Participaton 'important for healthy marine parks'

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The involvement of locals is a key ingredient in the success of marine parks which protect coral reefs and fish stocks.

The largest-scale study to date of how coastal communities influence successful outcomes in marine reserves has found that human population pressure was a critical factor in whether or not a reserve succeeded in protecting marine resources - but so too was local involvement in research and management.

The team looked at how successful coral reef marine reserves were at conserving fish stocks. They studied 56 marine reserves from 19 different countries throughout Asia, the Indian Ocean, and the Caribbean.

"About ¾ of the marine reserves we studied showed a positive difference in the amount of fish inside compared to outside - so most reserves we studied were working" says Dr Josh Cinner of the ARC Centre of Excellence for Coral Reef Studies and James Cook University

"However, the differences weren't always large. The most successful reserves showed really big differences of 14 times the amount of fish inside compared to outside, but that wasn't always the case.

"What we were most interested in, was understanding what made some reserves more successful than others. One of the best predictors of how 'successful' a marine reserve was, is actually the size of the human

communities around the reserve - but interestingly, this varied in different regions.

"In the Indian Ocean, for example, where reserves are government-controlled and moderate in size (around six square kilometres on average), having lots of people nearby had a positive effect. But this could be because marine resources outside the reserve are heavily degraded, accentuating the healthier state of those inside the reserve.

"In the Caribbean, we found the opposite. Large human populations near reserves led to poor performance of the reserve - which may be due to low compliance or poor enforcement in marine parks near population centers," Dr Cinner said.

The other key ingredient for a successful marine reserve was the level of poaching in the reserve. But importantly, the team found that compliance with reserve rules was not just related to the level of enforcement, but also to a range of social, political, and economic factors which enabled people to co-operate better in protecting their marine resources. Reserves worked best where there was a formal consultation processes about reserve rules, where local people were able to participate in monitoring the reserve, and when ongoing training for community members was provided so that they could better understand the science and policy.

"It was clear that this type of local involvement was a very important factor in building the local support necessary to make reserves successful. Park agencies need to foster conditions that enable people to work together to protect their local environment, voluntarily, rather than focusing purely on regulations and patrols.

"Enforcement will almost always be an important part of a successful reserve, but there is a lot of ocean out there to patrol and many of the

places we studied were poor, developing countries which don't have the luxury of being able to invest in lots of patrol boats.

The team's report appears in the *Proceedings of the National Academy of Sciences* (PNAS) in a paper entitled "Marine reserves as linked social-ecological systems" by Richard Pollnac, Patrick Christie, Joshua E. Cinner, Tracey Dalton, Tim M. Daw, Graham E. Forrester, Nicholas A. J. Graham, and Timothy R. McClanahan.

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