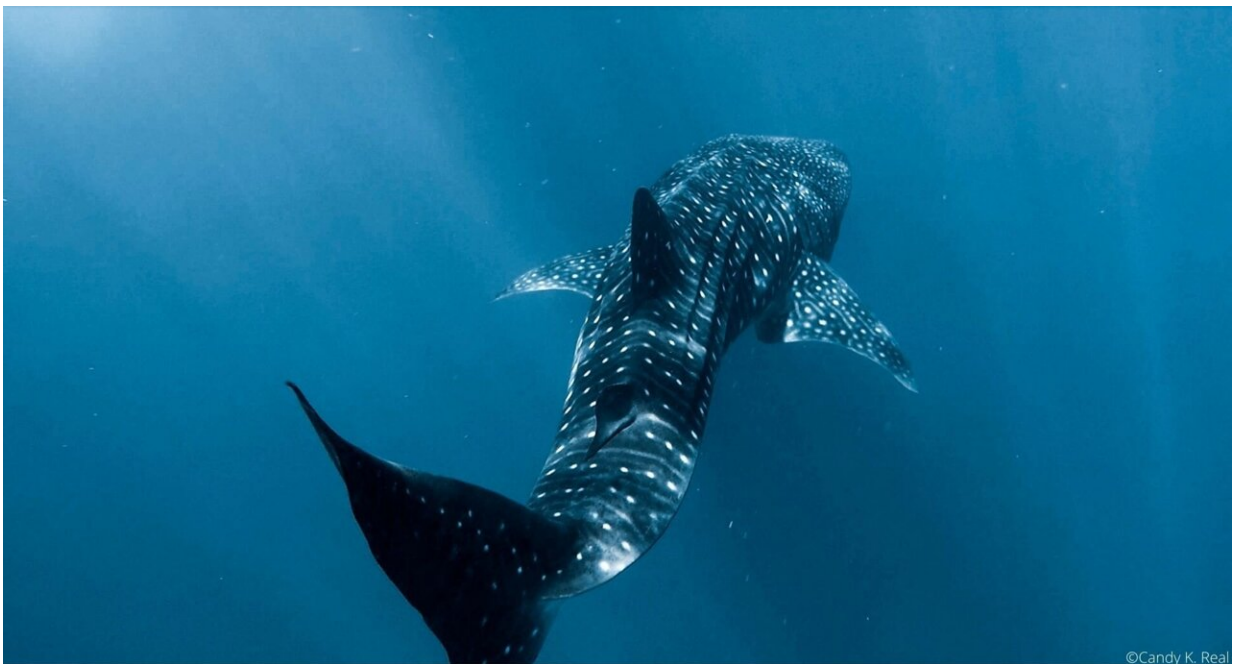


Satellite-tracking of whale sharks offered insight into their migratory and feeding behavior

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The largest fish in the ocean, the whale shark, is a highly migratory endangered species that may require conservation programs focused on protecting large ocean areas and establishing marine corridors that transcend national borders. Credit: Candy Real, Smithsonian Tropical Research Institute

The largest fish in the ocean is a globe-trotter that can occasionally be found basking in the coastal waters of the Panamanian Pacific. However,

little more is known about the habits of the whale shark (*Rhincodon typus*) in the region. By satellite-tracking the whereabouts of 30 of them, scientists from the Smithsonian Tropical Research Institute (STRI), the Anderson Cabot Center for Ocean Life and the University of Panama explored the factors influencing this endangered species' behavior.

The *R. typus*, like other large sharks, may take years or even decades to reach maturity and reproduce, making them vulnerable to population declines, especially when combined with human threats. For instance, they may be caught in fishing nets as bycatch or face the risk of vessel strikes when shipping lanes overlap with their feeding sites. Being able to understand and predict whale shark behavior is a necessary step for protecting the species.

The satellite monitoring of this species, led by STRI marine ecologist Héctor Guzmán, found that whale sharks feed mainly in coastal waters, seamounts and ridges of the Panamanian Pacific, where they can find an abundance of their favorite foods: small fish and plankton. They were also spotted swimming north and southbound along the coast, towards Mexico and Ecuador, and towards the [open ocean](#) to feed.

"This species requires clear regional planning," said Guzmán. "Once the feeding and breeding aggregation areas are identified, some protection measures should be implemented. The newly announced marine protected area expansions across the region provide an interesting platform for large-scale conservation practices."

Although they used marine protected areas, the whale sharks also spent time in industrial fishing and vessel traffic zones, which could endanger them according to the new article published in *Frontiers in Marine Science*.

"The study shows how complex it is to protect whale sharks: tagged

individuals visited 17 marine protected areas in 5 countries, but more than 77% of their time they were in areas without any protection," said Catalina Gómez, co-author of the study and marine ecologist at the University of Panama.

Thus, for highly migratory and [endangered species](#) such as the whale shark, [conservation measures](#) should go beyond the establishment of local marine protected areas.

Efforts should focus on protecting large oceanic areas and establishing marine corridors that transcend national borders, for example: the newly expanded Cordillera de Coiba Marine Protected Area in Panama or the Marine Conservation Corridor of the Eastern Tropical Pacific which connects Coiba with Costa Rica's Cocos Islands, the Galapagos in Ecuador and Colombia's Malpelo Island.

"A periodic tagging program should continue for two main reasons: first, we still don't know where the species reproduces and tracking may lead us in the right direction," said Guzmán. "Second, we know that they are moving across extensive areas. We have identified potential corridors or seaways, as well as aggregation areas, that require management attention and clear protection rules. Tracking will allow us to better identify those regional routes."

The satellite tracking also revealed a whale shark [migratory pattern](#) that seems to be associated with circular ocean currents called eddies.

"Eddies are recognized as potential feeding areas for migratory species or food epicenters in the oceans, so they can swim in those areas for a long time while foraging and feeding," said Guzman. "However, eddies are dynamic systems and change constantly in speed or strength, size and location, even seasonally. These feeding areas are important for conservation, especially considering their dynamics and potential

changes associated with [climate change](#)."

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More information: Hector M. Guzman et al, Movement, Behavior, and Habitat Use of Whale Sharks (*Rhincodon typus*) in the Tropical Eastern Pacific Ocean, *Frontiers in Marine Science* (2022). [DOI: 10.3389/fmars.2022.793248](#)

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