NOAA Technical Memorandum NMFS-SEFSC-587

COOPERATIVE TAGGING CENTER NEWSLETTER: 1996-2006 (AND BEST TAGGING PRACTICES)

BY
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March 2009

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March 2009

NOTICE

This report should be cited as follows:
Mathews, J., Snodgrass, D., Orbesen, E.S., Prince, E.D. 2009. Cooperative tagging center newsletter: 1996-2006 (and best tagging practices). NOAA Technical Memorandum NMFS-SEFSC-587

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Introduction

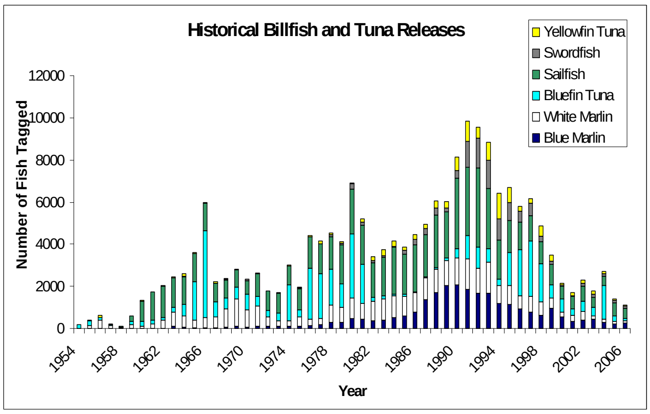
The Cooperative Tagging Center (CTC) began as the Cooperative Game Fish Tagging Program (GTP) at Woods Hole Oceanographic Institute (WHOI) in 1954. The GTP was started by Dr. Frank J. Mather III with an initial focus on bluefin tuna. The program quickly expanded to include billfish in 1973 and became a joint effort between the National Marine Fisheries Service (NMFS) and WHOI. In 1980 the Miami Laboratory of the NMFS's Southeast Fisheries Science Center (SEFSC) took complete responsibility for the operation, funding, and maintenance of the GTP (CTC History). In 1992 the SEFSC changed the program name to the CTC due to an increase in tagging efforts for a wider variety of species, as well as an increase in tagging research needs and requests for tagging data.

Between 1954 and 2006, 262,359 fish of nearly 80 different species were marked using the CTC's conventional tags. Today the CTC focuses solely on the tagging of billfish and tuna in the Atlantic Ocean, Gulf of Mexico, and Caribbean Sea. The CTC does not endorse the use of CTC conventional tags on any other species or in any other body of water (Appendix. 1).

Current Activities

This newsletter addresses the six targeted species of billfish and tuna (sailfish, blue marlin, white marlin, swordfish, bluefin tuna, and yellowfin tuna) that have been tagged in the Atlantic Ocean, Gulf of Mexico and Caribbean Sea. Because the CTC has not recently published an annual newsletter for its conventional tagging program, **everything discussed in this issue pertains to billfish and tuna tagged between 01 January 1996 and 31 December 2006**.

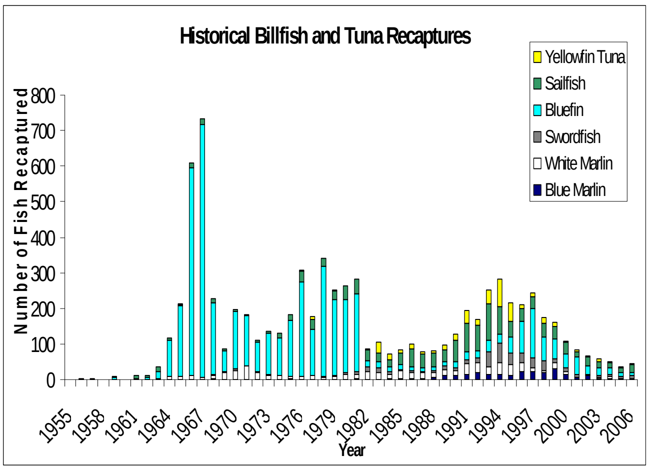
Figure 1. Total number of billfish and tuna tagged by species per year.



In addition to providing summary information on tag release and recapture efforts, the primary purpose of this newsletter is to provide guidance to our tagging participants on correct tagging procedure and the importance of submitting critical tag release and recapture information to the CTC. This information is intended to educate fishers as to where additional tag release and recapture efforts are needed, particularly if they happen to capture a tuna or billfish in a region outside of the areas where most tagging has occurred historically. It is also critically important for tagging constituents to understand consequences of not reporting release and recapture information back to the CTC

The CTC's conventional tagging program is dependent on volunteer fishers, (both recreational and commercial) who tag and release billfish and tuna, as well as report recaptures of tagged fish (Ortiz et al. 2003). To date, tens of thousands of fishers have participated in the program. Since 1954, 191,694 billfish and tuna have been tagged, including: 69,068 sailfish, 26,093 blue marlin, 32,777 white marlin, 10,763 swordfish, 42,992 bluefin tuna and 10,001 yellowfin tuna. The number of CTC tags deployed historically increased until the early 1990s, with an average increase of 206 tags per year from 1955 to 1990. Since 1990, there has been a general decrease in the number of CTC tags deployed by an average of 582 tags per year from 1990 to 2006 (Figure 1). This tagging effort reduction very much reflects our joint tagging agreement with The Billfish Foundation, which has taken over a sizable portion of the billfish tagging efforts. There has been a decrease (by about 22) in the total number of recaptured billfish and tuna reported per year since 1997 (Figure 2).

Figure 2. Total number of billfish and tuna recaptured by species per year.



Cooperative Tagging Center Activities – 1996 to 2006

All Billfish and Tuna

A total of 33,478 sailfish, blue marlin, white marlin, swordfish, bluefin tuna and yellowfin tuna were tagged with CTC tags (Figure 3). Of these, 92% were tagged by recreational fishers, 7% by commercial fishers, and 1% by scientists (Figure 4).

Figure 3. All billfish and tuna tagged between 1996 and 2006 by species and by year.

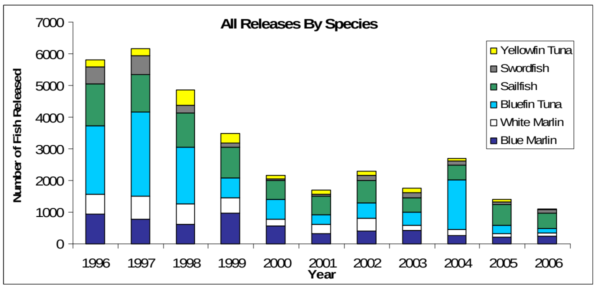
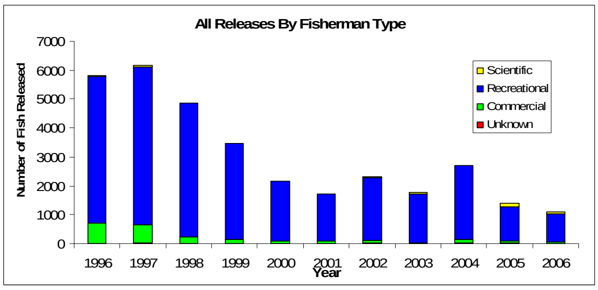
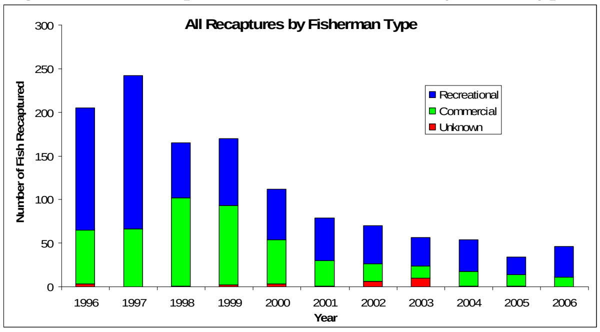


Figure 4. All billfish and tuna tagged by fisher type.



During this time period, 1,233 billfish and tuna were recaptured. Of these, 730 (59%) were by recreational fishers, 475 (38%) by commercial fishers, and 28 (2%) instances where fisher type was unknown (Figure 5).

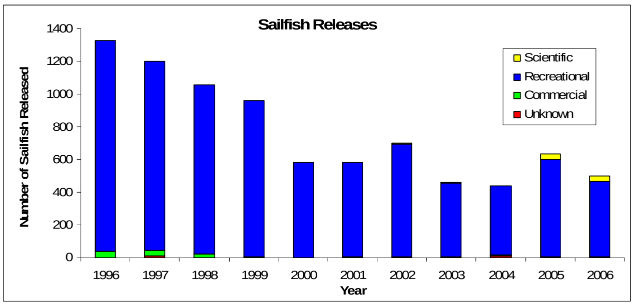
Figure 5. All recaptured billfish and tuna by fisher type.



Sailfish

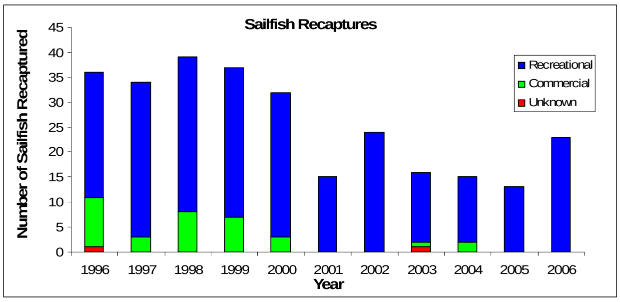
A total of 8,444 Sailfish were tagged and released, by 1,085 different captains. Captain John Dudas tagged 537, while eleven other captains tagged 100+ sailfish (Appendix 2). Of the total, 8,212 (97%) were tagged by recreational fishers, 108 (1%) by commercial fishers, 79 (0.94%) by scientists, and 45 instances where fishers type was unknown (.5%), (Figure 6).

Figure 6. Released sailfish by fisher type.



The historical recapture rate for tagged sailfish is 1.85%. There were 284 sailfish recaptured. Of these, 248 (87%) were reported by recreational fishers, 34 (12%) by commercial fishers, and 2 instances where fishers type was unknown (1%)(Figure 7).

Figure 7. Recaptured sailfish by fisher type.



The longest minimum straight line distance (the length of a straight line drawn between the release and the recapture locations) traveled by a sailfish was 1,558 miles (Ortiz et al. 2003). This fish was released off the Yucatan Peninsula in Mexico during May of 1997 and was recaptured 166 days (in October) later off the Venezuelan coast. The maximum days at large, for a sailfish, was 6,568 days (~18 years) with a straight line distance between tag and recapture of 1,410 miles. This fish was initially released in April of 1979 off the Yucatan Peninsula and was recaptured off Venezuela. There were three instances where a sailfish was recaptured on the same day it was released (Figure 8). The recaptured sailfish were at large for an average of 529 days (1 year, 164 days) (Figure 9).

Figure 8.Selected movements of recaptured sailfish.

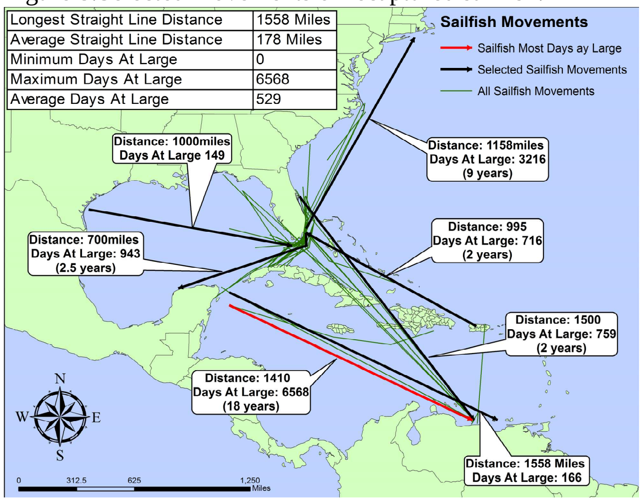
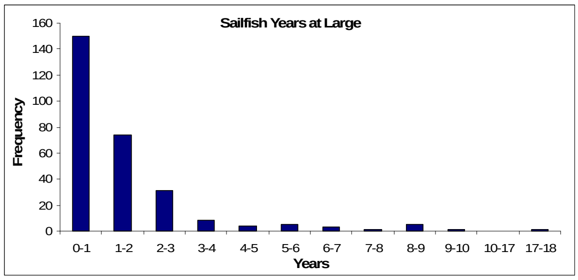


Figure 9. Years at large for recaptured sailfish.

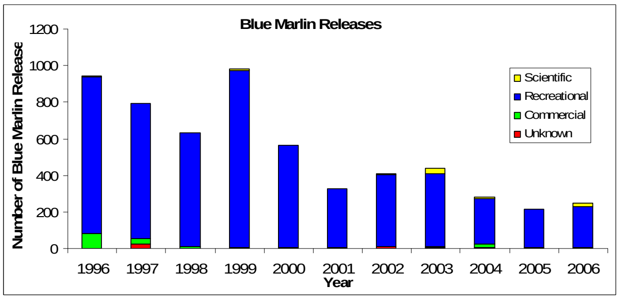


The overwhelming majority of sailfish were released off southeast Florida and the Florida Keys. Some secondary regions with high tagging concentrations were off the northeast coast of Florida, the northeast coast of the Yucatan Peninsula in Mexico, off Venezuela and North Carolina (Figure 30-A)

Blue Marlin

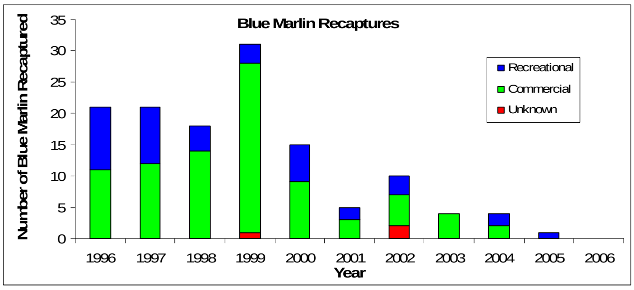
There were 5,815 blue marlin tagged by 1,149 captains. Captain Bill McCauley tagged 394 while eight other captains tagged 50 or more (Appendix 2). 5,538 (95%) blue marlin were tagged by recreational fishers, 159 (3%) by commercial fishers, 70 (1%) by scientists and 48 (1%) instances where the fisher type was unknown (Figure 10).

Figure 10. Released blue marlin by fisher type.



The historical recapture rate for blue marlin is 0.97%. 130 blue marlin were recaptured between 1996 and 2006. Of these, 87 (67%) were caught by commercial fishers, 40 (31%) by recreational fishers, and there were three instances where fisher type was unknown (2%) (Figure 11).

Figure11. Recaptured blue marlin by fisher type.



The longest minimum straight line distance traveled by a tagged blue marlin was 3,050 miles (Ortiz et al. 2003). This fish was released off Venezuela in September of 1996 and recaptured 513 days (1 year, 148 days) later off Sierra Leone, Africa. The longest time at large was 4,591 days (12 years, 211 days). This fish was initially tagged off the coast of Puerto Rico in October of 1989 and recaptured 455 miles away off the coast of Venezuela. The shortest time at large was a fish released near the US Virgin Islands in June of 1991 and recaptured off Dominica in the Lesser Antilles, having traveled at least 325 miles in just two days (Figure 12). The blue marlin recaptured between 1996 and 2006 stayed at large for an average of 901 days (2 years, 171 days) (Figure 13).

Figure 12. Selected movements of recaptured blue marlin.

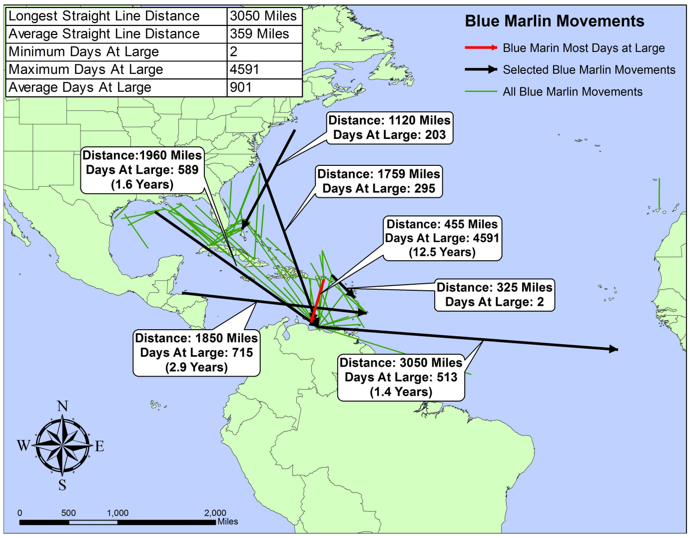
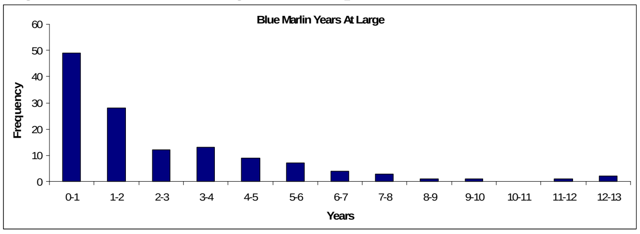


Figure 13. Years at large for recaptured blue marlin.

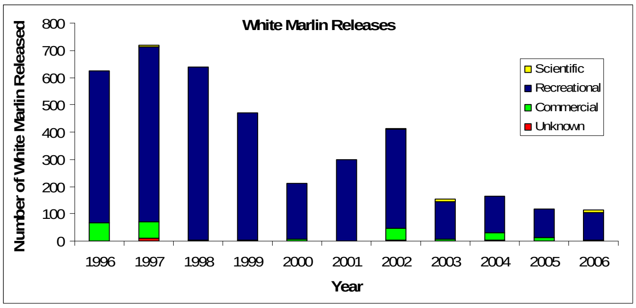


The highest concentration of blue marlin tagging occurred in the waters near Puerto Rico and the Virgin Islands. Secondary key areas included the north central Gulf of Mexico (off; Louisiana, Mississippi, Alabama and the western tip of the Florida panhandle), Venezuela, the northern Bahamas, North Carolina and Bermuda (Figure 30-B).

White Marlin

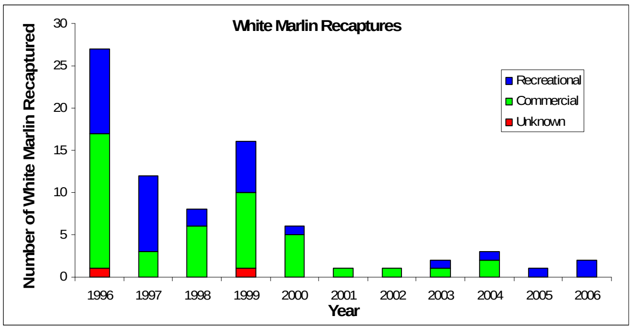
There were 3,927 white marlin tagged by 980 different captains. A total of 6 captains tagged 50 or more white marlin. Captain Paul Ivey of Deerfield Beach Florida led all captains releasing 339 (Appendix 2). There were 3,646 (93%) tagged by recreational fishers, 228 (6%) by commercial fishers, 30 (.7%) by scientists and 23 instances where the fisher type was unknown (.5%)(Figure 14).

Figure 14. Released white marlin by fisher type.



The historical recapture rate for white marlin is 1.78%. Between 1996 and 2006, there were 79 recaptures. Commercial fishers recaptured 44 (56%), recreational fishers caught 33 (42%), and there were two instances where fisher type was unknown (2%) (Figure 15).

Figure 15. Recaptured white marlin by fisher type.



The longest minimum straight line distance traveled by a recaptured white marlin was a fish tagged off the coast of New Jersey by a recreational fisher in July of 1995 (Ortiz 2003). After 474 days (1 year, 109 days) this fish was recaptured roughly 4,049 miles away off the coast of Guinea, Africa by another recreational fisher. The greatest time at large was 5,488 days (15 years, 11 days). This fish was initially released off Venice, Louisiana in June of 1984 and was recaptured off the Florida panhandle, only 254 miles from where it was tagged (Figure 16). The recaptures were at large for an average of 1,215 days (Figure 17).

Figure 16. Selected movements of recaptured white marlin.

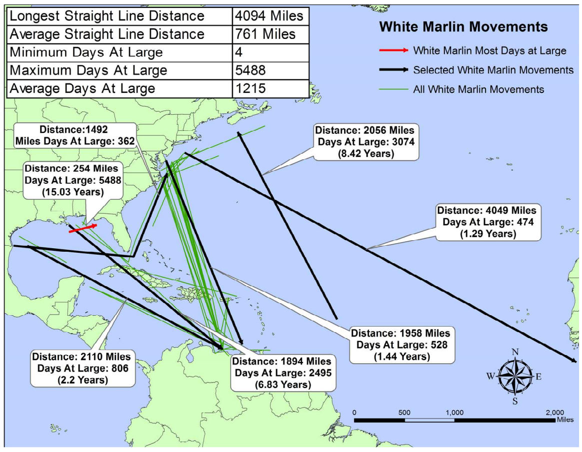
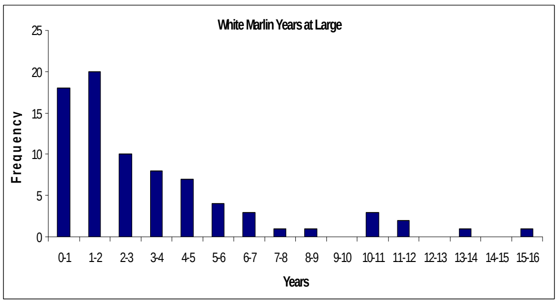


Figure 17. Years at large for recaptured white marlin.

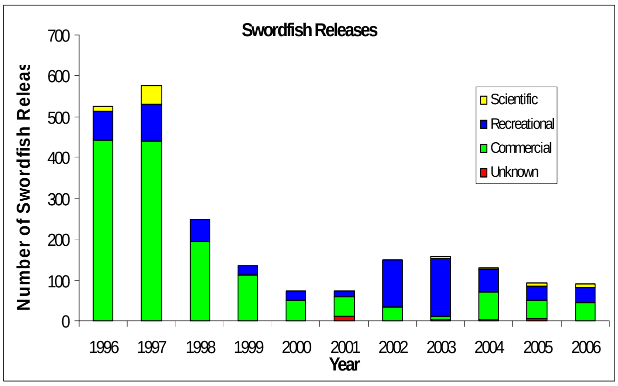


The highest concentration of white marlin tagging effort occurred off the east coast of the United States from North Carolina to Delaware. Other secondary tagging areas included the northern Gulf of Mexico off Louisiana, Mississippi, Alabama, and the Florida panhandle, the Bahamas, Puerto Rico and the Virgin Islands, as well as Venezuela (Figure 30-C).

Swordfish

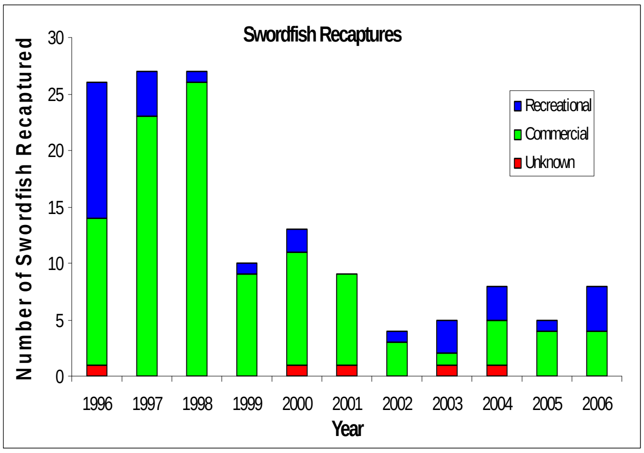
A total of 2,247 swordfish were tagged by 150 different captains. Captain T. Baker Dunn lead all captains with 326. That is 225 more swordfish than any other captain. Twelve captains tagged more than 50 swordfish during this period (Appendix 2). There were 1,486 (66%) swordfish tagged by commercial fishers, 654 (29%) by recreational fishers, 82 (4%) by scientists, and 25 instances where fisher type was unknown (1%)(Figure 18).

Figure 18. Tagged swordfish by fisher type.



The historical recapture rate for swordfish is 3.72%. During this time period, 142 swordfish were recaptured. Commercial fishers were responsible for 105 (74%) recaptures, recreational fishers for 32 (22%) and there were five instances where fisher type was unknown (3%) (Figure 19).

Figure 19. Recaptured swordfish by fisher type.



The longest minimum straight line distance traveled by a swordfish was 3,050 miles. This fish was initially tagged in April of 1995 by a commercial, longline fisher, about 600 miles east of Barbados. After 861 days at large (2 years, 131 days), a commercial gill net fisher recaptured the fish roughly 3,050 miles east, just south of Portugal and Spain. The greatest time at large was 5,308 days (14 years, 198 days) for a fish initially tagged in November of 1991 about 400 miles southeast of Newfoundland by a commercial longline vessel and recaptured again by a longline vessel only 265 miles west of where it was tagged (Figure 20). Tagged swordfish were at large for an average of 1,226 days (3 years, 131 days) (Figure 21).

Figure 20. Selected movements of recaptured swordfish.

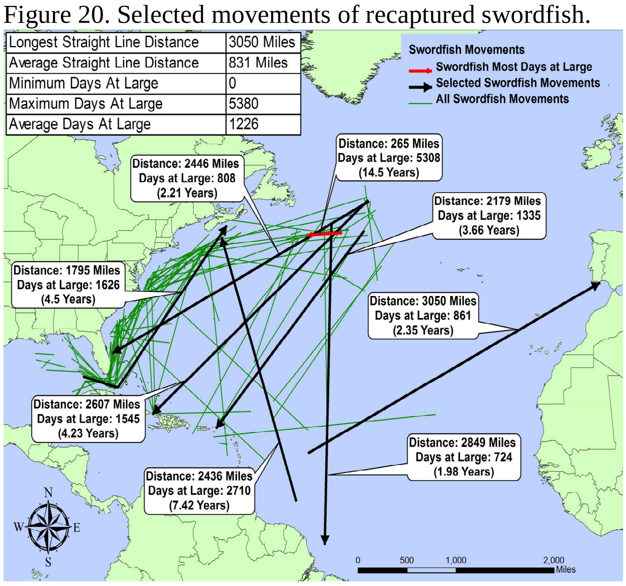
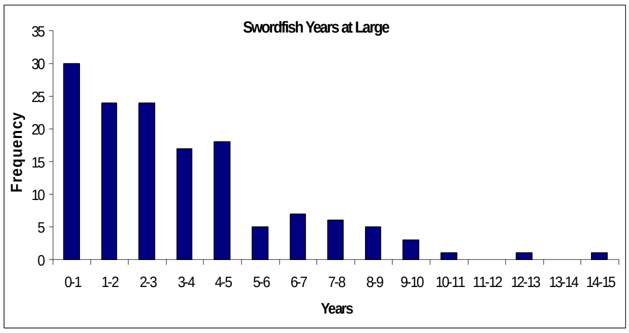


Figure 21. Years at large for recaptured swordfish.

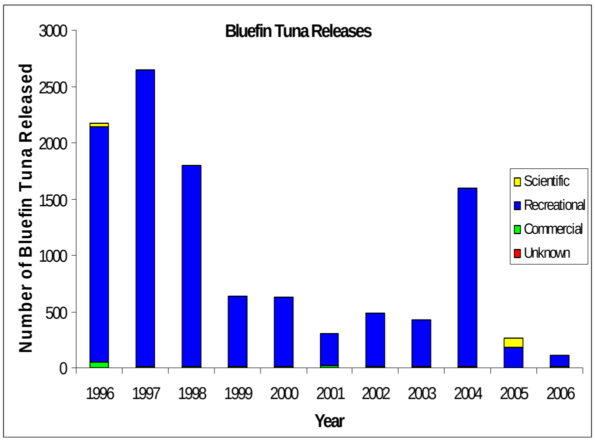


The highest concentration of swordfish tagging effort was off the southeast coast of Florida in the Florida Straits, where 454 tags were deployed. Secondary tagging areas were in the waters off northeast Florida, Georgia, and South Carolina, as well as west Florida and Venezuela (Figure 30-D).

Bluefin Tuna

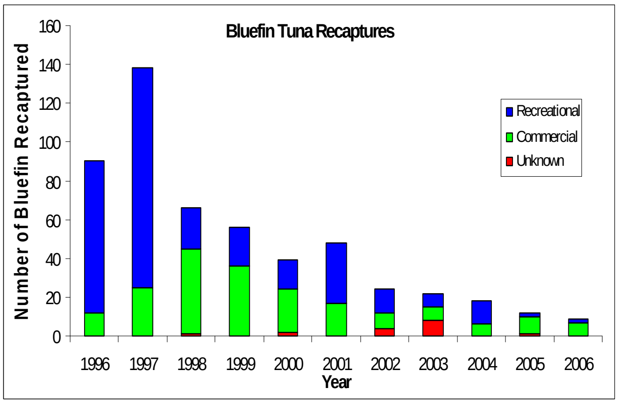
A total of 11,060 bluefin tuna were tagged by 642 different captains. Captain Al Anderson tagged the most bluefin tuna during this period, releasing 3,066 (Appendix 2). There were 10,811 (97.7%) tagged by recreational fishers, 105 (1%) by commercial fishers, 113 (1%) by scientists, and 31 (.3%) instances where fisher type was unknown (Figure 22).

Figure 22. Tagged and released bluefin tuna by fisher type.



The historical recapture rate for bluefin tuna is 11.10%. There were a total of 522 recaptures. There were 313 (60%) recaptured by recreational fishers, 193 (37%) by commercial fishers, and sixteen instances where fisher type was unknown (3%) (Figure 23).

Figure 23. Recaptured bluefin tuna by fisher type.



The longest minimum straight line distance traveled by a bluefin was 5,305 miles. This fish was initially tagged and released by a recreational fisher in July of 1983 off the southern tip of Texas and recaptured 5,117 days (14 years, 7 days) later by a commercial gill net fisher in the Straits of Gibraltar. Another bluefin that traveled nearly the same distance was recovered 5,300 miles from where it was initially tagged. This fish was tagged off Rhode Island in July of 2001 by a recreational fisher and was recovered 1,787 days (4 years, 327 days) later by a commercial purse seine fisher in the Mediterranean Sea off the coast of Cyprus. The greatest time at large for a bluefin was 6,250 days (17 years. 45 days). This fish was initially tagged in June of 1980 off the coast of North Carolina by a purse seine fisher and recaptured only 500 miles away off the coast of Massachusetts by a recreational fisher (Figure 24). Bluefin were at large for an average of 963 days (2 years, 233 days) (Figure 25).

Figure 24. Selected movements of recaptured bluefin tuna.

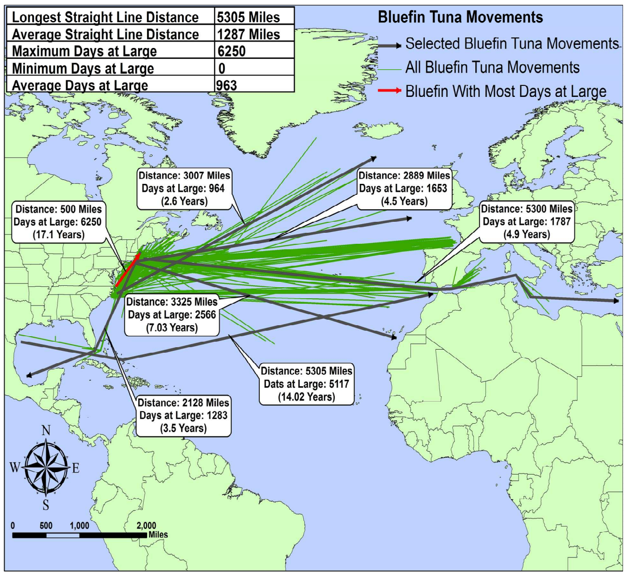
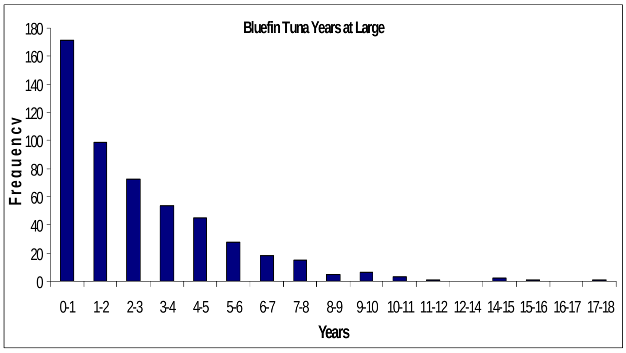


Figure 25. Years at large for recaptured bluefin tuna.

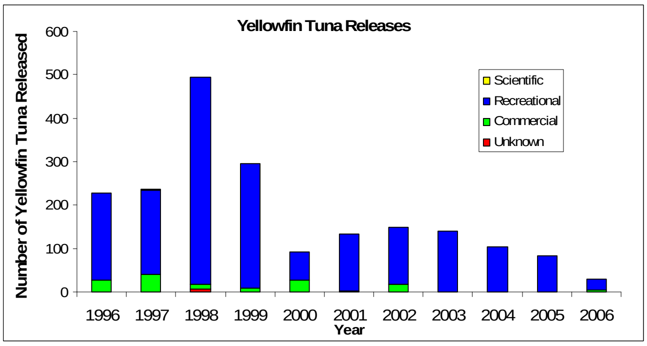


The overwhelming majority of the bluefin tuna tagging effort was concentrated in two areas off the east coast of the Unites States: off the coast of North Carolina or New York, Connecticut, Massachusetts, and Rhode Island (Figure 30-E).

Yellowfin Tuna

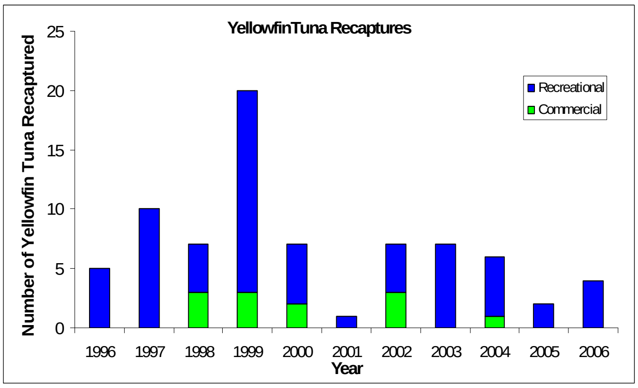
There were 1,985 yellowfin tuna tagged by 285 captains. Captain Jerry Shepherd tagged the most (141). Including Captain Jerry Shepherd there were eight other captains who released 50 or more yellowfin (Appendix 2). There were 1,835 (92%) tagged by recreational fishers, 141 (7%) by commercial fishers, 2 (.1%) by scientists, and seven instances where fisher type was unknown (.3%) (Figure 26).

Figure 26. Tagged and released yellowfin tuna by fisher type.



The historical recapture rate for yellowfin tuna is 4.25%. A total of 76 yellowfin were recaptured. There were 64 (84%) recaptured by recreational fishers and 12 by commercial fishers (16%) (Figure 27).

Figure 27. Recaptured yellowfin tuna by fisher type.



The longest minimum straight line distance traveled by a yellowfin tuna was 5,673 miles. This fish was initially tagged off the coast of North Carolina by a recreational fisher in March of 1996. After 739 days (2 years, 9 days) at large this yellowfin was recaptured off the coast of Gabon, Africa by a commercial longline fisher. The greatest time at large for a yellowfin recaptured was 1,004 days (2 years, 274 days). This fish was also tagged off the coast of North Carolina. It was tagged in July of 1996 by a recreational fisher and was recaptured later about 555 miles west of Sierra Leone, Africa by a commercial purse seine fisher (Figure 28). The average days at large was 246 days (Figure 29).

Figure 28. Selected movements of recaptured yellowfin tuna.

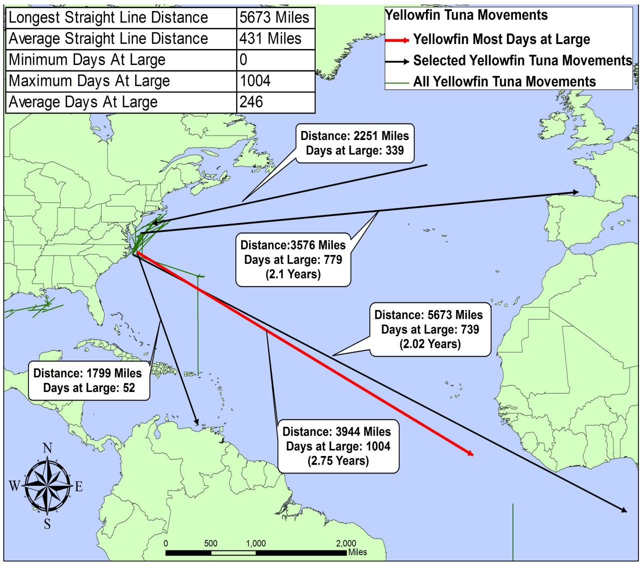
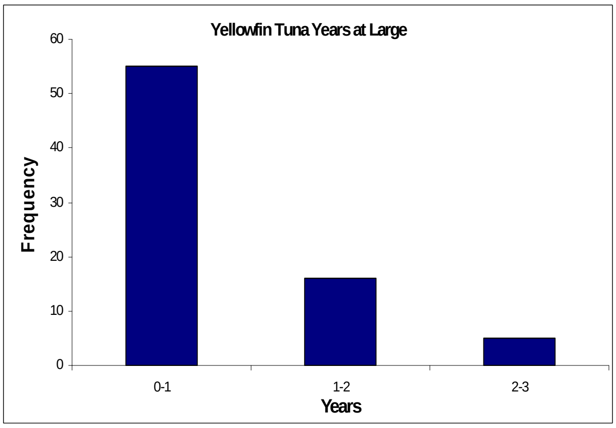
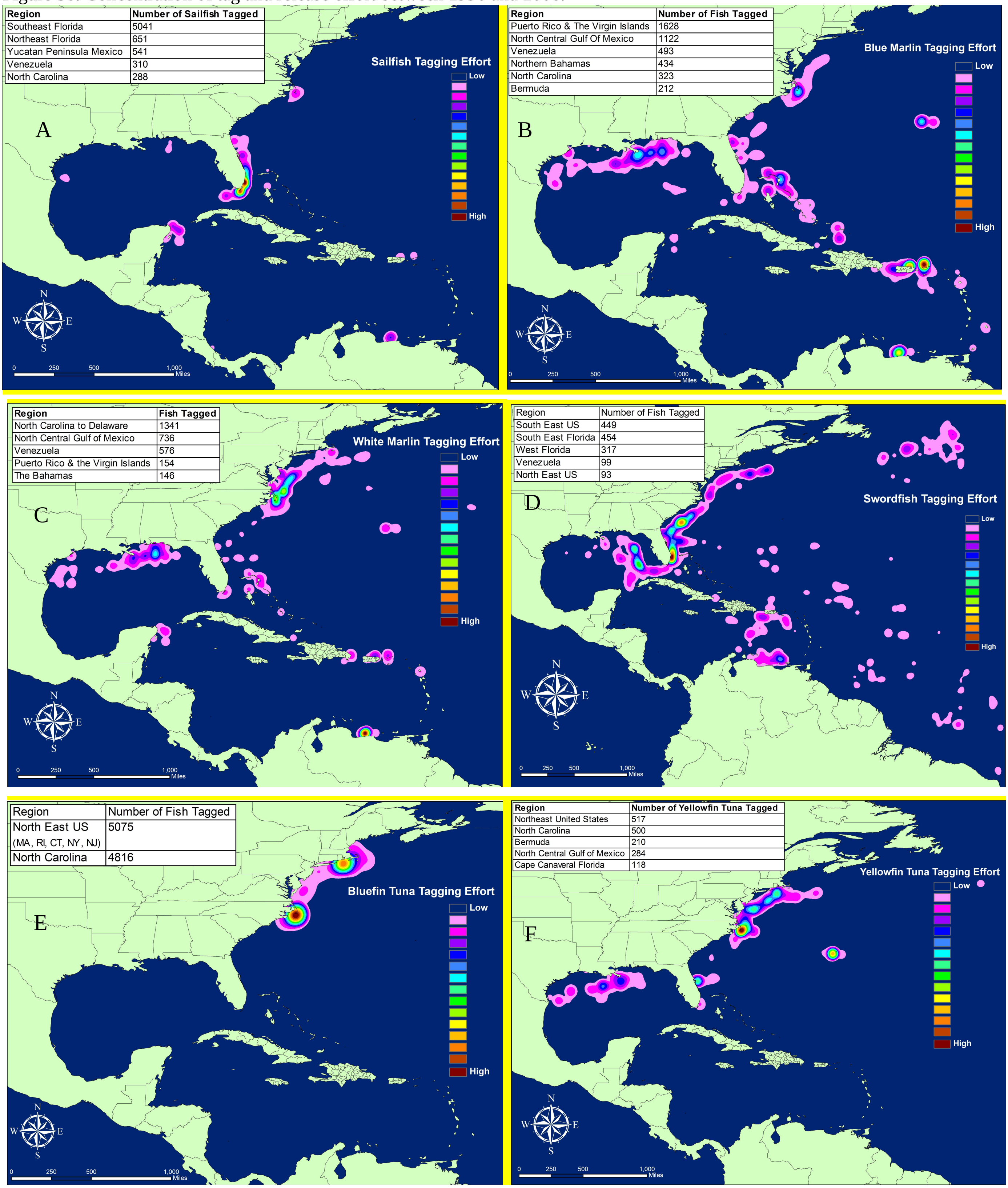


Figure 29. Years at large for recaptured yellowfin tuna.



The majority of yellowfin were tagged off the east coast of the United States from Cape Canaveral, Florida to Rhode Island. There were three major areas of concentration off the east coast of the US: the northeast, North Carolina and Cape Canaveral, Florida. Some secondary areas included Bermuda and the north central Gulf of Mexico, from Louisiana to Alabama (Figure 30-F).

Figure 30. Concentration of tag and release effort between 1996 and 2006.



Improving Tagging Information

The success of the CTC has always been dependent on volunteer participants (both recreational and commercial fishers) to tag, release and recapture billfish and tuna. Because billfish and tuna are highly migratory pelagic species that are widely distributed around the world they are difficult and expensive to study. By utilizing a constituent-based tagging program the CTC has been able to provide its scientists with information on these species that would otherwise be unobtainable. Directly involving the public in this data collection allows a significant number of tags to be deployed over a wide area with relatively low cost. In the practical sense, it would be financially unfeasible for scientists to collect these data from pelagic species with such a large geographical area of occurrence without the participation of recreational and commercial fishers (Ortiz et al. 2003).

The most valuable information collected by the CTC comes from tag recoveries.. It is therefore imperative that participants help the CTC make the most out of their donated time and effort by ensuring that each tagged fish has the best chance of being recovered and that the CTC can gain as much information as possible from each encounter. Contact the CTC for copies of any publication produced by our staff and collaborative scientists; (800)437-3936 or visit our website (SEFSC 2007) at www.sefsc.noaa.gov/fisheriesbiology.jsp .

Recommendations: *Tag Release Activities*

Conditions and opportunities for using in-water tagging techniques can vary depending on numerous factors, including weather, species, and circumstances involving individual fish. The following recommendations should be considered when tagging:

(1) Use circle hooks whenever possible (i.e., while using dead or live bait), as this terminal gear minimizes deep hooking, foul hooking, and bleeding (Prince et al. 2007). Thus, circle hooks reduce the physical trauma related to hook damage and promote the live release of tagged fish. Use of circle hooks on lures is not recommended at this time, due to incomplete information;

(2) Only attempt to tag fish that are calm or subdued at boat-side (Prince et al. 2002). If the fish is still active, slow down the tagging activity and wait until the fish is subdued before attempting to insert the tag in the target area. Speed tagging lends itself to inaccurate tag placement, increases the potential of injuring the fish as well as the crew, or can cause damage to the vessel. For these reasons, we discourage speed tagging;

(3) When possible, use a snooter (wire snare) on billfish (Prince et al. 2002), to control the fish and reduce the chance of injury to the crew or fish (Figure 31);

(4) Attempt to measure the length of the fish when circumstances permit, as measured size is always better than estimated size;

(5) Use a dual applicator tagging stick or small gaff to right the fish to increase the flexibility of the angle of tag entry and promote accurate tag placement (Prince et al. 2002). This is particularly important when tagging tuna and billfish that often turn sideways when brought alongside the boat;

(6) Use appropriate hydroscopic nylon double-barb dart tags, as these tags have significantly higher retention rates compared with stainless steel dart tags;

(7) Remove hooks whenever possible. Use of a de-hooker can facilitate quick and easy de-hooking;

(8) Resuscitate all fish that show an inability to maintain their body position in the water due to exhaustion from the fight (Prince et al. 2002). Resuscitation methods can differ between tuna and billfish. A snooter can be helpful in resuscitating billfish.

(9) **MOST IMPORTANTLY, fill out fish tagging report cards (Figure 32) immediately** and **mail them to the Cooperative Tagging Center as soon as possible. We also recommend keeping a copy of all your tag release cards as these data can become critical if your release information is lost.**

(10) The five most critical pieces of release information on these cards (Figure 32) are: Species, Date of tagging, Tag number, Location of tagging (latitude/longitude), and Size of fish. No matter what additional information you provide on the release card, these data are absolutely essential.

Figure 31. Snooter and safest tagging locations.

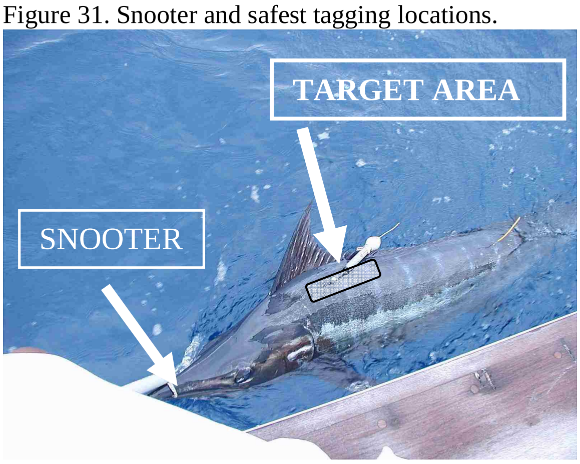
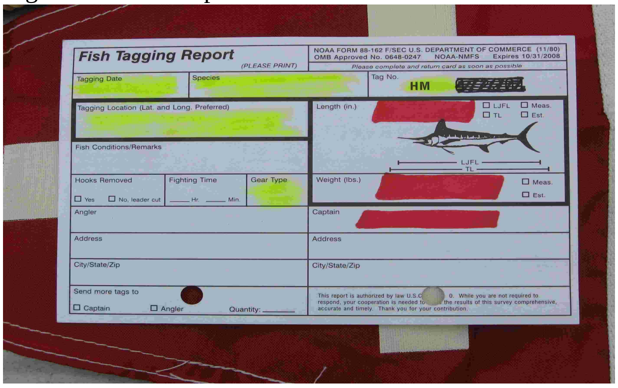


Figure 32. Most important data to be recorded.



You can get a complete hard copy or pdf file of our In-Water Tagging paper by writing, emailing, or calling the CTC at (305) 361-4253 or 1-800-437-3936 , Tagging@noaa.gov.

The Release Card

The tagging event does not end when the fish is released. Completely filling out and returning the release cards as accurately and quickly as possible is the last critical step in the process (Figure 32). A significant amount of data has been lost due to release cards being incompletely or incorrectly filled out. **Most importantly, many release cards are not being mailed back to the SEFSC**. A surprising number of participants fail to mail in the release information. This is a terrible waste because when the fish is recaptured, the lack of release information basically relegates this recapture as useless! In many ways, lack of release data is one of the greatest shortcomings of constituent based tagging programs. **We regard mailing in the release information as the single most important activity for CTC participants.**

Participants frequently record a general area or local name for the release location, which greatly reduces the amount of useful information to the program. The personnel entering the tag information into the database do not always have the local knowledge to understand where certain areas are located based on local names. The only definite way for the CTC to know where the fish was released is to have the latitude and longitude written on the release card.

It is also important that participants be sure they know what species of fish they are tagging. Certain species of billfish and tuna are easily confused, for example a small blue marlin can easily be confused with a white marlin. If you are not confident in your ability to recognize different species, there are several books and websites (www.marlinmag.com) that can help. All of the information on the tag card is useful to the CTC but there are five things that we must have to get useful information from the tagged fish: the tag number, an accurate latitude and longitude for the release location, the species of the fish, the size of the fish, and the date the fish was released.

Please note; tag cards mailed internationally may require additional postage. The CTC has received recapture information on a few hundred tagged fish whose release information was never received. Recaptures do not always happen years after the initial release; we have even had sailfish and tuna recaptured on the same day they were tagged. It is important that you send your tag cards in as soon as possible. Tag cards can also get lost in the mail so the CTC recommends that participants keep their own records of fish they tag, in case the release information never makes it to the CTC. The recapture information with no release data is saved because some fish are recaptured before the release card makes it to the CTC. For example; this year tag cards were mailed to the CTC for fish that were tagged in 1998 and 1999. This is not common but it is recommended that cards get sent in as soon as possible. CTC personnel often re-check recapture data that has no release information, to see if the release information has come in. This is just one method we have of crossing checking and resolving this problem. In the future, we hope to develop an email option for reporting tag released fish to our program.

Recommendations*: Tag Recapture Activities*

The following recommendations for tag recovery should be adopted by all fishers, even those that do not participate in the tagging portion of the program (Prince et al. 2002):

(1) Examine the dorsal musculature on both sides of each fish caught to see if a tag is present;

(2) Cut the old tag off where it meets the skin, and if the fish is to be released please retag the fish. Measure and record the length and weight of the fish. Tags that look old can indicate that the fish has been at large for a long time, and **long-term recaptures are particularly valuable to the program.**

(3) Record the recovery information, including **tag number, species, latitude and longitude** of the recapture site, **date, fishing method**, and size of fish on a piece of paper and:

(4) Report tag recovery information to the appropriate fisheries agency as soon as possible. Contact information is printed on the tags. You can get additional Atlantic tagging information for CTC and other large pelagic species from the web-sites given in Appendix 1.

<u>The Value of Conventional Tagging</u>

Much has been learned about the biology and movements of billfish and tuna through data that comes from the conventional tagging programs (Ortiz et al. 2003). For example, for the last 4 decades most of what we know about billfish and tuna are a result of conventional tagging programs. Relevant data can only being obtained when the fish is recovered (Ortiz et al. 2003). Even though newer tagging technologies (i.e. popup satellite archival technology) have been developed that do not rely on fishery dependent data retrieval and that provide much greater detailed information between points of release and recapture, conventional tagging still is an important tool for fisheries scientists. In fact, the only way to gain information on longevity and maximum age of some species is through long term conventional tagging programs.

<u>The Value of Volunteer Participation</u>

Although constituent based tagging programs like the CTC's have their limitations, a great deal of knowledge can be gained through its participants if they follow the CTC's guidelines. The participants directly affect the success of the CTC and their impact on the knowledge gained on billfish and tuna is invaluable. It has been estimated that between 50 and 80% of what is known about a particular fishery is discovered using tagging data. That concept holds true for billfish and tuna and there would be very little tagging data on billfish and tuna without the participation of recreational and commercial fishers (Ortiz et al. 2003). Your donated time and effort will continue to expand our understanding of billfish and tuna, and will help ensure that they survive for future generations of commercial and recreational fishers.

ADDITIONAL INFORMATION. We urge all participants to directly access the Migratory Fishery Biology Branch website below:

<u>www.sefsc.noaa.gov/fisheriesbiology.jsp</u>

Or contact us at:

1(800)437-3936
Tagging@noaa.gov

<u>References</u>

Ortiz, M., Prince, E.D., Serafy, J.E., Holtz, D.B., Davy, K.B., Pepperell, J.G., Lowry, M.B., and Holdsworth, J.C. (2003). Global overview of the major constituent-based billfish tagging programs and their results since 1954. In "Marine and Freshwater Research." **54**, 489-507.

Prince, E.D., Ortiz, M., Venizelos, A., and Rosenthal, D. (2002). In-water conventional tagging techniques developed by the Cooperative Tagging Center for large highly migratory species. In "Catch and Release in Marine Recreational Fisheries." *American Fisheries Society Symposium* **30**, 155-171.

Prince, E.D., Snodgrass, D., Orbesen, E.S., Hoolihan, J.P., Serafy, J.E., and Schratwieser, J.E. (2007). Circle hooks, "J" hooks and drop-back time: a hook performance study of the south Florida recreational live-bait fishery for sailfish, *Istiophorus platypterus*. In "Fisheries Management and Ecology." **14**, 173-182.

SEFSC Migratory Fishery Biology Branch [Migratory Fishery Biology Branch Homepage on the Internet]. Miami (FL): Southeast Fisheries Science Center (US); [updated 2007 April 25; cited 2007 July 18]. Available from: http://www.sefsc.noaa.gov/fisheriesbiology.jsp.

Appendix 1. List of other tagging programs that target pelagic species.

Program	Species	Location	Contact Information
ICCAT	Billfish	Eastern Atlantic Ocean	ICCAT Corazon de Maria 8 28002 Madrid, Spain Phone: 34-91-416-5600 Fax: 34-91-415-2612 www.iccat.es
The Billfish Foundation	Billfish	All Oceans	2161 E. Commercial Blvd 2nd Floor Ft. Lauderdale, FL 33308 Phone: 800-GET-TAGS Phone: 954-938-0150, ext 107 peter_chaibongsai@billfish.org www.billfish.org
Cooperative Shark Tagging Program	Shark	Atlantic Ocean Gulf of Mexico Mediterranean Sea	NOAA/NMFS/NEFSC 28 Tarzwell Drive Narragansett, RI 02882-1152 Phone: 401-782-3200 http://na.nefsc.noaa.gov/sharks/
Southwest Fisheries Science Center Tagging Program	Billfish Tuna	Pacific Ocean	8604 La Lolla Shores Dr. La Jolla, CA 92037 Phone: 858-546-7186 http://swfsc.ucsd.edu/billfish.hml
Dolphin Tagging Research Project	Dolphinfish	Atlantic Ocean Gulf of Mexico Caribbean Sea	Donald L Hammond Marine Fisheries Biologist Cooperative Science Services, LLC 961 Anchor Rd. Charleston, SC 29412-4902 (843)795-7524 CSSLLC@bellsouth.net www.dolphintagging.com
New South Wales Fisheries Tagging Program	Billfish Tuna Shark	Australia	202 Nicholson Parade P.O. Box 21 Cronulla NSW 2230 Australia Phone: 61 (0) 2 9527-8411
New Zealand Marine Gamefish Tagging Program	Billfish	New Zealand	NIWA-Auckland P.O. Box 1043 Whangarei

Note: More complete lists of tagging programs in other locations, and that are not limited to pelagic species can be found in the IGFA's World Record Game Fishes publication or at http://fwie.fw.vt.edu/tagging/allProgs.asp.

Appendix 2. Captains who made significant contributions to the CTC between 1996 and 2006. Those listed tagged 100 or more sailfish or bluefin tuna, or 50 or more blue marlin, white marlin, swordfish, or yellowfin tuna.

Captain	Home Port	Fish Tagged
Sailfish		
John Dudas	Miami, Fl	537
Jimbo Thomas	Miami, Fl	373
Richard Jeck	Palm Beach, FL	268
Ray Rosher	Miami, Fl	258
Al Kropp	Ft. Lauderdale, FL	251
Skip Nielsen	Islamorada, FL	232
Rich Hellmuth	Islamorada, FL	189
Rob Dixon	Islamorada, FL	146
Burt Moss	Pompano Beach, FL	135
Butch Standeven	Riviera Beach, FL	118
Glen Halle	Port St. Lucie, FL	118
Ed Dwyer	Coco Beach, FL	106
Bluefin Tuna		
Al Anderson	Narragansett, RI	3066
Walt Spruill	Hatteras, NC	770
Fred Parsons	Hatteras, NC	540
Jerry Shepherd	Hatteras, NC	442
Gary Stuve	Hobe Sound, FL	419
Rom Whitaker	Hatteras, NC	314
Bob Eakes	Buxton, NC	254
Ned Kittredge	N Dartmouth, MA	169
David Wright	VA Beach, VA	145
Edward Murray	Palm Beach Gardens, FL	136
Skeet Warren	Greensboro, GA	129
Andrew Dangelo	West Kingston, RI	110
Blue Marlin		
Bill McCauley	St. Thomas, USVI	394
Paul Ivey	Deerfield Beach, FL	149
Allen Desilva	Pembroke, Bermuda	118
Mike Canino	Houston, TX	98
Mike Lemon	Pinecrest, FL	92
Ron Schatman	N Miami Beach, FL	62
Pitain Martinez	Dorado, Puerto Rico	56
Bob Collins	Provo, Turks and Caicos	51
Bernardo Schummer	Caracas, Venezuela	50
White Marlin		
Paul Ivey	Deerfield Beach, FL	339
Benjie Stansky	Kill Devil Hills, NC	155
Peter Dubose	Morehead City, NC	119
Bernardo Schummer	Caracas, Venezuela	56
Walt Spruill	Hatteras, NC	52
Joseph DelCampo	Virginia Beach, VA	51

Captain	Home Port	Fish Tagged
Swordfish		
T. Baker Dunn	Ft. Pierce, FL	326
Robert Burcaw	Cape May Crthse, NJ	101
Randall Dyal	Neptune Beach, FL	95
Daniel Shawhan	Palm Bay, FL	84
Randall Smalling	Ft. Pierce, FL	74
Burt Moss	Pompano Beach, FL	73
Tim Palmer	Stuart, FL	73
Brian Delarosiere	Boca Raton, FL	69
Steve Sexton	Clearwater, FL	63
John Johnson	Conway, SC	60
Larry Horne	Mt. Pleasant, SC	57
John Caldwell	Melbourne, FL	53
Yellowfin Tuna		
Jerry Shepherd	Hatteras, NC	141
Keith Winter	Bermuda	127
Ed Dwyer	Cocoa Beach, FL	103
Bob Croswait	Manteo, NC	86
Rich Barrett	Jupiter, FL	81
Al Anderson	Narragansett, RI	72
Benjie Stansky	Kill Devil Hills, NC	57
David Pantry	Bermuda	52