

A big lesson from the reef

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The lesson from Australia's Great Barrier Reef is that we have to protect its biodiversity - because biodiversity in turn protects us.

That's the message from Professor Sean Connolly from the ARC Centre of Excellence for Coral Reef Studies and James Cook University who today receives the Australian Academy of Science's prestigious Fenner medal for his pioneering work in understanding how ecosystems develop and maintain their amazing diversity.

"The Great Barrier Reef is one of the richest systems of living things on the Planet. Understanding how it became so rich, and how to keep it that way, is essential for its survival - as well as for all our industries and activities that depend upon the Reef," he says.

Prof. Connolly says his research shows that that species diversity lies at the heart of stable ecosystems.

Since ecosystems help to support humanity in many ways - with food, clean air and water as well as livelihoods, industries and recreation - keeping them in a condition to continue to support us is vital, he argues.

"As a rule, ecosystems with many species are more stable over time. This is because, as conditions change, the system is more likely to have species that can cope with the new conditions. Having lots of species reduces the likelihood of a major ecological collapse.

"In other words, high [biodiversity](#) is nature's insurance policy."

"But it is also our insurance policy, because it protects and assures the many services that ecosystems provide us."

Prof. Connolly says that the many rare species the GBR contains make the system more robust overall. "If conditions change, then common species may become rare and rare species common - but the system as a whole survives. It's very much on our interest to manage and care for it so this keeps on happening."

Prof. Connolly has specialized in linking observations and experiments in [marine ecosystems](#) with mathematical models of how populations of different species change and interact over time - and how this drives the dynamics of biodiversity itself, now and in the deep past.

Among his achievements he has produced a model that helped pinpoint a previously unknown impact of ocean acidification caused by high CO₂ in the atmosphere - increased loss of coral species due to storm damage.

His work on the geographic ranges of coral species has challenged the conventional view that conservation should focus mainly on 'hot spots' of species diversity.

Sean was a co-author of the Townsville Declaration on Coral Reef Research and Management, hailed by The Australian newspaper as "a remarkable example of an increased willingness by governments to heed scientific advice."

He has identified a continued collapse in the populations of reef sharks on the Great Barrier Reef from over-fishing and his work is now helping to improve shark management in Queensland.

Sean Connolly ranks in the top 1 per cent of the world's ecological scientists in terms of the number of times his work is cited by other

researchers. He combines mathematical and statistical modelling with fieldwork and laboratory experiments to study biological turnover at all scales, including population dynamics, [species](#) interactions and biodiversity, and macroevolution.

He received his doctorate in 1999 from Stanford University (USA) for research on the ecology of rocky shores. In 1999-2000, he was a postdoctoral research fellow at the University of Arizona (USA) where he examined global dynamics of marine biodiversity in the fossil record. In 2000, he came to James Cook University in Australia to lead a research program in ecological modelling applied to [coral reefs](#).

Sean has 32 publications in leading international journals including *Nature*, and he has supervised 22 Postgraduate and Honours students since 2001. He currently holds an Australian Professorial Fellowship from the Australian Research Council, and is Program Leader of Understanding and Managing Coral Reef Biodiversity in the ARC Centre of Excellence for Coral Reef Studies.

The Fenner Medal honours the outstanding contribution to science of Professor Frank Fenner, AC, CMG, MBE, MD, FAA, FRS. It recognises distinguished research in biology by scientists under 40 years of age. The award is made annually to candidates for research conducted mainly in Australia.

Source: ARC Centre of Excellence in Coral Reef Studies

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