

CANYON RUNNER: FISHING ON THE EDGE

BIG GAME FISHING

THE EDGE

big game

FISHING JOURNAL

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**SCIENTIFIC
APPROACH
TO BIG GAME FISHING**

**SUN & MOON PHASE
WIND DIRECTION
OCEAN CONFIGURATIONS
THEIR INFLUENCE
ON GAMEFISH**

**WHAT
DRIVES THE
BITE?**

CURRENT • MIGRATION • SUN • MOON • OCEAN CONFIGURATIONS • WIND

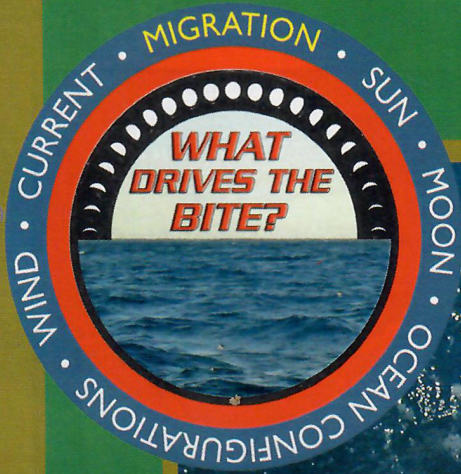
**DOLPHIN
MIGRATORY
SECRETS**

**"BLACK" BART MILLER
EARLY SCIENTIFIC EXPERIMENTS**

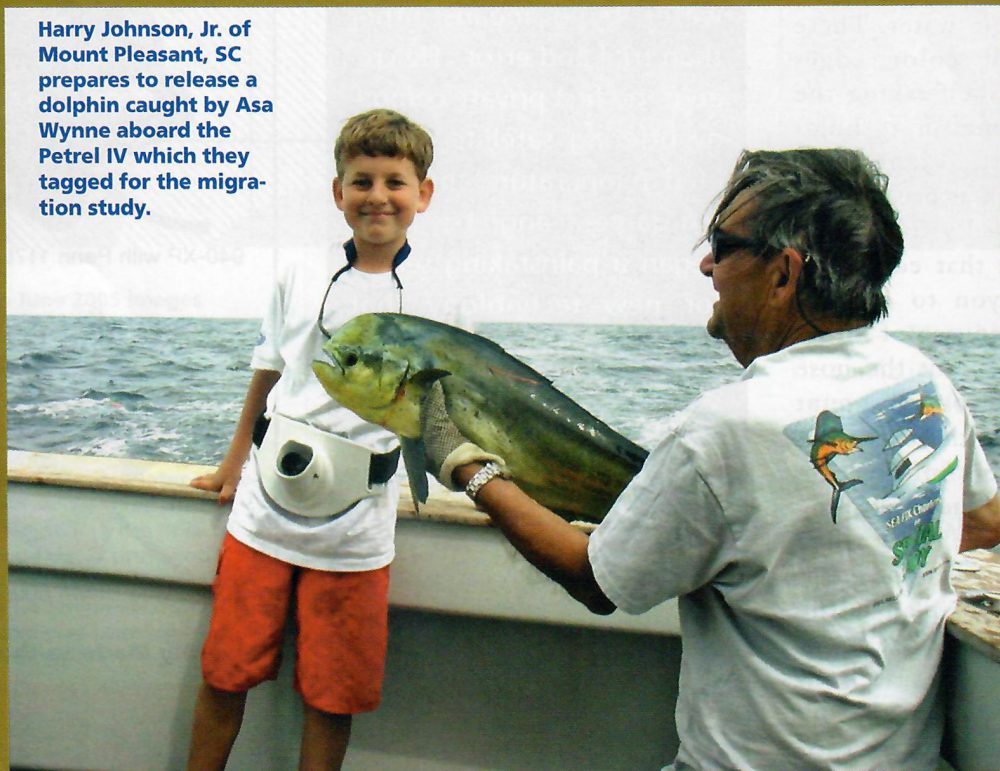
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Many sports fisherman along the eastern seaboard supported the project so strongly as to tag and release 40-pound dolphin to support the research.



Harry Johnson, Jr. of Mount Pleasant, SC prepares to release a dolphin caught by Asa Wynne aboard the Petrel IV which they tagged for the migration study.

DOLPHIN

MYSTERIES



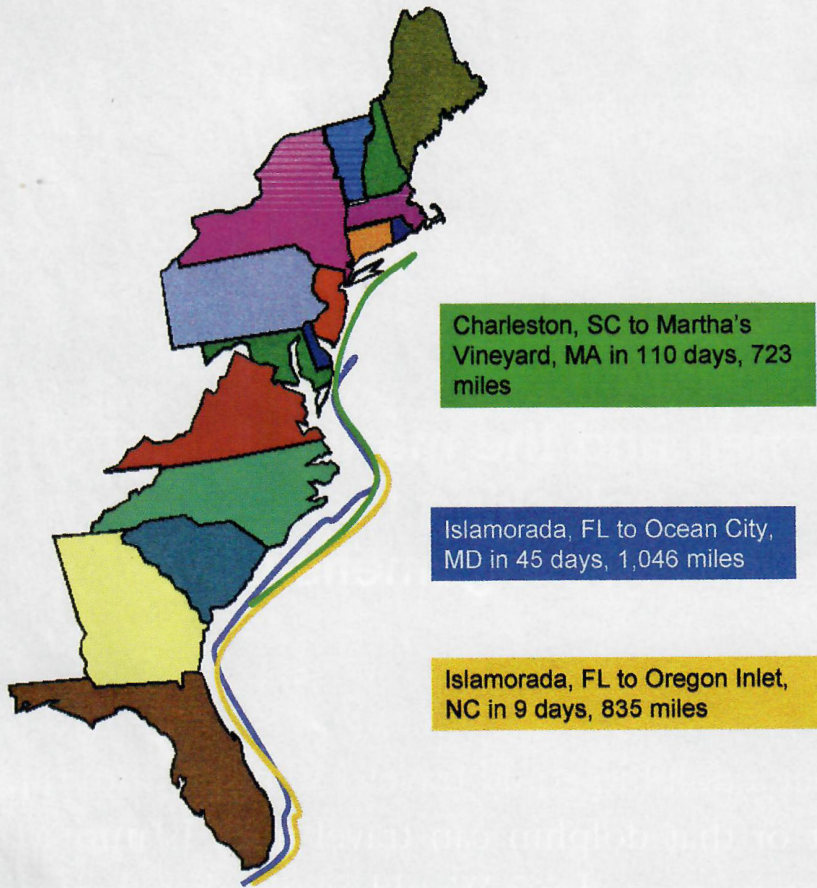
Scientists, fishermen and the marine industry working together are unlocking the migratory secrets of this great gamefish.

Text and Photos By Donald L. Hammond

Did you know that a dolphin could travel 130 miles from one day to the next or that dolphin can travel from Islamorada to Oregon Inlet in nine days? Would you believe that a tagged dolphin recaptured after 70 days of liberty was less than 20 miles from where it was originally released? How far up the east coast do the dolphin found off the Florida Keys travel? These are but a few mysteries revealed through a recent study on dolphin.

Each spring bluewater anglers along the east coast look forward to the arrival of dolphin off their shores. Almost as a right of spring, the appearance of dolphin heralds the arrival of the full blown fishing season. Beginning in March/April along the Florida Keys, the spring dolphin run rapidly moves northward along the South Atlantic Bight with dolphin showing up in large numbers off the Carolinas by April or May. From this point, the fish round Diamond Shoals off Hatteras, North Carolina and move into the Mid-Atlantic Bight (MAB) in June and July.

DOLPHIN MOVEMENTS



The spring migration of dolphin northward along the US east coast is a fact-of-life accepted by offshore fishermen. The sun rising in the east and dolphin migrating north in the spring are two standards accepted without question by anglers. However, science and fishery managers could not back up this migration theory with data until now.

The South Carolina Dolphin Tagging Study is the first research project to begin unraveling the mysteries of the migration of dolphin along the eastern seaboard of the US. The study was conducted from 2002 through September 2005 by the Marine Resources Division of the South Carolina Department of Natural Resources. The research

project was designed to involve fishermen along the Mid-Atlantic and South Atlantic Bights in tagging dolphin for this study. This research effort also yielded information on the species' temporal and spatial occurrence of the species, habitat utilization, geographical range, temperature selection and vertical movements in the water column.

As word about the study spread among offshore fishermen, anglers from Key West, Florida to Nantucket, Massachusetts volunteered to tag their small fish for science. During the four years of the study over 950 offshore fishermen signed up to tag dolphin. Over this period, 726 recreational anglers fishing aboard 293 different boats actually participated in

tagging dolphin for the study. This flotilla of vessels was comprised not only of privately owned boats, but charter boats as well. The fact that charter captains would talk their customers into releasing fish for science is a very strong conservation statement by these captains. It was this for-hire segment of vessels that contributed over 25 percent of the dolphin tagged during 2005.

Over the course of the study, almost 5,000 dolphin were tagged. Anglers fishing off the Florida coast marked and released the lion's share, 60 percent of the fish in the study. Anglers fishing off South Carolina tagged 1,587 dolphin (32 percent of the fish marked). Less than 2 percent of the fish tagged were released in the Mid-Atlantic Bight (Hatteras to Nantucket).

This massive tagging effort resulted in the reporting of 113 tag recoveries. Since a recovery rate of just one percent is the standard scientist's anticipate when studying such highly migratory species, the 2.3 percent realized in this project is far more than expected. But the disheartening part is that there were additional rumors of tagged dolphin being recovered which were never reported. The potential information that these unreported recoveries could have revealed can not be imagined.

Tag recovery reports came from very diverse origins. While most tags were reported by the angler or a crew member of the boat that caught the tagged fish, tags were taken from a fish's stomach, found washed up on a beach, discovered in fish given away and even found in fish sold to fish markets. Some recoveries were reported as quickly as the day of recapture while others drifted in as much as nine months after the fact. Regardless of any delay in reporting, every tag recovery is important. The

fishermen can not assess the importance that the tagged fish he caught may hold for science and the future management of the species. That is why anglers should report every tagged fish they recover.

The studies of animals employing mark and recapture methods, are a game of numbers. The more animals that you mark and release, in a healthy condition, the more recoveries of those marked individuals are likely to occur. Subsequently, coastal areas that had the highest levels of tagging, the Florida Keys and South Carolina, resulted in the largest number of tagged fish being reported recovered. This is good for tracking the spring migration. However, tracking the fall migration of dolphin would best be accomplished through tagging fish in their northern range. Unfortunately, only 189 fish were tagged in the MAB and off North Carolina combined.

Almost half of the tagged fish recaptured (54) were originally released in the Straits of Florida off the east coast of the Keys. Over 81 percent of these recoveries came from the Florida coast. However, the 10 remaining tagged fish that were recovered made it to North Carolina and points beyond before being recaptured. Three of these recoveries came from south of Hatteras after liberty periods that averaged 25 days during which time they had traveled an average of 723 miles. The remaining seven tag recaptures were scattered throughout the MAB which serves as the most northern area of the east coast regularly utilized by dolphin each year. These dolphin required an average of 37 days to travel the average 912 miles to reach these northern waters. Three of the fish originally tagged off the Keys were recovered in excess of 1,000

miles from their release site. In addition to the fish tagged in the Florida Straits, three other dolphin tagged off Florida, north of Key Largo, were also recaptured off Cape Hatteras. Rates of travel averaged 24.8 miles per day for the fish recovered south of Cape Hatteras while those moving into the MAB averaged traveling at the rate of 28.6 miles per day.

Sports fishermen fishing out of South Carolina tagged more than 1,500 dolphin for the study which resulted in 36 tagged fish being reported recovered. Like the fish tagged in the Florida Straits, all of the dolphin tagged off South Carolina and recovered off other states had moved north. Over 25 percent of the recoveries involving dolphin tagged off the Palmetto State were recaptured off South Carolina. Another 28 percent (10) of the recoveries were taken by anglers fishing out of North

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Area	Number Recoveries	Liberty Days	Distance Miles	Travel Rate Miles/Day
FL Keys	32	26.8	384.6	14.4
SC	25	52.5	327.9	6.2

Comparison of tag recoveries for fish marked off the Florida Keys and South Carolina. (Recoveries with incomplete data, recovered in one day or less, in the same area where released, recovered outside US waters and those tags washed ashore or taken from the stomach of a fish were not included.)

Carolina south of Cape Hatteras. These fish averaged moving 137 miles during 23 days between tagging and recapture exhibiting a travel rate of six miles per day. Almost 40 percent (14) of the recoveries of dolphin tagged off South Carolina came from the MAB as far north as Martha's Vineyard, Massachusetts. These fish averaged being at liberty for 69 days during which time they moved 435 miles from their release location traveling at a rate of 6.3 miles per day.

The study revealed that the speed at which individual fish travel was highly variable, 0.1 to 130 miles per day. Nine of the tagged dolphin recovered exhibited travel rates in excess of 50 miles per day. When biasing data such as international, short term (one day or less) and in-area recoveries were removed, trends did emerge. Dolphin tagged in southern Florida displayed an overall faster rate of travel, 14.4 miles per day, than fish tagged off South Carolina which averaged 6.2 miles per day. However, the average liberty period for the fish from South Carolina, 52.5 days, was almost twice that of the fish marked in the Florida Straits, 26.8 days.

The faster speed of the Florida fish may be based in the faster flow rate for the Gulf Stream in its southern

most range off the Sunshine state. The short liberty period could be a function of two factors. The first factor is the compression of the Gulf Stream and the fish between the US mainland and the Bahamas Bank off Florida which restricts their area of dispersal. The second factor influencing the shorter liberties of the fish from the Sunshine State is that they have to run a gauntlet of some of the heaviest fishing pressure occurring along the eastern seaboard. These fac-

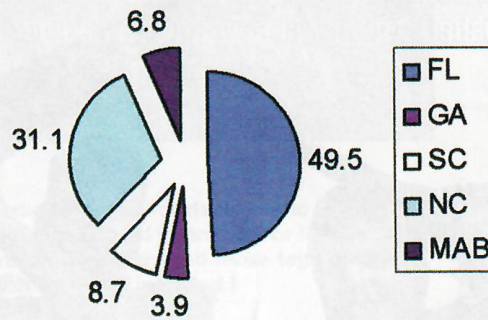
tors may have contributed to the elevated rate for in-area recoveries, 30.2 percent, in southern Florida of fish being tagged and recaptured in the same area. In-area recoveries were lower for dolphin tagged off South Carolina comprising 25 percent of the fish recaptured. The fishing pressure factor on in-area recoveries is also supported by the fact that the Florida Strait in-area recoveries were at liberty an average of only 4.6 days (longest was only 20 days) as compared to an average of 26 days for fish recovered in-area off South Carolina.

Four of the nine in-area recoveries off South Carolina had liberty periods of from three to 11 weeks. The reason for the increase in the liberty period, five times longer than in Southern Florida, may be the result of a stationary Gulf Stream gyre that periodically develops north of the Charleston Bump. This gyre is a common feature north of the bump and can last for an extended period of time. It may be that when this gyre is present, dolphin will ride its rotating waters for extended periods never

Annual averages for tagged dolphin recoveries. (Recoveries with incomplete data, recovered in one day or less, in the same area where released, recovered outside US waters and those tags washed ashore or taken from the stomach of a fish were not included.)

Year	Number Recoveries	Liberty Days	Distance Miles	Travel Rate Miles/Day
2002	7	54.1	375.4	6.9
2003	16	47.3	336.1	7.1
2004	26	48.6	323.5	6.7
2005	20	37.7	413.2	11.0
Wt. Ave.	17.2	45.7	357.4	8.1

**Percent of Tagged Dolphin Recoveries by State,
2002 - 2005.**



moving far from their original released site. This interesting phenomenon of the Gulf Stream is currently the subject of a study by scientists with the South Carolina Department of Natural Resources.

The travel pattern for the tag recoveries varied not only between the major tagging areas but also among the years. Overall long distance travel patterns along the US east coast during 2002, 2003 and 2004 were similar, varying less than 15 percent

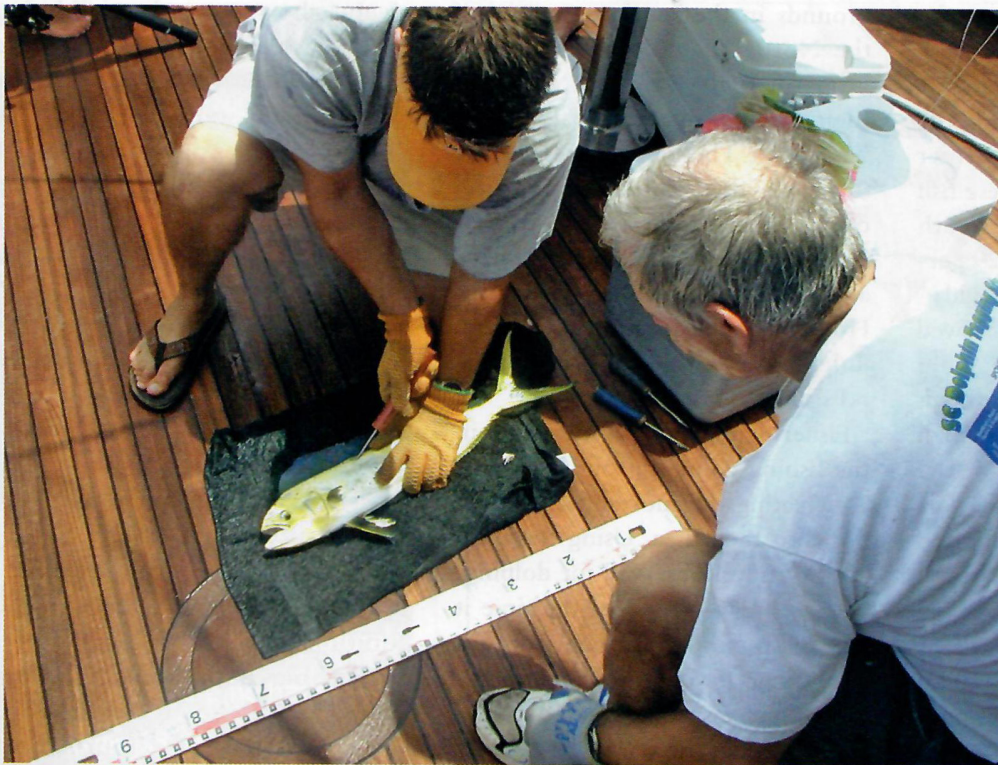
among these years. The fish averaged being at liberty for 49 days, traveling at a speed of 6.9 miles per day and were recovered 335 miles north of their release site. Dolphin recoveries in 2005 varied significantly from this pattern. The 2005 fish were at liberty a much shorter period, 37.7 days (30 percent less), traveled at a faster speed, 11 miles per day (60 percent faster) and were recovered farther from their release site, 413 miles (23 percent further). A change in the Gulf Stream's

behavior in 2005 may well be the reason for this difference. According to Dr. Mitch Roffer, fewer eddies were spawned on the western side of the Stream in the South Atlantic Bight during 2005 than in the previous three years. Most of the eddies that did develop remained within the Gulf Stream proper and did not push up over the continental shelf as they did in 2002 through 2004.

These eddies are the primary place to find dolphin as-well-as other bluewater predators because of bait-fish concentrations that develop within these nutrient-rich water masses. When a Gulf Stream eddy pushes into the shallower shelf water, it tends to slow its northward movement while bringing its associated fish population closer to shore. However, eddies that stay in the

Boat	Captain/Owner	Home	Number of Fish
Petrel IV	Harry Johnson, Jr	Mt. Pleasant, SC	101
Rock Boat	Richard DeLizza	Weston, FL	119
Killin' Time	Don Gates	Chuluota, FL	122
Partner	Kerry Kahl	Lake Worth, FL	142
Got Ta Go	Rob Harris	Cudjoe Key, FL	144
Tag Team	Howard Moseley	Charleston, SC	156
Summer Girl	Steve Leasure	Charleston, SC	159
Ballyhoo	Bill Baugh	Ramrod Key, SC	170
No Name	Chester H. Kalb II	Key West, FL	555
Draggin Dreams	Don Brown	Pembroke Pines, FL	577

**Top Taggers in the South
Carolina Dolphin Tagging Study,
2002-2005.**



Crew of the Triple Play owned by Art and Jimmy Hightower tag a school dolphin off Charleston, SC to support the research study.

main part of the current, continue their transit north at the speed of the Stream carrying their fish populations with them.

National statistics on the marine recreational fishing clearly shows that

the harvest of dolphin is not uniform throughout its East Coast range. Almost half of the tag recoveries reported for the East Coast were made off Florida. North Carolina reported the second highest level

with 31.1 percent. Fishermen off South Carolina were responsible for only 8.7 percent of the recaptures which was still higher than the 3.9 percent that came from off southern Georgia. Anglers fishing the Mid-

Justin Brown of Pembroke Pines, FL releases one of over 500 dolphin that he and his father, Don, tagged off South Florida during the four year study. Photo courtesy of Don Brown.



Atlantic Bight from Virginia's southern border northward reported 6.8 percent of the tagged dolphin recaptures during the study. Breaking the MAB recoveries down further showed that 71 percent of these fish had been released off South Carolina with the remaining 29 percent having their origin in Florida.

Angler recapture reports showed that 18.5 percent of the dolphin tagged off Florida and recovered, were recaptured from North Carolina northward through the MAB. However, it is curious no dolphin tagged off Florida was reported recovered by boats fishing off South Carolina. One dolphin marked off the north Florida coast was recaptured off southern Georgia. Could it be that the travel pattern for south Florida dolphin carries them seaward of the fishing grounds off South Carolina?

Over 95 percent of the tag recoveries reported exhibited a northward movement. However, two dolphin tagged during May in different years off the northeast coast of Florida exhibited short term movement to the south of less than 150 miles during their six and 28 days of freedom. These recoveries may represent nothing more than random movements by individual fish. However, other tag recoveries that displayed a southerly displacement offer the first information on the dolphin's annual migration cycle.

A dolphin tagged off Cape Hatteras in June 2003 was recovered in May 2004 150 miles east of Brunswick, Georgia. Another fish tagged in October 2003 off New Jersey was recovered May 2004 off Beaufort, North Carolina. It is doubtful that these fish spent the 313 and 221 days respectively that they were free traveling southward to these locations. It is far more rational to think these fish had

grounds in the southern waters of the North Atlantic/Caribbean and were on their way back north in their second migration along the East Coast. These recaptures are the first data that would support the theory that dolphin will repeat their spring northward movement along the eastern seaboard. However, the question of where dolphin go during the winter period still remains a mystery.

Fishermen are always interested in the fishing going on south of them, anticipating the movement of these fish into their area. Using the daily rates of travel observed for dolphin, we can begin to project the time it takes dolphin to move from one area to another. If you apply the average long distance speed observed for the Florida Strait fish, 14.4 miles per day, for a fish traveling from Key West, FL to east of Nantucket Island, MA (1,500 miles), it would take the fish 101 days to make the trip. If you use the slower speed of 6.2 miles per day observed for fish tagged off South Carolina, then the travel time for this trip would be 235 days. Using the fastest sustained speed observed for dolphin, 93 miles per day, the 1,500 mile trip would take only 16 days. In reality, the speed at which dolphin make this trip is largely dependent on the behavior of the Gulf Stream and the eddy in which they are entrained.

Thanks to the efforts of each sports fisherman who either tagged fish or reported a tag recovery in this study, the relationship of dolphin stocks present off the major fishing areas along the US East Coast is being revealed. For the first time there is hard evidence linking the dolphin found off Key West in April / May with the dolphin found off Delaware and New Jersey in the summer. Recoveries have shown these fish

tively short periods, validating their classification as an oceanic pelagic species. Information gathered in this study confirms the propriety of a single management plan for fish off the east coast that provides the necessary regulations to insure a sustainable fishery for future generations.

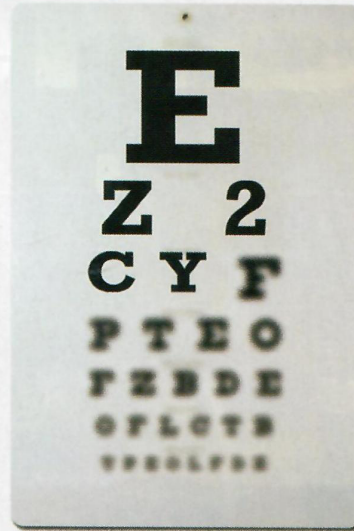
The success of this research is due to the overwhelming support the study received from sports fishermen, fishing tackle manufacturers, and the outdoor media. Individual anglers as well as clubs from Key West to Boston volunteered to tag fish for the study. These organizations went so far as to provide additional financial support to expand the study like the fishing tournament in South Carolina, the Charleston 50/50 Tournament which donated \$8,000 in support of the study. Penn Reels, Shimano Fishing Tackle Corporation and Star Rods, a division of Sea Striker Corporation, joined to donate over \$9,000 in rods and reels for the annual awards to the top taggers which provided an extra incentive for anglers to participate. However, it was the continuous support of the printed outdoor media, especially magazines like Big Game Fishing Journal that kept the project in front of the fishermen stressing the importance reporting every recovery of a tagged dolphin that help generated the large volume of recapture reports. This research project was truly a cooperative effort among science, fishermen and business to gather needed information on the dolphinfish to improve our understanding of the species and help insure a healthy fishery for future generations.

For more information on the South Carolina Dolphin Tagging Study visit the project website,

ABOUT THE AUTHOR



DON HAMMOND is a marine fisheries biologist living in Charleston, SC. He works for the Marine Resources Division of the South Carolina Department of Natural Resources where he has served for over 35 years in fisheries management and research. He helped develop one of the earliest state programs designed to aid the marine recreational fishing industry. As an avid and accomplished recreational fisherman, Don is active in regional and national sportfishing seminars and shows. His research efforts have focused on both inshore as well as oceanic gamefish. The last four years he served as principle investigator of the dolphin research project. He has established a private research company, Cooperative Science Services, LLC, to continue working in fisheries research and management following his state retirement.



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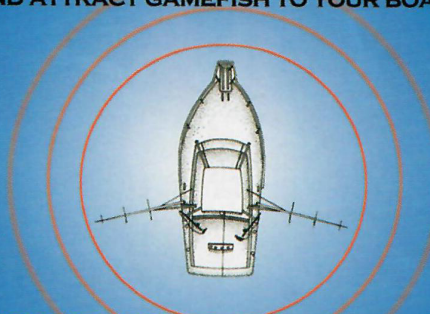
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