

# Big sharks equal big impact, but there's a big problem: Those most affected by fishing are most needed for ocean health

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Great white shark at Isla Guadalupe, Mexico, August 2006. Credit: Terry Goss/Wikipedia

Shark conservation must go beyond simply protecting shark populations—it must prioritize [protecting the ecological roles of sharks](#), according to new research published in [Science](#).

The largest sharks of many of the biggest species, such as [tiger sharks](#) and great whites, play an oversized role in healthy oceans, but they are often the most affected by fishing. The big sharks help maintain balance through their eating habits. Sometimes their sheer size is enough to scare away prey that could over-consume seagrass and other plant life needed for healthy oceans.

Sharks can also help shape and maintain balance from the bottom-up. That means a variety of sharks are needed in ecosystems, yet their many and diverse contributions to ocean health are under threat from overfishing, climate change, habitat loss, energy mining, shipping activities and more.

The study, led by Florida International University (FIU), sheds new light on what role sharks play in healthy oceans and why size should be a factor in conservation decisions.

"When we look around the world, we see that sharks can play lots of different roles in ecosystems—and some of them are really important," said Mike Heithaus, co-author of the study and executive dean of FIU's College of Arts, Sciences & Education.

"That means we need to maintain a diversity of sharks in our oceans as well as a wide range of sizes of sharks. It also means we need to be rebuilding heavily depleted populations and managing for how sharks will function in oceans that are changing due to human uses and [climate change](#)."

Heithaus has spent his career studying the ecological role of sharks. His two decades of work in Shark Bay, Australia is the most detailed study of the ecological role of sharks in the world and has been used as the underpinning for affecting positive policy changes.

There, he documented top-down roles, including keeping prey populations from growing too large or eating too much. When sharks scare off prey, like turtles and sea cows, these grazers don't overeat seagrass or other needed marine vegetation, giving it time to grow and recover before the grazers return.

"We're not saying big sharks are the only ones that matter. There's a lot more that sharks of all kinds are doing to shape entire ecosystems," said Simon Dedman, FIU marine scientist and co-lead author of the study.

"But what we do know is that big sharks of some species are playing an oversized role in ocean health and need better protection. It's time to have a conversation about everything sharks are doing to maintain ocean health so we can better prioritize conservation efforts and have the biggest impact."

Besides helping to maintain balance in [food webs](#), sharks feed in offshore waters and bring nutrients back to the reef. Others move nutrients around that are used at the base of the food chain. Sharks can also serve as food for other species and even as scratching posts for fish to remove parasites.

The problem is shark abundance has plummeted by 71% for oceanic species in the past 50 years. Populations of the top five reef shark species have been depleted by 63%.

"This study verifies what we've long suspected—sharks are critical to [ocean health](#)," said Lee Crockett, executive director of the Shark Conservation Fundy.

"This landmark study serves as confirmation that marine conservationists, philanthropists, policymakers, and the public alike need to recognize that sharks are keystone species that have a now-proven

significant effect on marine environments."

The issue of shark conservation becomes all the more critical as global temperatures increase, leading some sharks to head into new areas where they can find the temperatures they thrive in. In addition, with the expansion of blue economy industries like aquaculture and tourism, people's encounters with sharks will likely increase.

Finding a balance that protects the sharks most needed for healthy oceans is hitting a critical point.

"National and international policy must focus on actions that rebuild populations and restore sharks' functional roles," Heithaus said.

"That requires action to increase both spatial measures like Marine Protected Areas and fisheries management measures like catch/size limits and gear limitations. If people want healthy oceans, we need healthy [shark populations](#)."

**More information:** Simon Dedman et al, Ecological roles and importance of sharks in the Anthropocene Ocean, *Science* (2024). [DOI: 10.1126/science.adl2362](https://doi.org/10.1126/science.adl2362)

Provided by Florida International University

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