** Embargoed until 2PM AEST Monday 4 July 2023 **

How do we decide which coral species to underwrite in a warming future?

Coral scientists are squaring up to the dilemma of selecting which and how many coral species will have their future underwritten by cutting-edge reef restoration research.

With climate change an increasing threat to the world's coral reefs, an international team of scientists has devised an approach to selecting the coral species to be supported by research that could be used to restore damaged reefs.

Their findings, published today in the Journal of Applied Ecology, will guide decisions in reef restoration programs around the world including Australia's Reef Restoration and Adaptation Program and the Australian Coral Reef Resilience Initiative.

Senior author Professor Madeleine van Oppen, from University of Melbourne (U Melbourne) and Australian Institute of Marine Science (AIMS), said with more than 600 different species of coral on the Great Barrier Reef alone, scientists needed to decide which species were the most important to invest finite resources into researching, to optimise methods to increase coral reef survival in a warming world.

"If a program only has funds to focus on 20 or 30 coral species, it will want to focus on the sets of species to get the most ecosystem bang for its buck," she said.

"Current coral restoration programs tend to focus on easy-to-collect, fast-growing coral species, which have similar characteristics and cannot support ecosystem services on their own."

The lead author, research professor Dr Joshua Madin of Hawai'i Institute of Marine Biology, said ensuring species diversity and ecosystem function in future coral reefs was critical.

"The ecosystem services coral reefs provide us, such as coastal protection and fisheries, depend upon coral species with a broad range of 'life history strategies', for example slow to fast growing, mounding to branching shapes, and under to upper storey," he said.

The researchers combined databases of traits of corals from Australia's Great Barrier Reef with their ecological characteristics, including their resistance to thermal bleaching, to see how best to select sets of species for restoration using a hedging approach, much like that used for investment portfolios.

"Selection based on ecological characteristics is important for hedging against future species loss, whereas trait diversity is important for hedging against the loss of certain ecosystem services, reef-building groups, life history categories, and evolutionary variety," Dr Madin said.

This approach provides a simple framework for aiding restoration practitioners in selecting target species for their projects, depending on spatial scale and resources.

It was developed during a workshop organised by U Melbourne and AIMS, with today's paper being led by the University of Hawai'i.

***Selecting Species for Restoration*, Journal of Applied Ecology:**
https://besjournals.onlinelibrary.wiley.com/doi/10.1111/1365-2664.14447

Images are available here.

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Funding:

Funding for this work was provided by the Australian Research Council, Defense Advanced Research Projects Agency, National Science Foundation, and the Reef Restoration and Adaptation Program, which is funded by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.

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