Great Barrier Reef: Environment

The Great Barrier Reef, the world's largest coral reef system in Australia, faces severe threats from coral bleaching driven by rising sea temperatures, pollution, and climate change, leading to biodiversity loss. It is a UNESCO World Heritage Site and a vital marine ecosystem.

Great Barrier Reef (GBR)

Largest Coral Reef System in the World – Extends over 344,000 sq. km off the northeast coast of Australia, comprising 2,900 individual reefs and 900 islands.

Global Significance

Declared a UNESCO World Heritage Site in 1981. Supports 25% of all marine species despite covering <1% of the ocean floor. Vital for marine biodiversity, fisheries, and tourism (multi-billion-dollar industry). Ecosystem Services that acts as a natural barrier protecting coastlines from erosion, storm surges, and tropical cyclones.

2025 Report Highlights (Australian Institute of Marine Science)

Record Annual Coral Loss in 39 Years, despite 2024 starting with the highest coral cover on record. Mass Coral Bleaching, Triggered by record ocean temperatures during 2023–2024.

Regional Loss Distribution

1. Southern GBR – ~33% loss
2. Northern GBR – ~25% loss
3. Central GBR – ~14% loss

Bleaching Severity, The most extensive recorded bleaching event in GBR history.

Cause of Coral Bleaching

Coral–Algae Symbiosis, Corals host zooxanthellae algae, which provide nutrition via photosynthesis. Thermal Stress, Prolonged high sea surface temperatures cause algae expulsion where coral turns white (bleached), reduced growth, reproduction, and survival rates.

Current Event

1. Began: January 2023
2. Declared a global crisis: April 2024
3. Global Impact – 84% of global reef areas affected.

Climate Thresholds & IPCC (2018) Projections

High Sensitivity, Coral reefs highly vulnerable to even small temperature increases.

Warming Impact Projections

+1.5°C above pre-industrial → Severe coral decline, but partial survival possible.
+2°C above pre-industrial → Coral-dominated ecosystems predicted to become nearly extinct.
Current Situation, Global temperatures already ~1.3°C higher than pre-industrial levels.

Ecological & Global Impact

1. Biodiversity Loss – Habitat destruction for thousands of marine species.
2. Food Security Risk – Decline in reef fisheries impacts coastal communities.
3. Economic Damage – Threatens tourism and fishing industries in Australia and globally.
4. Coastal Protection Loss – Increased vulnerability to storm damage and erosion in reef-adjacent regions.
5. Global Climate Change Link – Highlights interconnectedness of climate systems and marine ecosystems.

Source: https://www.thehindu.com/sci-tech/energy-and-environment/great-barrier-reef-records-largest-annual-coral-loss-in-39-years/article69904116.ece