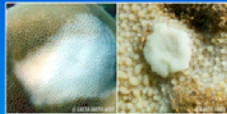


# HAWAIIAN REEFS AT RISK

Under pressure by coastal development, land-based pollution and global warming, Hawai'i's fragile reef ecosystems are threatened with rising levels of coral bleaching and disease, crown-of-thorn sea star outbreaks (COTS) and marine invasive species. Join the "Eyes of the Reef" network and report sightings of these events.



Bleaching causes corals to expel their symbiotic algae.

A coral growth anomaly on *M. Capitata*, or rice coral.



*Leptolyngbya croceoyana*, a blue-green algae, is an invasive cyanobacteria overgrowing the reef at popular Honaunau Bay.

A Crown-of-Thorn Sea Star feasts upon a *Porites* colony.

We are an island-wide association of community volunteers, businesses, scientists, non-governmental organizations, and governmental agencies who report upon the health of Hawaiian reefs.



## THE PURPOSE

The Eyes of the Reef Network was developed to increase public awareness and engage stakeholders in the monitoring and reporting of coral bleaching and disease, COTS and marine invasive species. The network is the first tier of a rapid response protocol developed by the Division of Aquatic Resources and the Climate Change and Marine Disease Local Action Strategy. The program is coordinated by Dr. Greta Smith Aeby, and implemented through the non-profit, community based, volunteer coral reef monitoring organization, Reef Check Hawai'i.



It is important that ocean users who regularly visit coral reefs be trained to identify and report coral bleaching and disease and marine invasive species. Without these initial sightings by the local "eyes" of our reefs, such occurrences may go unnoticed by scientists and resource managers.

## HELP KEEP HAWAIIAN REEFS HEALTHY

*Mai ke kai mai ke ola,  
E malama i ke kai.*



*A healthy Hawaiian reef*

*From the ocean comes life.  
Protect the ocean.*

JOIN THE  
EYES OF THE REEF NETWORK  
AND REPORT SIGHTINGS OF  
CORAL DISEASE AND  
BLEACHING,  
CROWN-OF-THORNS SEA STARS,  
AND MARINE INVASIVE SPECIES.

If you see these threats,  
please report them to:  
[www.reefcheckhawaii.org/eyesofthereef](http://www.reefcheckhawaii.org/eyesofthereef)  
or, call (808) 953-4044



[www.reefcheckhawaii.org/eyesofthereef](http://www.reefcheckhawaii.org/eyesofthereef)



# EYES OF THE REEF

HAWAII'S CORAL  
BLEACHING AND DISEASE,  
CROWN-OF-THORN SEA STAR  
AND MARINE INVASIVE SPECIES  
MONITORING NETWORK





## CORAL DISEASE

Unfortunately, coral disease is becoming increasingly more frequent in Hawai'i. Local researchers have identified 18 coral diseases on Hawaiian reefs.



*Porites Trematodiasis*, or "coral zits" (L), and coral growth anomalies, (R) are two of the most common diseases seen throughout Hawai'i.

Although disease is a natural part of the reef ecosystem, human stressors such as global climate change, land-based pollution, sedimentation, and overfishing may weaken reef ecosystems and cause corals to become more susceptible to disease.

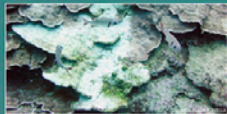


Predation (above), bleaching, competition and abrasion are often confused with coral disease.



## CORAL BLEACHING

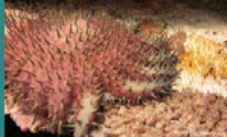
Reef corals contain symbiotic, single celled algae, or zooxanthellae, that provide over 90% of a coral's food and energy. Coral bleaching, which is the loss of zooxanthellae from the coral polyp, may lead to reduced growth, reproduction or even death. Bleaching may occur in response to stressors such as changes in salinity, light or temperature. Mass bleaching events, however, are associated with increased sea surface temperatures that are sustained beyond the optimal range.



A December 2008 bleaching event in Honaunau Bay on the Big Island of Hawai'i.



Characterized by gradual color loss, bleached corals retain their polyps.



## CROWN-OF-THORNS SEA STARS

Although these starfish are a natural part of the Hawaiian ecosystem, they are voracious corallivores. If their populations explode beyond normal, these starfish can cause significant coral mortality. Studies suggest that excessive nutrient input and polluted runoff may contribute to their proliferation. It is therefore important to monitor the number of Crown-of-Thorns Sea Stars.



Predation scars are identified by areas of bare white skeleton and distinct borders between living coral polyps and bare skeleton.

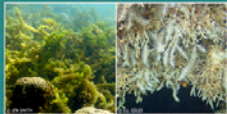


Keep your distance! COTS spines are poisonous and very painful to the touch.



## MARINE INVASIVE SPECIES

Marine invasive algae and invertebrates can be extremely harmful to the biodiversity and health of coral reefs. Introduced, or non-native species can out compete native species, dramatically altering the natural environment. Invasive native species, which proliferate beyond their normal population in a balanced ecosystem, overgrow and kill important reef building corals.



An alien red algae, *Kappaphycus* (L) and an alien soft coral, *Carjoia reisei* (R) are invasive species that smother and dominate the habitats of native Hawaiian corals.

It is important to recognize and report invasive alien species as well as any native species that exhibit invasive tendencies. Only through early intervention may the effects of these impacts be minimized.