

Imbalance of sharks and sea turtles challenges ecosystems worldwide

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(Phys.org) —The loss of sharks could contribute to the destruction of one of the planet's most under-appreciated sources of carbon storage—seagrasses. While sharks are often sensationalized as voracious predators, it's their actual prey that poses a risk to seagrasses, according to FIU researchers.

"Seagrasses around the world are under considerable threat—from

pollution to dredging and changes in water quality," said Mike Heithaus, interim dean of FIU's College of Arts & Sciences and a marine biology researcher who specializes in [sharks](#). "Now, it appears that the loss of sharks, especially [tiger sharks](#), can cause collapses of seagrass ecosystems as well."

As global efforts are under way to conserve sea turtles, shark populations are suffering from overfishing, which is creating an imbalance of the two animals in the world's oceans. The focus of the research is about sustaining the delicate food chain balance. In this case, sharks, turtles and seagrasses must all be preserved in concert. To not do so, could trigger an ecosystem collapse.

"Historical overfishing of sea turtles so drastically reduced the numbers of turtles in the ocean by the 16th century that impacts on [seagrass meadows](#) were rarely recognized," said James Fourqurean, FIU professor of biology and co-author of the study. "It's only now that conservation efforts are on their way to restoring sea [turtle populations](#) that we are now experiencing the consequences of how overfishing large sharks is impacting seagrass."

The concept is simple. Sharks feed on turtles. Turtles eat seagrass. Healthy tiger shark populations keep turtle populations in check so they do not devour entire meadows before the seagrasses are able to replenish themselves. Seagrass meadows, acre per acre, are among the world's most valuable ecosystems, providing nurseries for species that people rely on, protecting [water quality](#), slowing rates of coastal erosion and storing carbon dioxide, which helps to mitigate climate change. While most seagrass losses to date have been attributed to poor coastal zone management, the food chain variable has been largely ignored.

The researchers examined the impacts of green [sea turtles](#) on seagrass communities in Bermuda, Australia, Indonesia and India, all locations

with large green sea turtle populations. The findings were published this week in *Frontiers in Marine Science*. In each of the sites, data suggests the seagrass meadows are being disrupted by heavy grazing where turtle populations are increasing and shark populations are down. But that doesn't mean turtles are villains. In most of the world, they are threatened with extinction and still need conservation.

"We've seen similar issues on land – the loss of wolves leads to population explosions of deer that then damage ecosystems," Heithaus said. "We need efforts to protect and rebuild turtle populations in most of the world, but we also need to be working to ensure that populations of their predators are intact so the [turtles](#) don't eat themselves out of house and home."

More information: *Frontiers in Marine Science*,
journal.frontiersin.org/Journal/2014.00028/abstract

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