



## **PRESS RELEASE**

### **Whale Shark Movements Tracked by Star-Mapping Science**

Tracking pelagic animals like whale sharks is essential to understanding their behavior, and to protecting these animals and the habitats they use. Whale sharks are a mystery to scientists in many ways; one unanswered question is where these sharks go when they leave the coastal feeding sites where researchers study them. In North America, whale sharks are found in the Gulf of Mexico and Caribbean Sea at certain times of the year, but are thought to range widely at other times. There are many ways to track animals over time, but most are inadequate for following species whose migration cycles may span years or even decades. A typical satellite tag, for example, may function for only a few months. How then to track big spotted animals over long periods of time? By using their spots!

In work published in 2005, researchers showed how they had adopted a star-mapping program from the Hubble telescope to analyze the patterns of whale shark spots. A standardized region of the left flank of the animal serves as a “fingerprint” that is unique to each shark, and this fingerprint does not change as the shark grows. A database was established, which grew into the current Wildbook for Whale Sharks (<https://www.whaleshark.org/>), in which researchers -- but also swimmers, snorkelers, divers and fishermen -- can submit spot pattern photos of whale sharks they see. Submitted photos are compared with existing patterns in the database, and either matched to a known shark or identified as a new one.

The Wildbook for Whale Sharks has been an enormous research success, and is a spectacular example of “citizen science” – harnessing the efforts of the general public to further scientific research. In 2014 the database contained 30,000 photos of more than 6000 individual whale sharks seen in 54 countries, photos submitted by researchers and by the shark-loving public, and it continues to grow. This essential resource has allowed researchers to confirm that many sharks return to specific aggregation sites each year, but also that some sharks move across oceans and between countries.

New work published today aggregates 22 years of ongoing whale shark photo identification research. This extensive and truly global study includes among its authors Shark Research Institute Executive Director Marie Levine, Director of Science & Research Jennifer Schmidt, and Field Researcher Matt Potenski. This years-long tracking of individual sharks has revealed patterns of behavior over multiple life stages (i.e. from juveniles to adults). The work has identified “hotspots” of whale shark activity, regions where ecological conditions are ideal for whale shark aggregation, allowing scientists to study how these areas overlap and interact with fisheries and ecotourism activities. Continued monitoring of the numbers and patterns of whale sharks visiting these hotspots will highlight any changes that may occur as a result of human activities and/or climate change.

Lead author and Director of ECOCEAN Inc. Dr. Brad Norman says, “This effort is increasing our knowledge of whale shark abundance and geographic range, trends in site fidelity and frequency”. “That information is vital for prioritizing conservation areas for the species.”

The paper is: Norman B, Holmberg J, Arzoumanian Z et al. 2017. Undersea Constellations: The Global Biology of an Endangered Marine Megavertebate Further Informed through Citizen Science. *BioScience* 67:1029-1043. DOI: [10.1093/biosci/bix127](https://doi.org/10.1093/biosci/bix127)

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