

Climate is changing the Great Barrier Reef

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Satellite measurement of sea surface temperatures has yielded clear evidence of major changes taking place in the waters of Australia's Great Barrier Reef over the past 25 years, marine scientists have found.

The changes have big implications for the future management of the GBR and its [marine protected areas](#) say Dr Natalie Ban and Professor Bob Pressey of the ARC Centre of Excellence for Coral [Reef Studies](#) and James Cook University, who led the study with Dr Scarla Weeks from the University of Queensland.

"When we looked back at satellite data collected since 1985, we found evidence that most of the regions of the GBR are changing significantly, in terms of sea surface temperature – especially in the southern part of the [reef](#)," Dr Ban, who is the lead author of a new scientific paper on the issue, says.

"Risk of coral bleaching increases with higher water temperatures. Across the whole reef we found [water temperatures](#) increasing by an average of 0.2 of a degree over a quarter of a century – but the increase was significantly more in some areas.

"For example, off Rockhampton the water has warmed by about half a degree over the last 25 years."

The changes were also altering the [seasonal patterns](#) of water temperature at particular places along the reef, Dr Ban says. "In some areas summer is coming earlier and lasting longer; in others, both

summers and winters are warmer than in the past. This all affects the sea life."

The research has revealed [temperature conditions](#) are dynamic, with warmer waters moving in both space and time – posing new questions for the management of Green Zones and other protected areas which tend to be fixed.

"Some people think we ought to have the highest levels of protection for areas that are changing the least, so they remain as refugia to recharge the surrounding reef areas," Dr Ban says.

"Others argue the opposite – that the greatest protection should be afforded to the most vulnerable areas.

"Others still argue that Green Zones and other types of restrictions should migrate geographically along with the climate – that their boundaries should change gradually in line with trends in water temperature and reef biology.

"Our aim in publishing this paper on what is actually happening is to stimulate and inform this discussion, so that we can come up with the best and most flexible system for managing the GBR through what will undoubtedly be momentous environmental change."

The present Green Zones, where fishing is prohibited, cover the same temperature ranges as the whole reef, she says – but the debate on what to do next is only now getting under way.

With a view to encouraging discussion, the team has put forward three alternative scenarios for how the temperature data can be used to design appropriate management strategies for protected areas.

"We need to understand what we are managing for, to have the best management plan," she explains.

Australia is recognised as a world leader in managing [coral reefs](#), and was again leading global thinking about how to best manage them as waters warm and conditions change. "We hope that our research will also prove valuable to countries of the Coral Triangle who are trying to manage the world's centre of coral diversity through this challenging period," she says

More information: Their paper "Conservation Objectives and Sea-Surface Temperature Anomalies in the Great Barrier Reef" by Natalie C.Ban, Robert L Pressey and Scarla Weeks, appears online in the journal *Conservation Biology* at [onlinelibrary.wiley.com/doi/10 ... 39.2012.01894.x/full](https://onlinelibrary.wiley.com/doi/10.1111/cob.12189)

Provided by ARC Centre of Excellence in Coral Reef Studies

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