

Thursday, 10 July 2008 19:39 UK

'Alarming' plight of coral reefs

By Richard Black
Environment correspondent, BBC News website



Warming waters, a consequence of climate change, can devastate coral

A third of the world's reef-building coral species are facing extinction.

That is the stark conclusion from the first global study to assess the extinction risks of corals.

Writing in the journal *Science*, researchers say climate change, coastal development, overfishing, and pollution are the major threats.

The economic value of the world's reefs has been estimated at over \$30bn (£15bn) per year, through tourism, fisheries and coastal protection.

"The picture is frightening," said Alex Rogers from the Zoological Society of London, one of 39 scientists involved in the assessment.

“ Could you imagine if a single event wiped out 16% of the Amazon forest, or 16% of ecosystems in the UK? ”

Alex Rogers, ZSL

"It's not just the fact that something like a third of all reef-forming corals are threatened, but that we could be facing the loss of large areas of these ecosystems within 50 to 100 years.

"The implications of that are absolutely staggering - not only for biodiversity, but also for economics."

The analysis shows that reef-building corals are more threatened than any group of land-dwelling animals except amphibians.

'Incredible' destruction

The most dramatic decline in recent years was caused by the 1997/8 El Niño event, which caused waters to warm across large swathes of the tropics.

Known species of reef-building coral: 845
Enough data to assess 704
Critically endangered: 5
Endangered: 25
Vulnerable: 201
Near threatened: 176
Least concern: 297

The Red List definitions

When water temperatures rise, coral polyps - tiny animals that build the reefs - expel the algae that usually live with them in a symbiotic relationship. The corals lose their colour, with reefs taking on a bleached appearance, and begin to die off because the algae are not there to provide nutrients. The new analysis shows that before 1998, only 13 of the 704 coral species assessed would have been classified as threatened. Now, the number is 231. "It was a devastating event in terms of the destruction of corals, with 16% of reefs irreversibly destroyed - an incredible amount," said Kent Carpenter from Old Dominion University in Norfolk, Virginia, in the US. "The big problem is that if these bleaching events become more frequent as temperatures rise, as we suspect will happen, then we will see whole tracts of coral wiped out."

Adding to this, scientists have come to realise in recent years, is ocean acidification. The water absorbs some of the atmosphere's extra carbon dioxide, making it slightly more acid, enough to compromise the capacity of corals to build their skeletons, and snails to build their shells. "We know that high sea surface temperatures are bad for coral, but we also have an idea that some might be able to adapt," said Professor Carpenter. "But ocean acidification is a much more insidious thing. We don't know how bad it will be, but the evidence suggests it will be absolutely devastating, perhaps on the order of decades, perhaps on the order of years."

Complex web

But carbon dioxide is not the only culprit.

“ We either reduce our CO2 emissions now, or many corals will be lost forever ”

Julia Marton-Lefevre, IUCN

Overfishing in many regions - especially the use of dynamite to fish in East Asia and heavy trawls that reduce reefs to rubble - the excavation of building materials from reefs, coastal development, invasive species and pollution are all fingered in the new analysis.

The Caribbean shows how the threat jigsaw fits together.

Coastal development and farming produce effluent, which stimulates the growth of types of algae that smother growing coral.

Meanwhile, fishermen are catching fish that would usually graze on these

algae.

In this stressed condition, coral then fall prey more easily to disease, such as white-band disease which has swept through elkhorn and staghorn corals in the region.

The line taken by many scientists and campaigners is that these problems should be easier to tackle than the rising tide of greenhouse gas emissions; so this is where attention should be concentrated.



Natural predator

 [Enlarge](#)

[Enlarge Image](#)

Along Australia's Great Barrier Reef, protected areas have been established in the sea, and the use of fertilisers controlled on land to reduce pollution.

Recent research there has also shown that algae-munching fish can clean up smothered coral.

But there is another view; that these measures can only reduce and delay the inevitable impacts of rising greenhouse gas emissions.

The political response to climate change, said Alex Rogers, could be likened to "fiddling while Rome burns".

"Could you imagine if a single event wiped out 16% of the Amazon forest, or 16% of ecosystems in the UK?" he asked.

"I don't think politicians and the public are aware of the gravity of the situation we're in regarding coral reefs and other marine ecosystems."

Beyond value?

About one quarter of marine species are believed to depend on coral at some stage of their development. Many fish live their entire lives on reefs, while others use them as nurseries; presumably if the coral dies out, so do the fish. The economic impact of losing coral is also significant.



Climatic factors make coral more vulnerable to disease

Estimating the monetary value of natural ecosystems is far from being an exact science.

But one assessment published two years ago by the UN Environment Programme (Unep) concludes reefs provide services worth on average between \$100,000 and \$600,000 (£50,000 and £300,000) per square kilometre each year.

That gives a total global value between \$30bn and \$180bn (£15bn and £90bn) annually. In some regions, such as Sri Lanka, the value has been estimated to be 10 times the global average.

The same assessment concluded that protecting areas of reef costs about 0.2% of the value they bring.

The new assessment forms one element of a major project to measure threats to ocean ecosystems, the Global Marine Species Assessment, a joint initiative of the International Union for the Conservation of Nature (IUCN) and Conservation International (CI).

It will form part of the new IUCN Red List of Threatened Species, due to be published in October.

The IUCN's director general, Julia Marton-Lefevre, said world leaders faced a stark choice.

"We either reduce our CO2 emissions now, or many corals will be lost forever."

ADVERTISEMENT

Trawlers damage reefs (SeaWeb)

Richard.Black-INTERNET@bbc.co.uk