Fishing ban guards coral reefs against predatory starfish outbreaks

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No-take marine reserves where fishing is banned can have benefits that extend beyond the exploited fishes they are specifically designed to protect, according to new evidence from Australia's Great Barrier Reef reported in the July 22nd issue of *Current Biology*, a Cell Press publication. Researchers have found that outbreaks of large, predatory crown-of-thorns starfish (*Acanthaster planci*), which can devastate coral reefs, occur less often in protected zones, although they don't yet know exactly why.

" The geographic range of A. planci includes the most biodiverse as well as some of the most threatened reefs on earth," said Hugh Sweatman of the Australian Institute of Marine Science. "This study provides an additional argument for establishment of effective marine protected areas across the range, as refuges from exploitation and other threats and as sources for recolonization of damaged reefs to increase ecological resilience."

The crown-of-thorns starfish in question have up to 20 arms covered in "evil-looking spines," Sweatman said. Not only do they look menacing, but those spines are also extremely sharp and carry a painful toxin.

Now, Sweatman has found that no-take marine reserves can help prevent that vicious cycle. He compared the frequency of starfish outbreaks on no-take reefs to that on reefs that were open to fishing on the Great Barrier Reef, on the basis of results of an extensive monitoring program.

The initial zoning plan for the Great Barrier Reef Marine Park was fully implemented in 1989, with no-take zones covering 4.5 percent of the region. Subsequent surveys found that the relative frequency of outbreaks on reefs that were open to fishing was 3.75 times higher than on no-take reefs in the mid-shelf region, where most outbreaks occur.

He remains skeptical that exploited fish species are significant predators of starfish, but said there might be a "trophic cascade" where increased numbers of exploited fishes, many of which are carnivores, cause a decline in small predatory fishes that favors larger invertebrates. He speculates that those invertebrates may prey on the starfish when they are very small.

The Great Barrier Reef Marine Park was re-zoned in mid-2004, increasing the no-take zones from 4.5 percent to 33 percent of the area of the park, a move that Sweatman's group reported in the June 23rd *Current Biology* has led to a rapid comeback of coral trout in the area.

" Whatever the underlying mechanism, this study suggests that this increase should reduce the overall impact of future waves of *A. planci* outbreaks," he said. "That effect may be amplified if fewer reefs with starfish outbreaks mean less effective propagation of outbreaks from reef to reef."

Source: Cell Press