

Call to heal the world's coral reefs

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There is still time to save the world's ailing coral reefs, if prompt and decisive action can be taken to improve their overall health, leading marine researchers say.

Writing in the journal *Trends in Ecology and Evolution*, eminent marine scientists from Australia and the USA have called for an international effort to improve the resilience of coral reefs, so they can withstand the impacts of [climate change](#) and other human activities.

"The world's coral reefs are important economic, social and environmental assets, and they are in deep trouble. How much trouble, and why, are critical research questions that have obvious implications for formulating policy and improving the governance and management of these tropical maritime resources," explains Jeremy Jackson from the Scripps Institution of Oceanography.

The key to saving the reefs lies in understanding why some reefs degenerate into a mass of weeds and never recover – an event known as a 'phase shift' – while on other reefs the corals manage to bounce back successfully, showing a quality known as resilience.

This underlines the importance of managing reefs in ways that promote their resilience, the researchers say.

They presented evidence that coral decline due to human activity has been going on for centuries, but has been particularly alarming in the past 50 years. In all some 125,000 square kilometres of the world's

corals have disappeared so far.

The most recent global report card (2008) estimated that 19% of all reefs were effectively lost, another 15% were critical and likely to be lost in 10-20 years, and a further 20% are under threat from local human pressures (already experiencing 20-30% loss of corals). The remaining 46% of reefs were at low risk from direct human impacts, but were nevertheless vulnerable to climate change and ocean acidification.

"We have a very good scientific understanding of what causes reefs to decline – what we now need is a clearer picture of how to help them back onto the reverse trajectory," says lead author Professor Terry Hughes from the Australian Research Council Centre of Excellence for Coral Reef Studies at James Cook University.

Taking an optimistic view, the researchers argue there is compelling evidence from sites in Hawaii, Australia's Great Barrier Reef, the Caribbean, Bahamas and Philippines that the degradation and disappearance of corals can be arrested and reversed with the right management:

- In Hawaii, where ending sewage discharges allowed corals in Kanehoe Bay to recover
- In [Australia](#), where weed-eating fish played a decisive role in keeping seaweed down while the corals fought back
- In the Caribbean where recovering sea urchin populations are helping to keep down weed and allow corals to recover
- In the Bahamas and Philippines, where controls on over fishing for parrot fish and other weed-eaters, also helped to restore coral

cover.

"The coral reef crisis is a crisis of governance," says co-author Peter Mumby from the University of Queensland.

The team has formulated the scientific lessons from resilient reefs into a set of management advice which governments can adopt to give coral reefs a fighting chance:

- Empower and educate local people to look after their own reefs
- Change land uses that cause damaging runoff and sediment
- Control not only fishing, but also fish markets to protect herbivorous fish
- Integrate resilience science with reef management and support for local communities in restoring their reefs
- Improve laws that protect coral reefs globally
- "Confront climate change as the single most important issue for coral reef management and conservation by sharply reducing greenhouse gas emissions."

On climate change they caution: "Without urgent action, unchecked global warming and ocean acidification promise to be the ultimate policy failures for coral reefs. Although it is possible to promote the recovery of reefs following bouts of bleaching via local actions such as improving water-quality and protecting herbivores, these interventions alone cannot climate-proof reefs."

"The clear message from our research, and that of other marine scientists, is that the world's [coral reefs](#) can still be saved... if we try harder," Prof. Hughes says.

More information: Their article "Rising to the challenge of sustaining coral reef resilience" by Terry P. Hughes, Nicholas A.J. Graham, Jeremy B.C. Jackson, Peter J. Mumby and Robert S. Steneck appears in the latest issue of *Trends in Ecology and Evolution (TREE)*.

Provided by ARC Centre of Excellence in Coral Reef Studies

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