



## The Great Barrier Reef (GBR)

### Why in news?

The highest levels of coral cover, within the past 36 years, have been recorded in the northern and central parts of Australia's Great Barrier Reef (GBR).

### What are coral reefs?

- Corals are marine invertebrates or animals which do not possess a spine.
- They are the largest living structures on the planet.
- Each coral is called a polyp and thousands of such polyps live together to form a colony.
- Corals are of two types, hard corals and soft corals.
- **Hard corals** - They extract calcium carbonate from seawater to build hard, white coral exoskeletons.
- Hard corals are in a way the engineers of reef ecosystems.
- Measuring the extent of hard corals is a widely-accepted metric for measuring the condition of coral reefs.
- **Soft corals** - They attach themselves to such skeletons and older skeletons built by their ancestors.
- Soft corals also add their own skeletons to the hard structure over the years.
- These growing multiplying structures gradually form coral reefs.

### What is Australia's Great Barrier Reef (GBR)?

- Australia's Great Barrier Reef is the world's largest reef system.
- It stretches across 2,300 km and has nearly 3,000 individual reefs.
- It hosts 400 different types of coral and gives shelter to 1,500 species of fish and 4,000 types of mollusc.
- Coral reefs support over 25% of marine biodiversity even as they take up only 1% of the seafloor.
- The marine life supported by reefs further fuels global fishing industries.

*"Coral reef systems generate \$2.7 trillion in annual economic value through goods and service trade and tourism."*

## What does the report say?

- The annual long-term monitoring report by the Australian Institute of Marine Science (AIMS) found that Australia's great barrier reefs are improving.
- AIMS began its first research 36 years ago, and reefs are surveyed through in-water and aerial techniques.
- The current report surveyed 87 reefs in the GBR between August 2021 and May 2022.
- The new survey shows record levels of region-wide coral cover in the northern and central GBR since the first ever AIMS survey was done.
- Coral cover is measured by determining the increase in the cover of hard corals.
- The hard coral cover in northern GBR had reached 36% while that in the central region had reached 33%.
- Meanwhile, coral cover levels declined in the southern region from 38% in 2021 to 34% in 2022.
- However, the record levels of recovery were fuelled largely by increases in the fast-growing *Acropora* corals, which are a dominant type in the GBR.

*"Acropora is a genus of small polyp stony coral in the phylum Cnidaria and some of its species are known as table coral, elkhorn coral, and staghorn coral."*

- These fast-growing corals are also the most susceptible to environmental pressures such as rising temperatures, cyclones, pollution, and crown-of-thorn starfish (COTs) attacks, which prey on corals.

*"In Australia, the Barrier Reef, in pre-COVID times, generated \$4.6 billion annually through tourism and employed over 60,000 people including divers and guides."*

## Does this mean the reef is out of the woods?

- The biggest threat to the health of the reef is climate change-induced heat stress, resulting in coral bleaching.
- Corals share a symbiotic relationship with single-celled algae called zooxanthellae.
- The algae prepare food for corals through photosynthesis and also give them their vibrant coloration.
- When exposed to conditions like heat stress, pollution, or high levels of ocean acidity, the zooxanthellae start producing reactive oxygen species not beneficial to the corals.
- The corals kick out the color-giving algae from their polyps.
- This exposes their pale white exoskeleton and leads to coral starvation as corals cannot produce their own food.
- Bleached corals can survive depending on the levels of bleaching and the recovery of sea temperatures to normal levels.
- Severe bleaching and prolonged stress in the external environment can lead to coral death.

- Over the last couple of decades, climate change-induced rise in temperature has made seas warmer than usual.
- According to the UN assessment in 2021, the world is going to experience heating at 1.5°C in the next decade.
- This is the temperature at which bleaching becomes more frequent and recovery less impactful.
- The concern is that in the past decade, mass bleaching events have become more closely spaced in time.
- The first mass bleaching event occurred in 1998 when the El Niño weather pattern caused sea surfaces to heat, causing 8% of the world's coral to die.
- The second event took place in 2002.
- However, the longest and most damaging bleaching event took place from 2014 to 2017.
- Mass bleaching then occurred again in 2020, followed by earlier this year.
- According to the Australian government's scientists, 91% of the reefs it had surveyed in March were affected by bleaching.

### What are the future challenges?

- The AIMS report says that the prognosis for the future disturbance suggests an increase in marine heatwaves.
- Such marine heatwaves will last longer and the ongoing risk of COTs outbreaks and cyclones may further affect the corals.
- Therefore, the observed recovery offers good news for the overall state of the GBR.
- However, there is an increasing concern about its ability to maintain this state.

### Reference:

1. <https://www.thehindu.com/sci-tech/energy-and-environment/explained-the-great-barrier-reefs-recovery-and-vulnerability-to-climate-threats/article65741674.ece?homepage=true>



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