

New study shows Florida Keys' corals are growing but have become more porous

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Pseudodiploria strigosa (symmetrical brain coral) colony regrowing over the coring hole. Credit: UNC-Chapel Hill

Researchers have long questioned what impact climate change has on the rate at which corals are growing and building reef habitats in the Florida Keys. A new study from the University of North Carolina at Chapel Hill explored this topic, finding both good and bad news. The rate of coral skeletal growth in the Florida Keys has remained relatively stable over time, but the skeletal density of the region's corals is declining, possibly due to ocean acidification.

The study was led by marine sciences Ph.D. candidate JP Rippe and colleagues at UNC-Chapel Hill, and findings were published in the journal *Global Change Biology* on Sept. 11.

"As resource managers and scientists work to slow the deterioration of coral reefs across the globe, this research adds new insight into our understanding of how corals have historically been able to cope with climate change and may help to more accurately predict the extent that corals can adapt to their rapidly changing environment," Rippe said.

Researchers extracted skeletal cores from 67 colonies of two reef-building coral species across 200 kilometers of the Florida Keys Reef Tract and measured how three key growth parameters—skeletal extension, calcification and density—have changed over the past century. Extension and calcification rates have largely been maintained at 0.36 cm yr⁻¹ and 0.50 g cm⁻² yr⁻¹, respectively, for the massive starlet coral (*Siderastrea siderea*) and 0.47 cm yr⁻¹ and 0.55 g cm⁻² yr⁻¹, respectively, for the symmetrical brain coral (*Pseudodiploria strigosa*). Skeletal density has declined at a rate of 5 mg cm⁻³ per decade over the past century.



Colonies of *Siderastrea siderea* (massive starlet coral) and *Pseudodiploria strigosa* (symmetrical brain coral) growing side by side in the Florida Keys. Credit: UNC-Chapel Hill

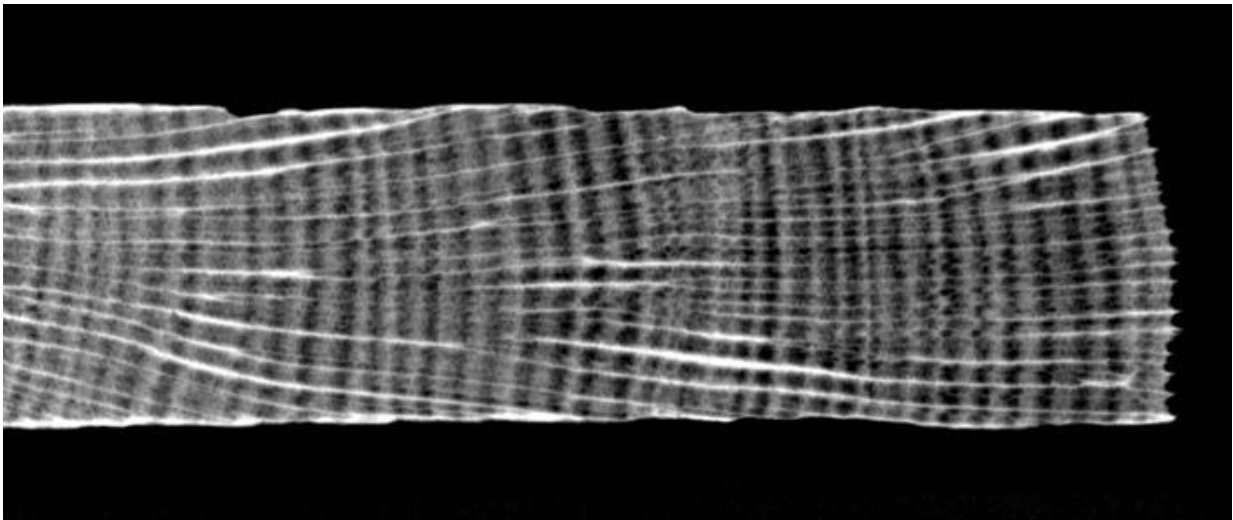
These patterns differ from reports on other reef systems in the Caribbean and Indo-Pacific, which have seen severe declines in coral growth rates, and are surprising considering the widespread coral mortality experienced in the Florida Keys over the past three decades. Multiple major [coral](#) bleaching events since the 1990s have reduced [coral reefs](#) in the Florida Keys to a fraction of their historic extent.

The new study highlights an important distinction between these acute

mortality events and long-term trends in baseline growth rates, which ultimately determine whether surviving corals will continue to build new [reef](#) framework or will experience net erosion in the near future.

The authors hypothesize that the cooler, subtropical climate of the Florida Keys is likely buffering corals from chronic growth declines associated with global warming, at least for now. A long-term decline in skeletal density may yet reveal an underlying vulnerability to ocean acidification.

Often referred to as "the other carbon dioxide problem," acidification is a distinct issue from ocean warming but one that stems, in large part, from the same source—carbon dioxide emissions. The absorption of carbon dioxide results in chemical changes in the oceans that reduce the availability of minerals needed by corals and many marine organisms, such as oysters, to build shells and skeletons.



Scanning the coral cores with X-ray computed tomography (CT) reveals annual high- and low- density bands used to measure coral growth. Credit: UNC-Chapel Hill

More information: John P. Rippe et al, Corals sustain growth but not skeletal density across the Florida Keys Reef Tract despite ongoing warming, *Global Change Biology* (2018). [DOI: 10.1111/gcb.14422](https://doi.org/10.1111/gcb.14422)

Provided by University of North Carolina at Chapel Hill

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