

Boat strikes in protected areas could be harming whale sharks' development

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Credit: Joe Ambrogio from Pexels

The [biggest fish in the ocean](#), whale sharks, are incredible animals. They can reach lengths of over 18 meters and weigh more than 19,000kg. Each shark has a unique pattern of spots on its body, like a fingerprint.

The number of [whale sharks](#) in our oceans has been in decline for years and as a result the species is endangered. Recently, efforts to conserve the animals through [ecotourism](#) have been severely impacted by the pandemic.

Marine protected areas (MPAs), where human activities like fishing are restricted, are an important tool when it comes to the global conservation of many animals in the sea, including whale sharks. But [our new study](#) shows these areas might not be the safe haven we once thought they were.

We looked into how long whale sharks spend within an MPA and how this is impacted by injuries. We found injuries from boat strikes delayed the animals' development, making them spend longer in the area before going out into the wider ocean. This is the first study to link [human activity](#) with a change in whale sharks' life stages. Our work poses difficult questions for the regulation of boat traffic and wildlife tourism within protected areas.

Ecotourism

In the past, whale sharks were easy targets for fisheries, who harvested their meat and oil from their fatty livers. International demand for shark fins means the fish are still hunted in many areas of the world. To conserve whale sharks, charities and activists have aimed to shift the focus away from hunting and towards ecotourism.

Despite their size, whale sharks are filter feeders, with throats incapable of swallowing anything larger than a thumb-sized sprat. The slow moving grace of the creatures, and their seeming indifference to the presence of humans, ensures their position on the bucket lists of many snorkelers, divers and swimmers.

Nowhere is this more evident than in the South Ari Atoll MPA (Sampa) in the Maldives. There, whale shark-related tourism was a cornerstone of the economy prior to the pandemic, bringing in [\\$9.4 million](#) (£6.9m) a year. Unfortunately, anecdotal reports suggest loss of income from tourism in 2020 has seen an upsurge in [illegal hunting and finning](#), threatening conservation efforts.

Sampa

The waters in Sampa are one of very few places in the world where the usually transient whale sharks take up semi-permanent residence. Most of the sharks in the area are immature males, so the area is referred to as a [developmental habitat](#).

Places like Sampa give young sharks somewhere to build up strength before moving off into the wider ocean. For [marine biologists](#) and conservationists, this provides a rare opportunity to study the behavior of individual animals for long periods of time.

Much of whale shark ecology remains a mystery. We are yet to identify where they give birth to their young, or even [confirm where they mate](#), which is a roadblock for conservation. Previously, it was assumed tourist attention had very little impact on sharks. But in recent years, mounting evidence has emerged, suggesting human presence is [altering their behavior](#).

Our study is based on 15 years of dedicated surveying by the [Maldives Whale Shark Research Programme](#) (MWSRP), along with citizen science data. We estimated whale shark abundance in Sampa and found it has been decreasing steadily each year, falling from 48 sharks in 2014 to 32 in 2019. The overall decline in whale shark abundance in Sampa falls in line with [global trends](#) for the endangered species.

Boat strikes

Worryingly, we found that 61% of sharks in the study had severe injuries. While some sharks arrive in the MPA with injuries, others acquire them during their residency. We did not directly observe boat strikes happening within the MPA. However, based on the modeling, we can say sharks likely acquired injuries during their residency in the area.

We modeled how long whale sharks were staying in the area, and how this related to injuries. For the first time, we found sharks with severe injuries spend longer in the developmental habitat than those without. Our study suggests injured sharks remain in the area as they have access to food and warm water which supports their recovery.

Unfortunately, human activities within the developmental habitat mean sharks continue to acquire injuries while they are there. Whale sharks spend a lot of time cruising just below the surface of the ocean, feeding on plankton and small animals. This puts them right in the path of boats. Most injuries we observed were clearly caused by humans, ranging from abrasions from hulls to fins cut off by propellers. The majority of boat traffic within Sampa is related to tourism, with vessels carrying snorkelers and divers.

Sharks are amazing [healers](#), given time they can recover from severe injuries. However, even if injuries don't kill them, they alter their life history.

Whale sharks [journey across vast distances](#) during their long lifetimes, which can see them reach ages of [more than 130 years](#). This means they often cross political jurisdictions and are subject to various levels of exploitation.

To ensure sharks have a safe space to recover, we suggest changes to the

[management to the MPA](#). Speed limit zones would help prevent further injuries. A transition of the current voluntary guidelines for tourist encounters to enforceable regulations would also help safeguard the animals.

The survival and health of juvenile animals is paramount to the future of the species. Protecting them at the [formative part of their life cycle](#) can have a global impact.

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