

Declines in sharks drive 'fatter' fish

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Credit: University of Western Australia

New research from The University of Western Australia and the Australian Institute of Marine Science (AIMS) suggests that reef fishes eat differently when sharks are around. To avoid unwanted attention from large predators, these fishes may consume less energy-rich food and as a result become 'leaner', leading to significant knock-on effects in the reef environment.

Sharks are the largest predators on coral reefs and are declining rapidly in number, yet their impact on prey is poorly understood.

Dr Shanta Barley and researchers from UWA and AIMS compared fishes at the Rowley Shoals, a marine reserve in Australia, to nearby Scott Reefs, where Indonesian fishers have significantly reduced shark

populations.

The study, published today in the journal *Plos One*, found that where [sharks](#) were rare, [reef fishes](#) consumed more prey from the water column, where the risk of being attacked is greater, than from the [reef](#), which provides relatively more shelter.

On reefs where sharks were rare, for example, fishes and other prey sourced from the water column were more than 60 per cent more abundant in the guts of humpback red snapper (*Lutjanus gibbus*) and two-spot red snapper (*Lutjanus bohar*) relative to fishes on shark-rich reefs.

Reef fishes were also eight to 28 per cent heavier where sharks were rare compared to shark-rich reefs.

This could be linked to the observed differences in diet, as fishes and other animals that frequent the water column are up to six times higher in energy content than crabs and other reef invertebrates.

Dr Shanta Barley said these findings are consistent with studies on other animals. "Fear is known to be an important driver of behaviour in animals.

When the risk of being attacked is high, prey eat less, fight less, mate less and, in general, do less. They also spend more time in shelter," Dr Barley said.

"Our research suggests that prey stick to the safety of the reef and mainly eat low-calorie reef invertebrates when sharks are abundant, but venture up into the more exposed [water column](#) and feast on more energy-rich items when predators are rare."

The finding is also consistent with studies that have linked declines in

predator abundance to improved body condition in fishes; however co-author Professor Jessica Meeuwig said this particular study is the first to explicitly examine the role of sharks.

"These changes may have important implications for [coral reefs](#)," Professor Meeuwig said. "Fatter fish produce more offspring than skinnier [fish](#) and have better survival rates, so our results suggest that shark overfishing has the potential to transform reefs."

Dr Barley said that over half of all species of sharks and rays are threatened or near threatened, making them more at risk than even mammals, amphibians or insects.

"Yet we still don't have a clear picture of how these huge losses of sharks will affect the reefs that are left behind," she said.

More information: Shanta C. Barley et al. Diet and condition of mesopredators on coral reefs in relation to shark abundance, *PLOS ONE* (2017). [DOI: 10.1371/journal.pone.0165113](https://doi.org/10.1371/journal.pone.0165113)

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