

**SOUTH CAROLINA MARINE GAME FISH TAGGING PROGRAM  
1974 - 1992**

by

**Kay B. Davy**

**Office of Fisheries Management  
Marine Resources Division  
South Carolina Department of Natural Resources  
P.O. Box 12559  
Charleston, South Carolina 29422**

**Technical Report No. 83**

**September 1994**

This project was funded in part through the  
Federal Aid in Sport Fish Restoration Act.

## TABLE OF CONTENTS

	Page
List of Tables . . . . .	ii
List of Figures . . . . .	iv
INTRODUCTION . . . . .	1
METHODS . . . . .	2
RESULTS . . . . .	4
DISCUSSION . . . . .	59
ACKNOWLEDGMENTS . . . . .	62
LITERATURE CITED . . . . .	63
APPENDIX I . . . . .	64
APPENDIX II . . . . .	65
APPENDIX III . . . . .	66
APPENDIX IV . . . . .	90

LIST OF TABLES

Table	Page
1. Numbers of target species tagged and recovered in the Marine Game Fish Tagging Program, 1974-1992 . . . . .	5
2. Tagged red drum recovered outside South Carolina.	13
3. Tagged spotted seatrout recovered outside South Carolina. . . . .	16
4. Tagged flounder recovered outside South Carolina.	18
5. Tagged striped bass recovered outside South Carolina. . . . .	18
6. Tagged Spanish mackerel recovered outside South Carolina. . . . .	21
7. Tagged great barracuda recovered outside South Carolina. . . . .	23
8. Tagged bluefish recovered outside South Carolina.	26
9. Tagged king mackerel recovered outside South Carolina. . . . .	26
10. Tagged black sea bass recovered outside South Carolina. . . . .	29
11. Tagged amberjack recovered outside South Carolina. . . . .	29
12. Tagged crevalle jack recovered outside South Carolina. . . . .	31
13. Tagged sailfish recovered outside South Carolina.	31
14. Tagged sharks recovered outside South Carolina. .	34
15. Tagged black drum recovered outside South Carolina. . . . .	38
16. Tagged blue marlin recovered outside South Carolina. . . . .	41
17. Tagged cobia recovered outside South Carolina . .	44

	Page
18. Tagged little tunny recovered outside South Carolina. . . . .	44
19. Tagged Atlantic sharpnose shark recovered outside South Carolina. . . . .	48
20. Tagged Florida pompano recovered outside South Carolina. . . . .	48
21. Tagged smooth dogfish recovered outside South Carolina. . . . .	52

## LIST OF FIGURES

Figure	Page
1. Number of fish tagged annually in the Marine Game Fish Tagging Program, 1974-1992 . . . . .	7
2. Number of new participants added annually in the Marine Game Fish Tagging Program, 1974-1992 . . . . .	8
3. Number of tagging kit disbursed annually in the Marine Game Fish Tagging Program, 1974-1992. . . . .	8
4. Locations of tagged fish releases along South Carolina's coast . . . . .	9
5. Number of tagged fish recovered annually in the Marine Game Fish Tagging Program, 1974-1992. . . . .	10
6. Locations of recovered tagged fish . . . . .	10
7. Number of red drum released (A) and recovered (B) annually . . . . .	12
8. Number of spotted seatrout released (A) and recovered (B) annually . . . . .	15
9. Number of flounder released (A) and recovered (B) annually . . . . .	17
10. Number of striped bass released (A) and recovered (B) annually . . . . .	19
11. Number of sheepshead released (A) and recovered (B) annually . . . . .	20
12. Number of Spanish mackerel released (A) and recovered (B) annually . . . . .	22
13. Number of barracuda released (A) and recovered (B) annually . . . . .	24
14. Number of bluefish released (A) and recovered (B) annually . . . . .	25
15. Number of king mackerel released (A) and recovered (B) annually . . . . .	27
16. Number of black sea bass released (A) and recovered (B) annually . . . . .	28

	Page
17. Number of amberjack released (A) and recovered (B) annually. . . . .	30
18. Number of crevalle jack released (A) and recovered (B) annually. . . . .	32
19. Number of sailfish released (A) and recovered (B) annually. . . . .	33
20. Number of gag released (A) and recovered (B) annually. . . . .	35
21. Number of requiem sharks released (A) and recovered (B) annually. . . . .	36
22. Number of Atlantic spadefish released (A) and recovered (B) annually. . . . .	37
23. Number of black drum released (A) and recovered (B) annually. . . . .	39
24. Number of Southern flounder released (A) and recovered (B) annually. . . . .	40
25. Number of blue marlin released (A) and recovered (B) annually. . . . .	42
26. Number of blacktip sharks released (A) and recovered (B) annually. . . . .	43
27. Number of cobia released (A) and recovered (B) annually. . . . .	45
28. Number of tarpon released (A) and recovered (B) annually. . . . .	46
29. Number of little tunny released (A) and recovered (B) annually. . . . .	47
30. Number of Atlantic sharpnose sharks released (A) and recovered (B) annually. . . . .	49
31. Number of dolphin released (A) and recovered (B) annually. . . . .	50
32. Number of Florida pompano released (A) and recovered (B) annually. . . . .	51

	Page
33. Number of bonnethead released (A) and recovered (B) annually. . . . .	53
34. Number of scamp released (A) and recovered (B) annually. . . . .	54
35. Number of smooth dogfish released (A) and recovered (B) annually. . . . .	55
36. Number of red snapper released (A) and recovered (B) annually. . . . .	56
37. Number of wahoo released (A) and recovered (B) annually. . . . .	57
38. Number of lemon sharks released (A) and recovered (B) annually. . . . .	58

## INTRODUCTION

South Carolina's Marine Game Fish Tagging Program (MGFTP) began in 1974 under the direction of David Cupka. Following Cupka, Charles Moore, Donald Hammond and Kay Davy assumed supervision of the program. Operated by the South Carolina Wildlife and Marine Resources Department's Office of Fisheries Management, it was initiated with a contribution from the Charleston based South Carolina Saltwater Sportfishing Association. Since 1991, it has received funding from the U.S. Fish and Wildlife Service's Sport Fish Restoration Act. This tagging program has proven to be valuable not only for the information gathered on different species of game fish but also for promoting conservation among saltwater anglers.

The program is unique in that it is the only state operated fish tagging program on the East Coast that encourages the direct participation of the public. The other large East Coast cooperative tagging programs are operated by the National Marine Fisheries Service. One program based in Miami encourages the tagging of billfish, and another in Rhode Island primarily tags sharks. Both of these programs have been operating successfully for over three decades.

Tagging fish is not a recent phenomenon. It was first mentioned in a fishing guide published in 1653 (Walton). Since the early 1940's, there have been numerous tagging operations conducted by scientists. It has only been in recent years that anglers have become involved in tagging the fish they catch. With the cooperation of anglers, a greater number of fish are tagged and much valuable information is gathered. This program, like other cooperative tagging programs, gives anglers the chance to assist in scientific research and also helps in conservation of fisheries resources.

Since 1974, nearly 6,000 participants comprised of recreational anglers, charterboat captains, headboat captains and commercial fishermen participated in the program. While most participants reside in South Carolina, fishermen from 40 states, Bimini, Canada and Japan have also participated. Anglers have tagged over 42,000 fish of 96 species representing 35 families. While this program targeted specific fish species, it also allowed anglers to tag within general categories, such as shark or grouper without any distinctions made for species. Nontarget species made up less than 1% of the total fish tagged and released.

Since its inception, the MGFTP has used seven types of tags. Through trial and error, two types of tags emerged as best suited for use by this program. The tags the program has used for the past several years were developed and manufactured in Australia by Hallprint Ltd. These tags are streamlined and constructed of non-toxic material. When properly applied, they minimize the tagging



injury to the fish. Most fish recaptured even after several years after tagging have been reported in excellent condition with tags showing very little wear. The majority of tags were recovered with the legend and both sets of tag numbers clearly legible.

While the program has grown continuously for nearly two decades, it has only been during the last few years that it has developed into a major tagging program recognized worldwide. This has resulted from a combination of the public becoming more environmentally conscious and the establishment of bag limits and minimum and maximum size limits on an increasing number of marine game fish.

#### METHODS

Fishermen requesting to participate in the MGFTP for the first time are supplied with a kit containing five tags, an applicator and instructions. Anglers who have become active participants are given kits containing ten tags. Anglers receiving their first large fish tags are supplied with an applicator tip and instructions on how to assemble a tagging pole. Small fish tagging kits given to new participants contain an applicator ready for use.

To keep track of tag numbers, files are maintained with the angler's name, address and the assigned range of tag numbers. Fishermen receiving tagging kits are asked not to give them to other anglers without first notifying the tagging office. Anglers who choose not to use their tags are asked to return them. In order to remove them from the files, anglers are also asked to report any lost or damaged tags.

A brochure was developed to promote the program and to serve as an instructional guide. The brochure gives a brief history of the program, what steps to take if a tagged fish is caught, and how to tag large and small fish. Also included are instructions on how to construct a tagging pole for tagging large fish, and a list of the species of fish that are eligible for tagging. To aid the angler in identification, most fish are also pictured on the cover of the brochure. The common names of fish listed in the brochure are those recognized by the American Fisheries Society.

A system, implemented in 1991, awards anglers who report tag recaptures. The reward is a white, golf style cap with the tagging program emblem over the visor. One cap is given per recapture reported. Anglers reporting multiple recaptures are given the choice of receiving several caps or a single cap. Caps reported lost or stolen are not replaced.

All tags are yellow in color and are printed with the program's address, the word "reward" and a unique sequential tag code (see appendix). The tag code consists of a single letter followed by a six digit number printed on both ends of the tag in

case one end is mutilated.

Before 1987, a cinch-up spaghetti tag manufactured by Floy Tag and Manufacturing of Seattle, Washington was used on fish weighing less than ten pounds (4.5 kg). The legend part of the tag measured 2.5 inches (6.4 cm). It was replaced by a cinch-up spaghetti tag with a legend measuring 4.5 inches (11.4 cm) manufactured by Hallprint, Ltd. of Australia. All of the tags used since 1987 are manufactured by Hallprint.

In 1988, a new dart tag design was introduced into the program. The dart tag consists of a 3.7 inch (9.3 cm) streamer with a single barb head 0.5 inches (1.2 cm) long. Anglers are advised to use the small dart tag on fish weighing less than ten pounds (4.5 kg). Dart tags are applied to fish with an applicator consisting of a sharpened steel cannula mounted in a 5/8 inch (1.7 cm) diameter wooden dowel 4.75 inches (12 cm) in length. The cannula is longer and slightly larger in diameter than the tag so that during application the tag is not restricted when the applicator is withdrawn. The tag is inserted below the spinous dorsal fin at a 45° angle that will allow the barb to anchor among the pterygiophores. Anglers are advised to pull lightly on the tag to ensure the barb's placement on the internal fin ray spine. The tag works best on fish weighing less than ten pounds. Larger fish usually have thick musculature surrounding the pterygiophores which prohibits proper insertion of the small dart tag.

Once in place, it is extremely difficult to remove the tag without causing injury to the fish or distortion of the tag streamer. Small fish are usually tagged in the boat. A soft, wet towel placed over the eyes and head of the fish helps to calm it. After tagging and measuring, the fish is gently released. The tagging process usually takes only a few seconds. If the fish appears stressed, anglers are advised to gently cradle the fish in the water until it revives. Small fish are revived by holding in the water and allowing water to pass over the gills or by moving the fish backward and forward in the water. Anglers are asked not to place their fingers in the eyes or gills of fish.

Anglers are asked to inspect fish caught bearing tags. If both the tag and the fish are in good condition, the angler is asked to record the tag number, the length of the fish and to re-release the fish with tag attached. If the angler can not read the tag number, the tag should be removed and a new tag placed in the fish. Anglers are requested to report pertinent information on recaptures and re-releases promptly.

When fighting large fish, anglers are advised to bring the fish to the boat as quickly as possible, but it should be "played" sufficiently in order to permit tagging without having to use too much force to restrain it. Large fish are left in the water alongside the boat. If necessary, a release gaff or lasso can be

used to hold the fish close to the boat. Anglers are asked to inspect both sides of large fish for tags already in place. If a tag is present and the angler is unable to read the tag number, it should be removed and a new one implanted. Tag recoveries should be reported as soon as possible. Anglers are asked to use the larger stainless steel harpoon tag on fish weighing more than ten pounds (4.5 kg).

The harpoon tag consists of a streamer measuring 5.3 inches (13.5 cm) long attached to a stainless steel angled head 1.3 inches (3.3 cm) long and 0.3 inches (0.8 cm) wide. The streamer portion of the tag is constructed out of polyethylene over a stainless steel wire which connects the head to the streamer. The tagging process consists of placing the tag on a slotted stainless steel applicator which is mounted on a wooden or metal pole. A rubber band is used to hold the tag firmly to the tagging pole. To properly insert the tag, the angler takes a position slightly behind the fish and implants the tag in the dorsal musculature below the dorsal fin. If the hook can not be removed, the leader should be cut as close to the hook as is possible.

Following the release of a tagged fish, the angler is asked to record the location, date, species, length, weight, and angler's name and address on the tag card (see appendix). Anglers are encouraged to complete the tag cards at the time of tagging so the information will not be confused with fish subsequently tagged and to return the tag cards promptly.

When a card is received, it is assigned codes for the angler, species and location, and is categorized. Lengths and weights are converted into decimal equivalents and the card is checked for additional tag requests. Tag requests are filled as soon as possible. Tagging information is key punched into a database system. Once the data have been entered on computer and checked for errors, the card is filed.

When a recovery is reported, the original release information is retrieved for comparison with the recapture data. Minimum distance moved, net direction of movement, days at liberty and growth are calculated. This information is then provided to both the angler who tagged the fish and to the angler who reported the recapture. These letters of acknowledgement give the participants a full history of the fish. The angler who recaptured the tagged fish receives a cap bearing the tagging program logo as a reward.

## RESULTS

From 1974 through 1992, cooperating anglers tagged over 42,000 marine fishes of 96 species representing 35 families (Table 1). Of these, 52 species in 20 families were considered target species.

**Table 1.** Numbers of target fishes tagged and recovered in the Marine Game Fish Tagging Program, 1974-1992.

Scientific name	Common name	Tagged	Recovered
<i>Sciaenops ocellatus</i>	Red drum	18366	2158
<i>Cynoscion nebulosus</i>	Spotted seatrout	11082	273
Bothidae	Flounders	1348	105
<i>Morone saxatilis</i>	Striped bass	1051	97
<i>Archosargus probatocephalus</i>	Sheepshead	1028	99
<i>Scomberomorus maculatus</i>	Spanish mackerel	854	9
<i>Sphyraena barracuda</i>	Great barracuda	671	26
<i>Pomatomus saltatrix</i>	Bluefish	663	18
<i>Scomberomorus cavalla</i>	King mackerel	661	8
<i>Centropristis striata</i>	Black sea bass	618	55
<i>Seriola</i> sp.	Amberjack	537	35
<i>Caranx hippos</i>	Crevalle jack	515	5
<i>Istiophorus platypterus</i>	Sailfish	463	7
<i>Mycteroperca microlepis</i>	Gag	428	22
Carcharhinidae	Requiem sharks	405	23
<i>Chaetodipterus faber</i>	Atlantic spadefish	397	3
<i>Pogonias cromis</i>	Black drum	350	57
<i>Paralichthys lethostigma</i>	Southern flounder	272	22
<i>Makaira nigricans</i>	Blue marlin	254	3
<i>Carcharhinus limbatus</i>	Blacktip shark	219	6
<i>Rachycentron canadum</i>	Cobia	209	16
<i>Cynoscion regalis</i>	Weakfish	164	
<i>Megalops atlanticus</i>	Tarpon	151	1
<i>Euthynnus alletteratus</i>	Little tunny	148	1
<i>Rhizoprionodon terraenovae</i>	Atlantic sharpnose shark	137	1
<i>Elops saurus</i>	Ladyfish	126	
<i>Carcharhinus plumbeus</i>	Sandbar shark	109	
<i>Tetrapturus albidus</i>	White marlin	103	
<i>Coryphaena hippurus</i>	Dolphin	103	1
<i>Trachinotus carolinus</i>	Florida pompano	79	3
<i>Paralichthys dentatus</i>	Summer flounder	63	
<i>Sphyrna tiburo</i>	Bonnethead	55	1
Sphyrnidae	Hammerhead sharks	53	
Serranidae	Sea basses	29	
<i>Mycteroperca phenax</i>	Scamp	28	2
<i>Mustelus canis</i>	Smooth dogfish	24	1
<i>Lutjanus campechanus</i>	Red snapper	22	1
<i>Sarda sarda</i>	Atlantic bonito	22	
<i>Sphyrna lewini</i>	Scalloped hammerhead	21	
<i>Acanthocybium solanderi</i>	Wahoo	16	1
<i>Carcharhinus obscurus</i>	Dusky shark	15	
<i>Galeocerdo cuvieri</i>	Tiger shark	13	
<i>Negaprion brevirostris</i>	Lemon shark	13	2
<i>Mycteroperca interstitialis</i>	Yellowmouth grouper	13	
<i>Thunnus albacares</i>	Yellowfin tuna	13	
<i>Epinephelus drummondhayi</i>	Speckled hind	9	
<i>Rhomboplites aurorubens</i>	Vermilion snapper	8	

<i>Euthynnus pelamis</i>	Skipjack tuna	8	
<i>Odontaspis taurus</i>	Sand tiger	6	
<i>Squalus acanthias</i>	Spiny dogfish	5	
<i>Ginglymostoma cirratum</i>	Nurse shark	4	
<i>Carcharhinus acronotus</i>	Blacknose shark	4	
<i>Sphyrna mokarran</i>	Great hammerhead	4	
<i>Epinephelus niveatus</i>	Snowy grouper	4	
<i>Epinephelus striatus</i>	Nassau grouper	4	
<i>Carcharhinus falciformis</i>	Silky shark	2	
<i>Epinephelus guttatus</i>	Red hind	2	
<i>Thunnus alalunga</i>	Albacore	2	
<i>Carcharhinus leucas</i>	Bull shark	1	
<i>Sphyrna zygaena</i>	Smooth hammerhead	1	
<i>Epinephelus adscensionis</i>	Rock hind	1	
<i>Tetrapturus pfluegeri</i>	Longbill spearfish	1	
Total		41981	3061
Non-targeted species		<u>341</u>	<u>35</u>
		42322	3096

Target species made up 99.1% of the total fish tagged and released.

In the first twelve years of the MGFTP, fewer than 500 fish were tagged annually (Figure 1). In 1986, with the enactment of red drum (*Sciaenops ocellatus*) and spotted seatrout (*Cynoscion nebulosus*) size limits, more anglers were inclined to tag their undersize fish before releasing. As tagging caught on, it carried over to other species and to all sizes of red drum and spotted seatrout. Once anglers were accustomed to tagging and releasing, it became a regular part of their fishing routine. Nearly 85% of the fish were tagged after 1986.

Participation and activity in the MGFTP increased steadily with little promotional effort (Figures 2 and 3). This program grew primarily as a result of anglers' interest in the concept of tag and release. Anglers not familiar with the MGFTP observed other anglers tagging and inquired how they could become involved. Sportfishing clubs and fishing related events requested program personnel to give talks and demonstrations related to tagging. Many fishing clubs integrated tagging into their tournament format and established award categories for those anglers who chose to tag their fish. Over the years, fish tagging has become a normal part of sportfishing along the South Carolina coast (Figure 4).

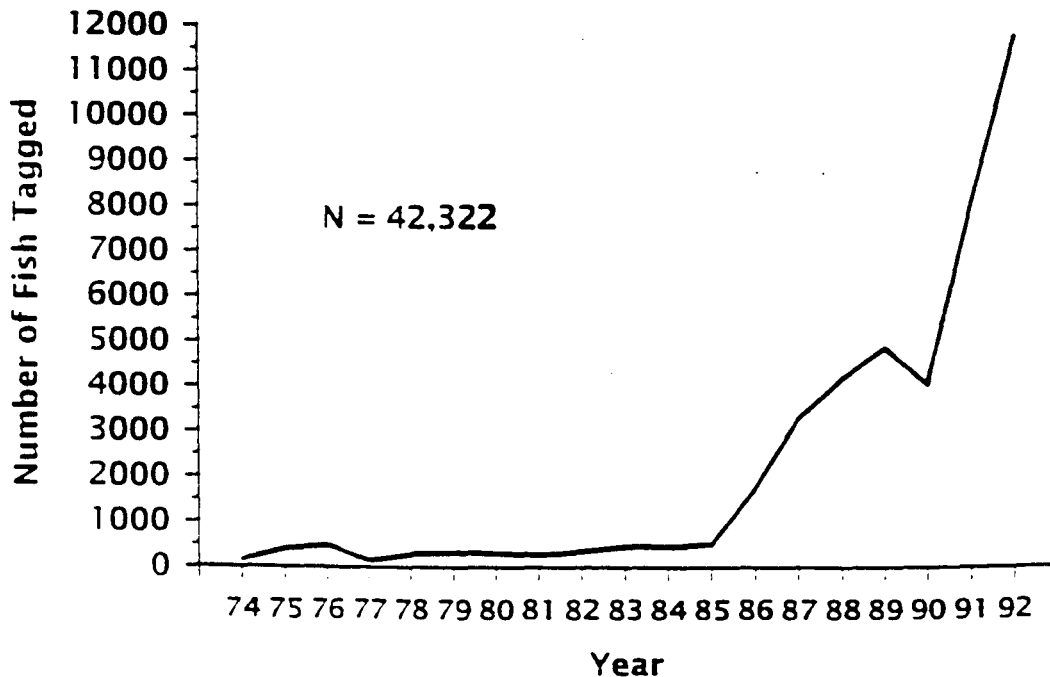
Along with sportfishing anglers, many charterboat and headboat captains have also been involved in tagging. Each year the number of fish tagged has increased except for the set back suffered as a result of hurricane Hugo, which struck the South Carolina coast in September of 1989. Tagging was expected to exceed 6,000 fish in that year but the hurricane hit during the peak fishing season for

red drum and spotted seatrout. Most of the fish tagged in 1989 were tagged before the hurricane. Also, a hard freeze during late December of the same year did additional harm to the inshore fish populations.

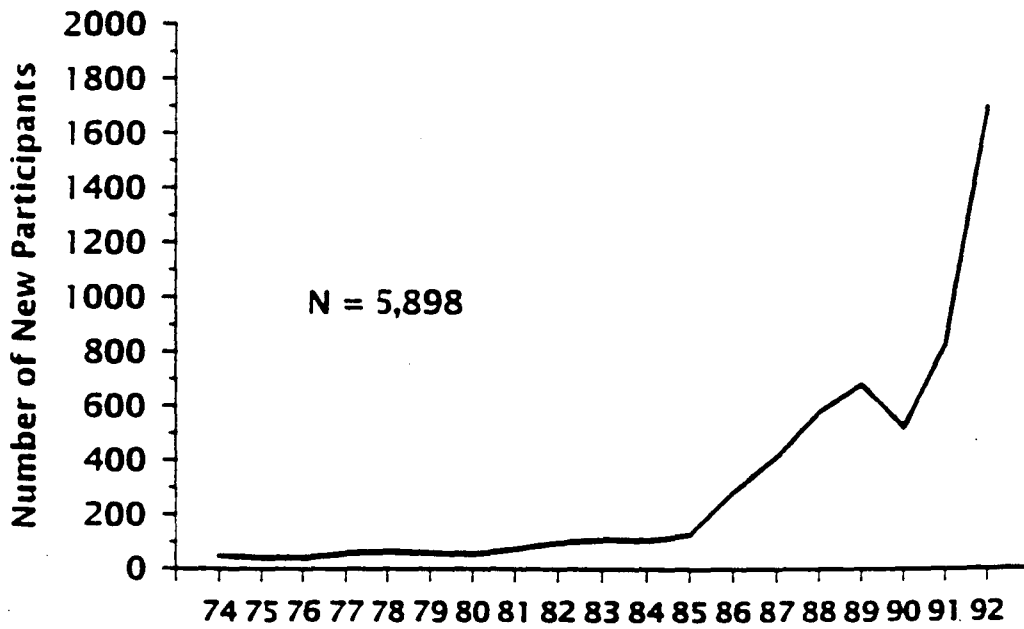
During the latter part of 1989 and early 1990, many anglers were concentrating their efforts on repairs of their homes and businesses instead of fishing. As a result, inshore fishing and tagging were far below normal. In 1991, activity doubled over the previous year with over 8,000 fish being tagged. Activity continued to increase in 1992 with a 31% increase over 1991.

Coinciding with tagging activity, the number of tagged fish recoveries has increased each year (except following hurricane Hugo) and has remained at an overall recovery rate of approximately 7.3% (Figure 5). Tagged fish have been recovered as far north as Connecticut, as far west as Texas and as far south as Brazil (Figure 6). A great barracuda (*Sphyraena barracuda*) was recovered near Bimini, marking the first international recovery. A blue marlin (*Makaira nigicans*), tagged in May 1992 off Georgetown, was recovered 750 nautical miles (nm) (1388.7 kilometers) east of Brazil. This was the first documented transequatorial crossing of a tagged Atlantic blue marlin.

Figure 1. Number of fish tagged annually in the Marine Game Fish Tagging Program, 1974-1992.



**Figure 2.** Number of new participants added annually in the Marine Game Fish Tagging Program 1974-1992.



**Figure 3.** Number of tagging kits disbursed annually in the Marine Game Fish Tagging Program, 1974-1992.

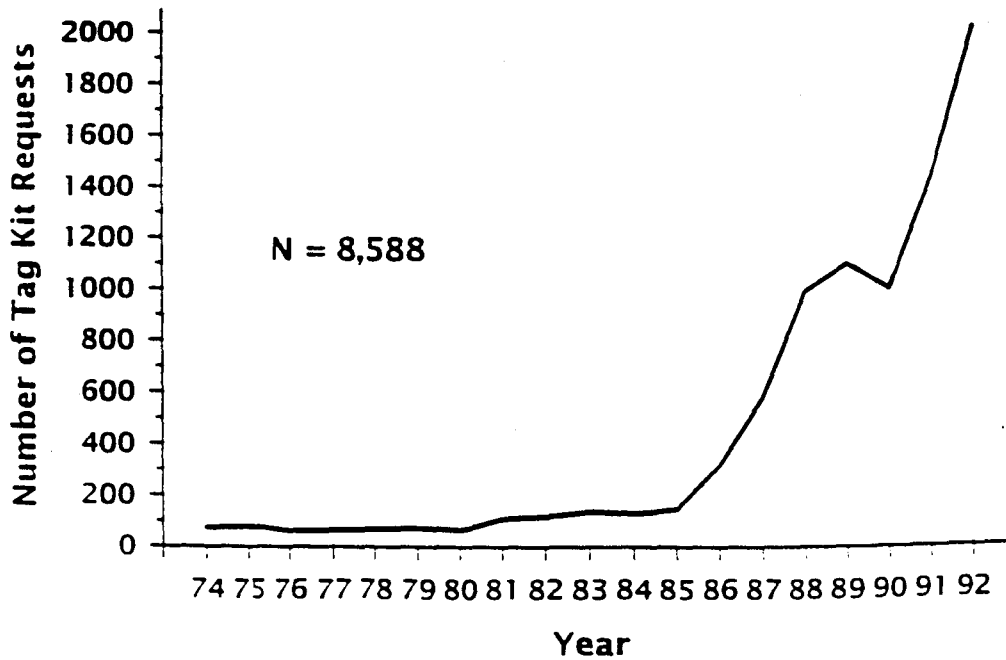
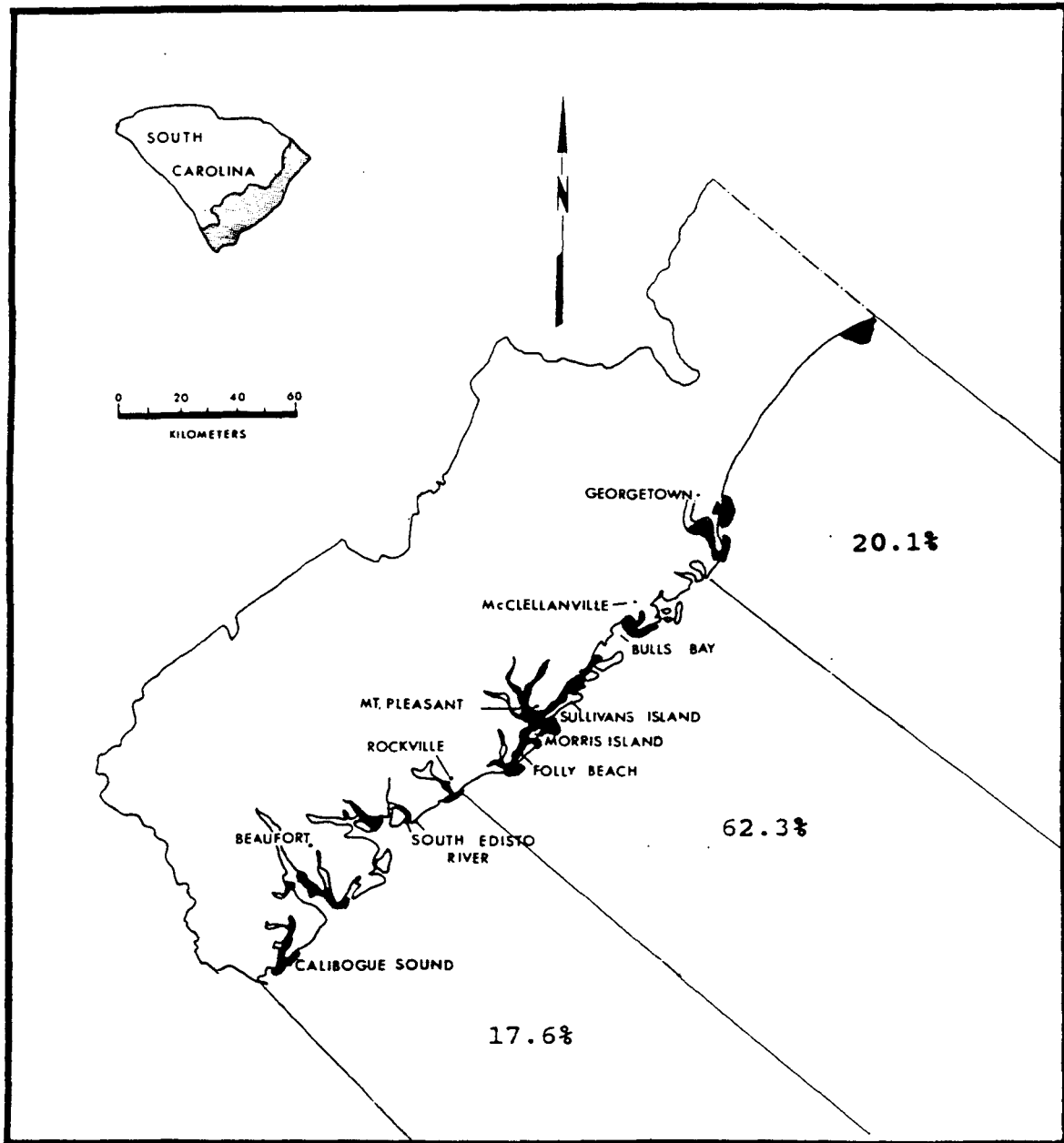


Figure 4. Locations of tagged fish releases\*



\* Does not include offshore releases



Figure 5. Number of recovered tagged fish reported annually in the Marine Game Fish Tagging Program 1974-1992.

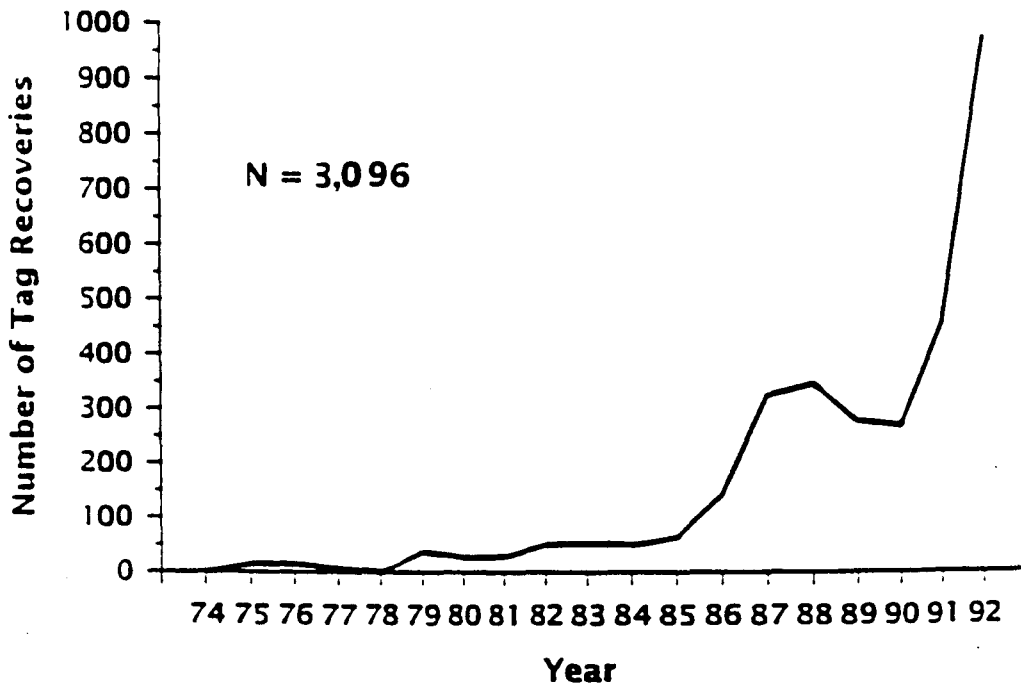
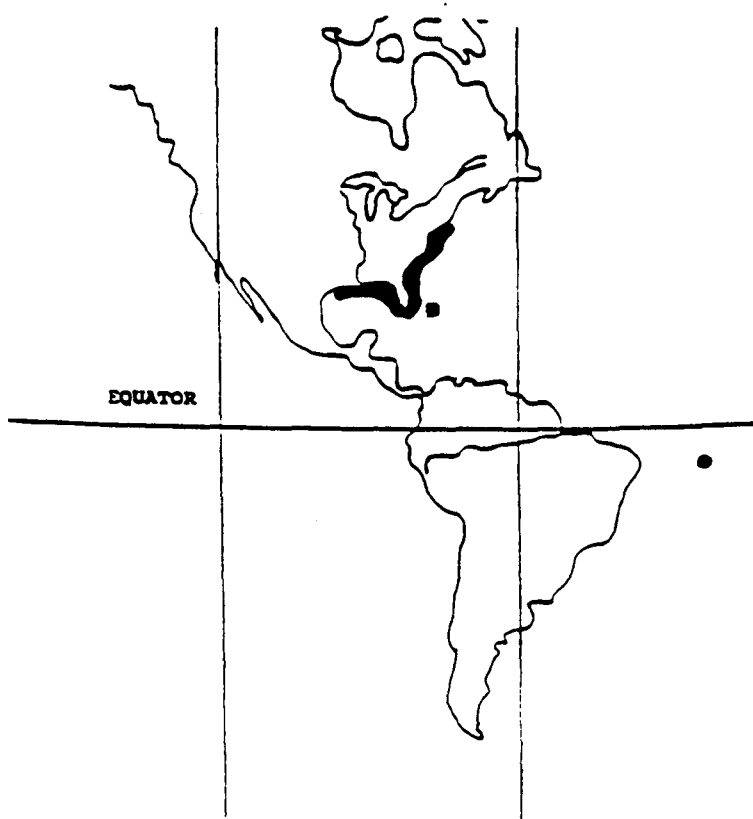


Figure 6. Locations of recovered tagged fish



## RESULTS BY SPECIES

The following is a listing of target species for which there were recaptures. (Also see Appendices III and IV.)

### Red Drum *Sciaenops ocellatus*

Red drum consistently dominated tagging activity making up 43.4% of the total fish tagged. The angling quality and desirable food value have made red drum one of the most targeted inshore species in South Carolina. They are available year-round in South Carolina estuaries and are found over a wide geographic range encompassing many habitats and salinities. A euryhaline species, they have been recorded from fresh water (0.2 ppt; Perret, 1971) to hypersaline conditions of 75 ppt (Simmons, 1957). Most fishing activity occurs in tidal creeks and rivers, but fish are also often caught in the surf along ocean beaches.

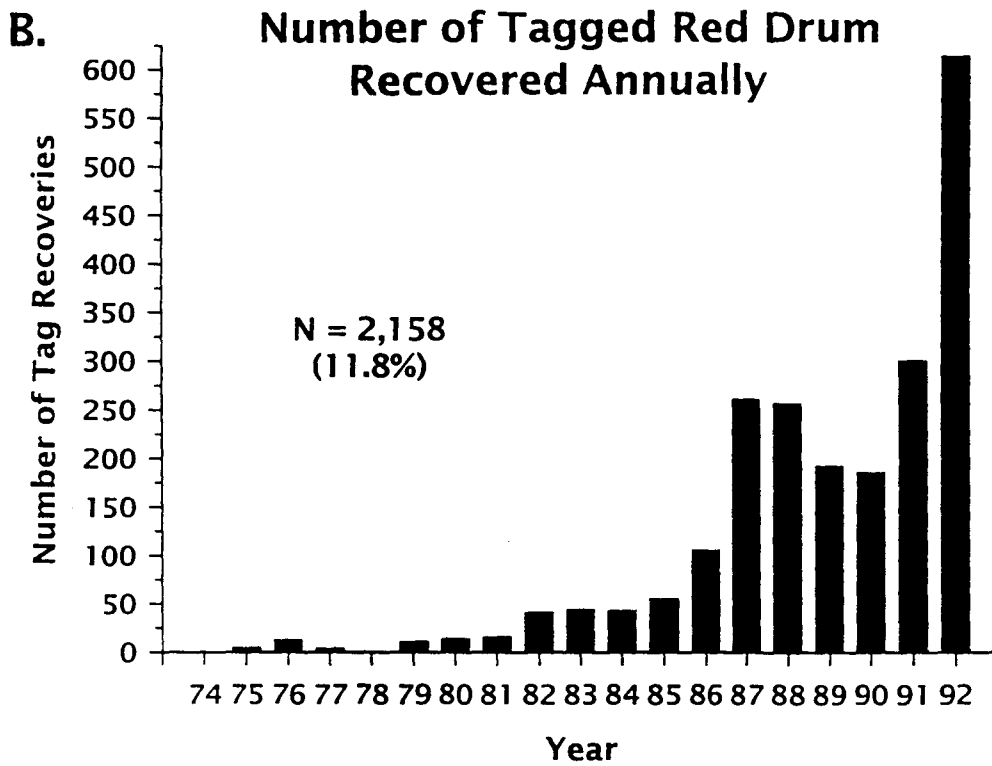
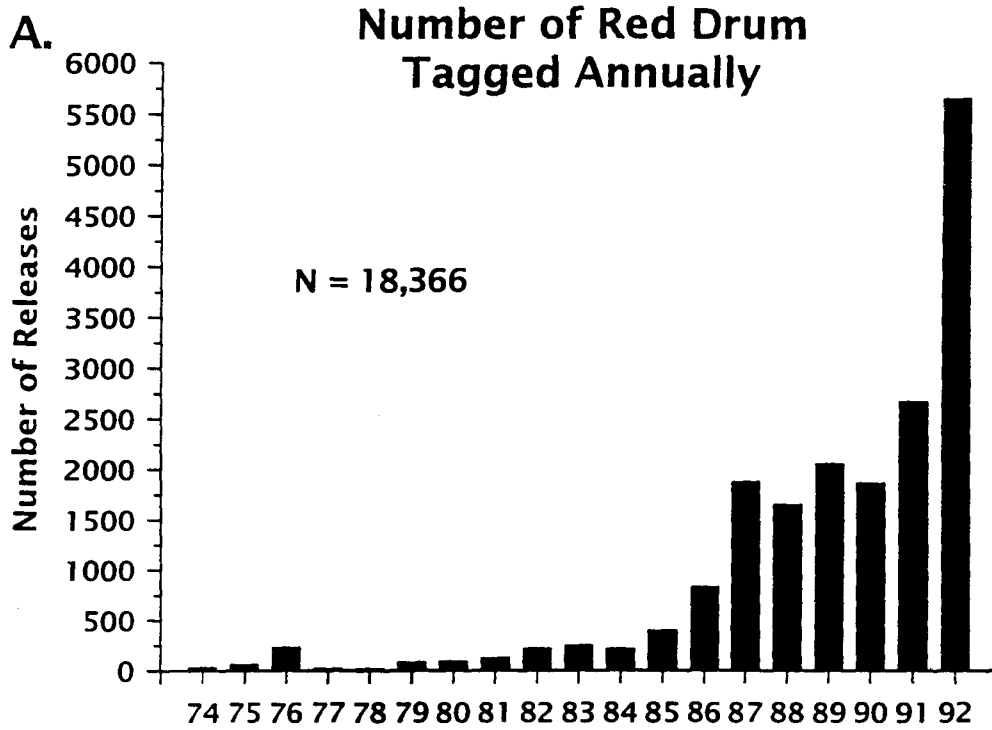
During 1974 to 1992, 18,366 red drum were tagged by participating anglers and 2,158 tags were recovered (Figures 7 A and B). Time at liberty ranged from 0 to 1818 days with a mean of 123 days. Nearly one third of the recaptures of tagged red drum occurred within the first month after tagging with 92.4% of all recoveries occurring within the first year. Only 1.3% of the recaptures occurred after the second year of liberty.

No large scale movement was indicated by adult red drum. However, several small red drum were recaptured outside South Carolina (Table 2). These fish ranged from 9 to 14 inches (22.9 cm to 35.6 cm) in length when tagged and grew to lengths of 12 to 19 inches (30.5 cm to 48.3 cm) at the time of recovery. Most movement was to the north, however, a few fish moved south. A 13 inch (33 cm) juvenile red drum went 180 nm (333.3 km) south to Ponce Inlet, Florida in 70 days. Most small red drum did not move from the tagging location. Minimum distances traveled ranged from 0 to 180 nm (333.3 km) with a mean of 0.4 nm (0.74 km).

It is speculated that some small red drum may utilize the Intracoastal Waterway when traveling north. Several recaptures occurred at various points along the waterway. One fish that was tagged in the Charleston area was caught and released twice in the waterway, each time at a more northern location. Its final known recapture was in North Carolina. These results indicate some exchange of juvenile fish between "stocks".

Approximately 90% of the fish tagged were juveniles or sub-adults. Nearly 35% of the total were below the minimum legal size limit. The establishment of year round size limits and creel limits have affected tagging. In particular, the red drum size limit enacted in 1986 required fish under 14 inches (35.6 cm) to be released. Consequently a small increase was seen in the number of

Figure 7.



fish being tagged in that size range. Over 75% of fish in the 14 inch size range were reported as being exactly 14 inches when tagged. Even though a fish 14 inches in length is legal, it appears many fishermen would rather release a borderline fish than keep it. A daily creel limit of one red drum per person per day for fish over 32 inches (81.3 cm) in length was enacted to protect adults in the brood stock. Even with the creel limit, very few adult fish were tagged and released. This was due primarily to adult fish being concentrated offshore where they were less accessible to anglers fishing from small boats. The recently (1993) enacted maximum size limit of 27 inches (68.6 cm) may, however, result in additional increases in numbers of red drum tagged since fish of that size are estuarine residents.

Nearly 90% of fish measuring fourteen inches or less were tagged from July to October. Seventy-four percent of fish over 14 inches were tagged from August to December. Tagging peaked for fish less than 14 inches in August and for fish over 14 inches in October.

Growth rates of red drum averaged about one and a quarter inches (3.2 cm) a month during the first year. Some fish, approximately 10 inches (25.4 cm) in length, were reported growing up to two inches (5.1 cm) in a single month during fall. Growth rate observations from tag recoveries in the Marine Game Fish Tagging Program were similar to growth rates determined in other states and in South Carolina (Wenner et al, 1990; Wenner, 1992).

Red drum recoveries made up 69.9% of the total tagged fish recaptured. The overall recovery rate for red drum was 11.8%. The recovery of tagged fish in specific locations was higher. Some of the individual creeks and rivers in the Charleston area had recovery rates as high as 26.8%. The overall recovery rate for the coast was lower than the reported rate for other tagging studies conducted by the Marine Resources Division due possibly to the geographically widespread tagging and releasing of fish by many anglers along the coast instead of the concentrated efforts carried out by fishery scientists. Most anglers tag only a few fish at a time, unlike the extensive tagging activity conducted by fishery scientists using nets to trap large numbers. Although many fish have been tagged by participating anglers, they are dispersed in small numbers throughout the coastal zone of South Carolina. The fact that fish are being caught by different methods (netting large numbers versus hooking individuals) may partly account for the difference in recapture rates between the MGFTP and other tagging studies.

**Table 2.** Tagged red drum recovered outside South Carolina.

Tag Location	Recovered	Days Out	Distance	Tag-Angler	Rec-Angler
Broad River	Ponce Inlet, FL	70	180	L. Fox	B. Ross

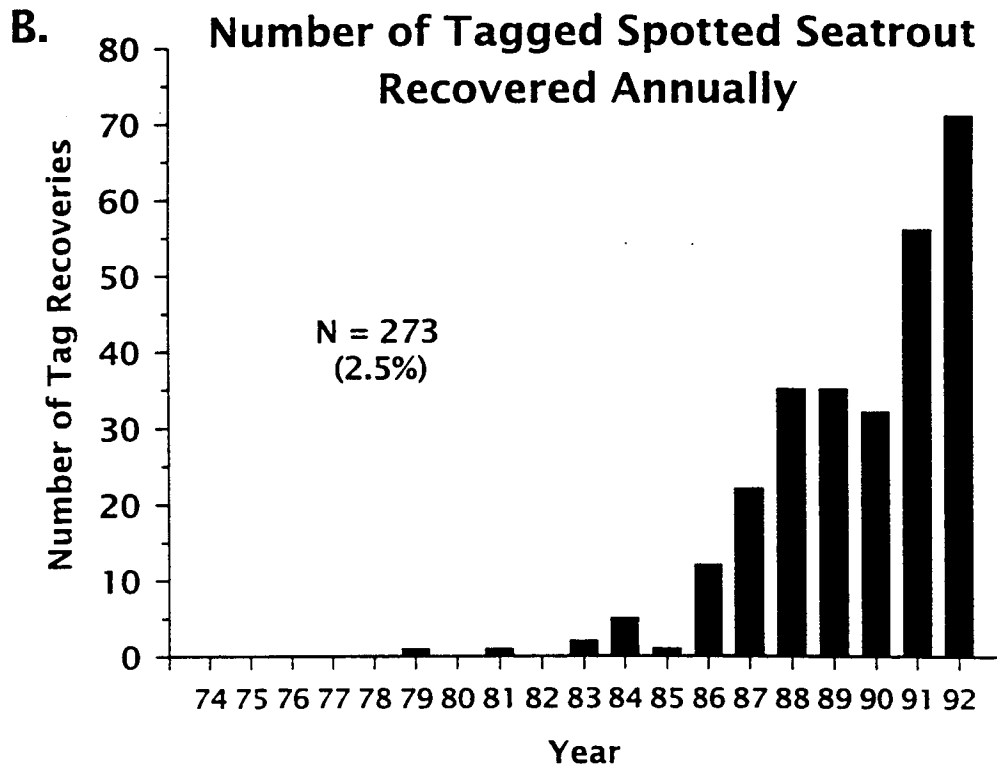
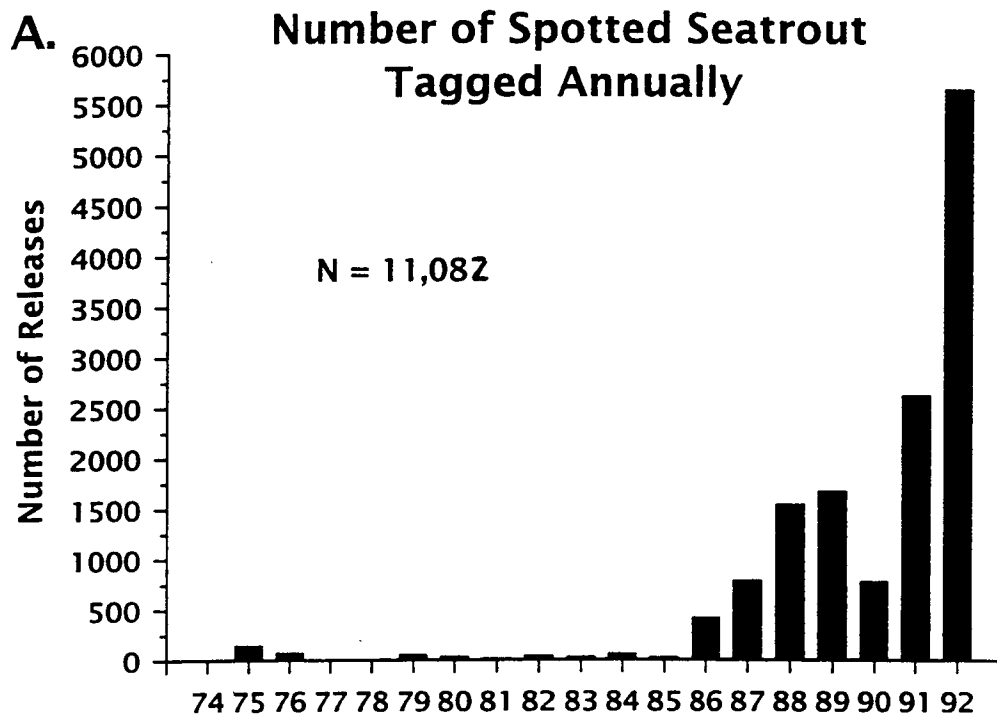
Tolers Cove	Wrightsville Beach, NC	94	150	R. Conklin	K. Gallery
Capers Island	Satilla River, GA	94	150	G. Madlinger	J. Hale, Sr.
North Inlet	Browns Island, NC	317	130	D. Allen	K. Thomas
Hobcaw Creek	Wrightsville Beach, NC	48	130	V. Mickelsen	J. Kirby
Wando River	Coswell Beach, NC	75	128	V. Mickelsen	H. Johnson
North Inlet	Savannah, GA	572	127	D. Allen	V. Jones
Morris Island	Southport, NC	138	126	J. Ohlandt	R. Simmons
Wando River	Brunswick, GA	102	123	V. Mickelsen	T. Gaskin
Prices Inlet	Coswell Beach, NC	67	119	W. Wolfe, III	E. Lewis
Wando River	Holden Beach, NC	86	118	E. Mickelsen	J. Mallisin
Simmons Creek	Long Beach, NC	26	117	P. Chakides	G. McDaniel
Wando River	Shallotte, NC	126	113	R. Coon	D. Pigott
Morris Island	Holden Beach, NC	21	110	J. Sproles	C. Robinson
Shem Creek	Ocean Isle, NC	59	109	J. Benich	B. Ward
North Inlet	Tub Inlet, NC	7	108	B. McDougal	T. Hughes
Bulls Bay	Long Beach, NC	43	100	M. Gross	C. Mintz
Debordieu Ck.	Carolina Beach, NC	654	86	J. Dixon	O. Odum
Prices Inlet	Tybee Island, GA	193	81	W. Wolfe, III	G. Keeran
North Inlet	Long Beach, NC	55	77	D. Allen	C. Cook
North Inlet	Long Beach, NC	40	70	D. Allen	B. Nichols
Morris Island	Tybee Island, GA	28	60	E. Bulwinkle	E. Ferguson
Lighthouse Ck.	Tybee Island, GA	94	60	E. Bulwinkle	C. Bell
North Inlet	Ocean Isle, NC	294	57	B. McDougal	J. Smith
North Inlet	Kingston, NC	91	45	G. Dickson	N/A
Ashepoo River	Tybee Island, GA	1314	45	J. Hewitt	R. Doyle

#### Spotted Seatrout *Cynoscion nebulosus*

Spotted seatrout were the second most targeted species by recreational anglers fishing South Carolina's inshore waters (Low and Waltz, 1988). Consequently, they also ranked second in number tagged (26.2% of the total fish tagged). During 1974 to 1992, 11,082 spotted seatrout were tagged by participating anglers and 273 tags were recovered (Figures 8 A and B). Time at liberty ranged from 0 to 1042 days with a mean of 80.8 days. Nearly 75% of the recaptures occurred within three months after tagging. Only six fish were recaptured after the first year of liberty.

Results showed that spotted seatrout were not inclined to move long distances. Of those recaptured, the average distance traveled was only 1.3 nm (2.4 km). The greatest distance achieved was with a 12 inch (30.5 cm) seatrout traveling 115 nm (212.9 km) from North Inlet to Topsail Beach, North Carolina in 85 days (Table 3). This was a very unusual recapture for the program since all previous distances traveled ranged from 0 to 7 nm (13 km). The results indicate that most spotted seatrout remain in South Carolina's inshore estuarine waters for their entire lives.

Figure 8.



**Table 3.** Tagged spotted seatrout recovered outside South Carolina.

Tag Location	Recovered	Days Out	Distance	Tag-Angler	Rec-Angler
North Inlet	Topsail Beach, NC	85	115	G. Dickson	R. Rambeaut
North Inlet	Shallotte, NC	256	55	D. Nesbitt	D. Pigott

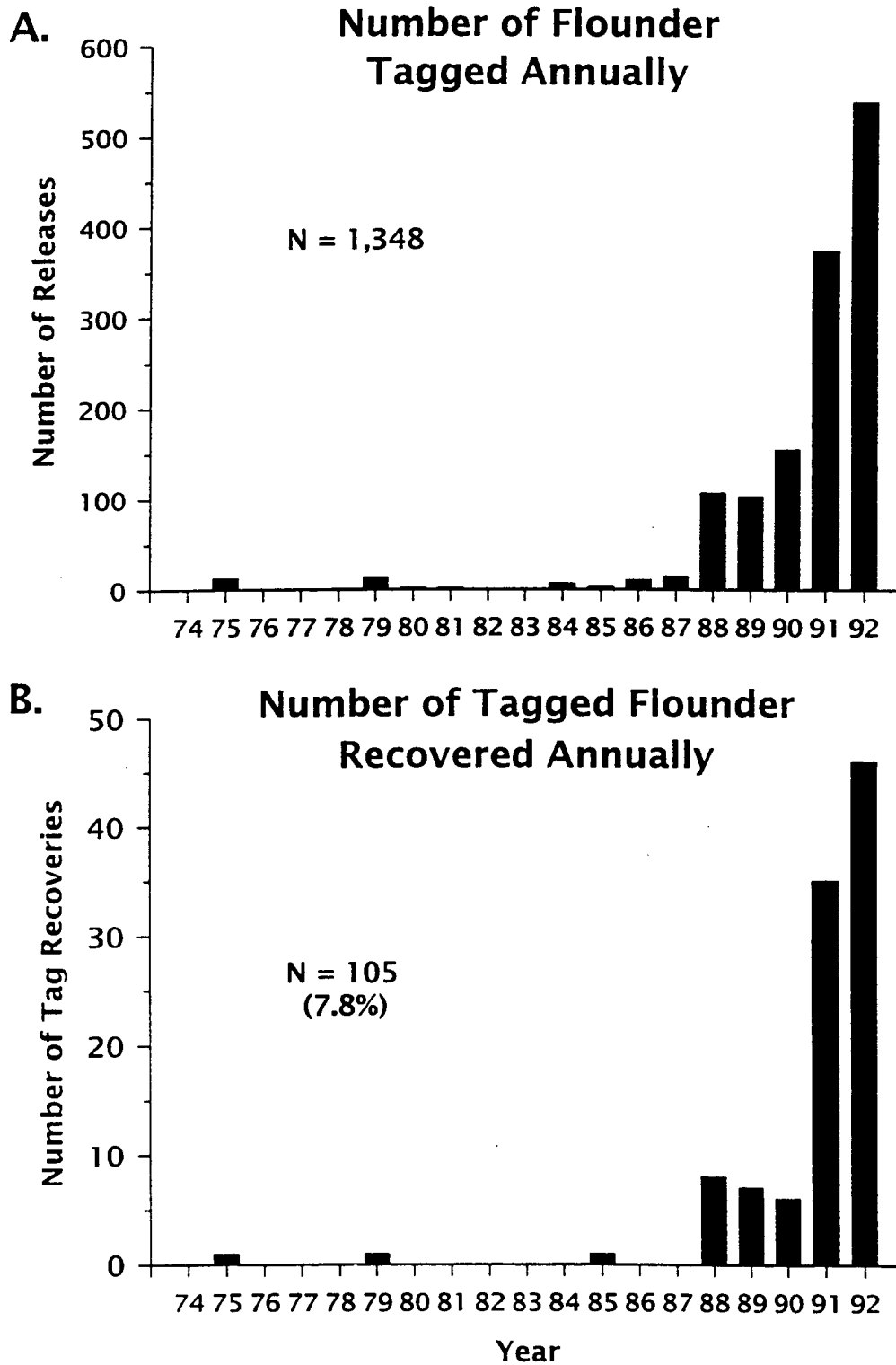
Only 2.5% of the spotted seatrout tagged have been recovered. This could have been due to several factors. Spotted seatrout are not as hardy as many other game fishes and may not survive the tagging process if conditions are not optimal. Seatrout flesh is soft, and if a tag is not applied correctly and locked into place behind the pterygiophores it may easily tear out. Tagging activity is widespread, and when examined in more detail the recovery rate is higher for individual locations. Spotted seatrout have a shorter life span than other game fish such as red drum, and therefore the tagged individuals would not be available for recapture as long. Seatrout are also a favorite prey of bottlenose dolphins (*Tursiops truncatus*), commonly found in South Carolina's coastal waters. Some participating anglers have observed dolphins actively feeding on schools of seatrout, and several tags that were originally applied to seatrout have been found washed up on beaches at Sullivan's Island, Morris Island and the Isle of Palms. Seatrout are also susceptible to cold induced mortality resulting from severe winter weather changes where the water temperatures drop quickly. The winter freeze of 1989 resulted in many reports of dead seatrout in shallow water.

Flounder  
Bothidae

Between 1975 and 1992, 1,348 flounder of various species were tagged by participating anglers and 105 tags were recovered (Figures 9 A and B). Most tagging occurred in high salinity areas in Charleston Harbor, Murrell's Inlet, Breach Inlet and behind Pawley's Island. Few flounder were tagged in the early years of the program. With the introduction of a new tag design, tagging of flounder increased. Southern (*Paralichthys lethostigma*) and summer (*Paralichthys dentatus*) flounders are the species most commonly caught by recreational anglers and no doubt make up the majority of flounder tagged.

The average distance traveled by flounder was 1.73 nm (3.2 km) and ranged from 0 to 130 nm (240.7 km) (Table 4). The majority of recaptures occurred at the same location where the fish had been tagged. Days liberty ranged from 0 to 833 days with an average of 86 days. Nearly half of the tagged flounder recaptures occurred within a month of their release.

Figure 9.





**Table 4.** Tagged flounder recovered outside South Carolina.

Tag Location	Recovered	Days Out	Distance	Tag-Angler	Rec-Angler
Charleston	Jekyll I., GA	292	130	W. Cordina	R. Youmans

Striped Bass  
*Morone saxatilis*

Participating anglers tagged 1,051 striped bass between 1980 and 1992 (Figure 10 A). Of these, 97 tagged fish were reported recaptured (Figure 10 B). Average time at liberty was 239 days with days at large ranging from 2 to 377 days.

The average distance traveled was 13.16 nm (24.4 km). Nearly two-thirds of striped bass recaptures occurred in the Combahee River. Most of the other recaptures were in the Sampit River. Fish tagged in the Combahee River generally stayed near the site of tagging and did not travel more than ten nautical miles (18.5 km). Five fish tagged in the Sampit River moved into the Pee Dee River system and traveled the full distance of the river until reaching the Blewitt Falls Dam approximately 130 nm (240.7 km) upriver (Table 5). One fish followed the North Santee River crossing through Lakes Marion and Moultrie to be caught in the Saluda River at Columbia 120 nm (222.2 km) inland.

**Table 5.** Tagged striped bass recovered outside South Carolina.

Tag Location	Recovered	Days Out	Distance	Tag-Angler	Rec-Angler
Sampit River	Blewitt Falls, NC	286	130	R. Nesbitt	H. Teal
Sampit River	Blewitt Falls, NC	390	130	W. Nesbitt	K. Woodard
Sampit River	Blewitt Falls, NC	280	130	R. Nesbitt	T. Brigman
Sampit River	Blewitt Falls, NC	322	130	R. Nesbitt	J. Snipes
Sampit River	Blewitt Falls, NC	267	130	W. Nesbitt	R. Bailey

Sheepshead  
*Archosargus probatocephalus*

During 1975 to 1992, anglers tagged 1,028 sheepshead and 99 tags were recovered (Figures 11 A and B). Most sheepshead were recaptured at their release site. The average distance moved was 1.3 nm (2.4 km) and ranged from 0 to 35 nm (64.8 km). All recaptures occurring 18 nm (33.3 km) or more from the tagging site were ingresses from offshore or nearshore structures to inshore creeks or rivers. Two of the fish had been tagged at offshore structures during the month of March and were then recaptured inshore in May and October. This supports the belief that some sheepshead over-winter offshore and move inshore during spring.