

# Catastrophe of the Caribbean corals

Human beings and nature have combined to wipe out 80% of living coral in the Caribbean, writes Toby Gardner.



Toby, below, a NERC masters student, worked with Isabelle Côté, Jenny Gill, Alastair Grant, and Andrew Watkinson on this project, also funded by the Tyndall Centre for Climate Change. Toby Gardner, University of East Anglia, Norwich NR4 7TJ, tel: 01603 592 269, email: t.gardner@uea.ac.uk



Coral reefs are often called the rainforests of the sea. They are home to more than one million species from 90% of all known phyla. Humans depend on them for food, to bring in tourists and to protect the coasts from storms. About 27% of coral reefs have been lost or severely damaged, and human activity threatens 58% of the remainder. So why does their plight receive so little attention compared to some land habitats?

Until recently we only had a fragmented picture of the state of the world's reefs, coming from expert opinion, remote sensing information, and a few detailed studies of local degradation. So it was easy to perceive a global situation of isolated cases of decline, instead of very recent losses across huge areas. Scientists, however, are realising that corals reefs are in serious trouble.

A team of us at University of East Anglia recently quantified the scale of coral reef decline across the Caribbean. Drawing together all the available coral monitoring data during the last 25 years, we covered 263 study sites from 65 separate research projects across the Caribbean.

We found that in the last three decades the average cover of living coral has dropped from roughly 50% to 10% across the Caribbean. The area of reef has

not been lost, it is the cover of living coral on the reef that has plummeted by 80%. This has happened at roughly twice the maximum annual rate of decline ever reported for any region of tropical forest.

Despite significant differences in the amount lost in each sub-region, the coral is dying off at about the same rate across the Caribbean. Jamaican reefs, already recognised as particularly badly affected, have lost the most coral cover since 1977, probably due to the combined impact of a major hurricane, two disease epidemics and heavy over-fishing. The rate and absolute level of coral loss varied among consecutive five-year time-periods. Indeed, although lower rates of decline continue, most was lost in the early 1980s, when an epidemic all but wiped out the black spined sea urchin *Diadema antillarum*, leaving algae to grow unchecked over the corals and kill them off.

It's still not entirely clear what's causing the Caribbean's drastic coral decline, despite much research. Coral bleaching, thought to be linked to warming seas, does not affect the area as badly as the Indo-Pacific. A host of factors, in various combinations, is

probably to blame. Major impacts from humans include; long-term over-fishing (without the fish the algae overtake the coral); domestic, agricultural and industrial effluent running off the land, which can smother the reefs in silt and fertilise coral-choking seaweed; and direct habitat destruction from building, including ports, piers and hotels. Our damage to the environment almost certainly exacerbates other natural factors, such as hurricane-driven waves smashing the reef, and disease – White Band Disease almost wiped out two dominant species of reef-building coral. There's not much hope for improvement, with human populations in the Caribbean set to grow by an average of 1.3% per year over the next 15 years, bringing more coastal development, pollution and fishing.

Facing many of the same threats as those in the Caribbean, coral reefs around the world may be in a worse plight than any other ecosystem on Earth. Their protection and management demands international co-ordination. We hope our research will ring loud alarm bells to everyone interested in, responsible for and concerned about the survival of the remaining areas of living coral, as well as the regeneration of the vast degraded areas.

*The cover of living coral on the reef has plummeted by 80%.*