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Global Coral Reef Monitoring Network

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International Coral Reef Initiative

STATUS & TRENDS OF **CARIBBEAN** CORAL REEFS: 1970 - 2024

Policy brief

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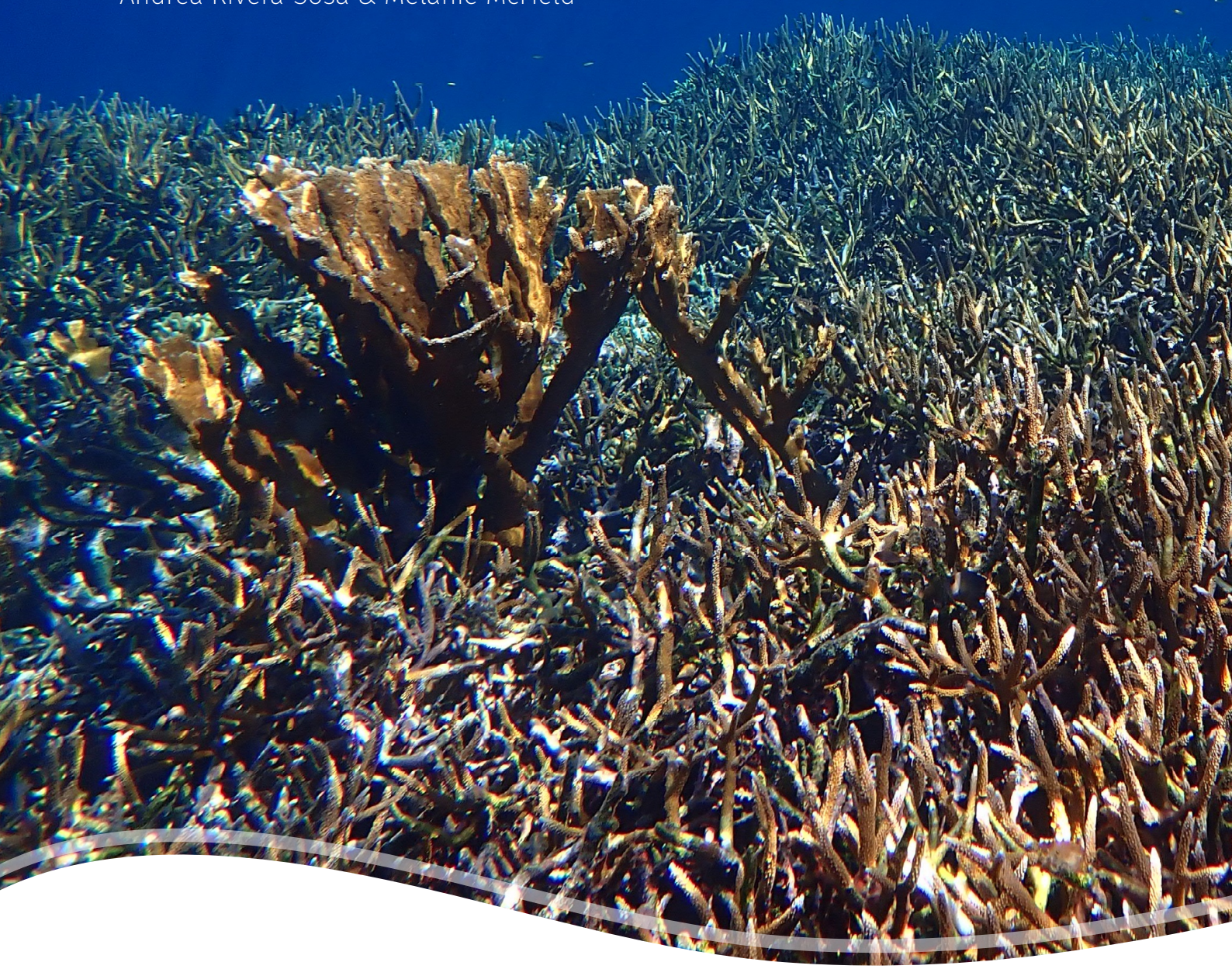

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DEDICATION

This report is dedicated to the numerous individuals who have worked to study, conserve and protect our coral reefs. We also recognize the International Coral Reef Initiative and partners, and particularly the people of all territories and nations throughout the Wider Caribbean region who continue to strive for the existence of healthy coral reefs for future generations.

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FRONT COVER

Healthy reef community of *Acropora cervicornis*, Roatan, Honduras, 2019.
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Overview

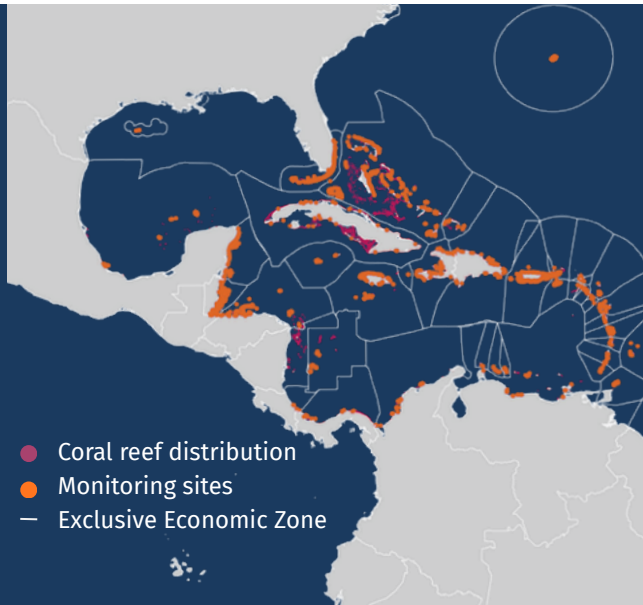
Caribbean coral reefs generate an estimated USD $6.2 billion annually, and together with mangroves and seagrasses, contribute up to USD $15 billion in fisheries, tourism, and other essential ecosystem services [1]. The Status and Trends of Caribbean Coral Reefs: 1970–2024 provides the most comprehensive assessment of reef conditions to date, revealing sustained declines in coral cover driven by climate impacts and local pressures, threatening the livelihoods of many Small Island States. Yet evidence shows that effective protection and management can reverse these trends. Well-managed marine areas have documented recoveries of key fish populations, increases in coral cover, and declines in macroalgae [2].

This work is led by the Global Coral Reef Monitoring Network (GCRMN) Caribbean Chapter, an operational network of the International Coral Reef Initiative (ICRI), which provides the most comprehensive scientific data on coral reefs to inform policy, strengthen management, and strengthen capacity for coral reef conservation worldwide. The work of the GCRMN–Caribbean directly supports the goals of Multilateral Environmental Agreements such as the Kunming–Montreal Global Biodiversity Framework (GBF); indeed, coral reefs are integral to achieving 16 of the Framework's 23 global targets [3].

Key Findings

In the Caribbean region:

- Holds ~10% of global coral reefs (24,230 km²) across 44 jurisdictions.
- Population within 20 km of reefs ↑27.6% from 2000–2020 (+13 million people).
- Hard coral cover ↓48% and macroalgae cover ↑85% from 1980-2024.
- Sea Surface Temperature ↑1.07 °C since 1985 (+0.27 °C/decade).



To secure reef resilience and protect coastal livelihoods, we recommend to:

1. Integrate coral reefs into national climate and biodiversity strategies

- Ensure coral reefs are integrated into national and regional planning through measurable, science-based targets within Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and National Biodiversity Strategies and Action Plans (NBSAPs).
- Develop regional blue economy strategies that encourage investment in reef protection.
- Align national and regional initiatives with global biodiversity, climate, and finance frameworks.
- Foster regional cooperation via governance platforms such as the Caribbean Community (CARICOM) and the Ocean Coordination Mechanism (OCM), to coordinate and align policies.
- Ratify international and regional conventions, such as the Cartagena Convention, to reduce pollution, promote resilience, and increase biodiversity protection.

2. Improve water quality, reduce local threats, and greenhouse gas emissions

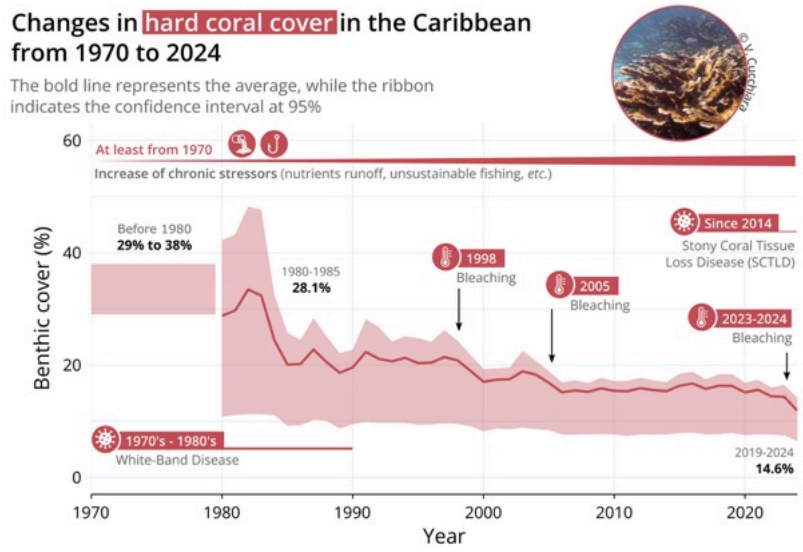
- Reduce national emissions of greenhouse gasses and invest in renewable energy sources.
- Enhance biodiversity, promote sustainable fisheries, and protect vulnerable species through fisheries management actions (e.g., World Trade Organization / Agreement on Fisheries Subsidies, catch/quota limits/protection of herbivores such as parrotfish). Strengthen enforcement and sustainable seafood consumption policies.
- Enforce regulations on coastal development (e.g., Integrated Coastal Zone Management).
- Improve wastewater treatment, solid waste management, and reduce pollution from land-based activities, ships, dumping, and seabed exploration (e.g., Belize's Oil Moratorium in 2018).
- Promote sustainable tourism through a shift to low-impact models (via ecotourism standards, green certification programs for accommodations, energy efficiency programs, and carbon offsets).

3. Strengthen and invest in protection via area-based management tools

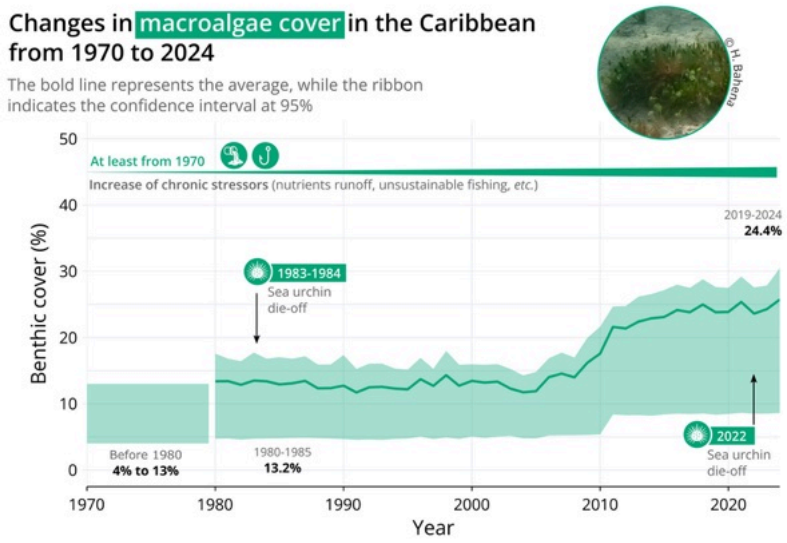
- Expand ecologically connected area-based management (e.g., networks of Marine Protected Areas (MPAs), Other Effective Area-based Conservation Measures (OECMs), Locally Managed Marine Areas (LMMAs) including fully protected (no fishing) zones, to support Target 3 of the Kunming-Montreal GBF.
- Strengthen engagement of interested parties, and invest in monitoring, control, and surveillance (MCS) to manage resources and ensure ecological and socio-economic benefits.
- Build equitable and collaborative governance, and training for MPA managers through cooperation networks, such as the Specially Protected Areas and Wildlife (SPAW-RAC) Protected area manager network, MPA Connect, or RedGolfo.
- Identify areas of potential climate resilient coral reefs in the Caribbean region, and invest in protection of these hope spots as well as a diverse network to promote adaptation.
- Catalyze blended-finance initiatives that leverage public and private funds to support coral reef resilience and create employment opportunities (e.g., the Global Fund for Coral Reefs-funded MAR+Invest).

Results

Through the collaboration of more than 300 scientists, 72 datasets were compiled from 13,864 sites and 23,742 surveys across the region between 1973 and 2024, ten years after the previous GCRMN Caribbean report [4].



Hard coral cover has **<u>declined</u>** from 28% in the 1980s to ~15% in 2024, a **relative loss of 48%**, largely due to disease, marine heatwaves, nutrient pollution, and overfishing.



Macroalgae cover has **<u>increased</u>** from 13% to ~24% over the same period, **a 85% rise**, due to increased nutrients from wastewater, land-based runoff, herbivore decline, and sea urchin die-offs.

These changes have likely already impacted, and will continue to affect, the ecosystem services reefs provide, including possible reductions in the abundance and diversity of reef-associated species, including fish and crustaceans that are important for food security and commercial fisheries. Furthermore, this degradation may compromise the capacity of Caribbean coral reefs to protect coastal areas from hurricanes, whose intensity is projected to increase under climate change [5].

4. Maintain and enhance coral reef monitoring

- Improve spatial representativeness and invest in long-term reef monitoring to inform, global, national policies and local management strategies.
- Standardize monitoring across the region, with indicators such as coral cover, abundance of key functional fish groups, water quality, invasive species, and disease prevalence.
- Make data findable, accessible, interoperable, and reusable (FAIR principles) using platforms like GCRMN, Atlantic and Gulf Rapid Reef Assessment (AGRRA), ReefCloud, and MERMAID, to ensure robust knowledge to inform science-based policy and decision making for coral reefs.

5. Support scalable reef restoration strategies

- Integrate coral restoration, coral gardening, and larval propagation into wider ecosystem and resilience-based conservation management plans, including area-based management, marine spatial planning, water quality improvements and herbivore population recovery.
- Incorporate thermotolerant coral genotypes and disease mitigation into restoration designs to strengthen resilience to climate stress.
- Reinforce partnerships with the tourism sector and innovative models such as "Restoration-as-a-Service" to align ecological goals with economic benefits.
- Scale up restoration initiatives with long-term financing, standardized monitoring, and regional collaboration to maximize ecological, social, and economic outcomes.

Conclusion

Strengthening protection and local conservation for Caribbean reefs is urgent as climate pressures accelerate. The GCRMN provides the scientific basis to convert local monitoring into comparable, policy-relevant evidence that guides effective management and supports global biodiversity targets, including reducing pollution (Target 7) and improving protected-area management (Target 3)[3]. Equitable access to resources and collaborative governance remain critical. Caribbean reefs are both warning and opportunity: their decline demands coordinated, science-based action, while recovery in protected areas shows progress is possible. Now is the time to invest in integrated management, restoration, and monitoring to safeguard coastal protection, livelihoods, and reef resilience for future generations.

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