

Whale shark mugshots reveal teenage males hang around WA's coast

November 16 2016, by Samantha Andrzejczek And Mark Meekan



A researcher taking a photo-identification shot of a whale shark. Credit: Peter Verhoog, Dutch Shark Society

Every year in March juvenile male whale sharks arrive at Ningaloo Reef, Western Australia, supporting a thriving ecotourism industry. But where do they go in July once they leave this meeting site?

Results from [our study](#), published today in *Royal Society Open Science*, suggests they don't go far. By comparing identification photos of [whale](#)

[sharks](#) in a collaborative study across the Indian Ocean, we have found that juvenile males appear to return to the same sites year after year.

The biggest fish in the sea

Whale sharks are the largest fish in the sea, reaching sizes of more than 12 metres. These peaceful giants are filter-feeders, mostly eating tiny crustaceans, fish eggs and small fish that they sieve from the water using plates on their gills.

They reach maturity when they are around 8m long, but it can take them up to 30 years to reach this size. Because of this slow growth rate and their vulnerability to ship strikes and bycatch in fisheries worldwide, the status of whale sharks has recently been upgraded to [Endangered by the IUCN Red List](#). If conservation strategies for the species are to be successful, we need to know where these animals are going and the places they visit on their migrations.



Researchers swim alongside a whale shark at Ningaloo Reef. Credit: Peter Verhoog, Dutch Shark Society

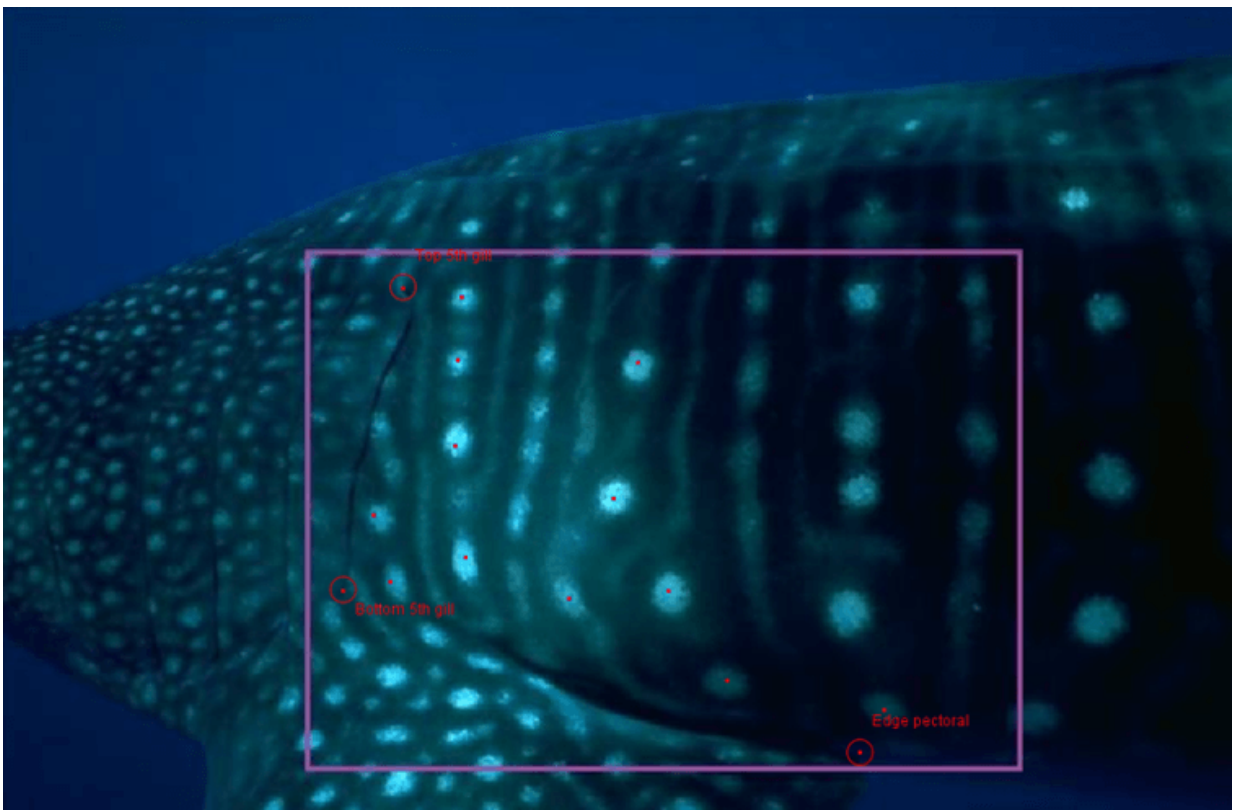
Whale sharks form aggregations off tropical coasts around the world that are a response to seasonal pulses in the abundance of their food. In the Indian Ocean, these occur at Ningaloo Reef as well as in the Maldives, off the coast of Mozambique, and in the Seychelles.

Because these sharks are docile and spectacular, aggregations are the target of ecotourism industries in each of these localities. To date, genetic studies have suggested the sharks in all these different aggregations form one population, implying that animals are moving between these sites. However, no direct evidence for these movements

exists.

Photo-identification

Just like a fingerprint, we can identify whale sharks from their unique spot and stripe patterns. By comparing photos of a standard area on the body of a whale shark among both years and locations, we can then determine if an individual is moving to a new location, or returning in multiple years. This method is called photo-identification.



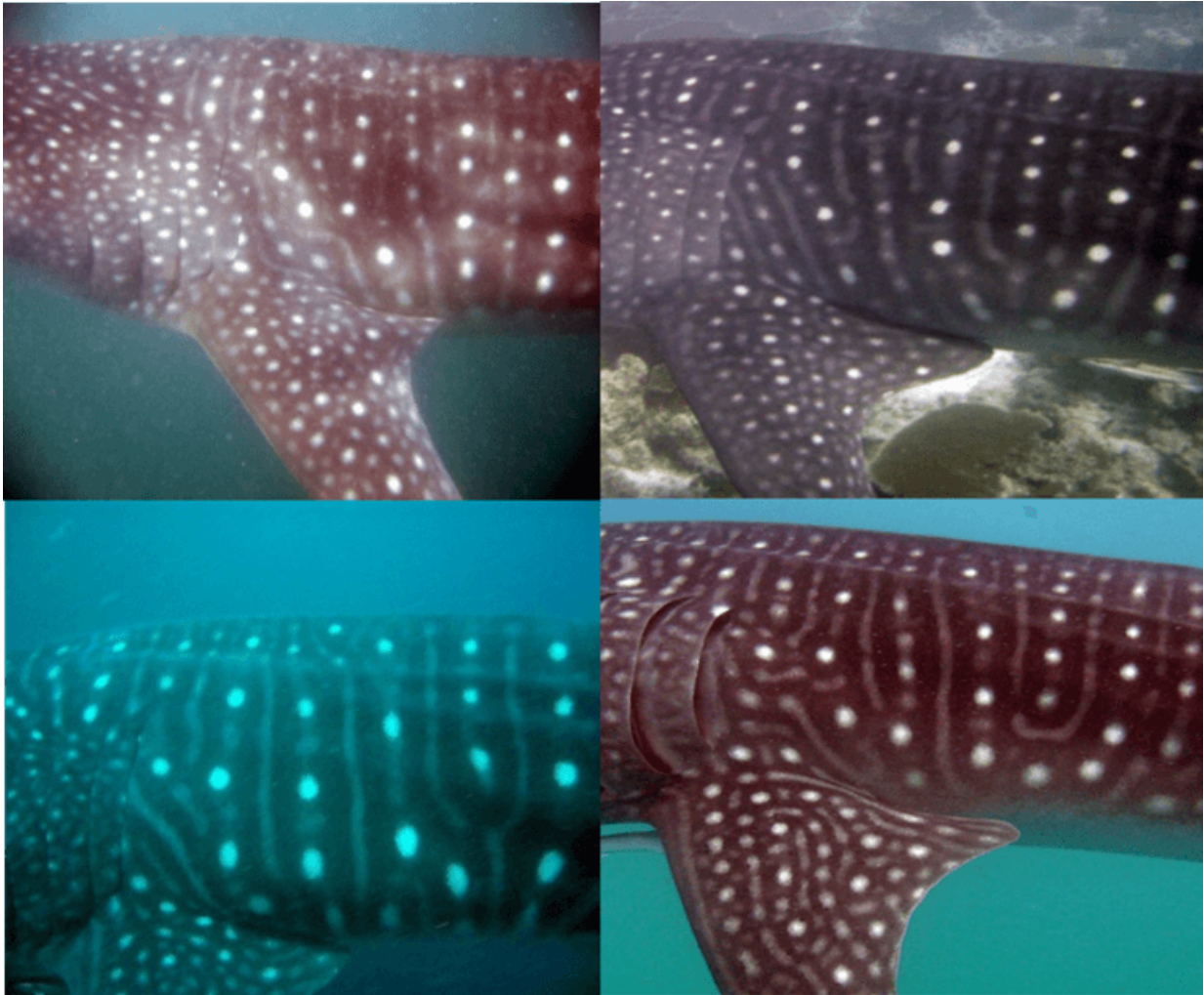
The area of spot and stripe patterns on a whale shark used in photo-identification.

Using the large and expanding database of whale shark photos taken by ecotourists, tour operators and researchers in the Indian Ocean, we used this method to look at movement patterns. Using a semi-automated matching program, we compared a database of over 6,000 images of whale sharks across the Indian Ocean.

What did we find?

From our comparison we were able to identify about 1,000 individual whale sharks, of which 35% were seen again at the same site in more than one year, and none of which were found to move across the Indian Ocean. One shark was tracked between Mozambique and the Seychelles, suggesting that regional links do occur, however on a larger scale, populations appear to be isolated and distinct.

Within these aggregations, juvenile males are returning on a regular basis. At Ningaloo, juvenile males photographed in 1992 have so far been seen up to 19 years later, with many sightings in between. In more recent years as the photograph databases have expanded with the tourism industries, we have seen some sharks returning in up to six consecutive years.



A sample of the identification photos from the database.

Females and adult males were rarely spotted at these sites, so it is possible that they aren't homebodies like the young males.

Good news for whale sharks

The absence of large-scale movements here is [good news](#) for the endangered whale shark. Conservation and management efforts can

focus on smaller areas, and a lesser degree of cross-jurisdictional management will be required than if we found cross-ocean movements to be commonplace.

However, we need to improve our understanding of the regional movements of these animals. A computer simulation analysis study of our data indicated we need to increase the number of study sites and photos taken to get an estimate of their migration patterns at larger scales.



Researchers from the Australian Institute of Marine Science get ready to photograph a whale shark. Credit: Peter Verhoog/Dutch Shark Society

More information: The ecological connectivity of whale shark aggregations in the Indian Ocean: a photo-identification approach, [DOI: 10.1098/rsos.160455](https://doi.org/10.1098/rsos.160455) , [rsos.royalsocietypublishing.org ... /content/3/11/160455](https://rsos.royalsocietypublishing.org/content/3/11/160455)

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