip
City/State/Zip
Send more tags to
Captain
Angler
Quantity:

We encourage participants to keep an independent log or file of personal tagging activities to insure CTC records reflect tagging participant records. Tag release cards are occasionally lost in the mail. However, if we are informed about the loss before too much time passes we can work together to recover the data. Acknowledgment letters are sent to participants when tag release cards are processed by the CTC.

It is important to keep the following items in mind when filling out the Fish Tagging Report Card:

1. Record the exact date the fish was tagged.

2. Give the tagging location in degrees and minutes of latitude and longitude. If this is not possible, tell us the distance and direction offshore you were from a city or landmark.

3. Check off the corresponding length boxes on the tagging card to specify estimated (Est.) or measured (Meas.) sizes. Let us know if the recorded length was Total (TL), from the tip of the bill to the end of the tail, or Lower Jaw to Fork Length (LJFL), from the end of the lower jaw to the fork of the tail, or Fork Length, from the tip of the snout to the fork of the tail.

4. To avoid errors on the release card, record the date, location, and size data immediately after releasing the fish, not at the end of the day.

5. Record condition of fish after release and check the appropriate box for lively, sluggish, or belly up.

6. Indicate if the hooks were removed or the leader was cut.

7. Clearly print the names and addresses of anglers and captains to insure proper credit is given to them.

When tags are distributed by the CTC we assign tag numbers to each participant. Again, to keep our records in order we remind tagging participants to avoid lending out or mixing their tags with other fishermen. Program participants who tag large number of fish often contact the tagging office to get their personal captain or angler code number. This code number is inserted in the name/address portion of the card, thus making the procedure for filling out the cards easier and faster, particularly when dealing with large volume of cards. The CTC asks its participants to inform the tagging office in the event of an address change.

Tagging Procedure

When fishers choose to participate in the tagging program, it is important to use correct tagging procedures each time a fish is tagged. The target area identified for placing tags into adult billfish and tunas should not be close to the head, gill plates, eyes and other vital organs (compensate the target area for smaller fish). This will prevent possible injury caused by last minute movement of the fish. The tag should ideally be placed in the dorsal musculature well above the lateral line. This tag position will promote rapid

healing of the tag wound and minimize the chance for serious injury.

Applying the tag to the fish is accomplished by taking a downward or dorsal tag placement approach over the fishes back. The tag is placed as close to the dorsal spines as possible. Tags should be placed away from the head at a distance equal to at least one half the length of the pectoral fin.

We recognize that dorsal tag placement over the back of the fish can not always be accomplished because many fish turn sideways when brought alongside the boat. Many fish (particularly tuna and billfish) come alongside the boat sideways with their belly closest to the boat and the target area furthest from boat side. Tagging a fish that comes to the boat in this fashion necessitates a lateral approach for tag placement. Using a tagging pole with perpendicular, as well as parallel applicator pins (dual applicator tagging pole) can circumvent this problem.

When a fish comes alongside the boat on its side, tagging can best be accomplished by using the perpendicular applicator. In essence, the tag placement using the perpendicular applicator mimics a dorsal approach using the parallel applicator over the fish's back. By equipping the tagging pole with dual applicator pins (parallel and perpendicular), the tagger has the flexibility to make last minute adjustments in the way the tag is placed in the fish, depending on the position of the fish at boatside.

The dorsal tag placement approach avoids the dense concentration of highly vascularized red muscle tissue, which is concentrated in the area underneath and adjacent to the lateral line. This area should be avoided to minimize hemorrhaging and promote healing of the tag wound. In most species, there is little, if any, red muscle tissue along the back next to the dorsal spines. If the lateral approach must be taken, the closer the tag can be placed to the dorsal spines, the better the chances for avoiding or minimizing hemorrhaging during the tagging event. **Remember**, tagging doesn't kill fish, but **BAD TAGGING CAN KILL FISH**.

Recapturing Tagged Fish

The ultimate source of information for the CTC has always been the recovery of tagged fish. Since recapturing a tagged fish is a rare event, all fish brought alongside the boat should be examined on **BOTH** sides to see if a tag is present. Persons catching a tagged fish should understand that, to maximize the value of the information we obtain from tag-recaptures, it is desirable to retain the whole fish for scientific examination. If this were not possible, cutting out the area surrounding the tag would provide scientists the opportunity to examine the healing process around the tag wound. Therefore, if a tag is discovered, a determination should be made to see if the fish could be legally boated. If the fish cannot be legally boated, clip off the tag as best you can while the fish is alongside the boat and insert a new tag. When returning the release card for the new tag, please note that the fish was previously tagged on the card. Removing the tag from the fish is easier if the fish can be boated. When examining the tag, remove any growth (algae, barnacles, etc.) by hand to see if the tag number can be read. Please refrain from using a knife or chemicals when removing growth from the tag. This often removes the identification number from the tag rendering the recapture useless.

If the whole fish or section of muscle surrounding the tag wound are saved, these samples should be frozen and the CTC contacted immediately at **(800) 437-3936** or on weekends or nights contact Dr. Eric Prince at **(305) 598-0944**.

OMB Approved No. 0648-0259 Expires 09/30/94

TAG RECAPTURE CARD

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

    YES ☐ NO ☐

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

    (305) 361-4248 (Daytime)

    (305) 598-0944 (Night/Weekends)
12. COMMENTS: _____

Tag Recapture Card

Time and experience have taught us that it is unreasonable to assume that the public can remember all the information we want from a tag-recaptured fish. The card is printed on fluorescent orange paper so that no matter how much time passes before a tagged fish is recaptured, it will be easy to find among your boat papers. The Tag Recapture Card is available in English and Spanish.

Save It For Science

The CTC emphasizes the importance of recapturing tagged fish through our "Save It For Science" program. Since this program's inception in 1982, we have encouraged fishers to retain the carcasses of tag recaptured fish. Scientists use samples to gain further knowledge about age and growth. In addition, the condition of the recovered tag and the tissue surrounding the tag is closely monitored through tag performance research. This research provides important information that is used to develop better tags.

The CTC requests anglers to save all legal size tag recaptured fish by freezing the fish and contacting the

tagging program at **(800) 437-3936** to receive further instructions. On weekends or after business hours, call Dr. Eric Prince at **(305) 598-0944**.

The quality of age and growth information taken from tagging studies is directly related to the accuracy of length and weight measurements and the duration of time the fish has been at large. Lengths and weights should be estimated or measured as precisely as possible. Most of the time, length is the only practical size variable that can be accurately measured on the high seas. Measuring weights of fish, particularly highly migratory species, can not normally be accomplished at sea. If the length at release is estimated too high, there is a possibility that the reported length at recapture will yield a negative number. The use of measuring tapes or marks on the side of your boat may help estimate length when the fish is brought to the boat before releasing.

Cooperative Efforts

Double Tagging

The tagging procedures for the double tagging study are more demanding than the procedures used in the conventional tagging program. Therefore, double tagging using the NMFS R-tag (steel anchor), the NMFS HM-tag or The Billfish Foundation BF-tags (nylon anchor) is not for everyone and we prefer that only the more experienced taggers attempt this activity. For example, when double tagging, we prefer to have one tag placed on each side of the billfish. This would greatly increase the probability that a tag on a recaptured fish would be seen when brought along side the boat. However, tagging on both sides of the fish takes longer and is not always possible under field conditions. In the past, some of the more innovative participants in this experiment have built tagging sticks that insert both tags into the fish at the same time. Although this simplifies the tagging procedure and saves time, we discourage this practice because having both tags on one side of the fish close enough to touch each other invalidates the purpose of the experiment. That is, under these conditions the shedding rates of the two tags are not independent of each other.

To date, there has been a total of 3,202 double-tagged billfish (as well as a few tunas) released and 103 (about 3.2%) of these have been recaptured (Table 27). Most of the double tagging has been with blue marlin and sailfish, but other billfish and a few tunas have also been double-tagged. Both the longline participants (mostly BWFA members) and rod and reel anglers have participated actively in the double tagging program. Of the 103 recaptured fish, 22 (or 21%) had both tag types intact, while 70 (68%) had only the TBF or NMFS nylon anchor tag. The NMFS R-tag (stainless steel tip) was apparently shed in 70 fish. Conversely, only 11 of the 103 recaptures (about 11%) had the NMFS R-tag. Because the total number of double-tagged billfish that have been recaptured has increased over the years to 103, we believe that these results strongly support the use of the TBF/NMFS double barb nylon anchor tag as superior to the stainless steel anchor tag used to tag highly migratory species. We greatly appreciate the efforts of rod and reel anglers, as well as BWFA members for their contributions to the double tagging program, as more effort is required to double tag properly.

Table 27. Summary of double-tagging experiments conducted jointly by The Billfish Foundation and the NMFS CTC, 1990-1998.

SPECIES	Releases	Recaptures			
		Total	Both tags	BF/ HM Type	R type
Sailfish	961	39	9	26	4
Blue Marlin	1,056	29	7	17	5
White Marlin	423	17	2	15	0
Swordfish	595	12	2	9	1
Bigeye tuna	55	0	0	0	0
Yellowfin tuna	84	3	1	1	1
Amberjack	3	1	0	1	0
Bluefin tuna	25	2	1	1	0
Total	**3,202**	**103**	**22**	**70**	**11**

Tagging System Improvements

The NMFS Miami Laboratory Cooperative Tagging Center introduced a new tag in 1995. This new tag design, the HM-tag, is in essence the same design that has been in use by The Billfish Foundation (BF-type) since 1990. The HM-tag anchor (HM stands for Highly Migratory) is constructed of medical grade nylon, has two barbs, and uses a stainless steel applicator for tag placement. After the tag is inserted, the applicator is withdrawn, leaving only the nylon anchor inside the fish. The HM-tag is designed as an intermuscular tag and has replaced the "R-type" stainless steel tags used in previous years. Improvements incorporated into the HM-tag are based, in part, on the double tagging observations outlined in the previous section.

The most recent refinement in our conventional tagging equipment came as a result of observing hundreds of tag recovered bluefin tuna recovered off Hatteras, N.C. These observations indicated that both NMFS and TBF tags were not being placed deep enough and that the monofilament used in tag construction was to light. Starting in 1997, we used heavier monofilament in tag construction. In addition, we added additional length to the monofilament between the anchor and legend, while increasing the length of the stainless steel applicator.

These changes resulted in a one-inch increase the depth of tag placement. We believe these changes have increased the chances of the tag being retained in the fish. Both NMFS and TBF incorporated these recent improvements during the 1997-fishing season. If any participants are using the shorter applicators with the new tags, please contact our office, or The Billfish Foundation to obtain the new applicators.

Tagging Awards

AFTCO Tag/Flag Tournament

The Axelson Fishing Tackle Company (AFTCO) first started a cooperative effort with the CTC to recognize contributors to the tagging program in 1989. Several other tagging programs also participate, including The Billfish Foundation; Fish Trackers, Inc.; Gulf Coast Conservation Association; and the South Carolina Marine Game Fish Tagging Program. Anglers and captains compete for handsome trophies for those tagging the most of each of the seven designated species. All fish must have been tagged in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Anglers and captains who tagged a certain number of each species received an AFTCO Tag Flag award. The designated species, and the number required to qualify (in parenthesis) for the AFTCO Tag Flag awards for each species, are: albacore (5), bigeye and/or yellowfin tuna (5), bluefin tuna (5), blue marlin (3), white marlin (5), and sailfish (10). For further information about the AFTCO Tag/Flag Tournament, contact the CTC or:

AFTCO Manufacturing Co.
17351 Murphy Avenue
Irvine, CA 92714.
(714) 660-8757

The winners of the 1996 and 1997 designated categories are listed in Table 26 and Table 27, respectively. The overall winners for 1996 were angler Stanley Klimek and Captain Dave Noling. For 1997 the overall winners were angler Frank Pettisani Jr. and Capt. Dave Noling.

ICCAT 1997 Tag Lottery

Each year, the International Commission for the Conservation of Atlantic Tunas (ICCAT), headquartered in Madrid, Spain, issues lottery rewards ($500 each) for a tag recaptured temperate tuna (i.e., bluefin tuna), a tropical tuna (i.e., yellowfin tuna, blackfin tuna), and for a billfish (i.e. swordfish, marlin, sailfish). These rewards are given as an incentive for fishermen to participate in the Atlantic-wide tagging programs by many countries for highly migratory species. The three ICCAT lottery winners for 1997 were. (1) Temperate tuna, Mr. E. Scarborough of the United States, who caught a tagged bluefin tuna on rod and reel off Hatteras, North Carolina March 29, 1996. This fish was originally tagged by U.S. scientists using rod and reel in the same location on January 29, 1996, 59 days earlier. (2) Tropical tuna, Crew of the "MOHAMED FADEL" recovered a tagged yellowfin tuna off West Africa, in September 1996. This fish was originally released by a French scientist, who tagged this fish earlier in the same month and off the same location. (3) Billfish, Mr. L. Bagley of the United States, who caught a tagged sailfish using rod and reel on January 28, 1996, while fishing off the upper Florida Keys. The fish was originally tagged 375 days earlier off of Vero Beach Florida, U.S. by Randy West using rod and reel. The CTC extends its congratulations to the winning anglers and captains, and to the sponsoring organizations for their effort and cooperation in the conservation of our marine fishery resources.

CTC Recapture Incentives and Rewards

We began to acknowledge participants of the CTC in 1976. We cannot give fishermen credit for fish tagged and released unless we receive the tag-release cards. Please make sure the addresses on the cards are correct and complete. Some participants use stamp pads or labels on their release cards. Program participants tagging as captains who released 10 or more fish during 1996 and 1997 are listed in Appendix 1. Participants tagging as anglers releasing 5 or more fish are listed in Appendix 2. The CTC awards a gray embroidered hat with the NMFS tagging flag emblem to the person reporting the recapture of a tagged fish. The gray hats cannot be purchased; however, the same hat in either black or in various colors can be purchased for $10.00 ($2.00 of this charge go towards a NMFS fund to buy the gray hats) by writing or calling our supplier:

Island Custom Embroidery
88511 Overseas Highway
Tavernier, FL 33070
(305) 852-6317
*FAX **(305) 852-9553***

Table 26. Winners of the 1996 individual trophies (both anglers and captains tagging the most fish of the designated species) for the AFTCO Tag/Flag tournaments.

SPECIES	WINNING ANGLERS	WINNING CAPTAINS
Albacore trophy donated by:	Stanley Klimek American Sportfishing Association	Robert Cassidy New York Sportfishing Federation
Bluefin Tuna trophy donated by:	Stanley Klimek International Gamefish Association	Peter B. Wright International Gamefish Association
Yellowfin & Bigeye trophy donated by:	Stanley Klimek American Sportfishing Association	Jerry Shepherd American Sportfishing Association
Blue Marlin trophy donated by:	Damon Chouest National Coalition for Marine Conservation	Dave Noling National Coalition for Marine Conservation
White Marlin trophy donated by:	Enrico Capozzi The Billfish Foundation	Dave Noling The Billfish Foundation
Sailfish trophy donated by:	Howard Peterson International Gamefish Association	Dave Noling The Billfish Foundation

Table 27. Winners of the 1997 individual trophies (both anglers and captains tagging the most fish of the designated species) for the AFTCO Tag/Flag tournaments.

SPECIES	WINNING ANGLERS	WINNING CAPTAINS
Albacore trophy donated by:	Chris Jorgensen American Sportfishing Association	Steve Sexton New York Sportfishing Federation
Bluefin Tuna trophy donated by:	Stanley Klimek International Gamefish Association	Gary Stuve International Gamefish Associaton
Yellowfin & Bigeye trophy donated by:	Paul O'Donnell American Sportfishing Association	Joseph Singer American Sportfishing Association
Blue Marlin trophy donated by:	M. Sam Jennings National Coalition for Marine Conservation	Dave Noling National Coalition for Marine Conservation
White Marlin trophy donated by:	Frank Pettisani Jr. International Gamefish Association	Dave Noling The Billfish Foundation
Sailfish trophy donated by:	Frank Pettisani Jr. International Gamefish Association	Brad Simonds The Billfish Foundation

Appendix 1. Captains who made outstanding contributions to the CTC in 1996 and 1997 by assisting in the tagging of 10 or more sailfish, blue marlin, white marlin, swordfish, bluefin tuna, yellowfin tuna, albacore tuna, and bigeye tuna. The anglers tagged column signifies fish tagged by captain while fishing as the angler.

SPECIES

CAPTAIN	SAIL-FISH	BLUE MARLIN	WHITE MARLIN	SWORD-FISH	BLUEFIN TUNA	YELLOW-FIN	ALBA CORE	BIGEYE TUNA	CAPTAIN TAGGED	ANGLER TAGGED
BOB EAKES		3	7		333				343	2
T BAKER DUNN	50	38	34	258		9		32	421	21
ROBERT BURCAW	3	4	57	161		5		3	233	1
PAUL IVEY	30	19	146						195	2
BILL BORER	20	97	19	1		4			141	2
DAVID MARKS	1	52	7	58		13		10	141	11
BILL MCCAULEY	23	90	12						125	1
JOE BRODESSER	113		12						125	2
EVERETT PETRONIO			3		37	84			124	111
DANIEL SHAWHAN		4	7	83			4	24	122	4
JAMES MEARS		1	7	27	5	44	2	25	111	2
JEFF WEST	26	50	32						108	2
JOHN FABRYKA	1	1	24	76		1			103	44
DAN MEARS				53	9	32		3	97	12
PETE BARRETT						54	28		82	5
CHRISTIAN EINSELEN	1	2	12	31	2	24		5	77	22
MICHAEL JOHNSON				40	7	15		1	63	1
SKIP NIELSEN	54	1							55	3
ROBERT CASSIDY					3	48	4		55	43
CHRIS WALKER	5	6	11	31					53	1
T RICH TEMPLETON			1	1	23	28			53	2
JACK FALCUCCI	29	2	5			6			42	4
CLYDE UPCHURCH	39	1							40	1
RICK ROSS	1	19		20					40	18
DEW FORBES					39				39	4
BURT MOSS	29								29	8
JIMMY DAVID	29								29	20
EDDIE WINDES	7	15	7						29	2
PALMER CLINGMAN	1	10	1	11				5	28	3
TOMMY TILOTTA	14	5	7						26	3
NORM WELTER	25								25	1
GREGG SKOMAL					14	11			25	4
ALEX WIDMER	24								24	3
DREW BROOKMAN			1			22			23	1
KLAUS SCHWARZKOPF	13	8	2						23	1
DAVID MOFFAT			2	19					21	1
THOMAS MORT		1			17	2			20	1
JOHN BASSETT	19								19	4
HOWARD BASNIGHT					18				18	1
BILL CHAPRALES					17				17	1
PATRICIA GERRIOR		1	1	4		11			17	1
BOB MATTHEWS					16				16	1
RONALD HOFMANN			10			6			16	1
THOMAS DULKA	1		3			12			16	1
GERARD DESILVA	3	12							15	1
RICHARD DESMARAIS					15				15	1
JOHN CANNING		1	5		9				15	1
LARRY WITHALL	5	10							15	1
BEN TRIBKEN			1			13			14	1
ROBERT TESHER	13								13	3
DANNY BOLAND	1	8	4						13	2
DOUG GRECO				6		6			12	12
LEE PEPIN					12				12	2

Appendix 1. (Continued)

CAPTAIN	SAIL-FISH	BLUE MARLIN	WHITE MARLIN	SWORD-FISH	BLUEFIN TUNA	YELLOW-FIN	ALBA-CORE	BIGEYE TUNA	CAPTAIN TAGGED	ANGLER TAGGED
BRIAN DAVENPORT	1				11				12	1
DAVE BAGGETT	12								12	2
JEFF ROSS			2		10				12	1
STEVE KAISER	1	3	8						12	1
GARY GIFFORD	12								12	10
JOHN MAGURSKY	8	4							12	2
RON MITCHEM	11								11	2
MIKE ADKINS	11								11	8
JOEY SALOMONE	8	1	2						11	1
C BRAD GILLAM					10				10	4
HENRY OTTO	9	1							10	1
MIKE PATRICK	5	2	2			1			10	1
TOM CARBO	1	7	1			1			10	1
JEFF SESSA	7	3							10	7
LEO GILLESPIE	2	7	1						10	1
EDUARDO ALCAIDE	2	7	1						10	2
GLENN TEMPLET	1	8	1						10	1
RONNIE RIDGEWAY				10					10	4
DON COMBS	1	8	1						10	2
H LAURELLI					9	1			10	15
JAY/SHARON BERMAN						10			10	4

Appendix 2. Anglers who made outstanding contributions to the CTC in 1996 and 1997 by assisting in the tagging of 5 or more sailfish, blue marlin, white marlin, swordfish, bluefin tuna, yellowfin tuna, albacore tuna, and bigeye tuna. The captain tagged column signifies fish tagged by angler while fishing as the captain.

SPECIES

ANGLER	SAIL-FISH	BLUE MARLIN	WHITE MARLIN	SWORD-FISH	BLUEFIN TUNA	YELLOW-FIN	ALBA-CORE	BIGEYE TUNA	ANGLER TAGGED	CAPTAIN TAGGED
EVERETT PETRONIO			1		37	73			111	124
JOHN FABRYKA			6	35		3			44	103
J RICHARD JECK	43								43	7
ROBERT CASSIDY					3	38	4		43	55
FRED DAVID	31								31	9
DAVID BREGMAN			1			21	3		25	1
CHRISTIAN EINSELEN				15		3		4	22	77
T BAKER DUNN		5	2	10		1		3	22	421
PAUL MOTTA	9	13							22	3
BRAD SIMONDS		20							20	8
JIMMY DAVID	19	1							20	29
RICK ROSS		8		10					18	40
H LAURELLI					15				15	10
MATT BROOKMAN						13			13	2
DOUG GRECO				10		1		1	12	12
DAN MEARS				9	1	2			12	97
DAVID MARKS		1		9		1			11	141
PAT KELLY			10			1			11	6
RICHIE DYAL	2	2	2	5					11	3
PAUL O'DONNELL	1		3	1		1	1	3	10	9
GARY GIFFORD	6	1	3						10	12
JOE IMBRIALE	4	1	5						10	1
ERIC LEECH	8	1							9	3
HARRY TELLAM	7		2						9	4
LINDA NOLL	9								9	1
DAN PURDY						9			9	1
BURT MOSS	8								8	29
CHUCK BALDWIN	8								8	3
MIKE ADKINS					8				8	11
JEFF SESSA	7								7	10
TONY VISENTIN					2	5			7	2
PATTY HAMILTON	7								7	1
ELIAS KATSAROS		5	1			1			7	1
MIKE GLAUBKE		1	4			1			6	3
AL HILLA							6		6	1
TIM MADDOCK	6								6	2
RUSSELL LEDBETTER					6				6	1
PAUL VISENTIN						6			6	1
LYNNE WILLIAMS	6								6	1
GAR BROWN	2	2	2						6	1
BILL BELIVEAU				6					6	1
D.M. GRAY	1	4	1						6	3
PETE BARRETT					5				5	82
BILL CHAPPELLE		4	1						5	5
CAREY ROBERTS						4	1		5	5
KENNY MCDANIEL	5								5	8

Appendix 3. Definition of broad scale location summaries used in release and recapture tables.

Western Atlantic - Atlantic Ocean north of 5^0 N and south of 41^0 N latitude. The east-west coordinates are west of 41^0 W longitude and varies eastward from 77^0 W to depending on the latitude and proximity to landmass.

Eastern Atlantic - Atlantic Ocean north of 5^0 S and south of 60^0 N latitude. The east-west coordinates are east of 41^0 W longitude north of 10^0 N latitude and steps eastward south to 25^0 W longitude at 5^0 S latitude.