



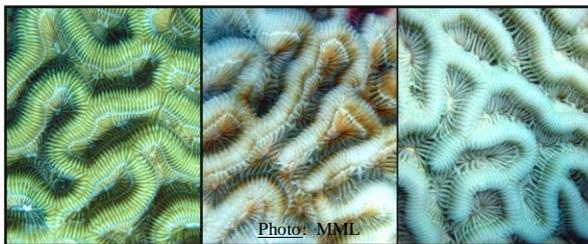
CORAL BLEACHING FACT SHEET

A single coral colony is made up of numerous individual coral polyps (*see photo right*). Corals depend on unicellular algae known as zooxanthellae located inside their tissue to provide them with carbohydrates and oxygen through photosynthesis. The zooxanthellae are usually golden brown in color and are found at various densities in individual species of corals. Some corals have additional pigments in their tissues which when combined with the zooxanthellae gives the normal “healthy” coloration of the coral. Stressed corals may lose or expel zooxanthellae. The transparent tissue remains with the underlying white skeleton giving the coral a bleached white appearance. This process is called coral bleaching.



Healthy *Porites astreoides* polyp showing zooxanthellae.

What Causes Coral Bleaching?



Comparison of healthy (left) and paling (middle) and bleached (right) brain coral *Colpophyllia natans*.

Bleaching is a stress response that results when the coral-algae relationship breaks down. Coral bleaching can be caused by a wide range of environmental stressors such as pollution, oil spills, increased sedimentation, extremes in sea temperatures, extremes in salinity, low oxygen, disease, and predation. The corals are still alive after bleaching and do not necessarily always die.

If the environmental conditions return to normal rather quickly, the corals can regain or regrow their zooxanthellae and survive. If the stressors are prolonged, the corals are more susceptible to disease, predation, and death because they are without an important energy source.

Past, Present ...FUTURE?

Localized or colony specific bleaching has been recorded for over 100 years but only in the last 20 years have we seen mass bleaching events. Mass bleaching occurs when a wide range of coral species bleach over a large area of reef. The most common cause is elevated water temperatures in conjunction with increased ultraviolet radiation due to calm weather and clear skies. Temperature increase of only 1-2°C, particularly when prolonged, can trigger mass bleaching because most corals live close to their maximum thermal limits.

In situations where coral bleaching causes extensive death of corals, recovery is dependent on new coral recruits settling and growing on the reef. This is a time-consuming process, even on relatively healthy reefs. Regrowth of reefs that have been severely damaged by bleaching may take decades and the new reef may be significantly different from that which existed before bleaching. If a recovering reef is affected by another bleaching event, or stress, before it has fully recovered, then it may persist in a degraded state for much longer. In locations suffering from pollution or other chronic pressures, recovery can be particularly slow or inhibited altogether.

Are all Corals Affected the Same Way?

Not all corals are affected by bleaching in the same way. Different species and growth forms of corals have different susceptibilities to bleaching. Since all reef communities are composed of a different mix of corals, often some reefs are more badly affected than others. Also, levels of climate and environmental stress can vary among reefs, leading to differences in the amount of bleaching seen at different locations. This leads to many unanswered questions about mass bleaching and resilience of different reef communities.



This beautiful photo of a healthy reef with Elkhorn coral is an increasingly rare scene in the Florida Keys National Marine Sanctuary.

FURTHER READINGS

NOAA's Coral Reef Information System (CoRIS)

<https://www.coris.noaa.gov/>

Southeast Florida Coral Reef Initiative

<http://www.dep.state.fl.us/coastal/programs/coral/seafan.htm>

Florida Keys National Marine Sanctuary

<http://floridakeys.noaa.gov/>

NOAA's Coral Reef Conservation Program

<http://www.coralreef.noaa.gov>

Great Barrier Reef Marine Park Authority's Coral Bleaching Information

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

International Coral Reef Information Network

<http://www.coral.org>

If you are a commercial or recreational scuba diver, snorkel diver, or airplane pilot, and see a bleaching event or would like to learn more about the program and how you can help please contact:

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Additional Funding Provided By:



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