

What is “Coming Home” for a Highly Migratory Species of Fish?

Emily Loose is a graduate student working with Dr. John Graves at the Virginia Institute of Marine Science, College of William and Mary. Her thesis research is focused on movements of white marlin and an analysis of scale morphology of white marlin and roundscale spearfish.



The white marlin (*Kajikia albida*) is broadly distributed within the Atlantic Ocean, ranging from approximately 45°N to 45°S latitude. The species is overfished with a current biomass probably less than 20% of that necessary to support maximum sustainable yield. Genetic analyses are consistent with a single, Atlantic-wide stock of white marlin, although the degree of mixing that occurs between geographical regions on a seasonal basis (fishery connectivity) is not well understood. Although conventional (“spaghetti”) tagging results have provided some insights on movements of white marlin, tag reporting rates are very low (< 2%), and the varying times at large for recaptured animals (from days to as long as 15 years), afford limited resolution of individual movements on a seasonal basis.



White marlin tagged with a PTT-100 PSAT.

Photo by Ken Neill

Over the past several years our lab has deployed more than 100 pop-up satellite archival tags (PSATs) on white marlin taken in recreational and commercial fisheries to study post-release survival and habitat utilization. However, as these tags were programmed to release after ten days, they provided limited information on seasonal movements. As part of my thesis research I am studying movements of white marlin caught on recreational gear during the late summer in waters offshore of the U.S. mid-Atlantic region. To date I have tagged 11 white marlin using Microwave Telemetry PTT-100 archival tags programmed for 6 and 12 month deployments. Several tags have gone to term, and the results indicate these animals are truly highly migratory, and that there are multiple routes travelled by these fish.

The magnitude of seasonal movements that some white marlin undertake was exemplified by a 50 lb



Figure 1. Map showing circuitous track of a white marlin tagged off-shore of Maryland.



Photo by Bill Gooch

Bringing a white marlin alongside the boat can be a very exciting time. Great care is taken to ensure the marlin are not injured during tagging.

fish that I tagged on September 11, 2011 off the Washington Canyon, about 60 miles off the coast of Maryland. The 12 month tag went to term, popping up about 480 km to the northeast of the original tagging location. However, light-based geolocation analysis (Figure 1) tells a very different story than the straight line distance between the points of release and pop-up. After release the fish spent a little over two weeks in the Mid-Atlantic Bight, leaving the area on approximately September 26. By mid-December it had traveled to waters off northern Brazil, a straight-line distance of approximately 3800 km from the tagging location, while covering well over 7000 km to get there. The white marlin remained in this general area throughout the winter, before beginning to travel west in mid-April. By mid-June, it had reached the Dominican Republic, an area where white marlin spawning is known to occur at that time of year. After spending a few weeks in that area, it headed north, making its way back to the Mid-Atlantic Bight by mid-July. Although those of us who live in the Mid-Atlantic region may consider this as the fish’s “homecoming”, to the fish it is simply a foraging area in a region of warmer water. Regardless of why white marlin return to this area, they are clearly a highly migratory species!

As for daily vertical excursions, marlin and sailfish tag data generally show that little time is spent at depth compared to time at surface, and this white marlin was no different. This individual spent the vast majority of its time in surface waters of 0-10 m, although it frequently dove as deep as 100 m.

Results from other white marlin tagged in this study indicate that a variety of routes are used when exiting the Mid-Atlantic Bight, with most animals moving large distances to the south or east, although some appear to remain in the same general area, overwintering in warmer waters on the eastern side of the Gulf Stream. Following the movements of white marlin with PSATs has given me a great appreciation for the connectivity of fisheries throughout the Atlantic and the need for strong international cooperation for the conservation of this incredible species.