

Historic coral collapse on Great Barrier Reef

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Australian marine scientists have unearthed evidence of an historic coral collapse in Queensland's Palm Islands following development on the nearby mainland.

Cores taken through the coral reef at Pelorus Island confirm a healthy community of branching Acropora corals flourished for centuries before European settlement of the area, despite frequent floods and cyclone events. Then, between 1920 and 1955, the branching Acropora failed to recover.

Scientists from the ARC Centre of Excellence for Coral [Reef Studies](#) at the University of Queensland say the rapid collapse of the coral community is potential evidence of the link between man-made changes in water quality and the loss of corals on the Great Barrier Reef.

It adds weight to evidence that human activity is implicated in the recent loss of up to half of the corals on the Great Barrier Reef, says Professor John Pandolfi of CoE CRS and UQ.

The destruction of branching corals coincided with wide-spread land clearing for grazing and agriculture which took place in the nearby Burdekin River catchment in the late 19th Century, causing an increase in the amount of mud and nutrients into the GBR lagoon, says the lead author of a new study on the collapse, Dr George Roff, of CoE CRS and UQ.

"Corals have always died from natural events such as floods and

cyclones, but historically have shown rapid recovery following disturbance. Our results suggest that the chronic influence of European settlement on the Queensland coastline may have reduced the corals ability to bounce back from these natural disturbances" he says.

The team took cores from dead coral beds on the western side of Pelorus Island and then analysed their coral species composition and their age, using high-precision uranium [dating methods](#) pioneered by a team lead by one of the study's co-authors, Jian-xin Zhao at the University of Queensland's Radio Isotope Facility. They then aligned this with records of cyclones, floods and [sea surface temperatures](#) over the same period.

"Our results imply ... a previously undetected historical collapse in coral communities coinciding with increased sediment and nutrient loading following European settlement of the Queensland coastline," the researchers report in their paper.

"Significantly, this collapse occurred before the onset of the large-scale coral bleaching episodes seen in recent decades, and also before detailed surveys of GBR coral began in the 1980s.

"And, even more significantly, we found no similar collapse occurring at any time in the previous 1700 years covered by our cores. Throughout this period the branching corals continued to flourish – despite all the cyclones and natural impacts they endured."

At two sites the Acropora corals vanished completely while at a third there was a marked shift in [coral species](#) from Acropora to Pavona, which the researchers say parallels similar observations of human impacts in the Caribbean.

"On a global scale, our results are consistent with a recent report from the Caribbean region, where land use changes prior to 1960 were

implicated in a significant decline in Acropora corals in near-shore reefs."

The research has raised another realistic possibility – that current coral surveys may significantly underestimate the possibility of major 'unseen' shifts such as these having taken place in the period before effective coral records began, the researchers suggest. In other words, the GBR may be more degraded than it appears to today's eyes.

"We know that at some sites in the region, branching [Acropora](#) was the dominant reef builder until recent times. This raises the question of why some inshore reefs appear resilient, while others failed to recover from disturbance" says Dr Roff.

"The research underlines that there is a very strong link between what we do on land – and what will happen to the [Great Barrier Reef](#) in future. It encourages us to take greater and more rapid steps to control runoff and other impacts on land," says Prof. Pandolfi.

More information: Roff, G. et al., Palaeoecological evidence of a historical collapse of corals at Pelorus Island, inshore Great Barrier Reef, following European settlement. *Proceedings of the Royal Society B*.

Provided by ARC Centre of Excellence in Coral Reef Studies

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