# CORAL REEF CPR: FACTSHEET

## Coral bleaching: the facts

**Animals:** Corals are animals related to sea anemones and jellyfish. They are composed of polyps that have tentacles and stinging cells to capture zooplankton

**Symbiosis:** Reef building corals have a symbiotic relationship with plant-like organisms (single celled golden-brown algae or dinoflagellates) called zooxanthellae

**Mutually beneficial relationship:** The zooxanthellae make sugars, glycerol and amino acids through photosynthesis and they share this food with their coral host. They also produce oxygen and help the coral remove its wastes and deposit its skeleton. In return, the corals provide a protected environment and nutrients they need for photosynthesis

**Stress:** Abnormal conditions, such as high water temperature, too much sunlight, fresh water, sudden cold spells, sewage and agricultural run-off, and sedimentation physically stresses the corals and zooxanthellae, and the corals may expel the colorful algae

**Bleaching:** When the coral expels their symbiotic algae, they become colorless and translucent, and their underlying brilliant white skeleton becomes visible. This is called *bleaching*. Some corals produce photo-protective pigments and become vividly fluorescent.

**Frequency of bleaching:** A small number of corals will bleach every year as water temperatures reach their annual maximum during summer months. If temperatures exceed the average temperature for a certain time, higher numbers of corals may bleach. Corals also bleach during unusually calm weather because of greater penetration of light and UV rays

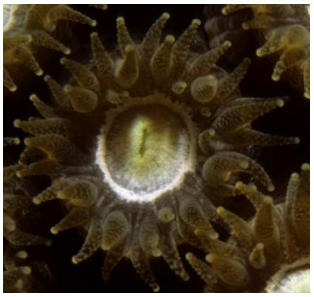
**How hot is too hot?** The temperature necessary to cause bleaching differs depending on the habitat, location, and environmental history. Seawater only needs to exceed the average temperature in a specific location by 1° C for one week for bleaching to begin. The hotter it gets, the faster and more severe bleaching may become. When combined with high levels and warming oceans, bleaching may worsen and corals may begin to die

**A bleached coral is not a dead coral:** A coral can survive for a short time without its symbiotic algae, and it can regain algae from the water column if environmental conditions improve. But if the stress is extreme or prolonged, the coral will slowly die

**El Niño and global (mass) bleaching:** Bleaching is becoming more frequent as a direct result of warming oceans and global climate change. El Niño events cause higher than normal water temperatures in large parts of the world for extended periods. At the warmest time of years, especially when the sea is unusually calm, an El Niño event can result in bleaching that affects entire ocean basins. Mass bleaching of corals in entire ocean basins was first observed in 1979, and again in 1982/1983, 1987-1989, 1995, 1997-1999, 2005, 2010 and 2015/2016

**Impacts of bleaching:** Mass bleaching events can be extremely destructive. The 1997/1998 El Niño caused the worst coral die-off on record and many reefs were reduced to rubble. One report suggests the impacts of the 2015/2016 El Niño may be more drastic

**Solutions to reduce bleaching risk:** Clean water, intact reef communities and minimal human pressure improve reef resilience and enhance the ability for coral recovery. Interventions to reduce local stressors and rehabilitate reefs can also speed recovery


Coral polyp


Unbleached & bleached *Goniopora*


Blue digitate *Acropora*


Bleached *Porites* (boulder coral)


Bleached staghorn coral


Dead & bleached staghorn coral