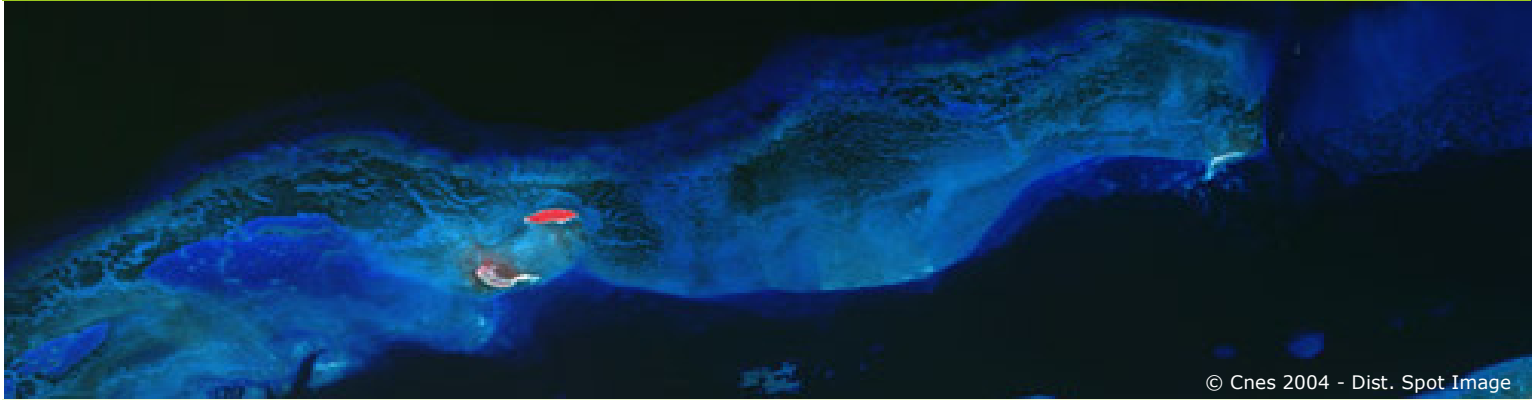




PLANET ACTION
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Satellites: An Eye on the Oceans

Coral Reefs Crisis



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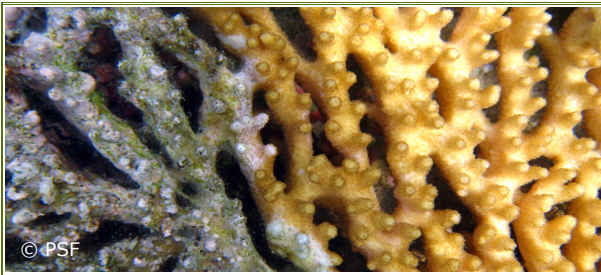
SPOT 5, Danajon Bank – Philippines – 2004

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 among local-scale human-actions and global-scale climatic change. Human activities include increased loading, destruction, coastal modification, contamination, and overfishing. The major climate change factor is rising ocean temperatures, which increases coral bleaching episodes. Also the effects of increasing atmospheric carbon dioxide (CO₂) on ocean chemistry will limit the ability of corals to grow and recover from bleaching and other forms of stress.



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What is Coral Bleaching?

Coral Bleaching is the whitening of corals, due to stress-induced expulsion or death of symbiotic unicellular algae "zooxanthellae" or due 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 coloration, depending on the particular clade.

Coral Reefs Seen from Space

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

Data from SPOT-5 is used to map the great coral reefs in Australia because of the size of the area being studied. In addition the Quickbird satellite also provides invaluable remote sensing capacity to detect coral bleaching. Both satellites will help documenting evidence of climate change impacts affecting this World Heritage Area.

The Caribbean corals are being studied using data from SPOT-5 and Formosat-2. Images from both satellites are used to detect and observe coral death in isolated and distant areas and to produce a thematic map of the degree of health of a reef (*Bleaching phenomenon in the Caribbean zone is difficult to see due to eutrophication conditions where algae's rapidly cover the coral*). There are two main advantages of using Formosat-2 data to study the coral reefs in Guadeloupe: first the satellite has a capacity of daily revisit of the area, and secondly the blue band of the instrument can better penetrate the ocean waters making it possible to identify reefs at greater depths.

In the Philippines a 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 allow seeing how and where climate change, destructive fishing, seaweed farming and other coastal activities (e.g. fishpond development and logging in mangrove areas) have impacted these habitats. SPOT 10 m and 20 m color images are used to map the marine habitats. SPOT 2.5 m panchromatic images are used to map seaweed farms, which are located in shallow waters of about 1 m depth. Furthermore, since little remote sensing work has been done to map seaweed farming, comparing the results of these images will allow the development of protocols for future monitoring.

Conservation Efforts

The diversity of coral species includes reefs that have shown an adaptation potential to climate variations and changes. Research and adaptation mechanisms to monitor and manage coral reefs 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 great efforts of protecting corals around the world.

Great Barrier Reef in Australia

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

Objectives

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

Project website: <http://www.gbrmpa.gov.au>

SEAHORSE in Philippines

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

Objectives

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

Project website: <http://seahorse.fisheries.ubc.ca/>

Coral Reef Bleaching in Guadeloupe

Nev@ntropic and the Université des Antilles et de la Guyane aims at studying the feasibility of satellite-based monitoring of Coral Reefs in the Caribbean Sea. This study is crucial to identify the health of the corals in Guadeloupe.

Objectives

- ✓ Detect and map Coral Reef condition and bleaching phenomenon.
- ✓ Take actions to reduce the human impact on Coral Reef.

Project website: <http://ifrecor.org/>



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