

Weeds on Coral Reefs Chase Away Fish

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6 June 2011—Overfishing threatens not just fish populations, but also the coral reefs that depend on seaweed eating fish to keep them healthy, according to a recent publication in *Ecology Letters*. Seaweed-eating fish, such as parrotfish and surgeonfish, are the natural weed control experts of coral reefs. But when the fish populations are reduced, the weeds grow larger—and the fish stop eating them.

“What we found is if weed gets dense enough, the fish won’t feed on it even if they’re there,” said David Bellwood, co-author of the article and professor of Marine Biology at James Cook University. “The bottom line is lots of weed scares off weed eating fish.”

Researchers designed plates of the brown seaweed *Sargassum*, the largest seaweed found on coral reefs, with varying densities of weed. The

Figure 1. *Sargassum*.

Image courtesy of NOAA (<http://oceanexplorer.noaa.gov/explorations/04etta/logs/aug25/media/sargassum.html>).



seaweed plates were then made available to fish in their natural environment off Orpheus Island, an inshore island of the Great Barrier Reef off the east coast of Australia. From video observations, fish were observed to have consumed less *Sargassum* when the plates contained a denser amount of the weed, indicating that they avoid densely weeded areas.

Bellwood believes fish may favor areas of lower density due to predator avoidance behavior. Predators of weed eating fish may hide in the dense weed, making it an unsafe place for fish to eat since they cannot see predators in time to escape.

Growth unabated

Sargassum generally grows close to shore. However, the weed will spread into the deeper water where corals grow if it is not kept back by weed-eating fish. Without enough consumption by fish, the weed continues to grow, eventually overtaking the coral and becoming the dominant species on the reef. The change in dominant species is referred to as a phase shift. These shifts can be difficult to reverse and are often responsible for killing coral and dislocating the fish that live on the reef.

“You get a small shift in weed levels, and it may cause the whole reef to go to hell in a hand basket,” Bellwood said.

The effort to maintain fish populations within the protected oceanic area of the Great Barrier Reef Marine Park includes strict regulations and license requirements for recreational fishers. Over 1500 fish species and 359 coral types live within the Park. The Orpheus Island study site used for the *Sargassum* research is located within the Park, but the Park does not include the entire Great Barrier Reef.

The full research paper “Suppression of herbivory by macroalgal density: a critical feedback on coral reefs?” can be read in *Ecology Letters*, 2011 edition 14. The paper is coauthored by Andrew S. Hoey and David R. Bellwood of the Australian Research Council Centre of Excellence for Coral Reef Studies and James Cook University.

Further Reading

Hoey AS, Bellwood DR. 2011. Suppression of herbivory by macroalgal density: a critical feedback on coral reefs? *Ecology Letters*: 14, 267-273.

ARC Centre of Excellence for Coral Reef Studies. Weed Eating Fish ‘key to reef survival.’ Press Release. 10 March 2011.

http://www.coralcoe.org.au/news_stories/herbivory.html

World Wildlife Fund Australia:
<http://www.wwf.org.au/ourwork/oceans/gbr/>

Great Barrier Reef Marine Park:
<http://www.gbrmpa.gov.au/>