

Satellites: an Eye on the Oceans

Coral Reefs Crisis

Theme



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Crisis Point Coral reefs have the highest biodiversity of any marine ecosystem, and they provide direct economic benefits to human populations in tropical and subtropical coastal zones. The coral reef crisis is almost certainly the result of complex interactions between local-scale human actions and global-scale climate change. Human impacts include population pressure, habitat loss, changing coastal areas, contamination and overfishing. Rising ocean temperature is the key factor behind increasingly frequent coral bleaching episodes. Also, the effects of higher levels of atmospheric carbon dioxide (CO₂) on ocean chemistry tend to limit coral growth and its ability to recover from bleaching and other forms of stress.

Coral Reefs Seen From Space

Satellite Earth imaging technologies are crucial for protecting coral reefs because the tonal variation that can be seen in satellite imagery can be used to classify and map reefs. Planet Action has made remote-sensing data from the SPOT 5, FORMOSAT-2 and Quickbird optical satellites accessible to map and monitor coral reefs in three key regions of the world: Australia, Guadeloupe and the Philippines.

Data from satellites SPOT 5 (wide-area coverage) and Quickbird (very-high-resolution) will document evidence of climate change impacts affecting the great coral reefs in Australia.

Caribbean corals are being studied using data from SPOT 5 and FORMOSAT-2 that are used to detect and observe coral death in remote and distant areas, and to produce a thematic map of reef health (*bleaching in the Caribbean zone is difficult to see due to eutrophication conditions that lead to algae rapidly covering the coral*).

In the Philippines, time series of satellite images are being used to map changes in the distribution of four ecologically important shallow water marine habitats (corals, mangroves, sea grass and macro-algae) over the last 20 years. This will reveal how and where climate change, destructive fishing, seaweed farming and other coastal activities like fishpond development and logging in mangrove areas have impacted these habitats and will enable development of protocols for future monitoring.



What is Coral Bleaching?

Coral bleaching is the whitening of corals, due to stress-induced expulsion or death of symbiotic unicellular algae called “zooxanthellae” or to the loss of pigmentation within the algae. The corals depend on a symbiotic relationship with the zooxanthellae that live within their tissues, which gives the coral its colour.

Conservation Efforts

Research on coral reef adaptation mechanisms, monitoring and management are essential for their survival. The establishment of marine protected areas may help better protect coral reefs from non-climate stresses as well as enable them to better adapt to the effects of climate change. Planet Action is proud to support the considerable efforts being pursued to protect corals around the world.

Great Barrier Reef, Australia

The Great Barrier Reef Marine Park Authority (GBRMPA), an Australian government organization, provides long-term protection, ecologically sustainable use and enhanced understanding and enjoyment of the Great Barrier Reef, a World Heritage Area.



Australian Government
Great Barrier Reef
Marine Park Authority



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Goals

- Monitor effects of climate change on vulnerable species.
- Protect surviving corals, reduce fishing pressure and address sources of pollution.
- Prepare adaptation plans.

SEAHORSE in the Philippines

The Project Seahorse Foundation, in the Danajon Bank, is dedicated to achieving sustainable use of marine resources and to develop management strategies that benefit coastal communities and ecosystems.



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Goals

- Create marine protected areas.
- Identify areas most threatened by habitat loss and seaweed farming.
- Develop management strategies for coastal communities and ecosystems.

Coral Reef Bleaching in Guadeloupe

Nev@ntropic and the Université des Antilles et de la Guyane aim to study the feasibility of satellite-based monitoring of coral reefs in the Caribbean Sea. This study is crucial to ascertain the health of corals in Guadeloupe.



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Goals

- Detect and map coral reef condition and bleaching.
- Take actions to reduce human impacts on coral reef.

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