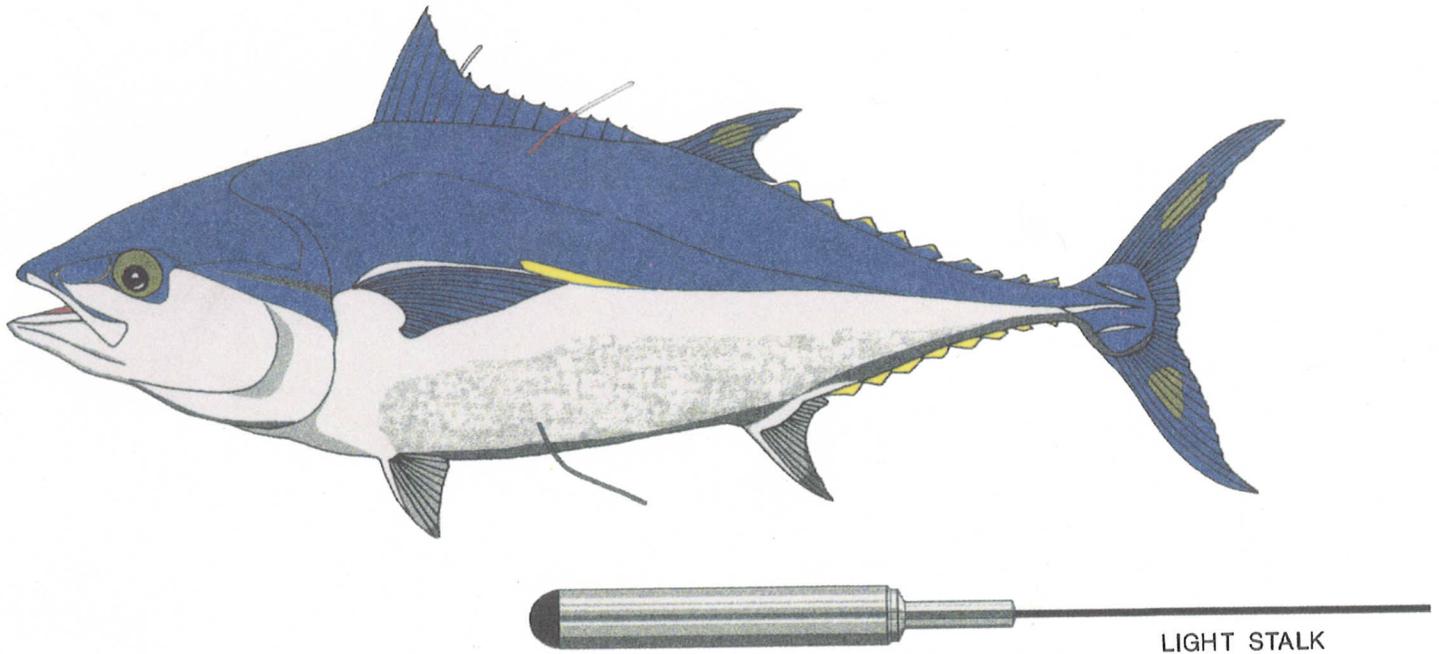




COOPERATIVE TAGGING CENTER ANNUAL NEWSLETTER: 1996



**Christopher D. Jones, David S. Rosenthal, Thomas L. Jackson,
Michael T. Judge, and Eric D. Prince**

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

September, 1996



**COOPERATIVE TAGGING
CENTER ANNUAL
NEWSLETTER: 1996**

by

**Christopher D. Jones, David S. Rosenthal, Thomas L. Jackson,
Michael T. Judge, and Eric D. Prince**

**U.S. DEPARTMENT OF COMMERCE
Mickey Kantor, Secretary**

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

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

September, 1996

This Technical Memorandum series is used for documentation and timely communication of preliminary results, interim reports, or similar special-purpose information. Although the memoranda are not subject to complete formal review, editorial control, or detailed editing, they are expected to reflect sound professional work.

NOTICE

The National Marine Fisheries Service (NMFS) does not approve, recommend or endorse any proprietary product or material mentioned in this publication. No reference shall be made to NMFS, or to this publication furnished by NMFS, in any advertising or sales promotion which would indicate or imply that NMFS approves, recommends, or endorses any proprietary material mentioned herein or which has as its purpose any intent to cause directly or indirectly the advertised product to be used or purchased because of NMFS publication.

Contribution MIA-95/96-55 from the Southeast Fisheries Science Center, Miami Laboratory, Migratory Fishery Biology Division.

This report should be cited as follows:

National Marine Fisheries Service. 1996. Cooperative Tagging Center Annual Newsletter: 1996. NOAA Technical Memorandum NMFS-SEFSC-391, 22p.

Copies may be obtained by writing:

Cooperative Tagging Center
National Marine Fisheries Service
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, Florida 33149

or

National Technical Information Service
5258 Port Royal Road
Springfield, Virginia 22161
(703) 487-4650 FAX (703) 321-8547
Rush Orders: (800) 336-4700

Cover: Atlantic bluefin tuna with special two tone conventional tags, as well as surgically implanted archival tag. A \$1,000.00 reward is offered for return of archival tags on bluefin tuna.



COOPERATIVE TAGGING CENTER ANNUAL NEWSLETTER: 1996

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.aoml.noaa.gov/sefsc/tag.html>.

CTC Historical Activities

The Cooperative Tagging Center (CTC) is a joint research effort by scientists and recreational and commercial fishermen. 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. The CTC began in 1954 as the Cooperative Gamefish Tagging Program, with its focus on the tagging of bluefin tuna. Almost immediately, in response to growing concerns about other highly migratory species, the program expanded to encompass billfishes - marlins, 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 have contributed towards the willingness of the public to participate in non-consumptive fisheries that include tag-release and recapture programs. Today, there are over 27,000 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 billfishes and tunas released, has been exceptional in the last few years (Figure 1). The total recaptures of billfishes and tunas are presented in Figure 2.

Recent Changes in the Volunteer Tagging Program

The NMFS Cooperative Tagging Center has limited tagging activities to highly migratory species. Volunteer tagging activities will continue to emphasize blue marlin, white marlin, sailfish, swordfish, and the tunas,

particularly bluefin tuna and yellowfin tuna, which have always been the primary target species for our tagging program. Non-target inshore pelagic and demersal species (tarpon, grouper, snapper, mackerel), while still important, will be gradually reduced or eliminated due to limited resources.



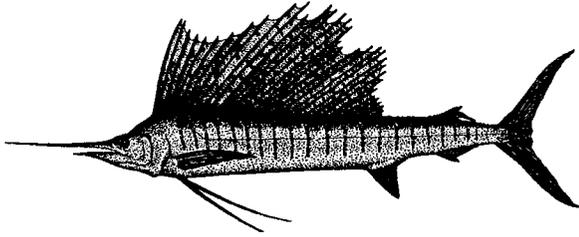
Boat/U.S. Starts Nearshore Tagging Program

The BOAT/U.S. Clean Water Trust and the National Marine Fisheries Service recently approved a cooperative agreement to develop a tagging program for near-shore species in the western Atlantic. The program will be run and administered through BOAT/U.S. and the release and recapture data will be stored on the NMFS computer in Miami, FL. This agreement is very timely and will provide anglers with an alternative source of tagging materials for many of the near-shore species that the CTC will no longer handle. Anglers interested in obtaining information or participating in the The BOAT/U.S. tagging program can use their toll free phone at: 1-800-262-8872.

Over the short term we will process all incoming data as we have in the past. However, there will be delays

Inside:	
2	1994-1995 Releases and Recaptures
14	Commercial Participation
15	Improving Tagging Information
17	Tag Development and Performance
18	Tagging Awards

involved with processing non-target species. All tagging data, including the non-target species, will be maintained permanently in our computer database. As the situation changes we will keep you informed of the status of the tagging program. We appreciate your patience and understanding during this transition.



1994-1995 Releases and Recaptures: Target Species

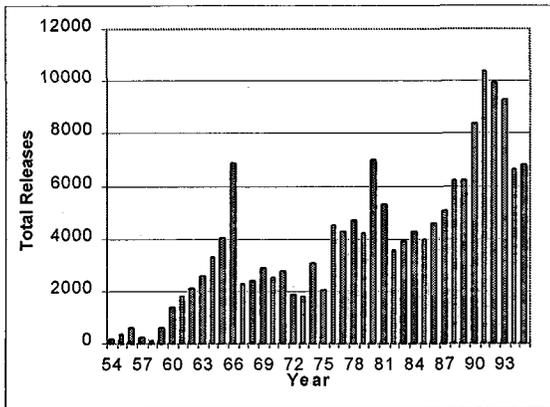


Figure 1. Number of target species tagged per year by participants of the Cooperative Tagging Center, 1954-1995. Target species are sailfish, blue marlin, white marlin, swordfish, bluefin tuna, and yellowfin tuna.

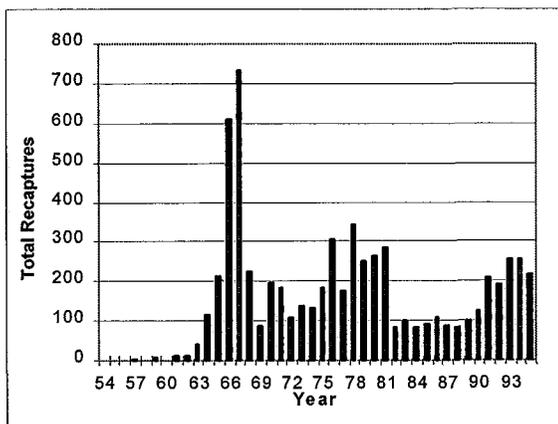


Figure 2. Number of tagged target species recaptured per year by participants of the Cooperative Tagging Center, 1954-1995. Target species are sailfish, blue marlin, white marlin, swordfish, bluefin tuna, and yellowfin tuna.

Sailfish

A total of 3,275 sailfish were tagged and released: 1,824 in 1994 and 1,451 in 1995. Of the total releases, 3,184 were released by recreational fishermen, 87 by commercial fishermen, and 4 by unspecified sources. As in previous years, a majority of sailfish tag releases (1,791) took place off the southeast coast of Florida. Other areas where sailfish were tagged are listed in Table 1. There were 114 tagged sailfish recaptured: 74 in 1994 and 40 in 1995. There were 102 recaptured by recreational fishermen, 7 by commercial fishermen, and in 5 cases the type of fisherman was not reported. The release and recapture locations of recaptured sailfish are given in Table 2, and a graph showing the years at-large is presented in Figure 3.

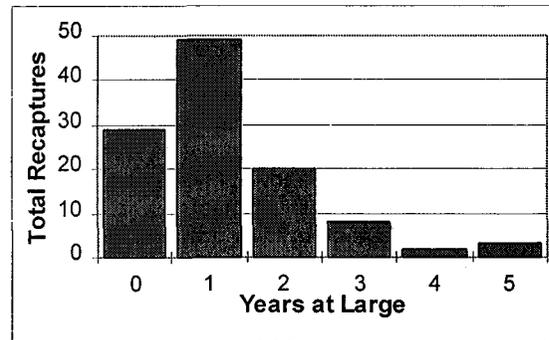


Figure 3. Years at-large for 1994-1995 sailfish recaptures.

Table 1. Location of 1994-1995 sailfish tag releases.

Release Location	Total Tagged
SOUTHEAST FLORIDA	1791
CANCUN, MEXICO	316
N. FLORIDA AND CAROLINAS	251
W. CENTRAL ATLANTIC	185
COZUMEL, MEXICO	180
LAGUAIRA, VENEZUELA	132
MID-ATLANTIC US COAST	85
UNSPECIFIED WATERBODY	50
TEXAS	48
NORTHERN BAHAMAS	44
GULF OF MEXICO	43
VIRGIN ISLANDS	34
FLORIDA NORTHWEST	28
PUERTO RICO	17
WESTERN ATLANTIC	12
BARBADOS	12
LOUISIANA	12
SOUTHERN BAHAMAS	8
COSTA RICO AND PANAMA	7
WEST FLORIDA	6
CUBA	4
N.E. U.S.	2
ROSALIND BANK, OFF MEXICO	1
HISPANIOLA	1
BELIZE	1
TRINIDAD AND TOBAGO	1

Because some recapture locations were not reported, tables summarizing release-recapture areas may contain fewer fish than the total number recaptured.

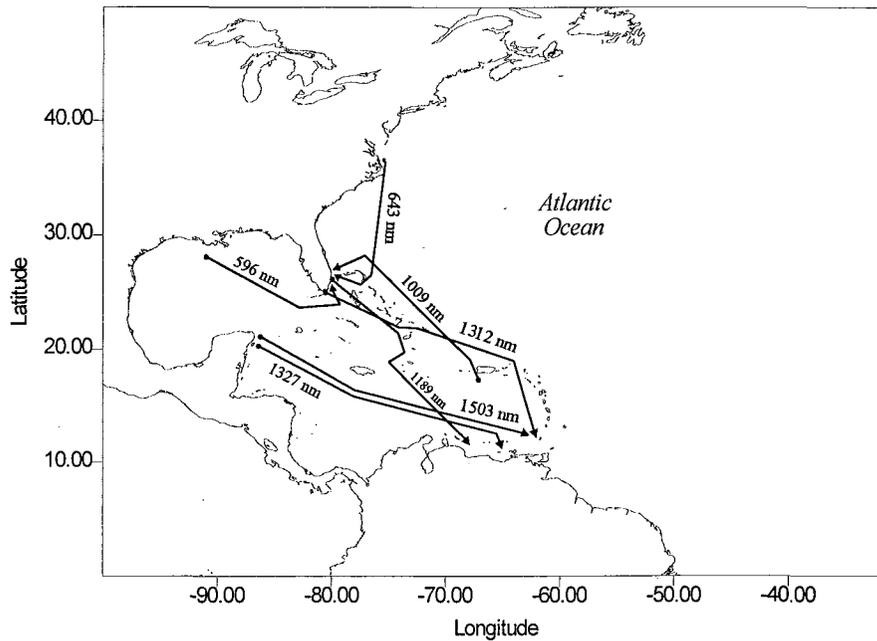


Figure 4. Movements of selected 1994-1995 tag-recaptured sailfish.

Table 2. Release and recapture areas for sailfish recaptured during 1994 and 1995.

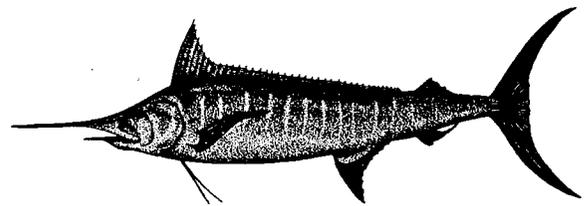
Release Location	Recapture Location	Total
BARBADOS	LAGUAIRA, VENEZUELA	2
CANCUN MEXICO	CANCUN, MEXICO	2
	GRENADA	1
	MEXICO	1
	NORTHERN BAHAMAS	1
COZUMEL MEXICO	CANADA	1
	CUBA	2
	CUMANA, VENEZUELA	1
	U.S. ATLANTIC COAST	1
GULF OF MEXICO	SOUTHEAST FLORIDA	1
LAGUAIRA WATERS	BARBADOS	1
	GRENADA	1
U.S. ATLANTIC COAST	CANCUN, MEXICO	1
	SOUTHEAST FLORIDA	1
N. FLORIDA AND CAROLINAS	CUBA	1
	JAMAICA	1
	NORTHERN BAHAMA	1
	SOUTHEAST FLORIDA	6
WESTERN ATLANTIC	SOUTHEAST FLORIDA	1
PUERTO RICO	SOUTHEAST FLORIDA	1
SOUTHEAST FLORIDA	CUBA	1
	GRENADA	1
	GULF OF MEXICO	2
	LAGUAIRA, VENEZUELA	1
	WESTERN ATLANTIC	2
	SOUTHEAST FLORIDA	78

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 1,503 nm. The fish was released off Cancun, Mexico, and recaptured 236 days later off the island of Grenada (Figure 4.). Selected movements for 1994-1995 recaptured sailfish are also presented in Figure 4. The longest time at-large for a recaptured sailfish was 1,854

days for a fish released 12/27/88 off Islamorada, FL and recaptured off Islamorada, FL on 1/24/94.

Blue Marlin

A total of 2,223 blue marlin were tagged and released: 1,134 in 1994 and 1,089 in 1995. Of the total releases, 2,031 were released by recreational fishermen, 191 by commercial fishermen, and 1 by an unspecified source. A majority of blue marlin tag releases (398) took place off the Virgin Islands. Other areas where blue marlin were tagged and released are listed in Table 3. There were 24 tagged blue marlin recaptured: 14 in 1994 and 10 in 1995. There were 13 recaptured by recreational fishermen, 4 by longline commercial fishermen, 3 by gillnet commercial fishermen, 1 by handline, and in 3 cases the type of gear was not reported. The release and recapture locations of recaptured blue marlin are given in Table 4, and a graph showing the years at-large is presented in Figure 5.



The longest straight line distance by a recaptured blue marlin was 1,531 nm. The fish was released off St. Lucia in the Caribbean and recaptured 140 days later off Ocean City, MD. Selected movements for 1994-1995 recaptured blue marlin are presented in Figure 6. The longest time at-large for a recaptured blue marlin was 3,042 days. This fish was released 10/16/85 off LaGuiara, Venezuela and recaptured near the same location on 2/13/94.

Table 3. Location of 1994-1995 blue marlin tag releases.

Release Location	Total Tagged
VIRGIN ISLANDS	398
PUERTO RICO	318
NORTHERN BAHAMA	232
LOUISIANA	207
LAGUAIRA, VENEZUELA	174
U.S. MID-ATLANTIC COAST	150
TEXAS	128
N. FLORIDA AND CAROLINAS	123
FLORIDA NORTHWEST	101
EASTERN ATLANTIC	77
GULF OF MEXICO	60
SOUTHEAST FLORIDA	55
WESTERN ATLANTIC	33
UNSPECIFIED LOCATION	31
SOUTHERN BAHAMAS	27
BARBADOS	23
BERMUDA	20
CANCUN MEXICO	15
VENEZUELA	9
WEST FLORIDA	6
COZUMEL, MEXICO	6
HISPANIOLA	5
BELIZE	5
TRINIDAD AND TOBAGO	4
JAMAICA	4
CUMANA, VENEZUELA	3
N.E. U.S.	3
CUBA	2
COSTA RICA AND PANAMA	1
CANADA	1
COLOMBIA	1

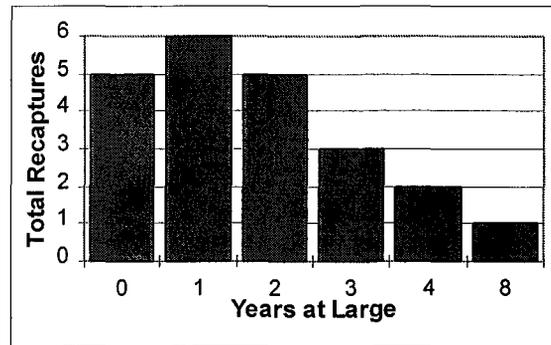


Figure 5. Years at-large for 1994-1995 blue marlin recaptures.

Table 4. Release and recapture are for blue marlin recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
BERMUDA	BERMUDA	1
LAGUAIRA, VEN.	HISPANIOLA	1
	LAGUAIRA, VEN.	6
LOUISIANA	GULF OF MEXICO	1
ST. LUCIA	U.S. MID-ATLANTIC	1
NORTHERN BAHAMAS	MARTINIQUE	1
	N. FLORIDA	1
EASTERN ATLANTIC	EASTERN ATLANTIC	1
PUERTO RICO	HISPANIOLA	2
TEXAS	TEXAS	1
VENEZUELA	U.S. MID-ATLANTIC	1
VIRGIN ISLANDS	PUERTO RICO	1
	VIRGIN ISLANDS	1
	WESTERN ATLANTIC	1
WESTERN ATLANTIC	CUBA	1

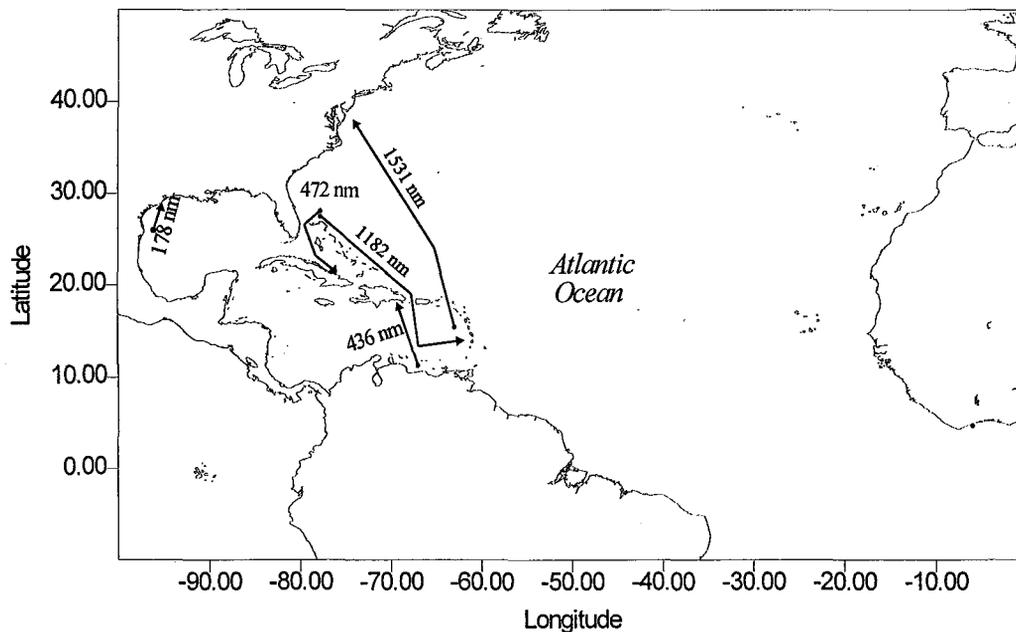
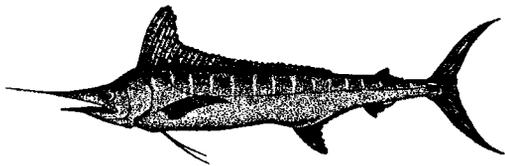


Figure 6. Movements of selected 1994-1995 tag-recaptured blue marlin.



White Marlin

A total of 1,765 white marlin were tagged and released: 866 in 1994 and 899 in 1995. Of the total releases, 1,469 were released by recreational fishermen, 281 by commercial fishermen, and 15 by unspecified sources. A majority of white marlin tag releases (734) took place off the eastern U.S. Other areas where white marlin were tagged and released are listed in Table 5. There were 45 tagged white marlin recaptured: 29 in 1994 and 16 in 1995. There were 22 recaptured by recreational fishermen, 19 by longline commercial fishermen, and in 4 cases the type of fisherman was not reported.

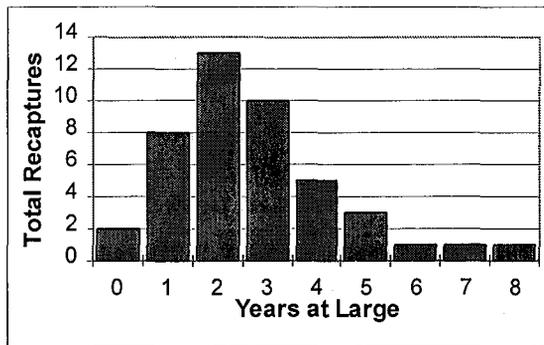


Figure 7. Years at-large for 1994-1995 white marlin recaptures

A graph showing the years at-large is presented in Figure 7. The release and recapture locations of recaptured white marlin are given in Table 6.

The longest straight line distance by a recaptured white marlin was 2,482 nm. The fish was released off Cozumel, Mexico and recaptured 286 days later in the central Atlantic. Selected movements for 1994-1995 recaptured white marlin are presented in Figure 8.

Table 5. Location of 1994-1995 white marlin tag releases.

Release Location	Total Tagged
EASTERN U.S. COAST	734
LAGUAIIRA, VENEZUELA	324
FLORIDA NORTHWEST	150
WESTERN ATLANTIC	81
TEXAS	69
N. FLORIDA AND CAROLINAS	64
LOUISIANA	63
EASTERN ATLANTIC	42
NORTHERN BAHAMAS	37
CANCUN, MEXICO	35
VIRGIN ISLANDS	28
SOUTHEAST FLORIDA	25
PUERTO RICAN	20
COZUMEL, MEXICO	18
GULF OF MEXICO	16
UNSPECIFIED LOCATION	15
MOROCCO	13
SOUTHERN BAHAMAS	9
N.E. U.S.	7
WEST FLORIDA	5
BERMUDA	4
CUBA	2
HISPANIOLA	2
VENEZUELA	2

The longest time at-large for a recaptured white marlin was 2,595 days. This fish was released 4/23/88 off Hispaniola and recaptured 6/23/94 near LaGuaira, Venezuela.

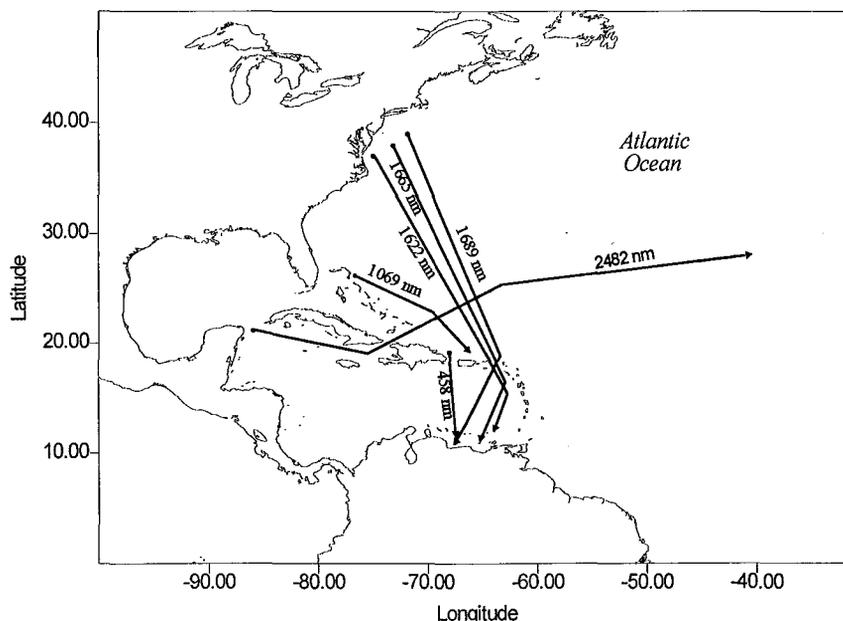
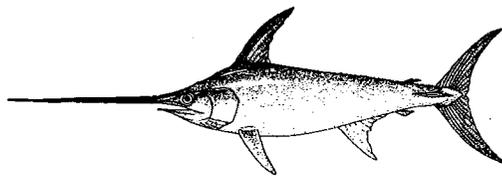


Figure 8. Movements of selected 1994-1995 tag-recaptured white marlin.

Table 6. Release and recapture areas for white marlin recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
CANCUN, MEXICO	WESTERN ATLANTIC	1
FLORIDA NORTHWEST	SOUTHEAST FLORIDA	1
HISPANIOLA	LAGUAIRA, VEN.	1
LAGUAIRA, VEN	CUMANA, VENEZUELA	5
	LAGUAIRA, VEN	5
	VENEZUELA	3
U.S. MID-ATLANTIC COAST	CUMANA, VENEZUELA	4
	LAGUAIRA, VEN	2
	U.S. ATLANTIC COAST	13
	EASTERN ATLANTIC	1
	WESTERN ATLANTIC	3
NORTHERN BAHAMAS	CUMANA, VEN.	1
	LAGUAIRA, VEN.	1
SOUTHEAST FLORIDA	PUERTO RICO	1
TEXAS	TEXAS	1
WESTERN ATLANTIC	WESTERN ATLANTIC	1



Swordfish

A total of 1,845 swordfish were tagged and released: 998 in 1994 and 847 in 1995. Of the total releases, 1,637 were released by commercial longliners, 170 by recreational fishermen, 28 by trawlers, and 10 by unspecified sources. A majority of swordfish tag releases (630) took place offshore of the eastern U.S. Other areas where swordfish were tagged are listed in Table 7. There were a total of 84 tagged swordfish recaptured: 54 in 1994 and 30 in 1995. There were 53 recaptured by longline commercial fishermen, 26 by recreational fishermen, 1 by gillnet, 1 by harpoon, and in 3 cases the type of fisherman was not reported.

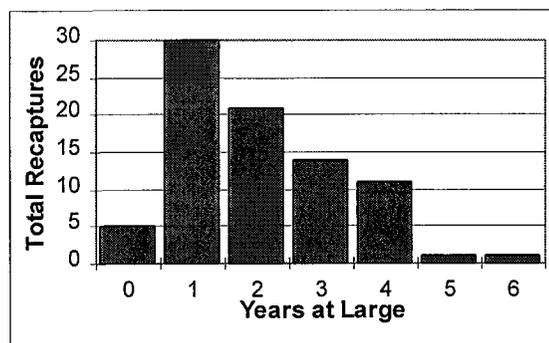


Figure 9. Years at-large for 1994-1995 swordfish recaptures.

A graph showing the years at-large is presented in Figure 9. The release and recapture locations of recaptured swordfish are given in Table 8. The longest straight line distance by a recaptured swordfish was 2732 nm. The fish was released off the U.S. mid-Atlantic in Wilmington Canyon and recaptured 390 days later off Spain. This recapture represents the first

documented trans-Atlantic movement of swordfish in the CTC.

Table 7. Location of 1994-1995 swordfish releases.

Release Location	Total Tagged
OFFSHORE EASTERN U.S.	630
WESTERN ATLANTIC	502
N. FLORIDA AND CAROLINAS	194
SOUTHEAST FLORIDA	164
GULF OF MEXICO	132
VIRGIN ISLANDS	71
N.E. U.S.	42
VENEZUELA	21
SOUTHERN BAHAMAS	18
PUERTO RICO	17
CENTRAL ATLANTIC	16
CANADA	14
CANCUN MEXICO	10
FLORIDA NORTHWEST	7
NORTHERN BAHAMIAN	4
HISPANIOLA	2
LAGUAIRA VENEZUELA	1

Other selected movements for 1994-1995 recaptured swordfish are presented in Figure 10. The longest time at-large for a recaptured swordfish was 2,231 days. This fish was released on 12/7/87 in Wilmington Canyon and recaptured 1/15/94 off Hispaniola.

Table 8. Release and recapture areas for swordfish recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
CANCUN, MEXICO	WESTERN ATLANTIC	1
GULF OF MEXICO	GULF OF MEXICO	1
	N. FLORIDA & CAROLINAS	5
	WESTERN ATLANTIC	1
	LOUISIANA	1
U.S. MID-ATLANTIC COAST	CANADA	2
	CANCUN MEXICO	1
	HISPANIOLA	1
	U.S. MID-ATLANTIC	20
	N. FLORIDA & CAROLINAS	1
	N.E. U.S.	4
	EASTERN ATLANTIC	1
	SOUTHEAST FLORIDA	1
	WESTERN ATLANTIC	5
N. FLORIDA AND CAROLINAS	CANADA	1
	U.S. MID-ATLANTIC	1
	N. FLORIDA & CAROLINAS	5
	SOUTHEAST FLORIDA	1
	WESTERN ATLANTIC	1
N.E. U.S.	N. FLORIDA & CAROLINAS	1
S.E. FLORIDA	OTHER WATERBODY	1
	SOUTHEAST FLORIDA	3
	WESTERN ATLANTIC	1
VENEZUELA	N. FLORIDA & CAROLINAS	1
	PUERTO RICO	1
VIRGIN ISLANDS	PUERTO RICO	1
WESTERN ATLANTIC	CANADA	4
	N. FLORIDA & CAROLINAS	1
	SOUTHEAST FLORIDA	1
	SOUTHERN BAHAMA	1
	WEST FLORIDA	1
	WESTERN ATLANTIC	13

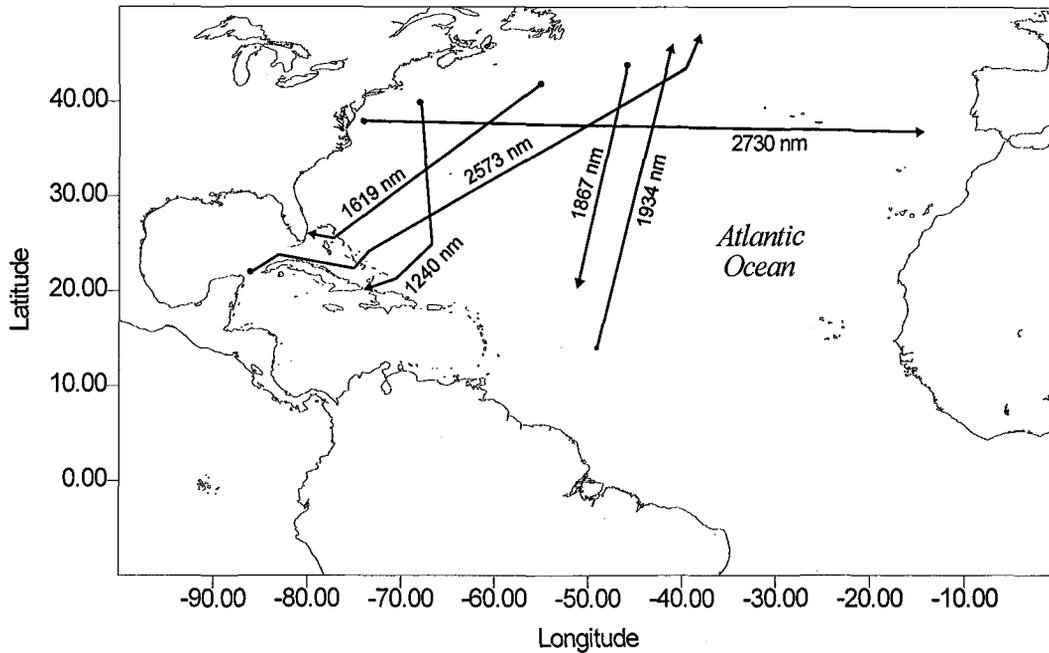
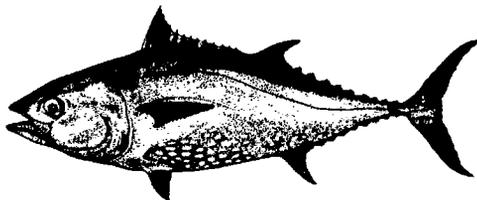


Figure 10. Movements of selected 1994-1995 tag-recaptured swordfish.



Bluefin Tuna

A total of 1,906 bluefin tuna were tagged and released: 358 in 1994 and 1548 in 1995. Of the total releases, 1,630 were released by rod & reel fishermen, 234 by longliners, 31 by harpoon, and 11 by unspecified sources. A majority of bluefin tuna tag releases took place offshore of the mid-Atlantic U.S coast (775), particularly off Hatteras, NC (710). Other areas where bluefin tuna were tagged are listed in Table 9. There were a total of 63 tagged bluefin tuna recaptured: 25 in 1994 and 38 in 1995.

Table 9. Location of 1994-1995 bluefin tuna releases.

Release Location	Total Tagged
U.S. MID-ATLANTIC COAST	775
HATTERAS, NC	710
N.E. U.S. WATERS	246
N. FLORIDA	98
WESTERN ATLANTIC	39
EASTERN ATLANTIC	22
SOUTHEAST FLORIDA	5
FLORIDA NORTHWEST	4
UNKNOWN WATERBODY	4
LOUISIANA WATERS	1
VIRGIN ISLANDS WATERS	1
PUERTO RICO	1

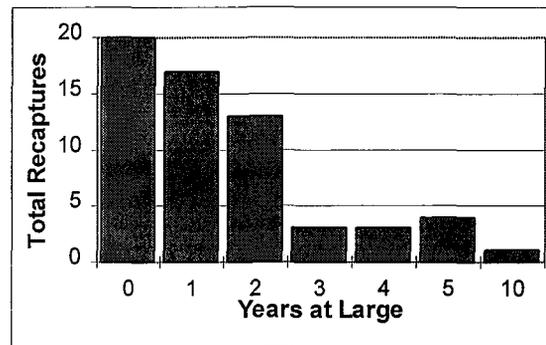


Figure 11. Years at-large for 1994-1995 bluefin tuna recaptures.

There were 47 recaptured by rod and reel fishermen, 11 by longline fishermen, 1 by bait boat, 1 by purse seine, 1 by hand line, and in 2 cases the type of gear was not reported.

A graph showing the years at-large is presented in Figure 11. The release and recapture locations of recaptured bluefin tuna are given in Table 11. The longest straight line distance by a recaptured bluefin tuna was 3,261 nm. The fish was released off the U.S. North Atlantic off Long Island, NY, and recaptured 1,698 days later in the Mediterranean off Spain. Other significant movements for 1994-1995 recaptured bluefin tuna are presented in Figure 10.

The longest time at-large for a recaptured bluefin tuna was 3,673 days (10 years). This fish was released on 8/13/85 off Long Island, NY and recaptured 103 nm away off Long Island, NY on 9/3/95.

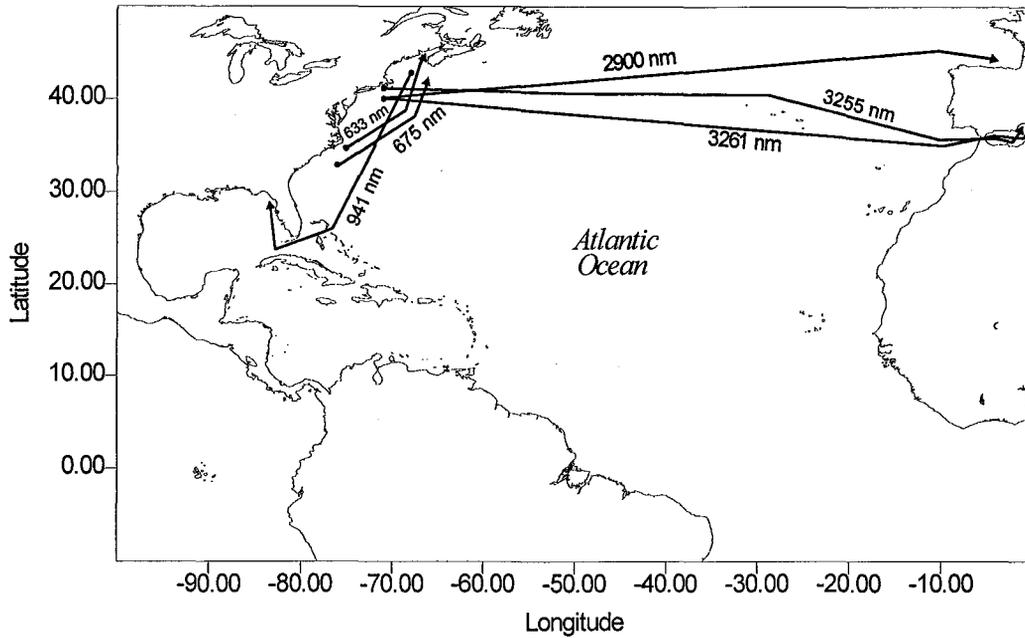


Figure 12. Movements of selected 1994-1995 tag-recaptured bluefin tuna.

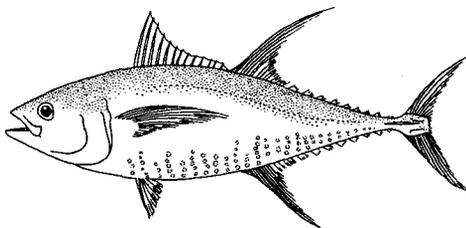
Table 10. Release and recapture areas for bluefin tuna recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
U.S. MID-ATLANTIC COAST	U.S. ATLANTIC COAST	24
	N.E. U.S.	14
	HATTERAS, NC	5
	UNSPECIFIED	2
HATTERAS, NC	WESTERN ATLANTIC	4
	MID-ATLANTIC U.S.	8
	HATTERAS, NC	1
N. FLORIDA	MID-ATLANTIC U.S.	1
	WESTERN ATLANTIC	1
N.E. U.S.	N. FLORIDA	1
	MEDITERRANEAN	2
	N.E. U.S.	3
	EASTERN ATLANTIC	1
	WESTERN ATLANTIC	1
OTHER WATERBODY	N.E. U.S.	1
WESTERN ATLANTIC	LOUISIANA	1
	N.E. U.S.	1
	WESTERN ATLANTIC	1

the mid-Atlantic U.S. Other areas where yellowfin tuna were tagged are listed in Table 11.

Table 11. Location of 1994-1995 yellowfin tuna releases.

Release Location	Total Tagged
U.S. MID-ATLANTIC COAST	1462
N. FLORIDA	124
UNSPECIFIED LOCATION	59
LOUISIANA	52
WESTERN ATLANTIC	39
OTHER WATERBODY	36
BERMUDA	34
N.E. U.S.	26
TEXAS	25
GULF OF MEXICO	13
VIRGIN ISLANDS	10
SOUTHEAST FLORIDA	9
NORTHERN BAHAMAS	8
FLORIDA NORTHWEST	7
VENEZUELA	4
COSTA RICA & PANAMA	4
LAGUAIRA, VENEZUELA	3
PUERTO RICO	2
COZUMEL, MEXICO	1



Yellowfin Tuna

A total of 1,918 yellowfin tuna were tagged and released: 1,231 in 1994 and 687 in 1995. Of the total releases, 1,559 were released by rod & reel fishermen and 359 by commercial longliners. A majority of yellowfin tuna tag releases (1,462) took place offshore of

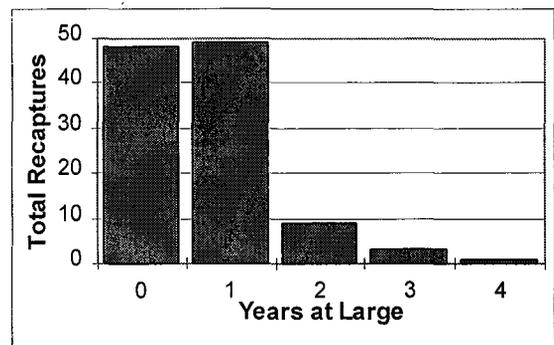


Figure 13. Years at-large for 1994-1995 yellowfin tuna recaptures.

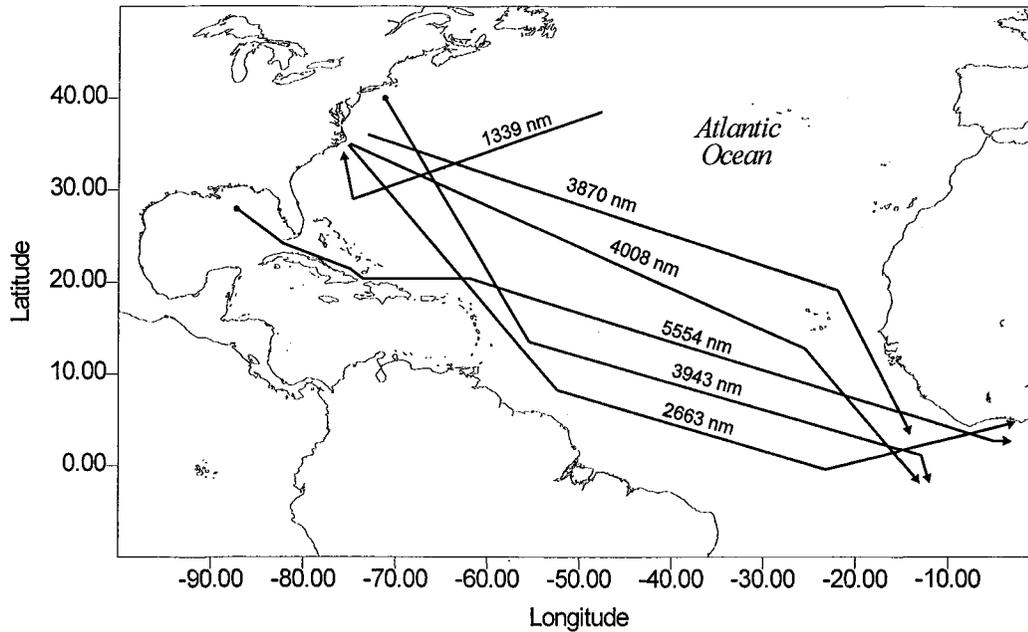


Figure 14. Movements of selected 1994-1995 tag-recaptured yellowfin tuna.

There were a total of 113 tagged yellowfin tuna recaptured: 48 in 1994 and 65 in 1995. There were 91 recaptured by rod and reel fishermen, 12 by longline fishermen, 5 by purse seine, and in 5 cases 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 yellowfin tuna are given in Table 12.

Table 12. Release and recapture areas for yellowfin tuna recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
BERMUDA	BERMUDA	5
FLORIDA NORTHWEST	UNSPECIFIED WATERS	1
MID-ATLANTIC U.S.	MID-ATLANTIC U.S.	77
	N. FLORIDA	2
	OTHER WATERBODY	9
	WESTERN ATLANTIC	1
N. FLORIDA	MID-ATLANTIC U.S.	2
	N. FLORIDA	1
NORTHERN BAHAMAS	MID-ATLANTIC U.S.	1
OTHER WATERBODY	UNSPECIFIED WATERS	2
SOUTHEAST FLORIDA	MID-ATLANTIC U.S.	1
UNSPECIFIED WATERS	UNSPECIFIED WATERS	8
WESTERN ATLANTIC	MID-ATLANTIC U.S.	2

The longest straight line distance by a recaptured yellowfin tuna was 5,554 nm. The fish was released offshore of Pensacola, FL and recaptured 589 days later off the Ivory Coast, West Africa. Other selected movements for 1994-1995 recaptured yellowfin tuna are presented in Figure 14. The longest time at-large for a recaptured yellowfin tuna was 1,335 days. This fish was released on 8/5/90 off Long Island, NY and recaptured 4/1/94 near the equator off the West African Coast; a straight line distance of 3,943 nm.

Other Tunas

Although the CTC mainly targets bluefin and yellowfin, all other species of tunas are also tagged. Table 13 lists the other important tunas species that were tagged and released as well as recaptured in 1994 and 1995.

Table 13. Numbers of releases and recaptures of other target tuna species during 1994 and 1995.

Tuna Species	Number Released	Number Recaptured
Albacore	76	3
Bigeye	100	2
Blackfin	24	2
Skipjack	2	0
(unspecified)	11	0
Totals	213	7

1994-1995 Releases and Recaptures: Non-Target Species

Historically, many species other than the primary target species of billfishes and tunas have been tagged by program participants. 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 1, "Recent Changes in the Volunteer Tagging Program") summaries of several of the most important non-target species for 1994-1995 are given below.

Amberjack

A total of 623 amberjack were tagged and released: 483 in 1994 and 140 in 1995. Of the total releases, 619 were by recreational fishermen, 1 by a commercial longliner, and, 3 by unspecified sources. A majority of amberjack tag releases (248) took place off of the mid-Atlantic eastern U.S. Other areas where amberjack were tagged are listed in Table 14. There were a total of 195 tagged amberjack recaptured: 126 in 1994 and 69 in 1995. Of the total recaptures, 184 were by recreational rod and reel fishermen, 2 by a commercial longliner, 2 by speargun, 1 by hand line, and 6 by unspecified sources.

A graph showing the years at-large is presented in Figure 15. The longest time at-large for a recaptured amberjack was 4,852 days (13.3 years). This fish was released on 10/8/81 off Hilton Head, SC and recaptured 1/20/95 near Key Largo, FL; a straight line distance of 446 nm.

Table 14. Location of 1994-1995 amberjack releases .

Release Location	Total Tagged
MID-ATLANTIC U.S. COAST	248
FLORIDA NORTHWEST	196
SOUTHEAST FLORIDA	134
WESTERN ATLANTIC	18
TEXAS	10
N. FLORIDA AND CAROLINAS	7
LOUISIANA	5
OTHER WATERBODY	2
UNSPECIFIED WATERBODY	2
VIRGIN ISLANDS	1

The release and recapture locations of recaptured amberjack are given in Table 15. The longest straight line distance by a recaptured amberjack was 1134 nm. The fish was released off Cape Hatteras and recaptured 1085 days later off the southern coast of Jamaica. Other selected movements for 1994-1995 recaptured amberjack are presented in Figure 16.

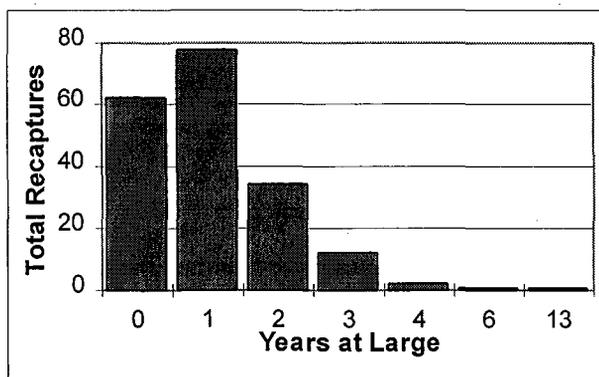


Figure 15. Years at-large for 1994-1995 amberjack recaptures.

Table 15. Release and recapture areas for amberjack recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
FLORIDA NORTHWEST	FLORIDA NORTHWEST	79
	LOUISIANA	4
LOUISIANA	LOUISIANA	3
	WEST FLORIDA	1
MID-ATLANTIC U.S. COAST	FLORIDA NORTHWEST	2
	JAMAICA	1
N. FLORIDA AND CAROLINAS	U.S. ATLANTIC COAST	31
	N. BAHAMAS	1
	OTHER WATERBODY	1
	SOUTHEAST FLORIDA	15
	FLORIDA NORTHWEST	1
SOUTHEAST FLORIDA	N. FLORIDA	3
	UNSPECIFIED WATERS	2
	SOUTHEAST FLORIDA	2
TEXAS	FLORIDA NORTHWEST	1
	MID-ATLANTIC U.S.	2
	N. FLORIDA	2
WESTERN ATLANTIC	SOUTHEAST FLORIDA	36
	FLORIDA NORTHWEST	1
	TEXAS	1
	FLORIDA NORTHWEST	1

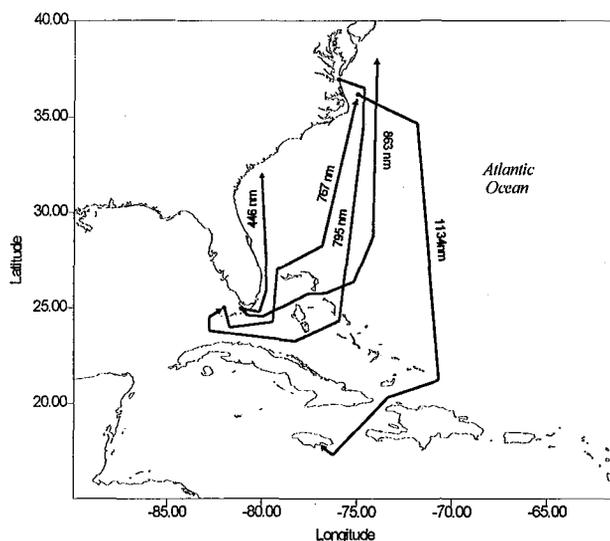


Figure 16. Movements of selected 1994-1995 tag-recaptured amberjack.

Cobia

A total of 257 cobia were tagged and released: 179 in 1994 and 78 in 1995. All fish were released by recreational rod & reel fishermen. A majority of cobia tag releases (131) took place off of the Florida NORTHWEST. Other areas where cobia were tagged are listed in Table 16. There were a total of 27 tagged cobia recaptured: 17 in 1994 and 10 in 1995. All recaptures were by recreational rod and reel fishermen.

A graph showing the years at-large is presented in Figure 17. The longest time at-large for a recaptured cobia was 1,919 days (5.3 years). This fish was released on 3/24/90 off Canaveral, FL and recaptured 6/25/95 off Virginia Beach, VA.

Table 16. Location of 1994-1995 cobia releases.

Release Location	Total Tagged
FLORIDA NORTHWEST	131
LOUISIANA	32
N. FLORIDA AND CAROLINAS	26
TEXAS	17
MID-ATLANTIC U.S. COAST	16
WEST FLORIDA	15
SOUTHEAST FLORIDA	9
UNSPECIFIED WATERBODY	6
N.E. U.S.	3
GULF OF MEXICO	1
CANCUN, MEXICO	1

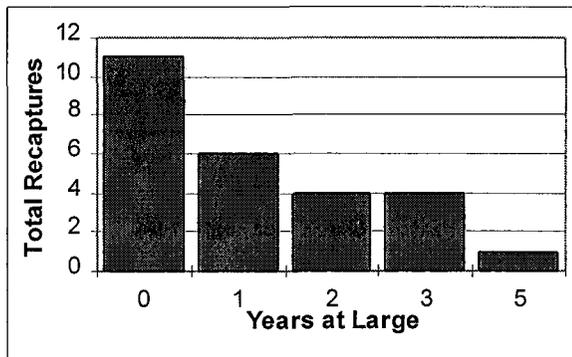


Figure 17. Years at-large for 1994-1995 cobia recaptures.

The release and recapture locations of recaptured cobia are given in Table 17. The longest straight line distance by a recaptured cobia was 1,155 nm. The fish was released near the mouth of the Chesapeake Bay and recaptured 1,003 days later off Pensacola, FL. Other significant movements for 1994-1995 recaptured cobia are presented in Figure 18.

Table 17. Release and recapture areas for cobia recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
FLORIDA NORTHWEST	FLORIDA NORTHWEST	2
	LOUISIANA	2
	N. FLORIDA	3
	WEST FLORIDA	2
LOUISIANA	LOUISIANA	1
MID-ATLANTIC U.S.	FLORIDA NORTHWEST	1
N. FLORIDA	MID-ATLANTIC U.S.	3
	LOUISIANA	1
	MID-ATLANTIC U.S.	1
UNSPECIFIED	N. FLORIDA	2
	SOUTHEAST FLORIDA	1
	TEXAS	1
SOUTHEAST FLORIDA	FLORIDA NORTHWEST	1
	SOUTHEAST FLORIDA	2
TEXAS	TEXAS	2
WEST FLORIDA	WEST FLORIDA	1

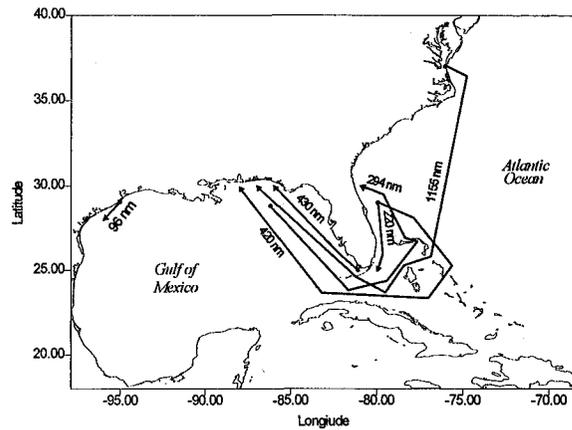


Figure 18. Movements of selected 1994-1995 tag-recaptured cobia.

King Mackerel

A total of 1,995 king mackerel were tagged and released: 859 in 1994 and 1,136 in 1995. Of the total releases, 1,171 were by recreational rod and reel, 817 by hand line, and, 7 by unspecified sources. A majority of king mackerel tag releases (1,190) took place off southeast Florida. Other areas where king mackerel were tagged are listed in Table 17.

There were a total of 87 tagged king mackerel recaptured: 48 in 1994 and 40 in 1995. Of the total recaptures, 71 were by recreational rod and reel fishermen, 14 by hand line, 1 by a commercial longliner, 2 by unspecified sources. A graph showing the years at-large is presented in Figure 19. The longest time at-large for a recaptured king mackerel was 1,686 days (4.6 years). This fish was released on 1/15/90 off Ft. Pierce, FL and recaptured 8/28/94 off West Palm Beach, FL.

Table 18. Location of 1994-1995 king mackerel releases.

Release Location	Total Tagged
SOUTHEAST FLORIDA	1190
N. FLORIDA AND CAROLINAS	393
TEXAS	338
FLORIDA NORTHWEST	27
LOUISIANA	21
WEST FLORIDA	14
MID-ATLANTIC U.S.	8
GULF OF MEXICO	4

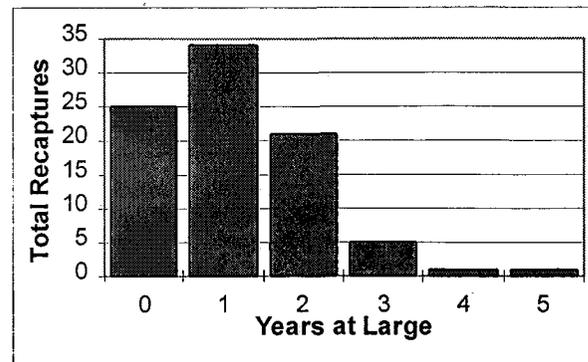


Figure 19. Years at-large for 1994-1995 king mackerel recaptures.

Table 19. Release and recapture areas for king mackerel recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
FLORIDANORTHWEST	FLORIDA NORTHWEST	2
	SOUTHEAST FLORIDA	1
LOUISIANA	FLORIDA NORTHWEST	2
	N. FLORIDA & CAROLINAS	5
SOUTHEAST FLORIDA	SOUTHEAST FLORIDA	13
	FLORIDA NORTHWEST	1
TEXAS	LOUISIANA	1
	N. FLORIDA & CAROLINAS	17
	SOUTHEAST FLORIDA	37
	TEXAS	1
	WEST FLORIDA	2
TEXAS	MEXICAN	1
	TEXAS	4

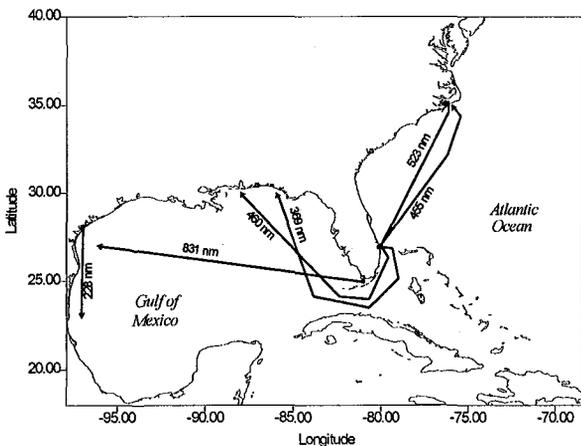


Figure 20. Movements of selected 1994-1995 tag-recaptured king mackerel.

The release and recapture locations of recaptured king mackerel are given in Table 18. The longest straight line distance by a recaptured king mackerel was 831 nm. The fish was released off Islamorada, FL, and recaptured 924 days later in the Gulf of Mexico off southern Texas. Other selected movements for 1994-1995 recaptured king mackerel are presented in Figure 20.

Red Drum

A total of 2,684 red drum were tagged and released: 1,190 in 1994 and 1494 in 1995. Of all releases, a total of 2682 were by recreational rod and reel and 2 were released by gillnet. A majority of red drum tag releases (1,813) took place between North Florida and the Carolinas. Other areas where red drum were tagged are listed in Table 20.

There were a total of 266 tagged red drum recaptured: 73 in 1994 and 194 in 1995. All recaptures were by recreational rod and reel fishermen. A graph showing the years at-large is presented in Figure 21. The longest time at-large for a recaptured red drum was 2152 days (5.9 years). This fish was released on 12/8/88 off Pensacola, FL and recaptured in the same

location on 10/30/94. The release and recapture locations of recaptured red drum are given in Table 21.

Table 20. Location of 1994-1995 red drum releases.

Release Location	Total Tagged
N. FLORIDA AND CAROLINAS	1813
FLORIDA NORTHWEST	383
WEST FLORIDA	267
SOUTHEAST FLORIDA	67
TEXAS	61
LOUISIANA	56
MID-ATLANTIC U.S. COAST	25
UNSPECIFIED WATERBODY	6
N.E. U.S.	5
NORTHERN BAHAMAS	1

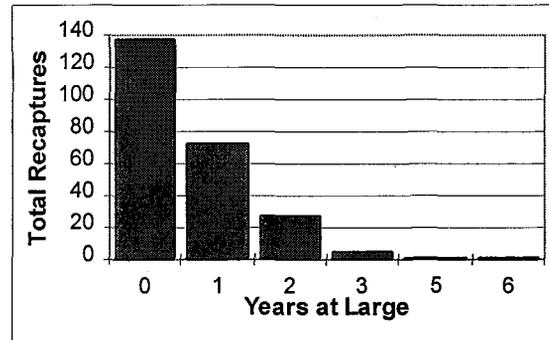


Figure 21. Years at-large for 1994-1995 red drum recaptures.

Table 21. Release and recapture areas for red drum recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
FLORIDA NORTHWEST	FLORIDA NORTHWEST	16
	LOUISIANA	3
	WEST FLORIDA	2
	UNSPECIFIED	1
LOUISIANA	LOUISIANA	9
	FLORIDA NORTHWEST	1
	UNSPECIFIED	1
N. FLORIDA & CAROLINAS	N. FLORIDA & CAROLINAS	198
	UNSPECIFIED WATERBODY	4
	SOUTHEAST FLORIDA	8
	WEST FLORIDA	3
SOUTHEAST FLORIDA	WESTERN ATLANTIC	1
	N. FLORIDA	1
TEXAS	TEXAS	3
	WEST FLORIDA	15

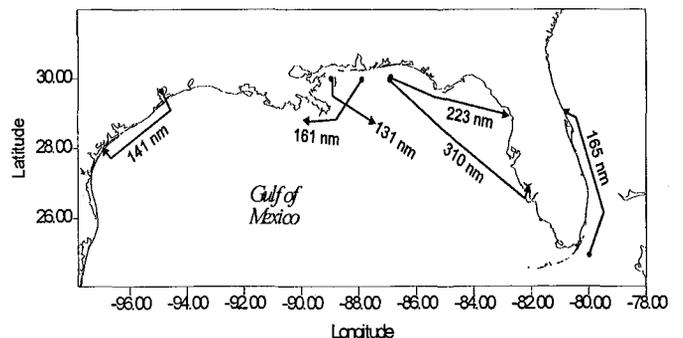


Figure 22. Movements of selected 1994-1995 tag-recaptured red drum.

The longest straight line distance by a recaptured red drum was 310 nm. The fish was released in Choctawhatchee Bay, FL and recaptured 164 days later in the Boca Grande pass, FL. Other selected movements for 1994-1995 recaptured red drum are presented in Figure 22.

Tarpon

In the past, distribution and sale of tags for tarpon had been managed by the Florida League of Anglers. 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 Jenny Peirera of Boat U.S. at 1(800) 862-8872.

A total of 2,027 tarpon were tagged and released: 1,133 in 1994 and 894 in 1995. Of the total tagged, all were released by recreational rod and reel. A majority of tarpon tag releases (1,075) took place off west Florida waters. Other areas where tarpon were tagged are listed in Table 22.

Table 22. Location of 1994-1995 tarpon releases.

Release Location	Total Tagged
WEST FLORIDA WATERS	1075
SOUTHEAST FLORIDA WATERS	420
LOUISIANA WATERS	308
TEXAS WATERS	65
PUERTO RICO	63
UNSPECIFIED WATERBODY	37
N. FLORIDA AND CAROLINAS	23
MID-ATLANTIC U.S.	19
FLORIDA NORTHWEST WATERS	10
NORTHERN BAHAMIAN WATERS	4
LAGUAIRA WATERS	1
COZUMEL MEXICO WATERS	1
CANCUN MEXICO WATERS	1

There were a total of 37 tagged tarpon recaptured: 21 in 1994 and 16 in 1995. Of the total recaptures, 36 were by recreational rod and reel fishermen and 1 by a recreational spearfisherman. A graph showing the years at-large is presented in Figure 23. The longest time at-large for a recaptured tarpon was 1,686 days (4.6 years). This fish was released on 1/15/90 and recaptured 8/28/94.

The release and recapture locations of recaptured tarpon are given in Table 23. The longest straight line distance by a recaptured tarpon was 698 nm. This fish was released off Louisiana, and recaptured 317 days later in the Gulf of Mexico off Veracruz, Mexico. Other significant movements for 1994-1995 recaptured tarpon are presented in Figure 24.

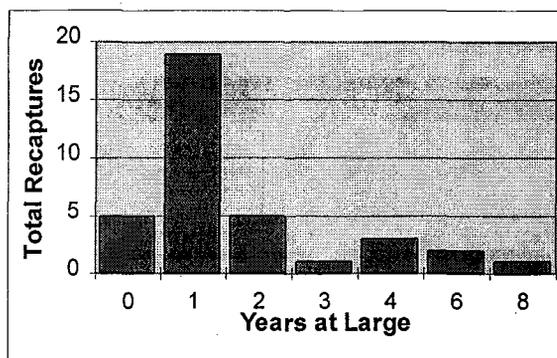


Figure 23. Years at-large for 1994-1995 tarpon recaptures.

Table 23. Release and recapture areas for tarpon recaptured during 1994 and 1995.

Release Location	Recapture Location	Total
LOUISIANA WATERS	MEXICAN WATERS	1
	WEST FLORIDA	1
N. FLORIDA	SOUTHEAST FLORIDA	1
PUERTO RICO	PUERTO RICO	1
SOUTHEAST FLORIDA	LOUISIANA WATERS	1
	N. FLORIDA	1
	SOUTHEAST FLORIDA	13
	WEST FLORIDA	1
TEXAS WATERS	MEXICAN WATERS	1
WEST FLORIDA	CUBAN WATERS	1
	SOUTHEAST FLORIDA	3
	WEST FLORIDA	12

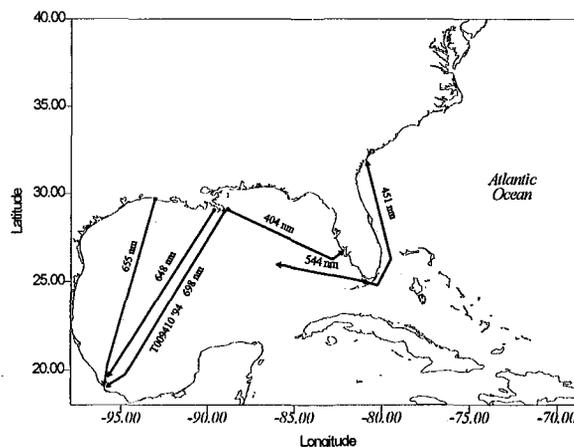


Figure 24. Movements of selected 1994-1995 tag-recaptured tarpon.

Other Species Released

Participants of the CTC tagged numerous other species during 1994 and 1995. Numbers of releases and recaptures of other species tagged are presented in Table 24. We acknowledge these contributions to our program, but discourage future tag and release of these species with CTC supplies.

Table 24. Other non-target species tagged by participants in 1994 and 1995.

Species	Number Released	Number Recaptured	Species	Number Released	Number Recaptured
Barracuda, Great	11	1	Shark, Dusky	23	2
Bass, Striped	120	28	Shark, Great Hammerhead	5	0
Bluefish	16	0	Shark, Lemon	1	0
Bonefish	5	0	Shark, Nurse	1	1
Bonito, Atlantic	2	0	Shark, Ocean Whitetip	1	0
Catfish, Hard Head	4	0	Shark, Sandbar	9	2
Croaker, Atlantic	1	0	Shark, Shortfin Mako	128	28
Dolphin	166	5	Shark, Silky	6	0
Drum, (generic)	69	3	Shark, Smooth Hammerhead	1	0
Drum, Black	38	0	Shark, Spiny Dogfish	1	0
Flounder	1	0	Shark, Thresher	2	0
Gag	58	11	Shark, Tiger	10	1
Grouper, (generic)	11	1	Sharks and Rays, (other)	3	0
Grouper, Black	53	10	Sheepshead	8	0
Grouper, Nassau	12	0	Snapper, (generic)	11	0
Grouper, Red	739	13	Snapper, Black	2	0
Grouper, Snowy	1	0	Snapper, Gray	1	0
Grouper, Yellowfin	1	0	Snapper, Lane	1	0
Jack, Crevalle	16	1	Snapper, Mutton	6	0
Jewfish	0	1	Snapper, Red	75	6
Mackerel, Spanish	7	1	Snapper, Vermillion	1	0
Marlin, Black	1	0	Snapper, Yellowtail	1	0
Marlin, Striped	21	0	Snook	35	3
Mullet, Striped	1	0	Species, (other)	127	1
Oilfish	1	0	Sunfish, Ocean	2	0
Permit	38	0	Tautog	5	0
Pompano, African	12	0	Tilefish, Blackline	21	2
Porgy	1	0	Triggerfish, Gray	3	0
Ray, Cownose	5	0	Tripletail	7	1
Rock Hind	1	0	Trout, Speckled	24	3
Scamp	11	2	Tunny, Little	6	2
Sea Bass, Rock	1	0	Wahoo	5	0
Shark, Big Eye Thresher	2	0			
Shark, Blacktip	16	0			
Shark, Blue	212	25			
Shark, Bonnethead	2	0			
Shark, Brown Cat	3	1			
Shark, Bull	2	0			
			Totals	2,406	162

WANTED

Missing Fish Tagging Report cards

The following fish have been recaptured but the *Fish Tagging Report* cards, with the release information, were never returned. Tagging is of no value if it is not reported. Tagging recapture rates are inherently low to begin with, thus making it essential to report the release information.

Please check to see if you have misplaced or forgotten to send in your *Fish Tagging Report* Cards.

SPECIES	MISSING CARDS
Blue Marlin	14
White Marlin	24
Sailfish	45
Swordfish	9
Tuna	13
Red Drum	29
Tarpon	8
Cobia	8
King Mackerel	9
Grouper	9
Amberjack	36
Other	35

COMMERCIAL PARTICIPATION

Commercial fishermen contribute significantly to our tagging program. This is particularly true for swordfish and bigeye tuna but also includes other species as well. The largest group of commercial fishermen involved in our program is the Blue Water Fishermen's Association [BWFA] (Table 25), although non-BWFA commercial fishermen make substantial contributions. For example, all commercial participants tagged and released 1,637 swordfish during 1994-1995. Of these, BWFA accounted for 845 (52%) of all releases. In addition, BWFA participants tagged and released 70 (40%) of the bigeye tuna, 214 (11%) of the yellowfin tuna, and 175 (10%) of the white marlin during this time period. The BWFA members, as well as all other commercial fishermen, are important participants of the Cooperative Tagging Center for which we are thankful.

Federation of Japan Tuna Fisheries

During the 1994 meeting of the International Commission for Conservation of Atlantic Tunas (ICCAT), the Federation of Japan Tuna Fisheries (FJTF) agreed, in theory, to start volunteer tagging of billfish (that come alongside their boats alive) from their high seas longline operations. Although this program was to be initiated in 1995, there were difficulties in distributing the tagging equipment to FJTF vessels that off-load at the Las Palmas, Canary Islands, transshipment port. These problems will hopefully be resolved and the program initiated during 1996 fishing season.

The FJTF is utilizing the newly developed HM tag discussed in the next section. The legend on these tags has the ICCAT name but a NMFS address to facilitate computerization of these data at the CTC. To help assist in recapture reporting from the Japanese vessels, the tag legend also includes the Japanese symbols for the word "reward".

Table 25. Commercial fishermen, including Blue Water Fishermen's Association members tagging 50 or more fish for the CTC during 1994-1995.

Captain	Number Fish Tagged
T. Baker Dunn	268
Robert Burcaw	244
Larry Horne	207
Eric Burcaw	174
Richard Mears	115
Dan Mears	91
James D. Mears	91
Christian Einselen	78

Improving Tagging Information

The ultimate source of information for the CTC has always been the recapture of tagged fish. However, for over 40 years this program has been known as a "Tag and Release" program and emphasis on obtaining tag recapture information has, to a certain extent, been neglected. This problem is more than just semantics because neglect of the recapture aspects of the program results in many lost opportunities for vital scientific information. We have developed several approaches to improve the lack of effort on recapturing tagged fish, including issuing fluorescent orange tag recapture cards to improve the quality and quantity of recapture information. 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 fishermen to retain the carcasses of tag recaptured fish. These fish are used by scientists 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 1-800-437-3936 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.

FISH TAGGING REPORT

Conscientious taggers 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 is compromised.

When fishermen choose to participate in the tagging program it is important to use correct tagging procedures each time a fish is tagged. 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 often recaptured during the first month they are at large.

Fish Tagging Report		NOAA FORM 00-000 F.SEC U.S. DEPARTMENT OF COMMERCE (7-92) OMB Approved No. 0000-0000 NOAA-NMFS	
(PLEASE PRINT)		Please complete and return card as soon as possible	
Tagging Date	Species	Tag No.	
Tagging Location (Lat. and Long. Preferred)		Length (in.)	<input type="checkbox"/> LJFL <input type="checkbox"/> Meas. <input type="checkbox"/> TL <input type="checkbox"/> Est.
Fish Condition/Remarks			
Hook Removed <input type="checkbox"/> Yes <input type="checkbox"/> No, leader out	Fighting Time	Weight (lbs.)	<input type="checkbox"/> Meas. <input type="checkbox"/> Est.
Angler		Captain	
Address		Address	
City/State/Zip		City/State/Zip	
Send more tags to <input type="checkbox"/> Captain <input type="checkbox"/> Angler Quantity: _____		This report is authorized by law U.S.C.P.S. 90-000. While you are not required to respond, your cooperation is needed to make the results of this survey comprehensive, accurate, and timely. Thank you for your contribution.	

Keeping a log or file of personal tagging activities is encouraged 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 fighting time in hours and minutes.
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. To keep our records in order we remind tagging participants to avoid lending out or mixing tags with other fishermen.

Target Area

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 (Figure 25). 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.

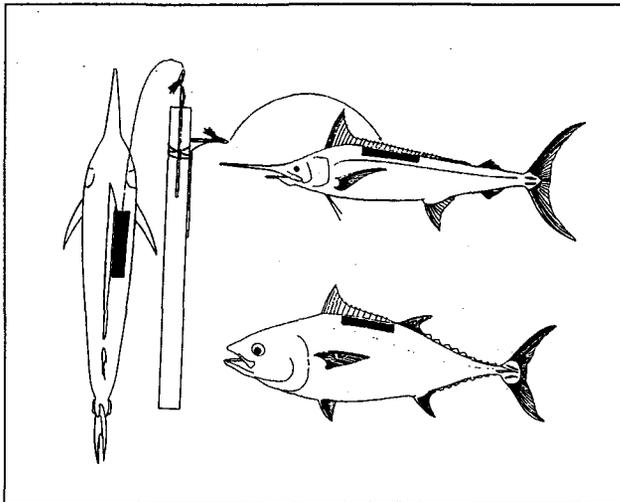


Figure 25. Target Area (shaded region) for placing tags in tunas and billfish.

We recognize that dorsal tag placement over the back of the fish can not always be accomplished because many fish turn sideways when brought along-side the boat. Many fish (particularly tuna and billfish) come along-side 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



Figure 26.

lateral approach for tag placement. This problem can be circumvented by using a tagging pole with perpendicular, as well as parallel applicator pins (dual applicator tagging pole). The wooden pole shown that can accommodate dual applicator pins (Figure 26) is made of 1.25 inch diameter wooden dowel (pine).

When a fish comes along side the boat on its side, tagging can best be accomplished by using the perpendicular applicator as shown in Figure 26. 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 idea of dual applicator pins is new and the Cooperative Tagging Center is not yet issuing 1.5 inch diameter tagging poles to participants; however, these can easily be obtained at your local hardware store.

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

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 is 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 can 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 report 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 tag growth. 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 1(800) 437-3936 or on weekends or nights contact Eric Prince at (305) 598-0944.

DNR 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 (S) ABOVE: _____
10. PHONE OF (S) 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: _____

billfish that have been recaptured has been so low, definitive conclusions from these preliminary results are not possible. We greatly appreciate the efforts of recreational anglers and BWFA members for their contributions to the double tagging program, as more effort is required to double tag properly.

Table 26. Summary of double-tagging experiments conducted jointly by The Billfish Foundation and the NMFS CTC.

SPECIES	RELEASES	RECAPTURES
Sailfish	901	19
Blue Marlin	946	6
White Marlin	404	8
Swordfish	573	5
Black Marlin	12	0
Striped Marlin	27	0
Spearfish	16	0
TOTAL	2879	38

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, the NMFS HM-tag or the The Billfish Foundation BF-tag 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. 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.

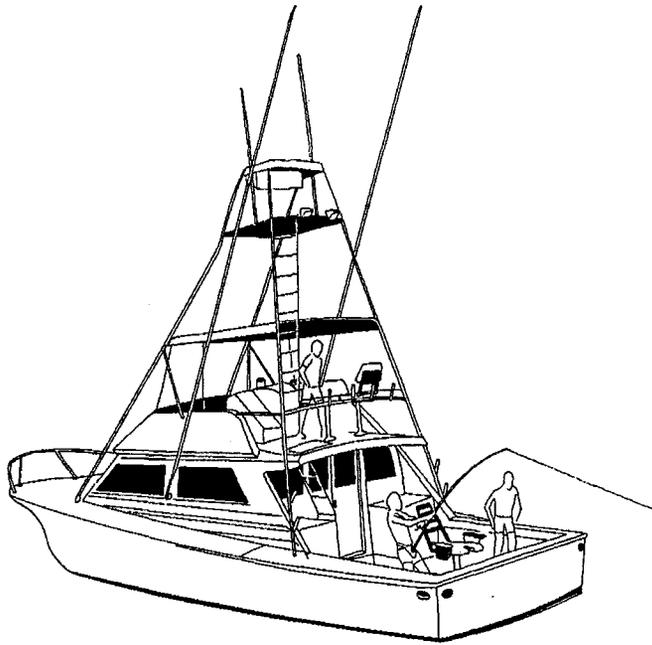
To date, there has been a total of 2,879 double-tagged billfish released and 38 (about 1.3%) of these have been recaptured (Table 26). Most of the double tagging has been with blue marlin, but significant numbers of sailfish and other billfish have also been double-tagged. Both the commercial participants (mostly BWFA members) and recreational anglers have participated actively in the double tagging program. Of the 38 recaptured fish, 19 had both tags intact, while 19 had only the TBF tag. The NMFS R-tag (stainless steel tip) was apparently shed in 19 fish. Because the total number of double tagged

Tag Development and Performance

The NMFS Miami Laboratory Cooperative Tagging Center introduced a new tag in 1995. This new tag design, the HM-tag, is similar to The Billfish Foundation (BF-type) tag. The HM-tag (HM stands for Highly Migratory) is constructed of medical grade nylon and uses a stainless steel applicator for tag placement which 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. Improvements incorporated into the HM-tag are based on the double tagging observations outlined in the previous section. The first documented trans-Atlantic movement of a swordfish was recorded in 1995 using an HM tag.

The CTC, in conjunction with the Gulf Coast Research Lab in Ocean Springs, MS, is also examining changes in the tissue response over time using medical grade nylon tags. Because billfish cannot be held in captivity, we used red drum and red snapper for the study. By using medical-grade nylon for the anchor tip we hope to reduce the rejection of the tag by the fish, thereby potentially increasing its biological compatibility. While there have been few preliminary studies to confirm this with fish muscle, it has gained widespread acceptance in the biomedical arena for use in human surgical implants. From this experiment, we found significantly lower shedding rates of the new tag, compared to the most widely used tag available for small, inshore species.





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 parentheses) 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 1994 and 1995 designated categories are listed in Table 27 and Table 28, respectively. The overall winners for 1994 were angler Mel Immergut and Capt. Brad Simonds. For 1995 the overall winners were angler Stanley Klimek and Capt. Brad Simonds.

ICCAT 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 1994 were: (1) Temperate tuna, Mr. D. Jose Ferrer Martinez of Valencia, Spain, who caught a tagged bluefin tuna off Valencia, Spain in March, 1994, originally tagged and released off Valencia September 24, 1994; (2) Tropical tuna, Mr. M. Moussa M'Dong of Dakar, Senegal, who caught a tagged yellowfin tuna on March 22, 1994 near the equator in the Gulf of Guinea. originally tagged and released 20 days earlier off Dakar, Senegal; and (3) Billfish, Mr. C. Gonzales Cova of Venezuela, who recaptured a tagged blue marlin off La Guaira, Venezuela on July 26, 1994, that was tagged and released about 2 years and six months earlier off La Guaira.

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 taggers 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 captians who released 10 or more fish during 1994 and 1995 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 (monetary awards are available for king mackerel recaptures by special request only). The gray hats cannot be purchased; however, the same hat in either black or in various colors can be purchased for \$10.00 (\$2.00 of this charge goes towards a NMFS fund to buy the gray hats) by writing or calling our supplier:

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

Table 27. Winners of the 1994 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:	Mel Immergut New York Sportfishing Federation	Pete Barrett American Sportfishing Association
Bluefin Tuna trophy donated by:	Roy Dicky International Game Fish Association	Al Anderson International Game Fish Association
Yellowfin & Bigeye trophy donated by:	Stanley Klimek American Sportfishing Association	Jerry Shepherd American Sportfishing Association
Blue Marlin trophy donated by:	Stewart Campbell National Coalition for Marine Conservation	Juan R. Martinez (Tito) National Coalition for Marine Conservation
White Marlin trophy donated by:	Enrico Capozzi The Billfish Foundation	Luis Suarez The Billfish Foundation
Sailfish trophy donated by:	Kevin Karl Spooner International Game Fish Association	W. Scott Walker The Billfish Foundation

Table 28. Winners of the 1995 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 New York Sportfishing Federation	David Wright American Sportfishing Association
Bluefin Tuna trophy donated by:	John Rafter International Game Fish Association	Bob Eakes International Game Fish Association
Yellowfin & Bigeye trophy donated by:	Stanley Klimek American Sportfishing Association	Jerry Shepherd American Sportfishing Association
Blue Marlin trophy donated by:	John A. Mueller National Coalition for Marine Conservation	Billy Borer National Coalition for Marine Conservation
White Marlin trophy donated by:	Enrico Capozzi The Billfish Foundation	Brad Simonds The Billfish Foundation
Sailfish trophy donated by:	Jon Fossel International Game Fish Association	Chito Maso The Billfish Foundation

Appendix 1. Captains who made outstanding contributions to the CTC in 1994 and 1995 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 1994 and 1995 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
RICHE 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° N and south of 41° N latitude. The east-west coordinates are west of 41° W longitude and varies eastward from 77° W to depending on the latitude and proximity to landmass.

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

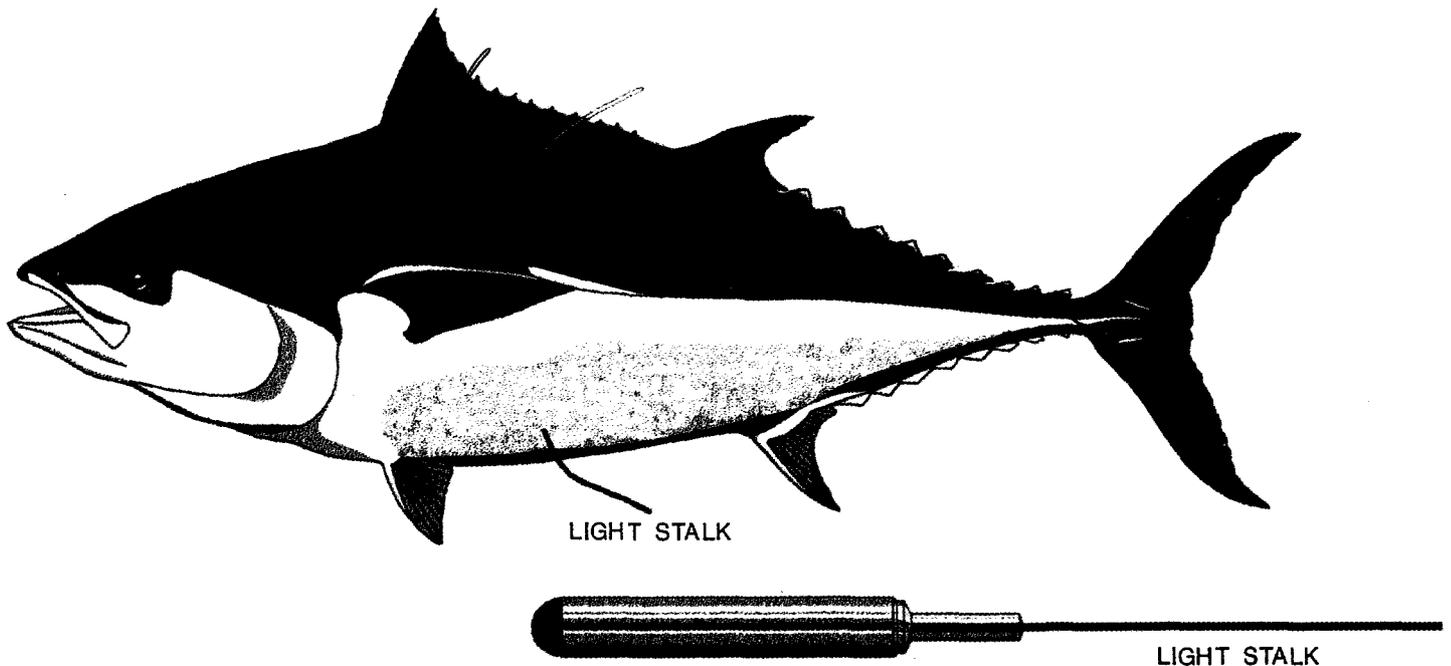
\$ 1,000 REWARD



OFFERED
FOR



ARCHIVAL TAGS FROM ATLANTIC BLUEFIN TUNA¹



What are archival tags? Archival tags are "state of the art" electronic data-logging devices that provide location estimates by measuring light intensity through a light stalk. They also measure pressure and provide data on depth, water temperature, and body temperature of the fish. This information is collected on a daily basis and stored in the tag for up to seven years.

How do you determine that a bluefin tuna has an archival tag? Archival tags are implanted in the body cavity of the tuna and only the light stalk protrudes out of the stomach. However, these specially equipped bluefin tuna also carry unique external conventional streamer tags, with two-tone coloration, to help fisherman recognize these fish and return the archival tags. The external tags are placed about an inch off the dorsal midline on each side of the fish. On the white portion of the streamer tag it says "electronic tag inside stomach" and on the green or orange side it says "Big \$\$\$ reward".

What to do if you catch a bluefin tuna with an archival tag? If legally taken, confirmed archival tagged fish should be brought aboard the boat. **DO NOT REMOVE THE ARCHIVAL TAG BY PULLING THE EXTERNAL LIGHT STALK IN THE STOMACH CAVITY.** To remove the archival tag, make a small incision in the area of the stomach and remove the archival tag (with the light stalk attached) by hand. Do not attempt to clean the tag, simply cover it and in the west Atlantic call the National Marine Fisheries Service. During business hours call 1-800-437-3936 or (305) 361-4248, on weekends, or at night call Dr. Eric Prince COLLECT at (305) 598-0944. In the east Atlantic, call the International Commission for the Conservation of Atlantic Tunas, Madrid, Spain, at 34-1-579-3352 or your local fisheries conservation agency. Instructions will be provided regarding where and how the tag should be mailed. After verification of the tag, arrangements will be made regarding payment of the \$1,000.

Size of bluefin tuna carrying archival tags. Medium (135-310 lbs) and Giant bluefin tuna (310 lbs and up) have been equipped with archival tags. \$1,000 will be paid for each tag that is properly removed from legally caught Atlantic bluefin tuna and returned.

¹ This experimental research program is being conducted jointly by Stanford University's Tuna Research and Conservation Center and NMFS.