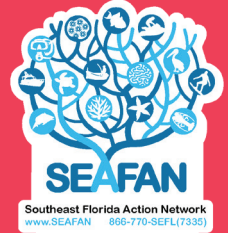




Florida Department of Environmental Protection
Coral Reef Conservation Program

SEAFAN BleachWatch Program Coral Bleaching Fact Sheet



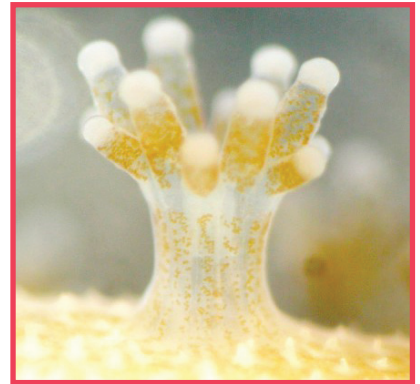
What is Coral Bleaching?

Stony corals are composed of animals called coral polyps that secrete hard, limestone skeletons. A single coral colony is made up of numerous individual coral polyps.

These polyps receive up to 90% of their energy requirements from algae known as zooxanthellae that live within their tissues and provide energy in the form of carbohydrates and oxygen through photosynthesis. This mutual relationship drives the growth and productivity of coral reefs. The zooxanthellae are usually golden brown in color and are found at various densities in individual species of corals. Zooxanthellae, along with additional pigments that some corals have in their tissues, provide the normal "healthy" coloration of coral.



Individual polyps forming a coral colony. Photo by Joe Marino.



Translucent coral tissue with golden brown zooxanthellae. Photo by Dr. Chuya Shinzato.

Stressed corals can lose or expel zooxanthellae, which leaves behind the transparent tissue and reveals the underlying white skeleton, giving the coral a bleached white appearance. This process is called coral bleaching.

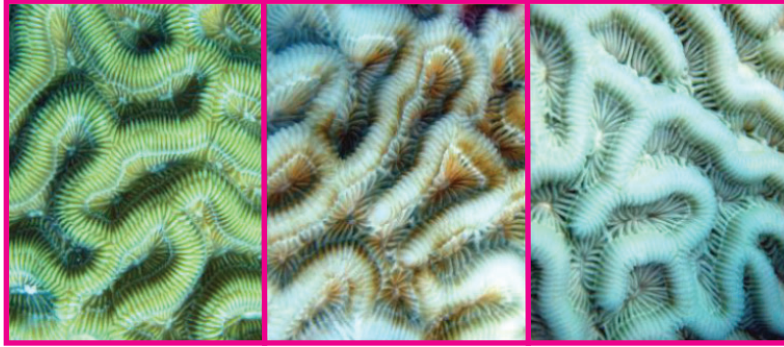
To determine if a coral is bleaching or dead, look for the presence of live tissue. View the coral colony from an angle to see if the coral polyps are extended or tissue is present. If no tissue or polyps can be seen, it is likely that the coral has experienced mortality. If translucent polyps or tissue can be seen, the coral is bleaching. As always, it is important to avoid any direct contact with the coral tissue as this can damage the protective layer, expose the coral to pathogens and trigger stress responses.

What Causes Coral Bleaching?

Coral bleaching is a stress response that results when the symbiotic coral-algae relationship breaks down. Coral bleaching can be caused by a wide range of environmental stressors such as pollution, oil spills, increased sedimentation, changes in sea temperatures and salinity, low oxygen, disease and predation.

Bleached corals are still living, and if the environmental conditions return to normal soon enough, the corals can regain their zooxanthellae and survive the bleaching event. If the stressors are severe or prolonged, however, bleaching can lead to the death of corals. Bleached corals are more susceptible to disease, predation and death because they are without their primary energy source.

How Does Bleaching Affect Different Corals?



Comparison of healthy (left), paling (middle) and bleached (right) brain coral. Photo by Mote Marine Laboratory.

Not all corals are affected by bleaching in the same way. Different species and growth forms of corals have varying susceptibilities to bleaching. Reef communities are composed of a mix of corals, some reefs may be affected by bleaching more severely than others. Additionally, climate and environmental factors vary among reefs, leading to differences in observed bleaching severity.

Researchers consider these variables as they continue to learn more about bleaching events and the resilience potential of different coral communities in responding to these disturbances.

When Does Coral Bleaching Occur?

Localized or colony-specific bleaching has been recorded, during the summer season, for over 100 years, but only in the last 20 years have mass bleaching events been observed in which a range of coral species bleach over a large area of reef. The influence of local stressors can explain small-scale bleaching events, while mass bleaching is mostly attributed to elevated sea temperatures in conjunction with increased ultraviolet radiation due to calm weather and clear skies.

Most corals live close to their maximum thermal limits, a temperature increase of only 1 to 2 °C above the long-term average can trigger mass bleaching, particularly when prolonged. The most recent mass bleaching event occurred during the El Niño event that was recorded in 2023.



Stony and soft corals experiencing bleaching in Fort Lauderdale during the 2022 warm season (June-Nov.). Photo by Jack Israel and Thomas Carpenter, BleachWatch Observers.

How Do Coral Reefs Recover?

Recovery from bleaching events is dependent on new coral recruits settling and growing on the reef. This is a slow process, even on healthy reefs. Repopulation of degraded or damaged reefs can take decades, and the new reef may be significantly different from what existed before the bleaching event.



Propagation and growth of boulder coral fragments at the Nova Southeastern University (NSU) land-based nursery. As an FCR3 awardee, NSU is building infrastructure for coral restoration to support long-term reef recovery.

Photo by DEP.

The Florida Department of Environmental Protection (DEP) is responsible for management of Florida's Coral Reef in partnership with state and federal agencies. DEP's Coral Protection and Restoration Program works with partners to breed and transplant tens of thousands of coral colonies each year that are more resilient to environmental stressors, while other DEP programs are working to address other challenges such as water quality.

Additionally, monitoring is an essential part of understanding reef recovery. The Southeast Florida Action Network (SEAFAN) BleachWatch Program trains recreational divers to aid in monitoring the reef before, during and after coral bleaching events. Monitoring data can provide insights into what species and reef areas are stress-tolerant and resilient to climate impacts. the reef before, during and after coral bleaching events. Monitoring data can provide insights into what species and reef areas are stress-tolerant and resilient to climate impacts.

Reef Restoration and Recovery (FCR3) Initiative in 2023 through Executive Order 23-06. The FCR3 Initiative will develop the infrastructure and capacity for coral propagation, technology, skilled workforce and logistics needed to support the long-term recovery of Florida's Coral Reef. DEP will continue to collaborate and advance efforts to protect and restore Florida's Coral Reef for future generations.

Resources

- [NOAA Coral Reef Watch](#)
- [Allen Coral Atlas](#)
- [World Wildlife Fund](#)
- [NOAA Coral Bleaching](#)
- [Coral Reef Alliance](#)
- [Great Barrier Reef Foundation](#)