

Under climate change, winners and losers on the coral reef

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As ocean temperatures rise, some species of corals are likely to succeed at the expense of others, according to a report published online on April 12 in the Cell Press journal *Current Biology* that details the first large-scale investigation of climate effects on corals. Image: Hughes et al. *Current Biology*

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"The good news is that, rather than experiencing wholesale destruction, many coral reefs will survive climate change by changing the mix of coral species as the ocean warms and becomes more acidic," said Terry Hughes of James Cook University in Australia. "That's important for

people who rely on the rich and beautiful coral reefs of today for food, tourism, and other livelihoods."

In an attempt to understand the sorts of changes that may take place as the world's oceans warm, the researchers examined the coral composition of reefs along the entire length of Australia's Great Barrier Reef. Earlier studies of climate change and corals have been done on a much smaller geographical scale, with a primary focus on total coral cover or counts of species as rather crude indicators of reef health.

"We chose the iconic [Great Barrier Reef](#) as our natural laboratory because water temperature varies by 8 to 9 degrees Celsius along its full length from summer to winter, and because there are wide local variations in pH," Hughes explained. "Its regional-scale natural gradients encompass the sorts of conditions that will apply several decades from now under business-as-usual [greenhouse gas emissions](#)."

In total, the researchers identified and measured more than 35,000 [coral colonies](#) on 33 reefs. Their survey revealed surprising flexibility in the assembly of corals. As they saw one species decline in abundance, some other species would tend to rise. The waxing or waning of any given coral species the researchers observed as they moved along the coastline occurred independently of changes to other [coral species](#).

Hughes concludes that corals' response to climate change is likely to be more complicated than many had thought. Although he now believes that rising temperatures are unlikely to mean the end of the coral reef, critical issues remain.

"If susceptible table and branching species are replaced by mound-shaped corals, it would leave fewer nooks and crannies where fish shelter and feed," he said. "Coral reefs are also threatened by much more local impacts, especially by pollution and overfishing. We need to address all

of the threats, including climate change, to give [coral reefs](#) a fighting chance for the future."

More information: Hughes et al.: "Assembly rules of reef corals are flexible along a steep climatic gradient."

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