



CORAL BLEACHING – ENVIRONMENT

NEWS: Catastrophic coral bleaching strikes southern Great Barrier Reef, 44% of corals lost

WHAT'S IN THE NEWS?

Catastrophic Coral Bleaching in the Southern Great Barrier Reef (GBR)

1. Severe Bleaching Incident:

- In **May 2024**, the southern Great Barrier Reef experienced one of the most devastating coral bleaching events in its history.
- **44% of corals in protected areas died** due to extreme heat stress, highlighting the catastrophic impact of rising temperatures.

2. Heat Stress Trigger:

- This bleaching event was caused by the **fourth global coral bleaching event (GCBE4)**, which began in **January 2023**.
- The severity of this event exceeded the levels observed during the **2014-2017 bleaching**, emphasizing the growing impact of global climate change on coral ecosystems.

3. Global Context:

- During GCBE4, **77% of reefs worldwide** were exposed to heat-induced stress, demonstrating the widespread nature of this phenomenon.
- This marked the **fifth-largest bleaching event** for the GBR, solidifying its place as a critical episode in the ongoing coral reef crisis.

Importance of Coral Reefs

1. Ecosystem Role:

- Coral reefs are integral to marine ecosystems, providing shelter, food, and breeding grounds for diverse marine life.
- They play a crucial role in **food security** for coastal populations and contribute significantly to local economies, particularly through **tourism and fisheries**.

2. Bleaching Process:

- Coral bleaching occurs when corals expel **zooxanthellae**, the symbiotic algae living within their tissues, in response to extreme stress, particularly due to rising sea temperatures.



- This results in the coral losing its color and turning white. Though corals can survive temporary bleaching, **prolonged stress or rapid environmental changes** often lead to their death.

Study Highlights

1. Monitoring Period:

- Scientists conducted a detailed study of **462 coral colonies** at **One Tree Reef** over a **161-day period**.
- The study spanned from the peak of heatwaves in January 2024 through the cooler autumn and winter months, offering critical insights into the progression and aftermath of the bleaching event.

2. Temperature Peaks:

- The daily temperature recorded near the coral colonies reached a **peak of 30.55°C** on **January 29, 2024**, a level significantly higher than the optimal range for coral survival.
- Satellite data corroborated these findings, showing sea surface temperatures reaching **29.13°C** on **January 30, 2024**, reflecting widespread thermal stress.

3. Bleaching Progression:

- The bleaching began to manifest in February, with **66% of coral colonies showing signs of bleaching** by that time.
- This figure increased to **80% by April**, with mortality following soon after, reaching **44% by May** and rising to **53% by July 2024**.

Extent of Damage

1. High Mortality Rates:

- Certain coral species, particularly **Acropora**, experienced a **95% mortality rate**, reflecting their extreme vulnerability to heat stress and bleaching.
- Even corals traditionally considered thermally resilient, such as **Porites**, were heavily affected, with **69% bleaching** and significant mortality.

2. Disease Vulnerability:

- Bleached corals were more susceptible to diseases such as **black band disease (BBD)**, which further weakened them.
- For instance, **Goniopora corals** experienced high mortality due to BBD, with **66% of colonies** developing the disease.



3. Structural Collapse:

- The physical structures of corals like **Acropora** and **Seriatopora** collapsed under the stress, leaving behind rubble on the seafloor.
- This led to near-total mortality rates (**95% and 100%, respectively**) and a shift in the reef's physical and ecological structure.

4. Species Impact:

- **Acropora, Montipora, Favites, Echinopora, Pocillopora, and Seriatopora** corals saw **complete bleaching**, indicating that no colonies survived the heat stress.
- Other genera, like **Goniastrea** and **Pavona**, were less affected, with bleaching rates of **47% and 10%**, respectively.

Implications for Reef Ecosystems

1. Ecosystem Shifts:

- Repeated bleaching events weaken coral resilience, reducing their ability to recover and maintain their ecological functions.
- This can lead to long-term shifts in species composition, disrupting the biodiversity and structural integrity of the reef ecosystem.

2. Global Warming Impact:

- The frequency and intensity of coral bleaching events are a direct consequence of rising sea temperatures caused by **global climate change**.
- This underscores the urgent need for effective climate action to mitigate further damage.

Call to Action

1. Urgency of Protection:

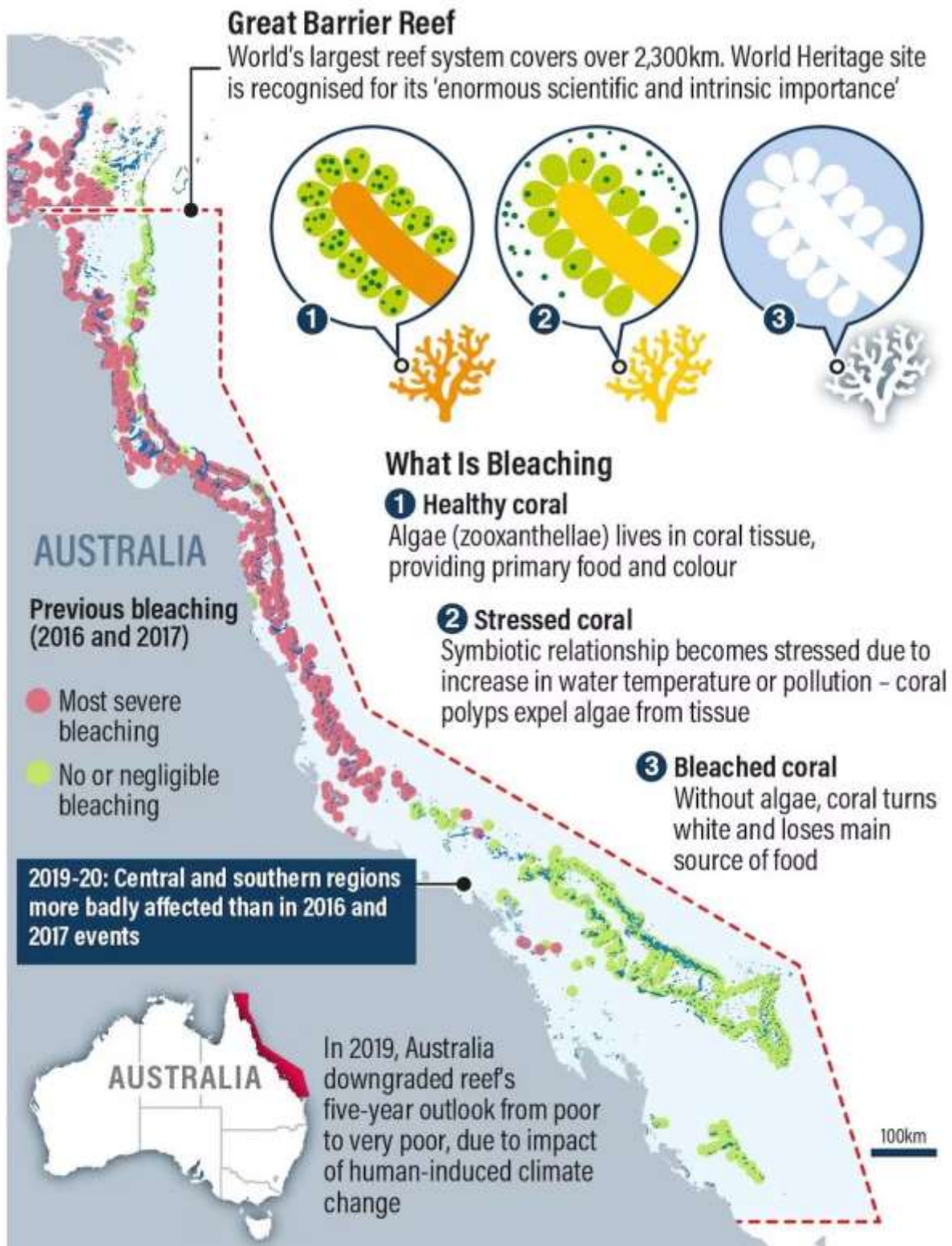
- **Maria Byrne**, lead author of the study, highlighted the critical importance of protecting coral reefs due to their role in supporting **biodiversity, food security, and coastal protection**.
- She emphasized that even protected areas were not immune to extreme heat stress, demonstrating the urgent need for global intervention.

2. Resilience Strategies:

- Co-author **Professor Ana Vila Concejo** stressed the importance of developing strategies to enhance the resilience of coral reefs to climate change.



- Immediate and effective management practices are essential to safeguard these ecosystems and support their recovery.





Great Barrier Reef (GBR)

- The GBR is the **world's largest coral reef system**. It's located in the Coral Sea off the coast of Queensland, Australia.
 - The GBR stretches across 2,300 km and is made up of around 3,000 individual reefs and 900 islands.
- The GBR is home to 400 types of coral, and 1,500 species of fish. It's also home to endangered species such as the **dugong** and the large green turtle. The **GBR is a UNESCO World Heritage site** and was inscribed in 1981.
 - In 2023, the UNESCO Heritage Committee **refrained from listing Australia's Great Barrier Reef as a site "in danger"** but warned that the world's biggest coral reef ecosystem remained under **"serious threat" from pollution and the warming of oceans**.
- Widespread mass bleaching of the Great Barrier Reef was first seen in 1998 and happened again in 2002, 2016, 2017, 2020, 2022 and now in 2024.

Conclusion

1. Impact of Warming World:

- The 2024 bleaching event in the southern GBR serves as a stark reminder of the fragility of coral reefs in the face of a rapidly warming climate.
- Without significant action to address climate change, these vital ecosystems risk further degradation and potential collapse.

2. Call for Global Efforts:

- Collaborative global efforts are required to implement sustainable solutions, mitigate climate impacts, and preserve the biodiversity and ecological services provided by coral reefs.