



Coral reefs: Critical wetlands in severe danger

Often called the “rainforests of the sea,” coral reefs fascinate us with their colourful explosion of life. Home to a quarter of all marine species, this special type of wetland directly benefits nearly 500 million people who live near tropical shorelines by providing food security, coastal protection and income from tourism.

Coral reefs are suffering dramatically from human-induced and natural pressures. 75% of the world’s coral reefs are at risk, and 10% are already damaged beyond repair. Yet there are some encouraging success stories on how to slow, stop and reverse their decline and degradation.

What is a coral reef?

Solid and wave-resistant, coral reefs are partly created by living colonies of coral polyps, tiny spineless organisms related to sea anemones. They synthesize and excrete calcium carbonate, creating a hard exoskeleton structure, which over generations contributes to reef formation. Live coral communities live as a thin veneer on the very reefs they create on the dead coralline bodies of their predecessors.

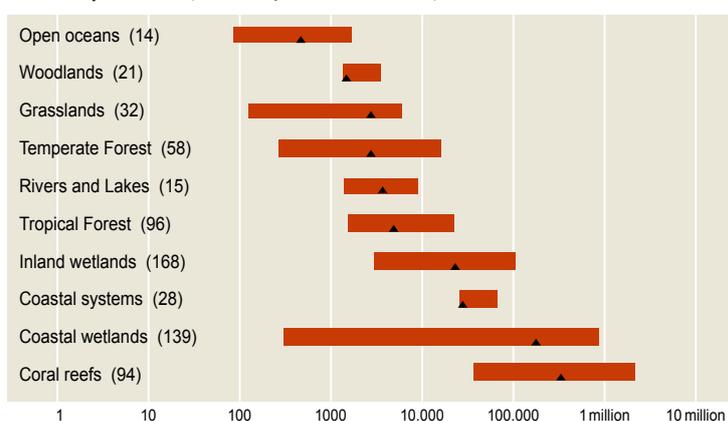
Each polyp hosts a population of microalgae (commonly called zooxanthellae) in its tissue. In a remarkable symbiotic interaction, the algae digest the polyp’s waste and carbon dioxide for their own photosynthesis, and in return, provide oxygen and organic outputs, which the polyp then turns into calcium carbonate.

Coral reefs generally form in tropical and sub-tropical locations where suitable conditions are found for coral polyps and associated reef organisms:

- Clear and shallow water that allows the light to reach the algae for photosynthesis
- Warm water temperatures
- Specific ranges of water salinity and acidity

Southeast Asia and the Pacific Ocean hold 70% of the reefs world-wide. Currently there are about 277 Wetlands of International Importance (Ramsar Sites) that host coral formations.

Range and average of total monetary value of the bundle of ecosystem services per biome (in Int. \$/ha/yr 2007/PPP-corrected).



The total number of published value estimates per biome is indicated in brackets; the average value of the value range is indicated as a triangle.

Adapted from R. de Groot et al. (2012).



Effective responses



Kenya Kuruwitu Marine Sanctuary

- In 2003, the fishermen of Kuruwitu, Vipingo, realized that the declining number and size of fish was making their way of life impossible. Together with local property owners, they started the Kuruwitu Conservation and Welfare Association (KCWA), which closed off a 30-hectare reserve to fishing. Since then, the area has seen a recovery in coral and fish species, better catches outside the reserve and an increased number of visitors eager to see a regenerating reef ecosystem.

Cuba Jardines de la Reina National Park

- This archipelago stretches for 120 km off the south central coast of Cuba and comprises 661 keys. In 1996, some 970 km² of the area were set aside as a marine reserve, one of the largest in the Caribbean. Commercial fishing is heavily restricted, and the site is marketed as an exclusive tourist destination for diving and sport fishing. Since being declared a National Park, ten key species of large fish are present in greater abundance.

Benefits to humanity that are worth a fortune

- When a 2012 global comparison measured the monetary value of services provided by ten different major biomes, coral reefs took the top place, with an estimated value of US\$ 500,000 per hectare per year. In the country of Belize alone, it is estimated that coral reef tourism accounted for US\$ 150-196 million in the year 2007. A well-managed reef in the Indian and Pacific Oceans can provide between 3-5 tons of seafood per km² per year.

Serious pressure

Live hard coral cover declined by an estimated 38% between 1980 and 2004. Direct threats from human activities include:

- Physical damage such as dredging and reclamation
- Overfishing and destructive fishing practices

- Coastal pollution, nutrient run-off and eutrophication
- Sedimentation due to changes in land use and erosion
- Spread of invasive species

In parallel, the human-induced rise in greenhouse gases and climate change is leading to:

- Coral bleaching, due to loss of zooxanthellae, primarily from thermal stress
- Increased calcium carbonate dissolution, due to acidification of the oceans from higher carbon dioxide levels

Encouraging resilience

A holistic approach to promoting a healthy, resilient coral reef might encompass:

- Defining “no-take” areas designed to maximise key species replenishment
- Zoning human activities around a coral reef, including management of activities on land and preservation of key habitat corridors
- Applying bans on fishing and collection during spawning season or in specific spawning areas
- Integrating local coral reef users and stakeholders into management actions

Other actions that can work at a much wider scale:

- Land activities management to limit run-offs, pollution and CO₂ emissions
- Information systems and integrated monitoring programmes
- Establishment of large marine protected areas

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The Ramsar Convention



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