Endangered Sharks Come Home to The Bahamas

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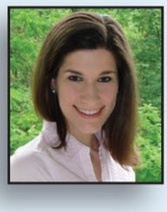

Oceanic whitetip sharks (*Carcharhinus longimanus*) exhibit a circumtropical distribution, inhabiting the pelagic environment. Jacques Cousteau considered the oceanic whitetip to be the most dangerous of all sharks and regularly encountered them on his expeditions. Yet, in the past half-century, industrial fishing fleets in the open ocean have depleted populations of this species to critically low levels. Sharks are fished for their fins which are used to make a soup consumed as an Asian delicacy. Emerging conservation plans to arrest these declines and initiate recovery hinge upon better understanding oceanic whitetip movements in relation to protected areas and potential threats.

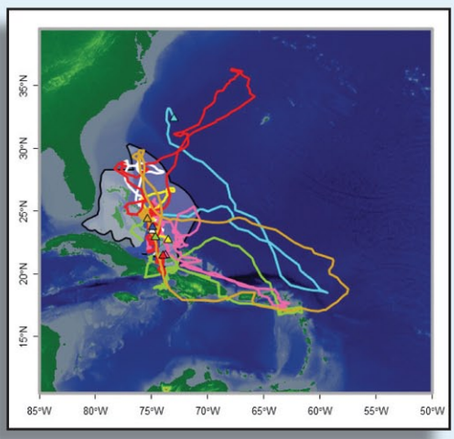

Figure 1. Filtered tracks of 12 oceanic whitetip sharks tagged at Cat Island, The Bahamas. Triangles indicate pop-up location.

In 2011, a group of researchers from the Cape Eleuthera Institute (Edd Brooks, Annabelle Brooks, Sean Williams), Stony Brook University (Demian Chapman, Debra Abercrombie), and Microwave Telemetry (Lucy Howey-Jordan, Lance Jordan) met in The Bahamas to begin a multi-year study of this poorly understood shark. Cat Island lies on the eastern margin of the Great Bahama Bank, exposed to tropical western North Atlantic waters (Figure 1). The southeastern tip of the island is called Columbus Point, marking the mouth of the Exuma Sound. This area represents one of the few locations in the world where oceanic whitetip sharks can be reliably encountered in abundance. Scuba divers and fishers have known for years that these sharks are present during summer months, then disappear as quickly as they arrive.

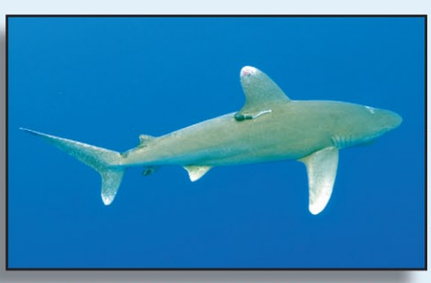

Photo by Lance Jordan

Photo 1. Oceanic whitetip shark instrumented with an X-Tag.

With the goal of increasing knowledge about the migratory behavior of oceanic whitetip sharks in the Atlantic, our group tagged 12 individuals at Cat Island with X-Tags the first year (Photo 1). Another 30 were tagged in 2012 (including the E-Tag prototype, see below), with 25 sharks tagged in May this year. Results from the first year of the tagging (published in PLOS ONE, February 2013) were surprising. As expected, the sharks left the waters adjacent to Cat Island in late summer. Some of the individuals migrated as far as the northern Leeward Islands (1400 km) but some actually remained within Bahamian waters. The Bahamas is a shark sanctuary where it is illegal to catch any shark species. Thus, those individuals that remained within The Bahamas' territorial waters were not exposed to longline fisheries.

Results from our study show that even though many of the tagged individuals migrated far from Cat Island, they return to the area. The reason for this apparent philopatry is unknown but suggests that waters of the central Bahamas are an important habitat for this pelagic shark. In an attempt to shed light on this behavior, a researcher from the University of North Florida (Brenda Anderson) joined our team in 2012 to examine reproduction in female individuals. Armed with an ultrasound machine, she was able to determine if females were carrying pups (Photo 2).

Despite being rejected in 2010, oceanic whitetip sharks gained global protection under Appendix II of the Convention on International Trade in Endangered Species (CITES) in March 2013. Hopefully, this measure will help curb further population declines of this once abundant apex predator.

Photo by Lance Jordan

Photo 2. Team performing ultrasound on female to determine if she was gravid.

E-Tag Update

This first-generation E-Tag is ~40% smaller in volume than the X-Tag, allowing for the study of even more species. The current version of the E-Tag only records (time-series) temperature and provides a pop-up location. However, the next version of the E-Tag will also record light-level data and calculate geolocation.

In addition to providing a means for tagging smaller animals, the E-Tag is intended to be deployed alongside X-Tags with the goal of improving geolocation estimates from X-Tag light-level data. Near the autumnal and vernal equinoxes, light-based geolocation methods fail to produce reliable latitude estimations. An E-Tag, programmed to release at the equinox, would reveal the animal's actual location during the time of uncertainty.

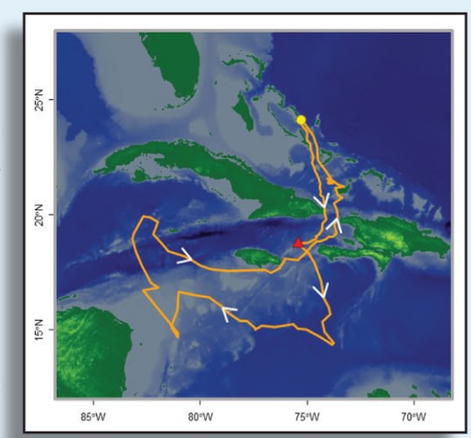

Figure 2. Filtered track of an oceanic whitetip shark tagged in May 2012 with an X-Tag and E-Tag. Tagging location (Cat Island, The Bahamas) indicated with yellow circle. E-Tag pop-up location indicated with red triangle.

The first E-Tag was successfully deployed on an oceanic whitetip shark alongside an X-Tag in May 2012. Double-tagging the individual allowed us to test the E-Tag against our already proven X-Tag and incorporate the E-Tag pop-up location as a known point in the X-Tag's estimated track. Figure 2 displays the filtered X-Tag track. The tagging location is indicated by the yellow circle. One month into the track, the E-Tag released on time at the location indicated by the red triangle, confirming that the animal traveled south of Cuba. Then, the track from the corresponding X-Tag indicates the individual looped through the Caribbean Sea and released in September 2012 at the tagging site (similar to other individuals, see above). The utility of this application holds much promise.