

Commercial fishing threatens sharks worldwide

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Bronze whaler shark. Credit: Andrew Fox/Rodney Fox Shark Expeditions

Even the remotest parts of the ocean appear to offer highly migratory sharks little refuge from industrialized fishing fleets, according to a major new international study published in the journal *Nature*.

Large sharks inhabiting the open ocean account for more than half of all identified shark catch globally in target fisheries or as bycatch.

Regional declines in abundance of some populations such as [shortfin mako shark](#)—the fastest shark in the sea—have led to widespread calls for catch limits in the High Seas (areas beyond national jurisdiction; ABNJ) where there is currently little or no management for sharks.

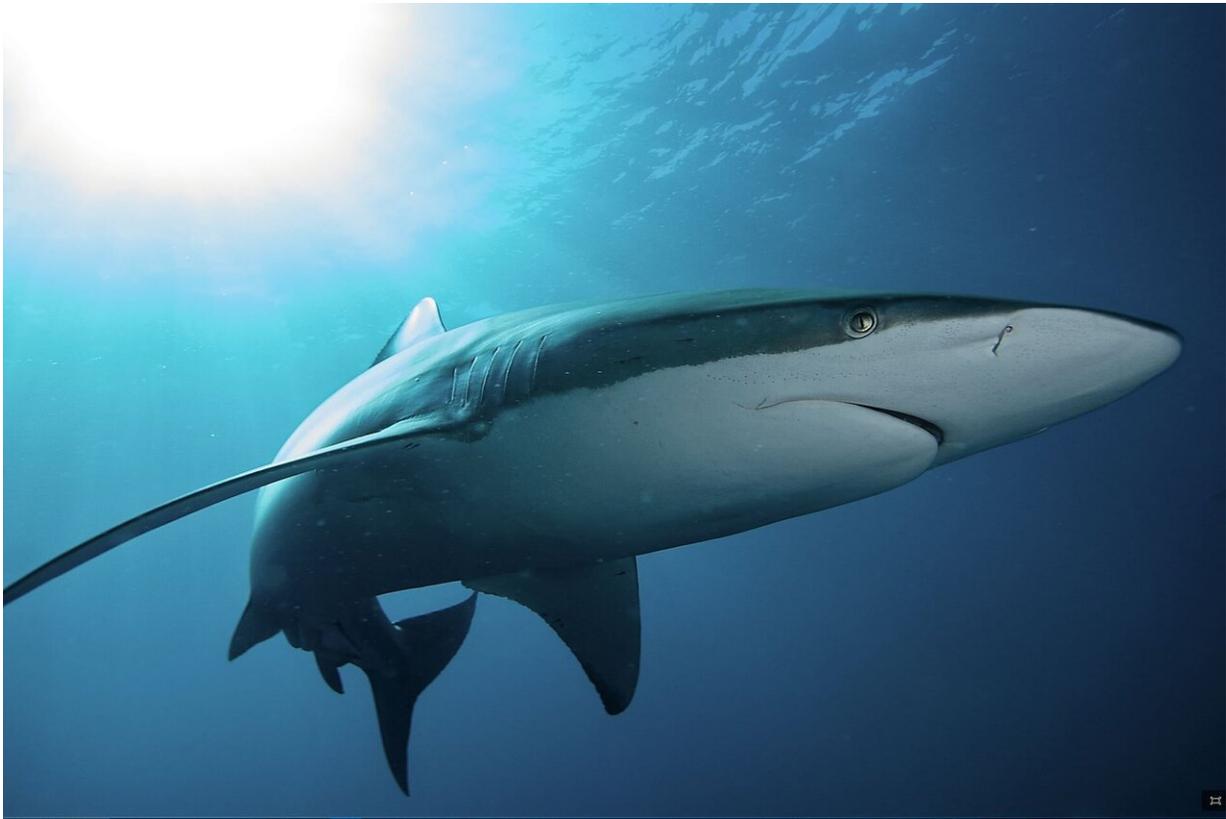
But precisely where in the vast expanse of the oceans sharks aggregate and how much fishing takes place in those chosen habitats remains poorly known globally, even though it will be crucial to selecting sites to conserve sharks.

More than 150 scientists from 26 countries have now addressed this knowledge gap by collating movement data from nearly 2000 sharks tracked with satellite transmitter tags and cross-referencing with data from global fishing fleets.

Researchers including Flinders University Associate Professor Charlie Huveneers mapped shark positions and revealed "hotspots" of space use in unprecedented detail.

They found multi-species pelagic shark hotspots were mostly located in boundaries in the sea between different water masses that are highly productive and food-rich.

They then calculated how much the hotspots were overlapped by global fleets of large, longline fishing vessels—the type of fishing gear that catches most pelagic sharks—with each vessel capable of deploying 100 km long lines bearing 1200 baited hooks on a daily basis.



Credit: Andrew Fox

"We found 24 percent of the mean monthly space used by sharks globally falls under the footprint of pelagic longline fisheries," says Associate Professor Huvneers.

"It means about one-quarter of shark habitats fall within active fishing zones, presenting a threat to these iconic ocean predators and demonstrating an urgent need for [conservation efforts](#) to protect declining pelagic shark populations," he says.

For commercially exploited sharks such as North Atlantic blue and shortfin makos sharks overlap was much higher, with on average 76

percent and 62 percent of their space use, respectively, overlapping with longlines each month.

"Even internationally protected species such as white and porbeagle sharks had overlap values exceeding 50 percent," Associate Professor Huvneers says.

"The South Australian Basin was found to be an important [hotspot](#) for pelagic sharks, providing some refuge for these species as fishing vessel activity for pelagic sharks is relatively sparse in this area."

The study was led by Professor David Sims, as part of the Global Shark Movement Project based at the Marine Biological Association Laboratory in Plymouth, England.

"Our results show major high seas fishing activities are currently centered on ecologically important shark hotspots worldwide" he says.

Equally alarming was that shark hotspots showing high overlap with longline fishing were often also subjected to high fishing effort, a potential "double whammy" for sharks that will result in higher catch rates and potentially accelerate declines in abundance.



Porbeagle shark off the UK coast. Credit: Marine Biological Association Laboratory, Plymouth, England

"Some shark hotspots were exposed to higher than average fishing effort for as much as half the year," says Dr. Nuno Queiroz, a lead researcher in the study from the University of Porto in Portugal.

Given the high fishing effort in hotspots of many species for significant portions of the year, and the very few tracked hotspots free from exploitation, the study reveals exposure risk of sharks to fisheries in the high seas is spatially extensive—stretching across entire ocean-scale population ranges for some species.

The team's findings indicate large sharks—some of which are already

endangered globally—face a future with limited spatial refuge from industrial longline fishing effort.

The researchers propose that the detailed maps they have produced of shark hotspots and exposure to longline fishing effort can provide a blueprint for use in deciding where to place large-scale marine protected areas (MPAs) aimed at conserving sharks, in addition to the need for strict quotas to reduce catches elsewhere.

"Some of the shark hotspots we studied may not be there in as little as a few years' time if management measures are not put in place now to conserve the sharks and the habitats on which they depend," Professor Sims says.

Key points include:

- Major [high seas](#) fishing activities are centred on ecologically important shark hotspots worldwide
- North Atlantic blue sharks and shortfin mako have an average 76 percent and 62 percent of their space use, respectively, overlapped by longlines each month
- Even internationally [protected species](#), such as white shark and porbeagle sharks, are at risk
- Results could provide a blueprint for use in deciding where to place large-scale marine protected areas (MPAs)
- There is a danger of accelerating decline in populations and disappearance of hotspots without immediate action

More information: Nuno Queiroz et al. Global spatial risk assessment of sharks under the footprint of fisheries, *Nature* (2019). [DOI: 10.1038/s41586-019-1444-4](https://doi.org/10.1038/s41586-019-1444-4)

Provided by Flinders University

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