

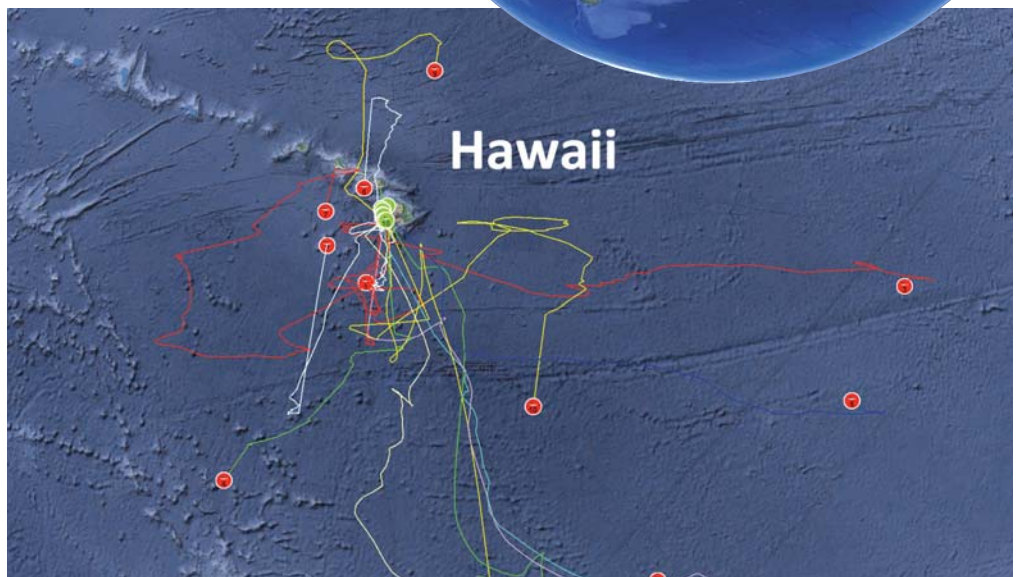
# NEW SATELLITE TAG TECHNOLOGY PROVIDES INSIGHT INTO MARLIN BEHAVIOR

*By IGFA Conservation Coordinator, Leah Baumwell and Stanford University Postdoctoral Researcher, Aaron Carlisle*



Entering its fourth year, the IGFA Great Marlin Race (IGMR) continues to provide exciting and new information on the behavior and distribution of marlin. To date, 78 blue marlin, 27 black marlin, six white marlin, and five sailfish have been tagged with satellite tags during 19 IGMR events spread across the globe. Cumulatively, these billfish traveled over 53,000 miles and recorded over 6,500 days of data. This enormous repository of data provides scientists with an amazing resource with which to study the movements and habitat use of these important, open-ocean fish. It is our hope that by further understanding how these amazing fish use their oceanic habitats, and what biological and physical factors influence their distribution, we will be better able to manage and conserve this important marine resource.

Pacific blue marlin tagged off the coast of Kona, Hawaii, USA and Tahiti, French Polynesia. To see IGMR tracks to date visit <http://igfa.org/Conserve/IGMR-Satellite-Tag-Tracks.aspx>



The work horse of the IGMR is the pop-up archival satellite tag. These tags record information on temperature, depth, and light until they detach from the fish at a pre-programmed date and transmit these data to researchers via Earth-orbiting satellites - meaning that data are recovered without having to recapture the fish. Temperature and depth data provide valuable information about what part of the water column the fish use, and the oceanographic structure of the water column. Light levels are used to estimate the location of the fish, using techniques similar to seventeenth century explorers.

Thanks to continuing advances in tag design, we are able to use the newest generation of pop-up archival satellite tags, which are much smaller and more sophisticated than the tags used during the first two years of the IGMR. We are learning that because of their smaller size and lower drag, these tags remain attached to fish longer than the older generation tags. Therefore, we are able to collect more data from longer tracks, which provide us with an insight into the overall migratory patterns of marlin that we did not previously have. For example, we are more frequently observing that marlin tagged off the coast of Kona, Hawaii as part of the annual Hawaiian International Billfish Tournament (HIBT, the longest running IGMR event) are migrating great distances and are often ending up around French Polynesia. The winner of the 2013 Kona, USA IGMR swam an astounding 2,883 nautical miles (nm) from Hawaii to Pitcairn Island at speeds in excess of 100 nm per day. These migrations may suggest that French Polynesia and Hawaii may be waypoints within the larger scale migratory patterns of Pacific blue marlin. Interestingly, some blue marlin tagged near Tahiti, French Polynesia appeared to migrate long distances in a northwesterly direction, which possibly could represent a new part of this migratory cycle. We are also finding that not all marlin are making dramatic long distance migrations. In fact, some are relatively residential within a region, and spend the full duration of the tag deployment in the general area where they were tagged, demonstrating that marlin exhibit a di-



versity of migratory behaviors. For example, several blue marlin tagged off the coast of Kona, Hawaii spent the full 180 days of the tag deployment moving within the vicinity of the main Hawaiian Islands.

A great benefit of the IGMR is that it is a long-term program wherein billfish are tagged in the same tournaments over multiple years. So as we continue to tag more marlin, it is our hope that over time we can learn more about the diversity of their migratory patterns and the factors that influence them in an effort to eventually “close the loop” on the global migratory cycles of marlin. As

ocean conditions continue to change, it is important to understand how the environment influences billfish distribution. By exploring the link between the physical environment and the distribution of marlin, we can learn how and why their geographic and depth distribution changes seasonally, interannually, and over longer time scales such as over El Nino/La Nina cycles. The information obtained from the IGMR can play a vital role in the development of effective management strategies and can help ensure a positive future for these amazing sportfish.