

New study shows that Florida's reefs cannot endure a 'cold snap'

August 26 2011



Corals like this one in the Florida Keys experienced unprecedented mortality rates during the severe cold snap in 2010, according to a new study published in *PLoS ONE*. Credit: Diego Lirman, UM/RSMAS

Remember frozen iguanas falling from trees during Florida's 2010 record-breaking cold snap? Well, a new study led by scientists at the University of Miami (UM) Rosenstiel School of Marine & Atmospheric Science shows that Florida's corals also dropped in numbers due to the cold conditions.

"It was a major setback," said Diego Lirman, associate professor at the UM Rosenstiel School and lead author of the study. "Centuries-old coral colonies were lost in a matter of days."

The chilly January temperatures caused the most catastrophic loss of corals within the Florida Reef Tract, which spans 160 miles (260 kilometers) from Miami to the Dry Tortugas and is the only living barrier reef in the continental U.S.

Members of the Florida Reef Resilience Program, a group comprised of Florida scientists and resource managers, conducted a month-long survey of 76 reefs sites from Martin County to Key West, both during and shortly after the unusually cold weather.

The research team compared the mortality rates of corals from the cold event to warm-water events, such as the highly publicized bleaching event in 2005, and concluded that the cold-water event cause even more widespread morality than previous warm-water events. The results were published in the August 2011 issue of the journal *PLoS One*.

The study found coral tissue mortality reached over 40-percent for several important reef-building species and that large colonies in shallow and near-shore reefs were hardest hit. This is in contrast to a less than one-percent tissue mortality caused by warm-water events since 2005. Coral species that had previously proven tolerant to higher-than-normal ocean temperatures were most affected by the cold-water event.

"This was undoubtedly the single worst event on record for Florida corals," said Lirman.

Ice-cold Arctic air swept into Florida in early January 2010, plummeting air temperatures to an all-time low of 30°F (1°C) and dropping ocean temperatures to a chilly 51°F (11°C).

"The 2010 cold-water anomaly not only caused widespread coral mortality but also reversed prior resistance and resilience patterns that will take decades to recover," the study's authors conclude.

Florida's reefs are located in a marginal environment at the northernmost limit for coral development. Corals have adapted to a specific temperature range and are typically not found in areas where water temperatures drop below 60°F (16°C).

Changes in climate patterns as well as others impacts, such as coastal development, pollution, overfishing and disease have put added stress on coral reefs worldwide. The authors cite the need to improve ecosystem resilience through reef restoration, pollution reduction efforts and the use of management tools, such as marine protected areas, in order for [coral](#) reefs to survive future large-scale disturbances.

"We can't protect corals from such an extreme event but we can mitigate other stresses to help them recover," said Lirman.

More information: "Severe 2010 Cold-Water Event Caused Unprecedented Mortality to Corals of the Florida Reef Tract and Reversed Previous Survivorship Patterns," *PLoS One*.

Provided by University of Miami Rosenstiel School of Marine & Atmospheric Science

Citation: New study shows that Florida's reefs cannot endure a 'cold snap' (2011, August 26) retrieved 22 September 2024 from <https://phys.org/news/2011-08-florida-reefs-cold-snap.html>

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