

Speak for the reefs

One of the most visible impacts of current climate change is the catastrophic bleaching and death of corals in reefs around the world. This issue of *Nature Ecology & Evolution* and an online Focus highlight recent research documenting the transformation of these systems.

In November of last year, the temperature in the coastal town of Cairns in northeastern Australia surpassed 40 °C for three days in a row, breaching temperature records before the southern summer had even started. The forecast predicts more extreme heat over the coming months, setting the stage for what will probably be a third consecutive year of devastating coral bleaching in the nearby Great Barrier Reef. The reef system, listed as a World Heritage site, is already being ravaged by climate change, like other reefs around the world.

This issue contains three papers adding to our understanding of coral reef biology and of human impacts on these systems worldwide. Looking at the [impact of bleaching on food security in coral-reef fisheries](#), James Robinson and colleagues present 20 years of catch and habitat data from the Caribbean that span a bleaching-induced mass coral mortality event. The authors show that catch yields were maintained despite post-bleaching habitat conversion to macroalgal dominance, but species composition changed and catch instability increased. In an accompanying [News & Views](#), Alice Rogers describes this as a possible story of hope for fishing communities, but highlights the cautionary message from the data: maintained productivity relies on the continued availability of substantial patches of healthy reef, which may not be present in severely or frequently disturbed reefs.

In [another paper](#), Cody Clements and Mark Hay demonstrate the importance of coral diversity to the maintenance and recovery of healthy reefs. The authors manipulated the composition of coral species in artificial gardens within a degraded, macroalgal-dominated Fijian reef over 16 months and found that loss of coral diversity can suppress the growth and survival of remaining corals. As J. Emmett Duffy discusses in his related [News & Views](#), this shows that beneficial effects of biodiversity on community health and function extend beyond terrestrial contexts to coral reefs as well.

Studying reef fish, Samuel Borstein and co-authors describe how [functional traits](#)

[evolve fastest](#) in trophic specialists with narrow diet breadths—at both low and high trophic positions. In their [News & Views](#), Mariana Bender and Osmar Luiz speculate about how local extinctions caused by overfishing may interact with this evolutionary trend to undermine the potential for future species diversification.

The science of coral reefs is covered by several *Nature* journals, and this issue is also accompanied by an online Focus on coral reefs, showcasing this recent research and opinion content. These publications are overwhelmingly focussed on how our activities are destroying these precious ecosystems—locally through pollution and harvesting, and insidiously through ocean heating, acidification and deoxygenation.

Three of the papers in this Focus document the effects of the 2016 and 2017 back-to-back bleaching events on the Great Barrier Reef ([Nature](#) **560**, 92–96, 2018; [Nat. Clim. Change](#) **9**, 40–43, 2019; and [Nature](#) **556**, 492–496, 2018). Coral cover diminished by up to 50% at some locations following the 2016 event and by another 20% in 2017. The corresponding author of two of those papers, Terry Hughes, has expressed on Twitter ([@ProfTerryHughes](#)) his profound worry about a potential third-in-a-row bleaching event on the Great Barrier Reef this summer, and his dismay at the Australian government's [abysmal lack of progress towards meeting emissions reductions targets](#) and decisions to allow energy company Adani to build a new coal mine in Queensland.

In November 2018, Hughes received the John Maddox Prize—awarded annually by *Nature* and the charity Sense About Science to individuals who promote sound science and evidence despite facing difficulty or hostility. Hughes was commended for his efforts in communicating the evidence for the effects of bleaching on reefs worldwide, in the face of personal criticism and attempts to discredit his research by some politicians and tourism-industry representatives.

Hughes has been vocal in his [frustration about far-fetched attempts at mitigation](#)

[of damage to coral reefs that are grabbing media attention](#). In Australia, for example, the federal government has commissioned a trial of giant fans designed to cool water down, despite [expert advice](#) describing the idea as 'a major departure from reality' and suggesting that there are more risks than benefits. Even restoration projects, [such as the use of underwater robots to spread lab-reared coral larvae](#), seem likely to have slight impact in the face of global change.

The coral reef Focus also contains a *Nature Ecology & Evolution* [obituary for Ruth Gates](#), a tireless coral reef researcher and conservation advocate. Authors Peter Edmunds and Virginia Weis write of her efforts to inform the public about coral reefs and of how her infectious enthusiasm for coral biology inspired students and colleagues. Gates remained [resolutely optimistic about the research community's ability to find ways to help reefs](#), such as through engineering resilient 'super corals', even while acknowledging the tandem need to address climate change.

Through different ways, the outreach of Hughes, Gates and other outspoken researchers raises public awareness and puts pressure on governments and businesses to recognise and lessen human impact on coral reefs using evidence-based approaches. We can all contribute to this. Local mitigation measures may do their bit, but the indisputable main danger to coral reefs worldwide is climate change—and so the main way we can help reefs is by pushing for policy change, urgently. Australia's next federal election is likely to be held in the few coming months. All Australian scientists should speak up in their local communities and to their members of parliament to encourage campaigning and voting with a mind to environmental and emissions policies. And even researchers working thousands of kilometres from a coral reef can use the devastation of these iconic and vital ecosystems to incite change. □

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