



Conservation through understanding

One researcher provides hope for the reefs of Christmas Island

Rising abruptly in the eastern Indian Ocean, Christmas Island is bound by a narrow fringing coral reef that is home to unusual secrets waiting to be discovered. Crystalline oceanic water bathes the reef edge and provides an indigo backdrop for gigantic schools of batfish, seasonal aggregations of threatened whale sharks, dramatic cave systems and thriving coral gardens that are inhabited by an unusual mix of coral reef fishes.

Only recently has research begun to uncover the unique marine life at Christmas Island, which is proving to be just as breathtaking as its widely regarded terrestrial environment. It is not the experts leading the expeditions, but a band of young marine biologist volunteers, inspired by new discoveries and dedicated to conservation. Heading this group is Jean-Paul Hobbs, a Marine Biology PhD student with James Cook University's ARC Centre of Excellence for Coral Reef Studies.

Jean-Paul first came to Christmas Island as a fresh-faced university graduate eight years ago and has been studying the fish and coral communities ever since. "There's so much waiting to be discovered in the waters around the Island, and the thrill of the unknown is a major driving factor of this work," Jean-Paul says.

◀ Marine biologist Jean-Paul Hobbs continues to be thrilled by the unknown.

▼ By monitoring how the reef changes over time, it is possible to determine how specific impacts are affecting the marine life.



Did You Know?

Worldwide coral reefs are in danger, with an estimated 20 percent already destroyed beyond repair and a further 50 percent at risk of collapse. Christmas Island's corals are in a more fortunate situation than others, as passionate locals, tourist operators and government officials work together to safeguard the reef.

His research is revealing unique aspects of Christmas Island's coral reefs that would otherwise have remained hidden amongst the complex coral reef community. Included amongst his contributions are 30 new fish records, adding to an ever-growing list of 630 species found in the waters around Christmas Island. His discoveries are revealing a reef that is unlike any other in the world.

A major focus of Jean-Paul's research is a rare phenomenon known as marine fish hybridisation, which arises through the interbreeding of different species. Christmas Island is uniquely positioned on a convergence zone of Indian and Pacific Ocean marine fauna, making it a major meeting place for closely related "sister" species that are not normally found living on the same reef.

►▲ Students of the Christmas Island District School learn about the very real impacts affecting coral reefs on their doorstep.

► Students tag bleached coral to monitor their survival.

▼ An growing list of 630 species are found in the waters around Christmas Island.



"At first, I noticed a spectacularly coloured angelfish, then an unusually patterned butterfly fish," Jean-Paul recalls. "The more we looked, the more we found." The total count of hybrid combinations found on Christmas Island's reefs stands at 14, the most recorded from any reef in the world.

The second part of Jean-Paul's efforts is to ensure the conservation of the unique marine life of Christmas Island. "A number of recent impacts are threatening the future of the Island's coral reefs and the challenge is to ensure that future generations can see this amazing wildlife," Jean-Paul says. His research team has established a detailed island-wide monitoring programme that includes training members of the local community who are keen to take stewardship of their reefs. By monitoring how the reef changes over time, it is possible to determine how specific impacts are affecting the marine life. This information is then provided to government agencies to guide them in the development of management strategies aimed at mitigating these impacts.

Although Christmas Island is isolated and surrounded by pristine Indian Ocean waters, Jean-Paul's monitoring has revealed that its reefs are vulnerable to human impacts. Earlier this year, the reefs were affected by a coral bleaching event. By studying the reefs response, he gained important insights into understanding how global warming will impact the Island's coral reefs. "It just goes to show you that if Christmas Island's reefs are bleaching, then nowhere is safe from rising sea temperatures," he says.

Education is also a major focus of Jean-Paul's work. He recently teamed up with Jacqui Foster, an Education Officer with the Western Australian Department of Fisheries, to teach the students of the Christmas Island District School about the very real impacts affecting coral reefs on their doorstep. The students each tagged a bleached coral to monitor their survival throughout the bleaching event. For the students, this was a valuable lesson about the serious impact global warming can have on coral reefs.

Other threats to Christmas Island's unique coral reefs have also been revealed through Jean-Paul's research. In 2008, the reefs experienced an outbreak of coral disease on the north coast of the Island. The greatest incidence of disease occurred at the sites closest to where phosphate from the local mine enters

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the water during heavy rain, or spills into the water during ship loading. Pollution has been linked to other disease outbreaks, and run-off from phosphate fertilisers is recognised as a major threat to the reef.

While research is beginning to unlock the marine secrets of Christmas Island, local and global impacts are threatening to destroy these secrets before they are fully appreciated. Through a combination of research, monitoring, education and the involvement of the local community and management agencies, Jean-Paul Hobbs is one of the many scientists around the world working to conserve Earth's fragile marine ecosystems. **AG**

Justin Gilligan is a freelance photojournalist with a degree in Marine Science and a passion for all things natural. His work has been published around the world, and his images have received international acclaim in prestigious photographic competitions.

How to help!
You can help by simply visiting Christmas Island. You can also volunteer your time with coral reef monitoring organisations such as Reef Check Worldwide (reefcheck.org), and assist them in the conservation and rehabilitation of coral reefs.