

2014/16 MASS-BLEACHING EVENT A PRELIMINARY STATUS REPORT FROM COUSIN ISLAND SPECIAL RESERVE

After two underwater heat waves in 1998 and 2010, El Nino has once again struck coral reefs worldwide, triggering the third global coral bleaching event in recorded history.

The US National & Oceanic Atmospheric Administration (NOAA) officially declared the event “global” in October 2015, following alarming reports from many locations in the Pacific and the Caribbean.

In December 2015, the *Reef Rescuers* (Nature Seychelles) launched a *Bleaching Response Plan* consisting of:

- Predictions of bleaching risks from surveillance of seasonal temperature forecasts
- Ecological impacts assessments before and after the bleaching event
- Communication to the press, social networks, etc.
- Reporting bleaching impacts to groups of experts (e.g. CORDIO East Africa)

Weekly monitoring was undertaken on the transplanted reef and control sites within Cousin Island Special Reserve as well as *Les Parisiennes* reef; used as a donor site for the 2010/15 coral restoration project.

The first signs of bleaching were recorded in March (Figure 1). By mid-April, 12% of colonies had bleached on the transplanted site. With water temperatures peaking at 31.5°C, bleaching intensified by the end of April and reached its highest in May with 83% of colonies fully bleached. On the second week of May, bleaching declined as a consequence of dropping water temperatures.

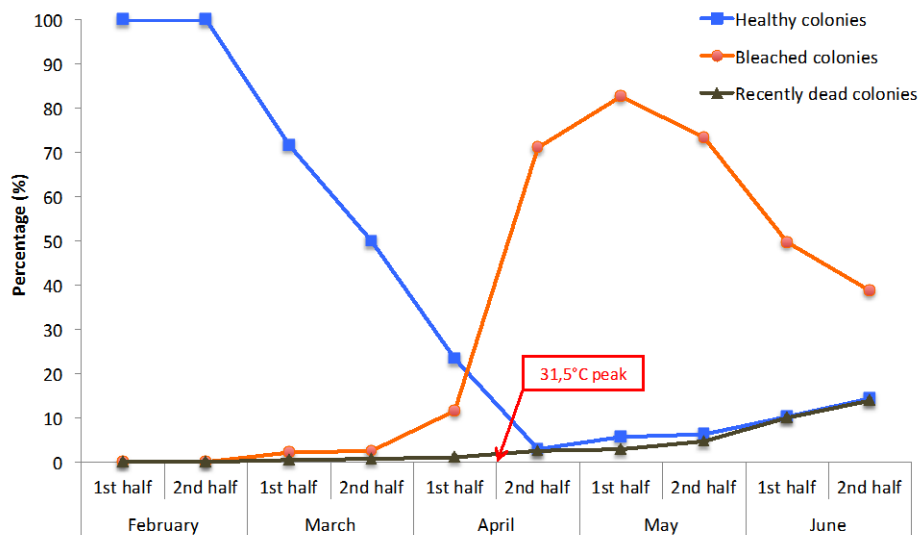


Figure 1 Evolution of reef health on the transplanted site offshore Cousin Island Special Reserve, Seychelles.

According to the US NOAA, the 2016 El Nino dissipated over the last month and neutral conditions are now present, with near-to-below average Sea Surface Temperatures (SSTs). However, with many reefs still bleached globally, experts predict this mass-bleaching to persist until the end of 2016, making it the longest in recorded history.

Is Cousin Island restored reef affected?

According to the Reef Rescuers, no accurate impact assessment can be done until bleaching has completely withdrawn. With nearly 40% of the reef recorded as white at the end of June (Figure 2), it is still too soon to estimate the impact of this year's bleaching event on the restored reef. Time will tell whether these bleached colonies will shift towards recovery or eventually succumb.



Figure 2 Landscape picture of the restored area after the peak of the bleaching event. Cousin Island Special Reserve, Seychelles.

A bleached coral continues to live; but without its colorful symbiotic algae – the *zooxanthellae* – it loses 90% of its energy source and become extremely vulnerable to disease, predators and invasive organisms like seaweed and sponges. If temperatures drop soon enough, the coral can regain its algae. However, if the thermal stress persists the colony will starve to death.

Most colonies surveyed on the restored site remained bleached for over 2-months and many did not survive. At the end of June, mortality and recovery were balanced on the restored site, with an estimated 13,9% dead corals and 14,3% that had regained their healthy tone.

A number of colonies were recorded as “partly dead” where part of the colony is covered with algae but the rest is still alive and recovering (Figure 3). Corals are in fact colonies of smaller organisms, called polyps. If harmed, the colony is able to regenerate from just a few living polyps. The Reef Rescuers hope that these particular colonies will regenerate their tissue and resume growth.



Figure 3 Branching coral of the genus *Pocillopora* recorded as “partly dead” on the restored site. Algae cover dead tissues at the periphery of the colony but the centre is regaining its healthy pigmentation.

How does coral bleaching affect us?

According to the Australian Institute of Marine Sciences (AIMS), at least 500 million people rely on coral reefs for food, coastal protection and livelihood (Fig 4).

With an average consumption of 60-120 kilograms of fish per person every year, island nations are particularly dependent on coral reefs (Atlas of Ocean Wealth, The Nature Conservancy, 2016).

Although coral reefs cover less than 1% of the Earth’s surface, they are home 25% of all marine fish species and 800 types of corals (Burke, L., K. Reytar, M. Spalding, and A. Perry. 2011). Overall healthy reefs provide goods and services worth US\$ 375 billion each year globally (NOAA).

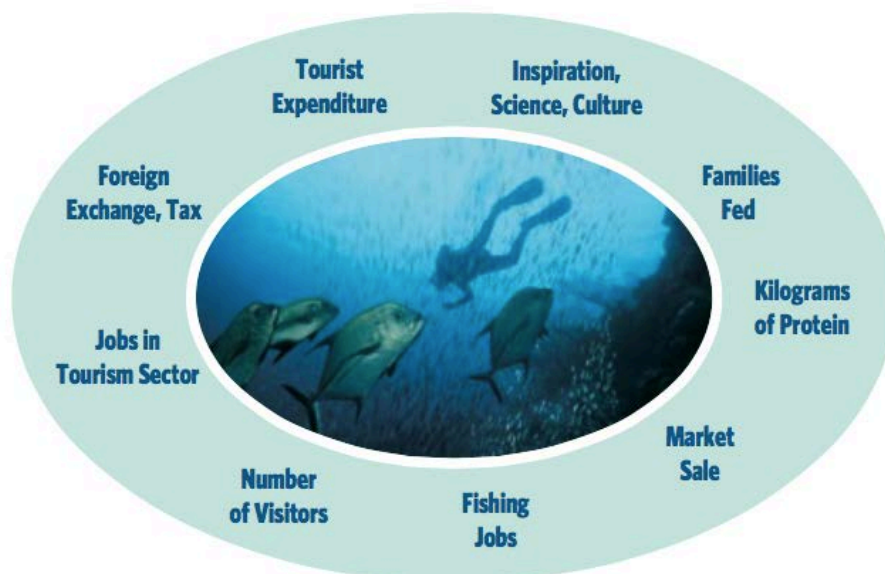


Figure 4 The value of coral reefs can be expressed in multitude ways (retrieved from the Atlas of Ocean Wealth, The Nature Conservancy, 2016).

"How long will recovery take?"

After such a severe event, the recovery on the reef may take several years, but it will take much longer to regain the largest and oldest corals that have died.

The stress from bleaching affects corals in many ways. It temporarily slows down their reproduction and growth rate. Additionally, dead tissues are subject to smothering by algae, sponges and other encrusting organisms against which the remaining healthy coral tissue will have to compete.

Nevertheless, the extent and the rate of reef recovery depends on many factors independent to the coral itself.

The reefs of Cousin Island Marine Reserve exhibit healthy populations of herbivorous fish. High densities of rabbitfish, surgeonfish and parrotfish can be observed grazing the reef. Widely present on the Transplanted site (Figure 5), these herbivores are key to the recovery of the reef as they will keep algal growth in check and indirectly help surviving corals to grow. Their only presence is already a big step towards recovery.

Finally, to account for mortality, the arrival of new coral recruits (baby corals of <5cm diameter) on the reef is also paramount to full recovery. The observation of many coral recruits on the transplanted reef comfort the Reef Rescuers in their high expectancy for recovery on this site.

Overall, natural processes along with the appropriate management currently in place around Cousin Island Special Reserve should drive the ecosystem back to its healthy state. »



Figure 5 Abundant populations of herbivorous fish species continually graze the restored reef, clearing it from invasive seaweeds.