

Bringing coral reefs back from the brink

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Shocks caused by climate and seasonal change could be used to aid recovery of some of the world's badly-degraded coral reefs, an international team of scientists has proposed.

A new report by Australian and Swedish [marine scientists](#) in the journal *Frontiers in Ecology and the Environment* suggests that it may be possible to restore living coral cover to a badly-degraded [reef system](#) – though not easy.

With 70 per cent or more of the world's [coral reefs](#) now assessed as degraded, adopting a business-as-usual approach to how we use and manage reefs is no longer an option, says lead author of the report Nick Graham.

"We are unlikely to be able to keep many of the world's reefs in a pristine state, but with good management we may be able to maintain them in a coral-dominated condition and in some cases we may be able to bring back reefs from a degraded state," he explains.

The researchers have taken heart from examples on land in desertified landscapes; exceptional falls of rain, in combination with controls on grazing pressure, can result in widespread regrowth of [natural vegetation](#).

They argue that coral reef managers may be able to take advantage of shocks like [tropical storms](#), periods of [cloudy weather](#) or even strong seasonal effects on abundance to restore coral cover on degraded reefs.

"Normally we think of these shocks as damaging to coral reefs – but research suggests they are just as damaging to the organisms that can replace coral. In other words they may act as a circuit-breaker that allows corals to regain control of a reef."

The key to the new thinking is resilience: healthy corals reefs are naturally resilient to shocks – but damaged ones may become overgrown with sea weeds, and the corals vanish.

"Weed-dominated systems are pretty resilient too and, once established, it is very hard to restore the corals," Dr Graham explains.

"However a weed-dominated reef can be damaged by big storms too. Cloudy weather and [seasonal changes](#) in water temperature can also cause the weeds to die back.

"This dieback of weeds opens a window through which corals can re-establish."

The key to bringing back corals is exactly the same as preventing coral cover being lost in the first place, Dr Graham says – reducing human impacts through regulation of fisheries and water quality. If reefs are prepared in this way, they may bounce back when a window for recovery opens.

Prof David Bellwood emphasized that "When it comes to saving our coral reefs, prevention is always better than cure and early action is important to slow or reverse degradation.

The researchers emphasize that both protection and recovery of the world's coral reefs call for a fundamental change in how people interact with and use reef ecosystems.

"Until now the focus has mainly been on conserving small parts of a reef in marine protected areas, said Prof Bellwood- we're talking about broader approaches to change the relationship between humans and coral reefs to reduce human impacts across the whole ecosystem."

The paper concludes "Although the composition of coral reefs will likely continue to vary over time, it may be possible to maintain coral-dominated reefs and their associated ecosystem goods and services... Scientists and managers could take advantage of opportunities for change by harnessing shocks and natural variability as potential stimuli for beneficial shifts in ecosystem states."

The paper "Managing resilience to reverse phase shifts in coral reefs" by Nicholas AJ Graham, David R Bellwood, Joshua E Cinner, Terry P Hughes, Albert V Norström and Magnus Nyström appears in the journal *Frontiers in Ecology and the Environment*.

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