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# Fourth global mass coral bleaching triggered: What are corals and why are they important?

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Written by [Alind Chauhan](#)

New Delhi | Updated: April 22, 2024 05:27 IST

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Corals are among the most sensitive organisms to rising ocean temperature. (Photo: Wikimedia Commons)

The fourth global mass coral bleaching event has been triggered by extraordinary ocean temperatures, the US National Oceanic and Atmospheric Administration (NOAA) said on Monday (April 15). This could have serious consequences for ocean life and millions of people who rely on reefs for food, jobs, and coastal defence.

Since mid-March 2023, [the average sea surface temperature \(SST\) has been abnormally high](#). In March this year, it reached a record monthly high of 21.07 degree Celsius, according to the EU Copernicus Climate Change Service (C3S). The primary reason behind the soaring temperatures is the rising emissions of heat-trapping greenhouse gases (GHGs) such as carbon dioxide and methane in the atmosphere. Nearly 90% of the extra heat trapped by GHGs has been absorbed by the oceans — that is why they have become so warm.

Here is a look at why corals are important, what coral bleaching is, where it is taking place, and what can be its implication.

## But first, what are corals and coral reefs?

Corals are essentially animals, which are sessile, meaning they permanently themselves to the ocean floor. They use their tiny tentacle-like hands to catch from the water and sweep into their mouth. Each individual coral animal is as a polyp and it lives in groups of hundreds to thousands of genetically identical polyps that form a 'colony'.

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Corals are largely classified as either hard coral or soft coral. It is the hard corals that are the architects of coral reefs — complex three-dimensional structures built up over thousands of years. “Unlike soft corals, hard corals have stony skeletons made out of limestone that are produced by coral polyps. When polyps die, their skeletons are left behind and used as foundations for new polyps,” according to NOAA.

Coral reefs, also referred to as “rainforests of the sea”, have existed on the Earth for nearly 450 million years. Australia’s Great Barrier Reef is the largest in the world, stretching across 2,028 kilometres.



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A variety of corals form an outcrop on Flynn Reef, part of the Great Barrier Reef near Cairns, Queensland, Australia, in 2010. (Photo: Wikimedia Commons)

### What is the significance of corals?

Coral reefs have a crucial role in marine ecosystems. Thousands of marine species can be found living on one reef. For instance, “the Great Barrier Reef contains over 400 coral species, 1,500 fish species, 4,000 mollusc species and six of the world’s seven sea turtle species”, according to a report by the Natural History Museum. Research has shown that there could be millions of undiscovered species of organisms living in and around reefs.

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These massive structures also provide economic goods and services worth about \$375 billion each year. More than 500 million people across the world depend on coral reefs for food, income and coastal protection from storms and floods. Coral reefs can absorb up to 97% of the energy from waves, storms, and floods, which prevents loss of life, property damage, and soil erosion. Therefore, the absence of coral reefs would not only result in severe ramifications for marine life but also for humans.

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#### What is coral bleaching?

Most corals contain algae called zooxanthellae — they are plant-like organisms — in their tissues. Corals and zooxanthellae have a symbiotic relationship. While corals provide zooxanthellae a safe place to live, zooxanthellae provide oxygen and organic products of photosynthesis that help corals to grow and thrive. Zooxanthellae also give bright and unique colours to corals.

Corals are very sensitive to light and temperature and even a small change in their living conditions can stress them. When stressed, they expel zooxanthellae and turn entirely white. This is called coral bleaching.

Coral bleaching doesn't immediately lead to the death of corals. They rather go under more stress and are subject to mortality. Coral bleaching reduces the reproductivity of corals and makes them more vulnerable to fatal diseases. If the bleaching is not too severe, corals have been known to recover.

Global mass bleaching of coral reefs is when significant coral bleaching is confirmed in the Atlantic, Indian and Pacific oceans, according to a report published by The Conversation. Such events are a relatively new phenomenon first one took place in 1998 in which 20% of the world's reef areas suffered bleaching-level heat stress. The next two global bleaching events occurred in 2014 (35% of reefs affected) and between 2014 and 2017 (56% of reefs affected).

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# CORAL BLEACHING

Have you ever wondered how a coral becomes bleached?

### HEALTHY CORAL

**1** Coral and algae depend on each other to survive.

Corals have a symbiotic relationship with microscopic algae called zooxanthellae that live in their tissues. These algae are the coral's primary food source and give them their color.

### STRESSED CORAL

**2** If stressed, algae leaves the coral.

When the symbiotic relationship becomes stressed due to increased ocean temperature or pollution, the algae leave the coral's tissue.

### BLEACHED CORAL

**3** Coral is left bleached and vulnerable.

Without the algae, the coral loses its major source of food, turns white or very pale, and is more susceptible to disease.

### WHAT CAUSES CORAL BLEACHING?

- Change in ocean temperature**  
Increased ocean temperature caused by climate change is the leading cause of coral bleaching.
- Runoff and pollution**  
Storm generated precipitation can rapidly dilute ocean water and runoff can carry pollutants — these can bleach near-shore corals.
- Overexposure to sunlight**  
When temperatures are high, high solar irradiance contributes to bleaching in shallow-water corals.
- Extreme low tides**  
Exposure to the air during extreme low tides can cause bleaching in shallow corals.

NOAA  
NOAA's Coral Reef Conservation Program  
<http://coralreef.noaa.gov/>

How coral bleaching takes place. Credit: NOAA

## What is happening right now?

NOAA has confirmed that the fourth global bleaching event is currently underway. Nearly 54 countries, territories and local economies — from Florida, the US, Saudi Arabia to Fiji — have confirmed bleaching, according to a report by The New York Times. The Great Barrier Reef is witnessing its most severe bleaching event. “About a third of the reefs surveyed by air showed prevalence of very high or extreme bleaching, and at least three quarters showed some bleaching,” the NYT report said.

On Monday (April 15), bleaching was also confirmed in the Western Indian Ocean, including Tanzania, Kenya, Mauritius, Seychelles, and off the western coast of

Indonesia.

In total, more than 54% of the world's coral area has experienced bleaching heat stress in the past year, and that number is increasing by about 1% per year. Derek Manzello, the coordinator of NOAA's Coral Reef Watch program, told the

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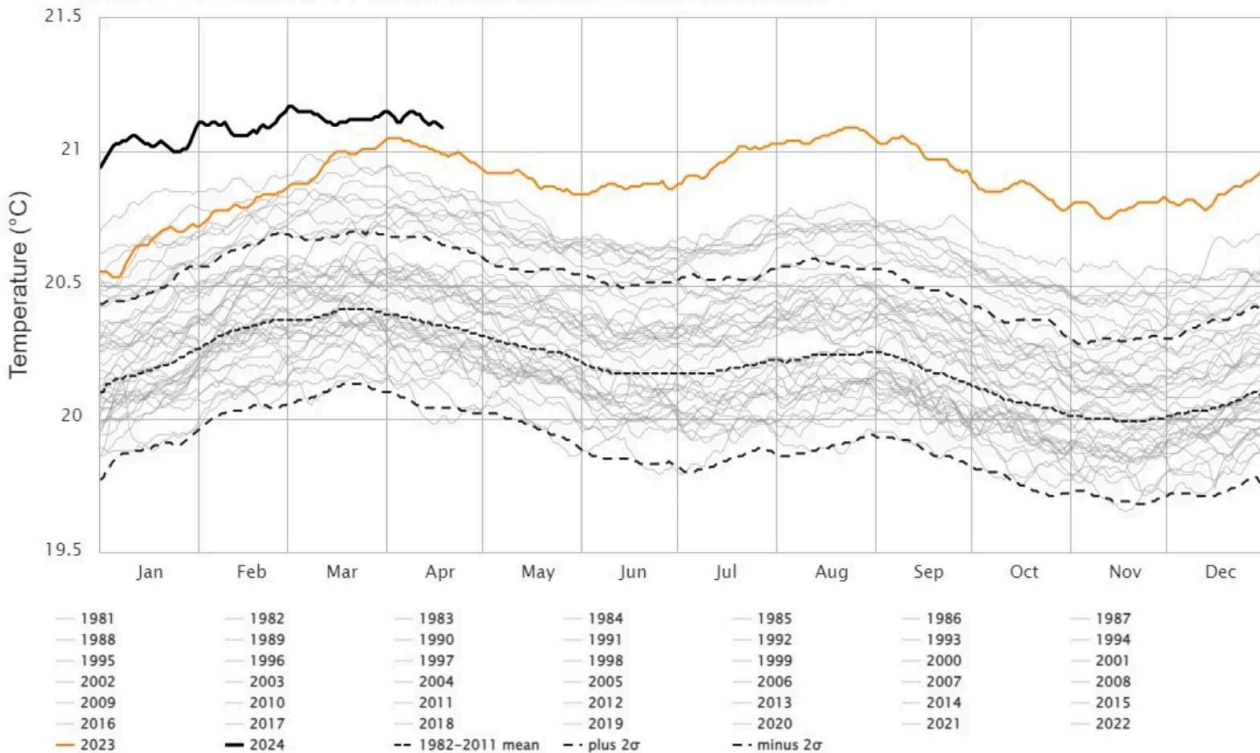


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The key driver behind the current event is higher ocean temperatures. However, the situation has been exacerbated by El Niño, a weather pattern which is associated with warmer oceans. Given that El Niño is weakening and a cooler La Niña may set in by the end of the year, the event may not last for very long.

#### Daily Sea Surface Temperature, World (60°S–60°N, 0–360°E)

Dataset: NOAA OISST V2.1 | Image Credit: ClimateReanalyzer.org, Climate Change Institute, University of Maine



Credit: Climate Analyser

### What can be the impact of the event?

As the global mass bleaching event is still unfolding, its full impact will not be known for a while. Nonetheless, scientists have said the event is the most severe yet.

“I do get depressed sometimes because the feeling is like, ‘My God, this is happening’... Now we’re at the point where we’re in the disaster movie,” Ove

Hoegh-Guldberg, a professor of marine studies at the University of Queensland, told the NYT.

With global temperatures soaring, such events are expected to become more frequent and longer. As a result, the world may lose the vast majority of its reefs at 1.5 degree Celsius of warming, and virtually all at 2 degree, according to a 2018 report by the Intergovernmental Panel on Climate Change (IPCC) — a United Nations body which assesses the science related to climate change. Currently, the average global temperature of the Earth has increased by at least 1.1 degree Celsius since 1850.

To curb global warming to no more than 1.5 degree Celsius, countries need to bring GHG emissions to a net zero by 2050, according to the Paris Agreement. The goal, however, is unlikely to be achieved as record levels of GHG emissions have continued to be emitted into the atmosphere.

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First uploaded on: 19-04-2024 at 17:26 IST

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