

Belize extends protection for sharks after research documents population decline

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Katie Flowers—lead author and a Ph.D. candidate in FIU's Predator Ecology & Conservation lab—in the field. Credit: Florida International University

Even in protected areas, endangered sharks may still be vulnerable, according to one of the first long-term monitoring studies of reef sharks

within a marine protected area (MPA).

FIU researchers and a team of collaborative scientists tracked the number of Caribbean reef sharks at Glover's Reef Atoll, which is part of the Glover's Reef Marine Reserve World Heritage Site, an MPA in Belize. Monitoring was focused on the no-take zone, where fishing is prohibited. The team documented a population decline between 2009-2019. They shared the data with the National Shark Working Group—a team made up of government officials, shark fisherfolk, non-governmental organizations, and scientists. The group made recommendations that led to new legislation prohibiting shark fishing two miles around Glover's Reef Atoll, Lighthouse Reef Atoll, and Turneffe Atoll.

"Once a marine protected area is implemented, they aren't often monitored. Our findings are a call to action and stress the importance of monitoring population trends over time," said lead author Katie Flowers, a Ph.D. candidate in FIU's Predator Ecology & Conservation lab. "MPAs can't be created and then ignored, because management measures that might work at one time may not work later due to changing socioeconomic and environmental conditions."

For two decades, FIU professor and Director of Sharks & Rays Conservation Research at Mote Marine Laboratory Demian Chapman and University of Miami professor Elizabeth Babcock have spearheaded a project tracking shark populations at Glover's Reef.

Initial research conducted by FIU Research Assistant Professor in the Institute of Environment Mark Bond found Caribbean reef shark populations were doing well within the MPA from 2001 to 2013.

Then, their numbers started to dwindle. When examining footage from baited remote underwater videos, researchers could normally spot

several Caribbean reef sharks at a time.

By 2018, they saw none.

Flowers points out it could be possible sharks were somewhere else in the MPA and didn't pass by the cameras. However, it was still cause for concern. Caribbean reef sharks are listed as endangered by the International Union for the Conservation of Nature Red List of Threatened Species. Research by FIU Ph.D. candidate Jessica Quinlan shows they are also one of the most fished shark species in Belize.

MPAs are one conservation method that helps protect reef sharks. However, sharks don't know where boundaries of MPAs begin and end—and reef sharks don't always necessarily spend all of their time near a coral reef. They can frequent or visit areas beyond a no-take zone. In this case, the researchers do believe fishing along the edge of the MPA could have contributed to the decline of Caribbean [reef](#) sharks.

The good news, though, is the long-term data provided the concrete evidence the government in Belize needed to quickly respond and exact new management measures to further protect sharks.

"We can only be successful in the effective conservation and management of our marine resources when policy and management benefit from sound science. The contribution from our partners at FIU, Mote Marine Laboratory and the University of Miami has been central to the declaration of the recent Shark MPAs, which along with other management measures has been embraced by fishers and managers as important for the long-term protection and viability of Belize's shark populations."

There is some more good news—for a different shark species. Nurse shark populations remained healthy and stable within the MPA. This is

in part because they tend to stay within the boundaries and are also a nationally protected species in Belize.

Global FinPrint—the world's first and largest shark and ray survey—revealed sharks are absent on many of the world's coral reefs. This groundbreaking research was led by Chapman and Dean of the FIU College of Arts, Sciences & Education Mike Heithaus, and conducted by a network of hundreds of scientists and collaborators. They found countries with good governance and conservation management practices had healthier shark populations. Belize has been a long-time partner, collaborating with scientists to protect sharks.

"You can think of MPAs like a garden. You don't plant a garden and walk away. You have to tend it," Chapman said. "And that's what we are helping the government of Belize do. We are helping them tend the garden."

The findings were published in *Marine Ecology Progress Series*.

More information: KI Flowers et al, Varying reef shark abundance trends inside a marine reserve: evidence of a Caribbean reef shark decline, *Marine Ecology Progress Series* (2021). [DOI: 10.3354/meps13954](https://doi.org/10.3354/meps13954)

Jessica R. Quinlan et al, Using fisher-contributed secondary fins to fill critical shark-fisheries data gaps, *Conservation Biology* (2021). [DOI: 10.1111/cobi.13688](https://doi.org/10.1111/cobi.13688)

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