Home Ranges of Atlantic Great White Sharks, Phase II

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Sharks have been living in the oceans since the Ordovician period, for some 450 million years. Yet, no studies have quantified the roaming capacities and migratory habits of Great White Sharks (Carcharodon carcharias) in the Atlantic Ocean. This study hypothesized that C. carcharias would: (i) follow seasonal ocean temperatures, (ii) potentially aggregate in areas of high primary productivity where food was available, and (iii) follow the continental shelf margin, where prey may aggregate. Over 3350 lines of code were written in the statistical program R to analyze 45 months of tracked-shark data, from January 2013 to September 2016. The home ranges of the 27 C. carcharias showed two overlapping clusters, one along the eastern North American coastline, and the other around the South African coastline. The home ranges varied from thousands of km² to 20 million km², with shark length significantly affecting home-range size. The home ranges of sharks were bimodal, with most sharks spending the majority of their time (95%) within their given home range, with considerably less time (5%) swimming large distances. This study also found that C. carcharias have a preference for cool-ocean temperatures and high chlorophyll-a concentrations, than for warm-ocean temperatures and low chlorophyll-a concentrations. In addition, C. carcharias consistently followed the margin of the continental shelf within five decimal degrees, spending less time outside of those areas. This is the first study of its kind, and has revealed the home-range sizes, movement patterns, and preferable environmental conditions of C. carcharias tracked in the Atlantic Ocean.

Awards Won:

Third Award of $1,000

National Oceanic and Atmospheric Administration - NOAA: A fully paid summer internship at a NOAA research lab, plus a $500 monetary award.