

Have Sail Will Travel: Long-distance Migrations of Western North Atlantic Sailfish

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Biologists with the South Carolina Department of Natural Resources have been conducting satellite tagging studies of billfishes and sharks in offshore

waters of the southeastern United States since the year 2000. We have attached PTT-100 Archival Pop-Up Standard Rate or High Rate Archival Tags to 11 different highly migratory fish species that spend at least part of their lives in a broad area known as the “Charleston Bump Complex”. The Charleston Bump Complex is made up of two basic parts: The “Charleston Bump” and the “Charleston Gyre”.

The Charleston Bump is an area of high relief that rises out of the Blake Plateau approximately 90 nautical miles southeast of Charleston, South Carolina. The Charleston Bump causes an offshore deflection of

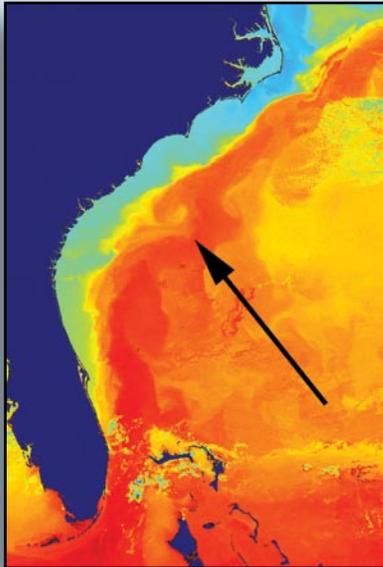
the Gulf Stream which forms a semi-permanent gyre (an area of counter-clockwise circulation) known as the “Charleston Gyre”. The Charleston Gyre causes upwelling of cold, nutrient rich bottom waters off the coast, and creates numerous thermal fronts and eddies. These hydrographic features make this a highly productive area which is important to a variety of highly migratory fish species during different stages in their life history.

Rather than focusing on any one species, our research focuses on the habitat of the Charleston Bump Complex and the highly migratory species that this habitat is important to. The goals of our research are to estimate migration patterns, habitat partitioning, post-release survival, and seasonal residency times for species that use this habitat.

One of the more common highly migratory species in the Charleston Bump Complex is the Atlantic sailfish (*Istiophorus albicans*). Atlantic sailfish are one of the smaller members of the billfish family Istiophoridae, and are widely distributed in tropical and temperate waters throughout the Atlantic and Pacific Oceans (Indo-Pacific sailfish are arguably a distinct species, *I. platypterus*). The Atlantic sailfish is common in our study area from approximately May to October, and

abundance varies roughly in accordance with seasonal surface water warming in spring and cooling in fall. Sailfish are commonly regarded as the fastest fishes in the ocean (capable of burst speeds in excess of 60 mph/97 kph), and are extremely slender and acrobatic.

Long term tag retention is one of the greatest difficulties encountered when conducting satellite tagging of any fast-swimming and agile fish. Though it seems counter-intuitive, we have found sailfish to have one of highest long-term tag retention rates of any species we have studied despite its slender build and acrobatic nature. Over the past three years, 50% (three of six) of 240-day interval tags attached to sailfish were retained for the



Sea-surface temperature satellite image of the southeastern United States. Note the deflection of the Gulf Stream current by the Charleston Bump and the resulting Charleston Gyre (black arrow).



A sailfish about to be fitted with a PTT-100 Archival Pop-up Tag.

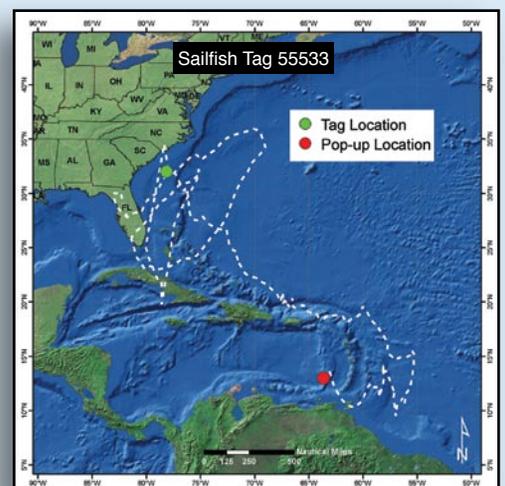
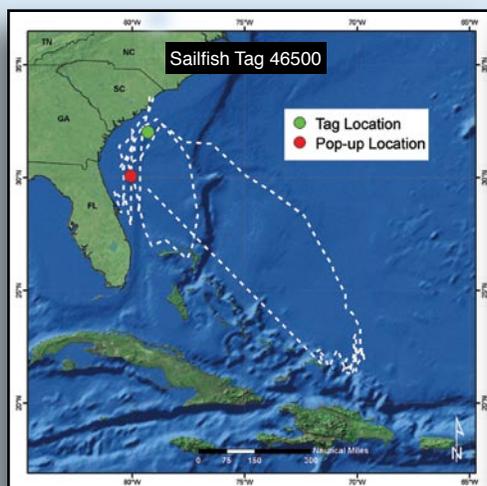
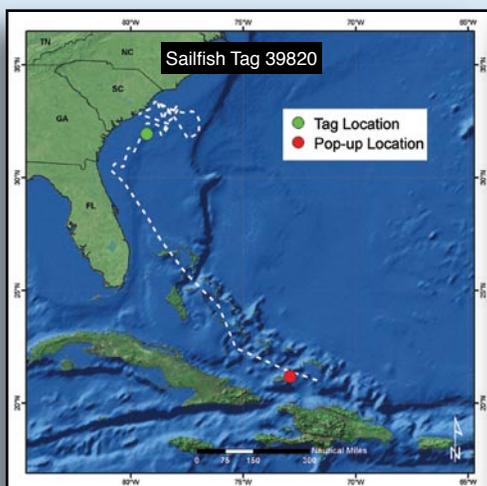
Photo by P. Weinbach

entire study period. Retention times for the other 240-day tags deployed on sailfish ranged from 6 to 81 days.

Light level geolocation data (*Footnote) from the three fully-retained 240-day tags has provided some interesting insights into potential sailfish migration patterns. All three of these long-term studies indicated movement from the Charleston Bump Complex to some area of the Caribbean or beyond.

Tag 39820 was deployed on 7/10/2003 and stayed in the Charleston Bump Complex for 130 days before beginning a long journey to the southeastern Bahamas on 11/19/2003. The tag made first satellite contact several km east of Great Inagua Island in the southeastern Bahamas 110 days later (on 3/10/2004). Tag 46500 was carried for the entire deployment interval and released on schedule off the coast of northern Florida. Geolocation estimates for this tag indicated a migration of approximately 1500 km from the tagging location off of South Carolina to the southeastern Bahamas by January of 2005. The fish apparently began to move back up the southeastern U.S. coast on a return migration when the tag reached its pop-off date in April 2005.

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4 Tagging/pop-up locations and averaged geolocation calculations for three 240-day tags that remained attached to sailfish for the entire study interval.