



Status of Coral Reefs of the World: 2020

Summary for Policymakers

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Value of coral reefs

Estimates indicate coral reefs contribute US\$2.7 trillion per year in ecosystem service value, including US\$36 billion in coral reef tourism

Coral reef ecosystems are found in more than 100 countries and territories and whilst they cover only 0.2% of the seafloor, they support at least 25% of marine species and underpin the safety, coastal protection, wellbeing, food and economic security of hundreds of millions of people.

Coral reefs are vulnerable to anthropogenic pressures, including global threats from climate change, such as ocean acidification, as well as local threats including coastal development, land-based input of nutrients and sediments from agriculture, sea-based pollution, overfishing and destructive fishing practices and other activities.

Retaining the integrity and resilience of coral reef ecosystems is a critical part of the solution for achieving the Sustainable Development Goals under the 2030 Agenda for Sustainable Development.

Global Coral Reef Monitoring Network

The Global Coral Reef Monitoring Network (GCRMN) is an operational network of the International Coral Reef Initiative (ICRI) that aims to provide the best available scientific information on the status and trends of coral reef ecosystems to provide an evidence base for their conservation and management. The activities of the GCRMN are coordinated through ten regional nodes and a global coordinator.

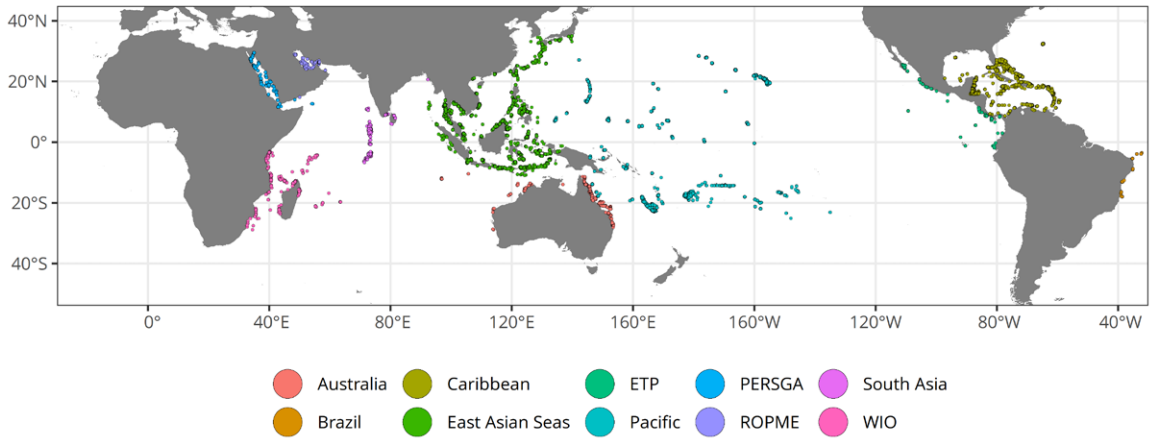


Figure 1. Distribution of monitoring sites within each of the 10 GCRMN regions from which data were compiled for the GCRMN *Status of Coral Reefs of the World: 2020* report. ETP is the Eastern Tropical Pacific. PERSGA is the area included within the Regional Organization for the Conservation of the Environment of the Red Sea and Gulf of Aden. ROPME is the sea area surrounded by the eight Member States of the Regional Organisation for the Protection of the Marine Environment. WIO is the Western Indian Ocean.

A quantitative analysis of a global dataset

The *Status of Coral Reefs of the World: 2020* report is the sixth edition of this periodic flagship report produced by the GCRMN, which describes the status and trends of coral reefs worldwide. This is the first report since 2008, and for the first time the report is based on the quantitative analysis of a global dataset.

The report is built on the contributions of hundreds of scientists and organisations, bringing together almost 2 million observations recorded at more than 12,000 sites in 73 countries, to understand the status and trends of the world's coral reefs over the past 40 years.

The vast majority of these observations have been collected since 1998 which is when the first global-scale coral bleaching event occurred, affecting nearly all coral reef regions. This event triggered a substantial increase in global monitoring effort to measure the impacts on the world's coral reefs. As a result, more data from more sites were available, and estimates of global average coral cover became more precise. Since then, most monitoring programs have been maintained and new programs have also been established, often in response to more recent mass bleaching events, which has further strengthened confidence in coral cover estimates.

Rigorous quantitative global analyses were conducted for two key indicators of coral reef health:

1. Hard coral cover – which is a measure of the percentage of reef surface covered by live hard coral instead of sponges, algae, or other organisms. The cover of living hard coral is a globally accepted and universally used indicator of coral reef health; and
2. Algal cover - conversely, is a globally recognised indicator of stress on coral reefs.

Coral reefs support high biodiversity and sustain reef-dependent communities, but when coral reefs are degraded, and algae becomes dominant, these valuable coral reef ecosystem services can be lost

Global status of coral reefs

Prior to the first major mass coral bleaching event in 1998, global average cover of hard coral was high (>30%) and stable. There was, on average, twice as much coral on the world's reefs as algae.

The 1998 mass coral bleaching event killed about 8% of the world's coral. This represents about 6,500 km² of coral, which is more than all the coral currently living on coral reefs in any of the Caribbean, Red Sea and Gulf of Aden, South Asia or Western Indian Ocean regions. In contrast, the global average cover of algae, did not change in response to the 1998 global coral bleaching event.

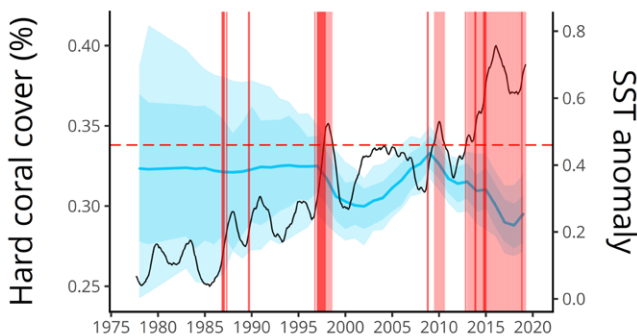


Figure 2: Representation of the trend in global average cover of live coral (blue line and 80/95% credibility ribbons) overlaid with the Sea Surface Temperature (SST) anomaly from 1977 to 2020 (black line: 18 month rolling mean smoothed).

In the absence of large-scale disturbances, the global average cover of hard coral recovered to pre-1998 levels within a decade. But, when faced with too many pressures, occurring too frequently, resilience is tested, and coral reefs struggle to fully recover.

The report found that between 2009 and 2018 there was a progressive loss of about 14% of the coral from the world's coral reefs

Between 2009 and 2018, there was a progressive loss of about 14% of the coral from the world's coral reefs. This was primarily due to recurring large-scale coral bleaching events, combined with other local pressures such as coastal development, land-based and marine pollution, unsustainable fishing and tropical storms. To put this into context, 14% of the world's coral occupies an area of about 11,700 km², which is more than that occupied by all the coral currently living on Australia's coral reefs. Since 2011, the amount of algae on the world's coral reefs has increased by about 20%, mirroring the decrease in the amount of hard coral that began in 2009.

During the last decade, the interval between mass coral bleaching events has been insufficient to allow coral reefs to recover. Globally, algal cover is increasing and coral cover is decreasing, which is a strong sign that the condition of the world's coral reefs condition is declining.

However, coral reefs in East Asia's Coral Triangle region, which contains almost 30 percent of the world's coral reefs and is the center for global coral diversity, offer some hope. On average, these reefs had more coral in 2019 than they did three decades ago and were less impacted by thermal disturbances, until the most recent events in 2010 and 2016.

High coral cover and diversity may confer a degree of natural resistance to elevated sea surface temperatures

The report also highlighted that although during the last decade the interval between mass coral bleaching events has been insufficient to allow coral reefs to fully recover, some recovery was observed in 2019 with coral reefs regaining 2% of the coral cover that was previously lost.

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Implications for coral reef management

Almost invariably, sharp declines in coral cover corresponded with rapid increases in sea surface temperatures, indicating their vulnerability to marine heatwaves, which is a phenomenon that is likely to happen more frequently as the planet continues to warm.

Global action through the Paris Agreement is crucial for the future of coral reefs

It is clear that reduction in global emissions is necessary to deliver a positive future for coral reef ecosystems and the people that depend on them. Global action through the Paris Agreement to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels is crucial for the future of coral reefs.

This report shows that many of the world's coral reefs are still resilient and if pressures on these critical ecosystems ease, they have the capacity to recover, potentially within a decade, to healthy, flourishing reefs.

If coral reefs are resilient and if pressures ease, they have the capacity to recover

Understanding the condition of coral reefs is a foundation for their protection. Regular monitoring informs management decisions – it tells us when coral reefs are under pressure, and when our interventions are making a difference.

ICRI's Ad Hoc Committees on Reef Restoration¹ and Resilience-Based Management² are linked with the work of the GCRMN and share global expertise on best practice, using monitoring information to underpin protection, restoration and management.

New targets will be adopted by governments under the Post-2020 Global Biodiversity Framework to the Convention on Biological Diversity to halt, and ideally reverse, biodiversity loss in the coming decades. While this Framework encompasses all biodiversity, there are some particularly vulnerable ecosystems, such as coral reefs, which support millions of people through the provision of jobs, food security and cultural identity. Coral reefs need to be specifically identified within the Framework, and the inclusion of coral reef-specific indicators will be critical to make the Framework meaningful and help drive implementation. ICRI³ has recommended a suite of indicators that is aligned with monitoring undertaken by the GCRMN and will help measure progress toward the goals and targets for coral reefs. Adoption of the Framework and these indicators will promote action to save these critical ecosystems.

Next steps for the Global Coral Reef Monitoring Network

Future ambition for GCRMN would extend the quantitative reporting to fish abundance and biomass – telling us about the health and integrity of these critical elements of coral reef ecosystems; and reinforcing the strong connections between coral reefs and dependent communities.

In recent years, technological solutions for coral reef monitoring have rapidly emerged, ranging from satellite mapping to automated analysis of coral reef images. A collaborative approach to align and integrate these different technologies and tools used for data collection and analysis is critical to enable rigorous and timely reporting of the status of coral reefs at local, national and global scales. Availability, comparability and reliability of data are crucial to inform coral reef management and investment in coral reef protection and restoration

The GCRMN has a role in supporting vital, ongoing investment in the development of methodological approaches, new technologies, capability and capacity that expands geographic coverage and enhances the quality, accessibility and interoperability of data.

It is critical that coral reef monitoring remains accurate, compatible, timely, relevant, and collaborative to support coral reef science and conservation

¹ <https://www.icriforum.org/reef-restoration-ad-hoc-committee/>

² <https://www.icriforum.org/resilience-based-management/>

³ <https://www.icriforum.org/terms-of-reference-for-the-ad-hoc-committee-on-developing-a-recommendation-for-a-post-2020-coral-reef-target/>



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