

In the turf war against seaweed, coral reefs more resilient than expected

June 1 2009

There's little doubt that coral reefs the world over face threats on many fronts: pollution, diseases, destructive fishing practices and warming oceans. But reefs appear to be more resistant to one potential menace seaweed - than previously thought, according to new research by a team of marine scientists from the United States and Australia.

Their study is the first global-scale analysis of thousands of surveys of individual reefs - in all, more than 3,500 examinations of about 1,800 reefs performed between 1996 and 2006. The study appears the June issue of the journal *Ecology*, which is published by the Ecological Society of America.

"Until now, many scientists have concluded that the world's <u>coral reefs</u> are being overrun by seaweed," said John Bruno of the University of North Carolina at Chapel Hill and lead author of the study. "Our findings show that's not the case. Seaweed have taken over and are dominating some reefs, but far fewer than assumed."

The problem with too much seaweed, researchers say, is that it can smother the baby corals, reducing the ability of reefs to recover from other disturbances such as hurricanes and <u>disease outbreaks</u>. Over recent decades, there have been several dramatic examples of such shifts, with one of the most widely known and striking cases occurring in the Caribbean in the 1980s. Following a series of events that disturbed the <u>marine environment</u> (including two major hurricanes, a disease outbreak and the loss of a seaweed-grazing urchin), coral cover on several reefs in



Jamaica plummeted from about 70 percent to less than 10 percent, and macroalgae became the dominant life form.

So Bruno, along with colleagues Hugh Sweatman from the Australian Institute of Marine Science and William F. Precht, a Florida-based marine ecologist, set out to determine how bad and how widespread the problem of seaweed-dominated reefs really is.

The team came up with a "phase-shift index" to determine the state of each reef. Pristine reefs where coral was still abundant had an index number of -2 to -3, while areas where macroalgae have overwhelmed reefs' surfaces were given an index ranking of between 3 and 5.

They found that while there were moderate local increases in seaweed cover over the study period, only four percent of reefs worldwide were dominated by macroalgae - that is, more than 50 percent of a reef's surface was covered in seaweed. Researchers also found overall "phase shift severity" decreased in the Caribbean, did not change in the Florida Keys and the Indo-Pacific, and increased slightly on the Great Barrier Reef due to moderate coral loss.

"Overall, our results indicate that there is no general recent trend (i.e., post-1995) toward marcoralgal dominance," the researchers wrote.

"The results from this study question many of the prevailing paradigms that coral reef ecologists have developed over the past two decades," Precht said. "These findings will change the way we view and manage these fragile yet resilient ecosystems."

Said Sweatman: "I hope this study leads to clearer definition of what coral-algal phase shifts are and broadens our perspective on the serious loss of corals in many parts of the world. Australian reefs have been relatively lucky so far, but there is no reason for complacency."



The study team noted that while their analysis suggests the threat posed by macroalgae has been exaggerated, individual case studies such as the degradation of Jamaican reefs have been invaluable warnings of the consequences of subjecting reefs to multiple natural and manmade disturbances.

<u>More information:</u> *Ecology* Journal Web site: <u>www.esajournals.org/loi/ecol</u>.

Source: Ecological Society of America

Citation: In the turf war against seaweed, coral reefs more resilient than expected (2009, June 1) retrieved 28 April 2024 from <u>https://phys.org/news/2009-06-turf-war-seaweed-coral-reefs.html</u>

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