



## FINDING HOPE: THE FUTURE OF THE GREAT BARRIER REEF

### 1. WHAT IS CORAL BLEACHING?

Most corals have a symbiotic relationship with microscopic algae, called zooxanthellae, which live within coral tissue. Through photosynthesis, zooxanthellae convert water and carbon dioxide to sugars which feed themselves and the corals. Zooxanthellae provide up to 90% of the energy that coral needs to grow and survive. In exchange, corals provide protective casings for the zooxanthellae.

Coral bleaching occurs when the relationship between the zooxanthellae, which provides the coral with its colour, and the coral breaks down. The zooxanthellae releases a toxin which causes the coral polyp to eject the algae. Without the zooxanthellae, the tissue of the coral becomes transparent, exposing the coral's white skeleton.

If normal conditions are restored quickly, the coral will survive and, within a few months, will regain its zooxanthellae. If abnormal conditions persist, the coral may not be able to feed itself without the zooxanthellae and the polyp will die, leaving behind the dead, white skeleton. Dead coral will eventually be covered with other types of algae, leading to changes in the species of fish and other organisms living on the reef.

### 2. WHAT CAUSES CORAL BLEACHING?

Several environmental pressures can cause coral bleaching. These include:

**Heat stress** resulting from higher-than-average sea surface temperatures. A rise in sea surface temperatures of **one degree for a month** is enough to cause a bleaching episode.

**Nutrient-enriched or sediment runoff** which can make surface water murkier and make it more difficult for zooxanthellae to photosynthesise.

**Freshwater inundation** which changes the water chemistry in which zooxanthellae photosynthesise.

Ocean acidification (from increased carbon dioxide in the atmosphere being dissolved in the water) which places stress on the coral polyp.

### 3. HOW HAS CORAL BLEACHING AFFECTED THE GREAT BARRIER REEF THIS YEAR?

This year, above-average sea surface temperatures have driven the worst mass bleaching event in recorded history along the Great Barrier Reef. According to the Australian Climate Change Council a section stretching over 1000 km in length has been affected by this bleaching event.

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### 3. HOW HAS CORAL BLEACHING AFFECTED THE GREAT BARRIER REEF THIS YEAR?

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The northern areas of the GBR have recorded the most severe coral mortality rates (with average coral loss at 50% in the far north area). Between Cairns and the Whitsunday area, coral mortality ranges from high (50%) to no loss. South of Mackay, no bleaching-driven coral mortality has been recorded.



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### 4. HOW DOES THIS CORAL BLEACHING EVENT FIT INTO THE WIDER PICTURE OF RECENT CLIMATE CHANGE

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The Intergovernmental Panel on Climate Change (IPCC) assert that more frequent and more intense coral bleaching episodes are one of the many impacts of human-induced climate change (due to rising sea surface temperatures).



According to the Bureau of Meteorology, the GBR recorded the **highest average sea surface temperature for March, April and May** since measurements began in 1900.

Since mid-2014, the temperature of the surface ocean in the eastern and central-equatorial Pacific Ocean **has risen by more than 2°C**. This record-breaking heat event has triggered a global-scale coral bleaching event.



Coral bleaching occurred in reefs in the **northern and equatorial Pacific, Indian and western Atlantic Oceans**. Moderate bleaching has also occurred in areas of the **northern Caribbean**.

A group of Australian climate scientists have concluded that **human influence on the climate makes the chance of a hot March 175 times more likely**.

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### THE LOSS OF BRAMBLE CLAY MELOMYS: A CAUTIONARY TALE

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The Bramble Clay Melomy (see image below), a small rodent found only on a tiny island in the eastern Torres Strait, is thought to be the first mammal driven to extinction by human-induced climate change.

Between 1993 and 2014, rates of sea level rise in the Torres Strait were almost twice as much as the global average. As a result of rising sea, the island was continually inundated, killing the animals and destroying their habitat. This process alone caused a 97% reduction in their habitat between 2004 and 2014.

On a global scale, sea level rise over the last 100 years has occurred unparalleled to any other time in the last six millennia. This is likely to drive further species loss, with scientists predicting that one sixth of the world's species will become extinct due to sea level rise and the other impacts of human induced climate change.



**“The Great Barrier Reef is in grave danger. The twin perils brought by climate change – an increase in the temperature of the ocean and in its acidity – if they continue to rise at the present rate the reefs will be gone within decades and that will be a global catastrophe”**

**- Sir David Attenborough, 2016**

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## THE ADANI CARMICHAEL MINE

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The Adani-Carmichael Mine is a thermal coal mine proposed to be constructed in the north of the Galilee Basin in Central Queensland. The proposed mine would be the largest coal mine in Australia and, in fact, be one of the biggest in the world. At peak capacity, the mine would produce approximately 60 million tonnes of coal per year and would emit more than 4.6 billion tonnes of carbon dioxide over its predicted 90-year life span. The project is highly controversial due to the range of adverse social and environmental impacts that it is expected to cause. These impacts include:

The devastation of the “ancestral lands and waters, totemic animals and plants, and cultural heritage” of the Wangan and Jagalingou people, the traditional custodians of the proposed site.



Pollution and sediment run-off onto the Great Barrier Reef which may lower water quality, affect marine animals and plants, and potentially cause coral bleaching incidents.



The potential extinction of a number of endangered species, including the Yakka Skink, the Ornamental Snake, the Waxy Cabbage Palm and the Black Throated Finch, which are native to the proposed site.

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It is easy to become disheartened after reading about the current state of, and future threats to, the Great Barrier Reef. There are, in fact, many individuals and organisations working to create a more positive future for the reef - below are a few of their stories.

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### GREAT BARRIER BEER

The Good Beer Co. and Bargara Brew Company have partnered to create an “ethical beer”, called the Great Barrier Beer (see image below), which is produced through solar energy from all-Australian ingredients. Half the profits of all sales of the Great Barrier Beer are to be donated to the Australian Marine Conservation Society (AMCS) to be used for Great Barrier Reef conservation projects. Founder of The Good Beer Co., James Grugeon believes “The reef is so important for Australia and Queensland in terms of not just it being this iconic, beautiful natural resource, but also from a tourism point of view and for the economy”.



### THE REEF TRUST TENDER-BURDEKIN

The Reef Trust Tender-Burdekin Cane Industry is an initiative by the Australian Government to improve the quality of water entering the Great Barrier Reef and to develop a sustainable sugarcane industry in the Burdekin. \$2.84 million has been provided to farmers in the Burdekin area to help improve on-farm fertiliser and irrigation management practices.

Will Lucas, for example, is a cane farmer who has started trialling biofertilisers which can be produced from cow guts and sugars. Mr Lucas believes that by using the cow guts-based fertiliser he will be able to reduce the amount of nitrogen-based fertiliser he needs by up to 50%.



## FOR THE LOVE OF OUR FUTURE CAMPAIGN

In April this year, over 2000 Australians signed up to participate in the "For The Love Of Our Future" Campaign. As part of the campaign, participants gave up chocolate, coffee or alcohol for one week whilst raising funds for the Great Barrier Reef. This year, the funds raised (over \$150,000) went towards supporting climate justice and advocacy projects run by the Australian Youth Climate Coalition and the Seed Indigenous Youth Climate Network.



"In so safeguarding the integrity of the waters of the Pacific and the Great Barrier Reef, we are in a profound sense, honouring and sharing in the life of the risen Christ"  
- Catholic Bishops of Queensland

### WHAT CAN YOU DO?

Follow the Social Justice Committee of CLRI on Twitter: [www.twitter.com/clrinsw](https://www.twitter.com/clrinsw)

Write to your local Federal MP to express your concerns that Australia is not meeting its commitments to the Paris Agreement

Purchase sustainable seafood to protect wild fish stocks and the ecosystems in which they live: <http://www.marineconservation.org.au/pages/sustainable-seafood.html>

Make your voice heard! Sign a petition to protect the Great Barrier Reef and to ask the Federal Government to stop all industrial development activity in the GBR World Heritage area: <https://www.getup.org.au/campaigns/great-barrier-reef--3/save-the-reef/save-the-reef?t=4QtnteW>

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God of the sun and the moon,  
of the mountains, deserts and plains  
God of the mighty oceans, of rivers, lakes and streams  
God of all creatures that live in seas and fly in the air  
Of every living thing that grows and moves on this sacred Earth.

We are formed by Christ into Your People  
Called to bring the world into Your marvelous light  
As the Body of Christ, we are messengers of ecological vocation  
We are entrusted with caring for this Earth which You have created.

Help us to love and respect it  
To repair what we have damaged  
To care for what You have made good and holy  
Give us the wisdom and the passion to change our minds, our hearts and our ways.

Let us be mustard seeds in our world  
Bringing about ecological conversion which grows and spreads to every corner of the Earth  
For our sake now and for every generation which is to come  
We ask this through Christ, Our Lord. Amen

- Catholic Earth Care, 2002