

World-class protection boosts Australia's Great Barrier Reef

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Australia's Great Barrier Reef (GBR) is showing an extraordinary range of benefits from the network of protected marine reserves introduced there five years ago, according to a comprehensive new study published in the *Proceedings of the National Academy of Sciences*.

The scientific team, a 'who's-who' of Australian coral reef scientists, describe the findings as "a globally significant demonstration of the effectiveness of large-scale networks of marine reserves".

"Our data show rapid increases of [fish](#) inside no-take reserves, in both reef and non-reef habitats," says Professor Terry Hughes, Director of the ARC Centre of Excellence for Coral Reef Studies, speaking today at the American Association for the Advancement of Sciences meeting in San Diego, California.

"Critically, the reserves also benefit overall ecosystem health and resilience", says lead author Dr Laurence McCook of the ARC Centre of Excellence for Coral Reef Studies and [Great Barrier Reef](#) Marine Park Authority.

"Outbreaks of coral-eating, crown-of-thorns starfish are less frequent on no-take reefs, which consequently have a higher abundance of healthy corals after outbreaks."

"In concert with other measures, the reserve network is also helping the plight of threatened species like dugongs and marine turtles", says Dr McCook.

"There is now very strong evidence that no-take zones benefit fish populations within those zones. The numbers of coral trout doubled on some reefs within two years of closure to fishing," reports Dr Hugh Sweatman, from the Australian Institute of Marine Science.

Overall, the team concluded "With 32% of GBR reef area in no-take reefs, and fish densities about two times greater on those reefs, fish populations across the ecosystem have increased considerably." The researchers predict that as protected fish inside no-take areas grow larger and larger, they will contribute many more larvae to the whole ecosystem. Therefore, the benefits of no-take areas are expected to extend far beyond the no-take boundaries, replenishing surrounding areas that are open to fishing.

Larger, more mobile species, such as sharks, have benefited less than residential fishes, but nevertheless show clear effects of protection: grey reef sharks are much more abundant on highly protected reefs than on fished reefs.

However the team cautioned that there was evidence of some poaching in no-take zones, reinforcing the need for education and enforcement.

The researchers say that preliminary economic analysis points to considerable net benefits, both to the environment and to tourism, fishing and related enterprises.

"The Great Barrier Reef generates far more economic benefit to Australia than the cost of protecting it" they added.

"Given the major threat posed by climate change, the expanded network of marine reserves provides a critical and cost-effective contribution to enhancing the resilience of the Great Barrier Reef," the scientists comment.

"In summary, the network of marine reserves on the GBR has brought major, sustained ecological benefits, including for target fish and sharks.

"Overall, the results demonstrate that the large-scale network of marine reserves on the GBR is

proving to be an excellent investment - in social, economic and environmental terms," they conclude.

More information: The paper "Adaptive management of the Great Barrier Reef: a globally significant demonstration of the benefits of a network of marine reserves" by Laurence J. McCook, et al. is published in the current issue of the *Proceedings of the National Academy of Sciences (PNAS)*.

Provided by ARC Centre of Excellence in Coral Reef Studies

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