



Shark hotspots ‘tracked’ by fishing vessels

Significant geographic overlap between ‘hotspots’ of oceanic shark distribution and fishing activity is reported in a new study.



Blue shark *Prionace glauca*.
Image courtesy of
J. Stafford-Deitsch

Tens of millions of ocean-dwelling sharks are caught by fishing each year, and catch rates have declined significantly for many species, yet oceanic shark fishing remains largely unregulated. A lack of data on where sharks are likely to encounter fishing vessels hampers current conservation efforts.

An international team of researchers from the UK, Portugal, Spain and U.S.A. tracked more than 100 sharks from six different species by satellite across the entire North Atlantic, one of the most heavily exploited oceans. Concurrent with the shark tracking, the scientists tracked 186 Spanish and Portuguese longline fishing vessels using GPS to quantify the overlap in space and time.

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“Many studies have tracked sharks, and many studies have tracked fishing vessels, but fine-



scale tracking of sharks and fishing vessels together is lacking, even though this should better inform how shark fisheries should be regulated,” says Professor David Sims of the Marine Biological Association in Plymouth, UK, the senior author of the study.

From the sharks’ satellite tracks and from remote sensing images of the ocean environment, the team found that within each species’ preferred range, sharks tended to aggregate in locations characterized by strong temperature gradients and high productivity. Perhaps unsurprisingly, they found that the fishing vessels and sharks targeted similar locations.

However, the scale of the overlap was surprising. For the most heavily fished shark species, blue and mako, about 80% of the sharks’ tracked range overlapped with the fishing vessels’ range, with some individual sharks remaining near to longlines for over 60% of the time they were tracked.

“Although we suspected overlap might be high, we had no idea it would be this high. Space-use overlap on this scale potentially increases shark susceptibility to fishing exploitation, which has unknown consequences for populations” says says Dr Nuno Queiroz of the University of Porto, Portugal, a lead author of the study.

The researchers propose that because current hotspots of shark activity are at particularly high risk of overfishing, the introduction of catch quotas or size limits will be necessary to protect oceanic sharks that are commercially important to fleets worldwide at the present time.

Areas of highest overlap included the Gulf Stream, the North Atlantic Current/Labrador Current Convergence Zone near Newfoundland, and along the Mid-Atlantic Ridge southwest of the Azores.

Over the period 2005-2009, the overlap between sharks and fishing vessels persisted between years in hotspot locations.

“This highlights how broadly the fishing exploitation efficiently ‘tracks’ oceanic sharks within their hotspots year-round. In the North Atlantic it seems threatened sharks have few places left to hide in the face of industrialised, high-seas fishing of the last 50 years,” says Sims.

The research is published in *Proceedings of the National Academy of Sciences of the U.S.A.*

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2. The research is published in *Proceedings of the National Academy of Sciences of the U.S.A.*

“Ocean-wide tracking of pelagic sharks reveals extent of overlap with longline fishing hotspots”

By Nuno Queiroz, Nicolas E. Humphries, Gonzalo Mucientes, Neil Hammerschlag, Fernando P. Lima, Kylie L. Scales, Peter I. Miller, Lara L. Sousa, Rui Seabra, and David W. Sims

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5. Photographs

Photographs of shark species studied in the paper are available to use. Permission has been obtained where these were not taken by authors of the study.

Photos can be downloaded from

<https://www.dropbox.com/sh/oc3qmhje1wuzwdc/AADCDCVcXkRagfH4bwzG3GWgCa?dl=0>

If photos are used they should be credited as below.

Photos 1-4 caption: The distributions of blue and mako sharks tracked in the present study were found to overlap 100-km longlines, each bearing over 1200 baited hooks, for over 80% of the time.

Photo 1 - blue shark *Prionace glauca*

Credit: Image courtesy Joe Romeiro, 333 Productions

Photo 2 – blue shark *Prionace glauca*

Credit: Image courtesy Joe Romeiro, 333 Productions

Photo 3 – shortfin mako shark *Isurus oxyrinchus*

Credit: Image courtesy of Bill fisher, 333 Productions

Photo 4 – blue shark *Prionace glauca*

Credit: Image courtesy Neil Hammerschlag, SharkTagging.com

Photos 5 & 6 caption: Millions of blue sharks are captured each year by commercial longline fishing vessels, however international catches remain largely unregulated.

Photo 5 - blue shark *Prionace glauca* on commercial longline in north Atlantic

Credit: Image courtesy Marine Biological Association

Photo 5 - blue shark *Prionace glauca* on commercial longline in north Atlantic

Credit: Image courtesy Marine Biological Association.

The Marine Biological Association (MBA) is a professional body for marine scientists with some 1,400 members world-wide. Since 1884 the MBA has established itself as a leading marine biological research organization contributing to the work of several Nobel Laureates and over 170 Fellows of the Royal Society. In 2013, the MBA was awarded a Royal Charter in recognition of its long and eminent history and its status within the field of marine biology. The award strengthens the Association's role in promoting marine biology as a discipline and in representing the interests of the marine biological community.

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