# CAN-122-One Tenth of Corals Unbleached

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# Less than one tenth of reefs unbleached

With a new one underway, research into the 2016 coral bleaching event on the Great Barrier Reef provides little hope for the future. **Jo Khan** reports.

Acropora corals, such as this one, are the worst hit by bleaching events.
REINHARD DIRSCHERL

**After three mass bleaching events, only 9% of reefs surveyed off the Australian eastern seaboard have so far escaped damage**, and with a fourth event underway, it's unlikely that any of them will remain unscathed for much longer.

New research published in Nature highlights the extent and severity of the third global-scale bleaching event, which took place in 2016, compared to the two previous events on the Great Barrier Reef, in 1998 and 2002.

The study found that the 2016 event was so severe that factors such as high water quality and low fishing pressure, which are often the focus of local management actions, had no effect on the extent of bleaching.

Lead author Terry Hughes, from the ARC Centre of Excellence for Coral Reef Studies at James Cook University in Australia, says although local management of reefs is important for recovery following disturbance, its effectiveness is diminishing as the intensity and frequency of disturbances increase due to global warming.

“We are not saying that it’s not a good idea to manage water quality and fishing pressure, far from it,” he says. “What we are saying is that those two interventions are not sufficient to protect coral reefs.”

According to the research, addressing global warming through emissions reductions is the only way to secure the future of coral reefs. Further implications for the ecology of coral reefs arise from the wide spectrum of responses to bleaching among different coral species.

“The classic losers in bleaching events are Acropora corals,” says Hughes. These are crucial manufacturers of complex habitat structures for fish and invertebrates.

In the northern Great Barrier Reef, where the worst bleaching took place in 2016, there were few winners, and many losers. Hughes argues that “the species composition in the north has changed irrevocably because of this event.”

Post-bleaching, corals normally die from starvation because of the loss of their photosynthetic symbiotic algae. This can up to occur several months later. However, the severity of the 2016 event saw multiple types of mortality occur. Around 10% of the bleached corals died almost instantly, effectively cooking in the unusually hot water. A smaller portion of bleached corals continue to experience a third kind of mortality: predation. Coral predators such as Drupella snails are homing in on surviving corals, with devastating effect. Currently, Hughes and colleague Dr James Kerry are taking to the skies for new aerial surveys, following the same flight path over 1,156 reefs that they flew in early 2016.

“We want to compare the severity of bleaching this year, as a consequence of the reefs’ experience just one year ago,” said Hughes. “We can ask questions like, are they more likely to bleach this year, for a given level of heat exposure, because they're still physiologically damaged from last year?”

The short recovery period between mass bleaching events is unprecedented, and it’s allowing scientists to study coral bleaching in a new light.

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