

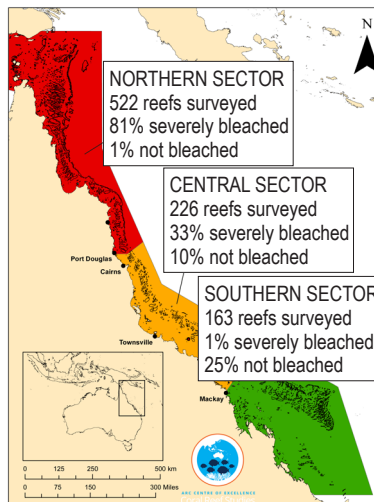
# The Great Barrier Reef 2016 - Global Coral Bleaching Event



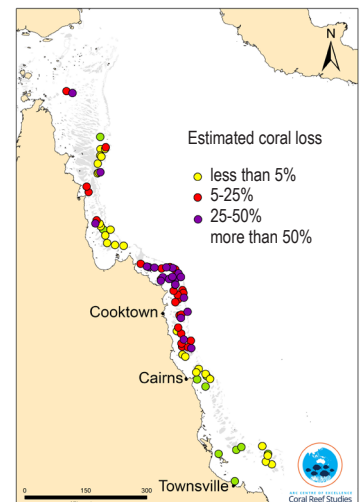
The shocking bleaching event hitting the Great Barrier Reef (GBR) is just one chapter of a larger global coral bleaching event that began back in mid-2014 in the North Pacific. This global coral bleaching event is the third and longest lasting event on record and has been attributed to record breaking sea surface temperatures combined with a strong El Nino event in the Pacific. As temperatures subside and the extent of damage starts to sink in here in Australia, bleaching has been sweeping across reefs in the coral triangle region, with reports of severe bleaching in Indonesia and Maldives. It is predicted bleaching continuous until at least the end of 2016, and is currently affecting reefs in the Caribbean.

## The GBR - A close-up look

In Australia, major bleaching on the GBR also happened in 1998 and 2002, but not to this extent. Up to date reports indicate that 81% of surveyed reefs in northern sector of the GBR show severe bleaching, it became clear that the relatively pristine reefs north of Port Douglas were hit the hardest. However, the extent and severity of bleaching was less in the central sector of the GBR (33% of reefs severely bleached) and fortunately reefs in the southern sector basically escaped severe bleaching (1%). The first measures of coral mortality associated with the event are being revealed. Sadly, an average of 35% of corals are already dead or dying on surveyed reefs along the northern and central sector of the GBR. However, as bleaching and mortality continue to play out, we are yet to know the full extent of the damage.

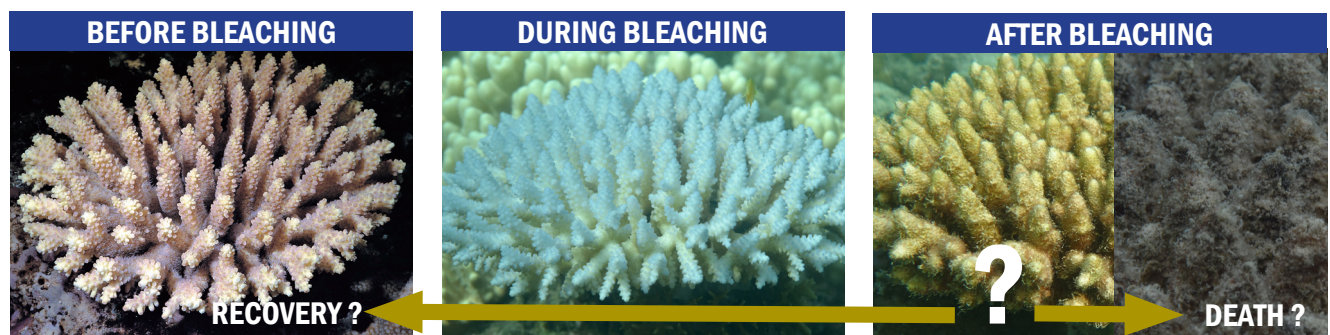


Map of the Great Barrier Reef showing results of aerial surveys for 911 reefs (20.4.2016).



Map of mortality estimates on coral reefs along 1100km of the Great Barrier Reef (30.5.2016).

ARC Centre of Excellence for Coral Reef Studies / Tom Bridge and James Kerry



**BEFORE BLEACHING**  
Before bleaching, colours are often a deep brown or khaki-green colour. These colours come from the symbiotic algae (zooxanthellae) that co-exist with the coral polyp.

**DURING BLEACHING**  
During bleaching, the symbiotic algae are expelled. Polyps are transparent and we see only the white skeleton beneath. Sometimes polyps can be brightly coloured. But whether white or fluorescent, these corals are far from happy.

**AFTER BLEACHING**  
Coral that have been stressed for weeks or months, may recover slowly – by re-acquiring its symbiotic friends – or may die, having run out of energy normally provided by the symbiotic algae. At this stage, turf algae take over and cover the once healthy coral.



*Purple tinged bleaching.*



*Bleached corals can appear fluorescent.*



*Pure white bleaching.*



*Purple glow.*

## Bleaching can be strangely beautiful

Unfortunately, what we are now seeing on the northern third of the Great Barrier Reef is the death of many of these beautiful organisms. But, as noted above, the bleaching can in some cases be weirdly beautiful, as the corals shed their algal cloaks and reveal themselves.

These pictures show a variety of heavily bleached corals, with almost no remaining symbiotic algae. From this point forward it is either death or a long slow road to recovery for the corals - even those corals that survive will remain metabolically and reproductively compromised for months.

The amazing colours are pigments present in the coral polyps. They are often fluorescent – hence the day-glo appearance of some corals and their amazing fluorescence on torch-lit night dives.

Some healthy corals display such vivid blues and other colours naturally, not during a bleaching event. But these corals are rare. What we are seeing on the Great Barrier Reef is certainly bleaching.



*Bleached colonies stand out starkly.*

## Algal overgrowth

When the polyps die, macro or turf algae take over – a process that is already evident along much of the Great Barrier Reef.

Especially in warm or nutrient-rich waters, these algae outcompete any coral trying to settle or spread on the reef, taking over areas that corals previously dominated.



## Fish are losing their homes

Not only is the turf algal community uglier than healthy coral, but it means the other species that depend on the coral lose their livelihoods too. Eventually, the reef structure itself breaks down, meaning that many fish species will lose their homes and need to move on or die.



Juvenile damselfish using the coral for shelter.



Butterfly fish feeding on coral.

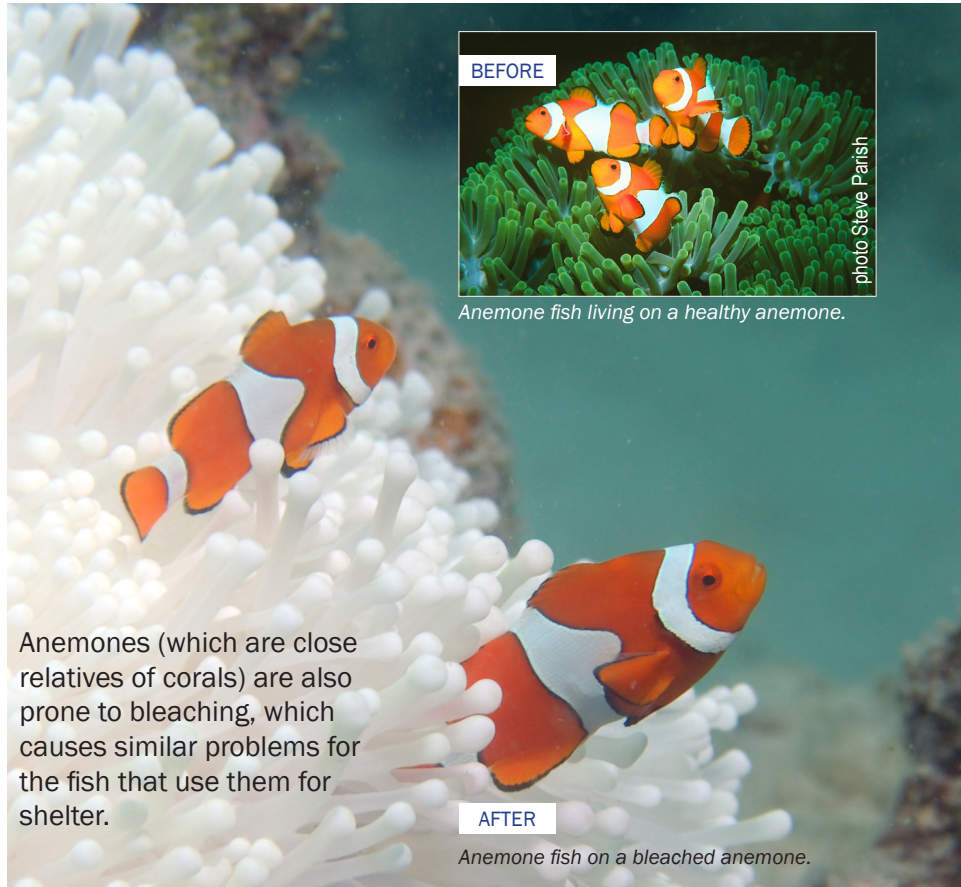
The turquoise-blue chromis damselfish form huge clouds or schools over coral heads, and use coral branches for shelter when predators come along.



Chromis damselfish on a healthy reef.



Chromis damselfish on bleached coral.



Anemone fish living on a healthy anemone.

Anemones (which are close relatives of corals) are also prone to bleaching, which causes similar problems for the fish that use them for shelter.

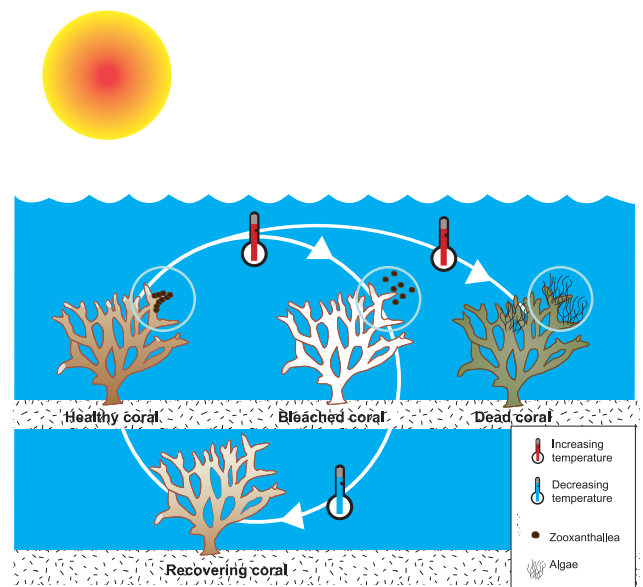
Anemone fish on a bleached anemone.

## Can corals recover?

The primary factor determining whether a coral survives a bleaching event or not is the amount of time that it is exposed to elevated temperatures under high light conditions. The longer the coral is exposed, the greater the chances of mortality. Corals can recover quickly from bleaching events once the sources of stress are removed. In some cases, corals can regain their colour within days. However, each bleaching event weakens the overall health of the coral over time.

One-quarter of all marine life lives in or around a reef. What happens when these reefs disappear?

Current predictions are that coral reefs worldwide could be gone within 25 years. How much will be left after this global bleaching event? How much will be left for future generations? This is a worldwide coral bleaching event - not just Australia.



*“Coral reef declines will have alarming consequences for approximately 500 million people who depend on coral reefs for food, coastal protection, building materials, and income from tourism. This includes 30 million who are virtually totally dependent on coral reefs for their livelihoods or for the land they live on (atolls).” – Global Coral Reef Monitoring Network (Status of Coral Reefs of the World: 2008)*

# ACT NOW for the future of our reefs



## Why the reef needs your help

There are not enough scientists to monitor all the world's reefs, all of the time. This is why we need your help! By participating in volunteer monitoring programs, citizen scientists, just like you, can help gather important data that scientists otherwise not have access to. By gathering such data, you have the opportunity to improve the evidence used to make decisions about how our reefs are managed. By conducting regular CoralWatch surveys, your data will help answer questions about patterns of coral bleaching, severity of coral bleaching and how corals and reefs recover after bleaching.

## Get involved in CoralWatch

CoralWatch uses the Coral Health Chart to measure changes in coral colour associated with coral bleaching. The chart is easy to use and allows anyone to get involved in the project without the need for special training. Simply match the colours on the chart to the colours you see on corals and contribute to our global coral bleaching database. Get started today by downloading a 'Do It Yourself Kit' and ordering a free Coral Health Chart at [www.coralwatch.org](http://www.coralwatch.org)!

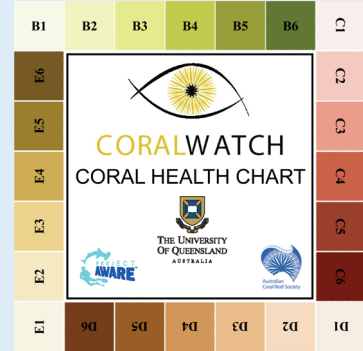
## Invest in a future for reefs

CoralWatch needs your support to engage people in reef conservation. A donation online will sustain our global network of volunteers and help distribute reef education materials to communities both here in Australia and around the world. We also offer a wide range of corporate sponsorship packages, providing you with a way to invest in our reefs while also harnessing effective marketing opportunities. Please contact us to further discuss the possibilities.

## Visit the reef and learn about it

The best way to understand the importance and value the beauty of the reef is through your own experience. If possible, visit the reef today - it's an memory you will never forget!

CoralWatch produces education materials for individuals and educators to share the beauty and importance of reefs. These include the 'Coral Reefs and Climate Change' book and DVD, reef education packages and curriculum-linked lesson plans. Order yours today via [www.coralwatch.org](http://www.coralwatch.org)



## How to use the Coral Health Chart

1. Choose a random coral and select the lightest area.
2. Rotate the chart to find the closest colour match.
3. Record this colour on a data sheet.
4. Select the darkest area of the coral and record the matching code.
5. Record the coral type.
6. Continue survey with other corals. Assess at least 20 corals.
8. Submit your data online at [www.coralwatch.org](http://www.coralwatch.org) or use the CoralWatch Data Entry App (iOS & Android).



Chris Roelfsema



CoralWatch is a proud member of The Great Barrier Reef Citizen Science Alliance, a network that fosters collaboration, capacity building, advancement and action for citizen science that benefits the Great Barrier Reef.

[www.greatbarrierreefcitizenscience.org.au](http://www.greatbarrierreefcitizenscience.org.au)  
There is a citizen science project for everyone!

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