

## Healthy microbes make for a resilient Great Barrier Reef

Written by Maxine Gatt, Editor, The Conversation

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Healthy microbes make for a healthy coral reef. And if that microbiological community is disrupted by overfishing, pollution or climate change, it can contribute to the decline of reefs.

A three-year study published this month in [Nature Communications](#), conducted on a reef in the Florida Keys, United States, has shed light on how microbes living on corals are instrumental to keeping coral reefs healthy, and how overfishing, pollution and climate change can destabilise the coral's natural defence and disrupt ecological communities.

According to the lead author of the study Dr Rebecca Thurber, from Oregon State University, healthy corals normally recover easily from small injuries, such as fish bites.

“In our experiment, 100% of the corals bitten in normal waters recovered. But in the presence of elevated nutrients, 66% died after they were bitten by fish, showing that nutrient pollution increases the vulnerability of corals to normal every day events,” she said.

Although this study focused on Caribbean ecosystems, it can inform threats to the Great Barrier Reef, said Dr Jon Brodie from James Cook University, who was not involved in the study.

[Coral bleaching](#) and warming [ocean temperatures](#) are already affecting tropical reefs, with coral cover already on the decline.

The addition of overfishing and nutrient pollution interact with the elevated temperatures creating more disease-causing bacteria, and this may make reefs less resilient to disruptive events such as cyclones.

According to Dr Zoe Richards, from Western Australian Museum, who was not involved in the study, the study shows “how easily an innocuous interaction like a fish feeding on a coral can turn deadly in overfished and polluted habitats, especially in summer”.

### Adding protection

The results suggest it's especially important to manage overfishing around important reefs, says Richards. This will help sustain the population of fish that feed on microbes that might otherwise increase in numbers and disrupt the normal microbial ecology.

“This will help suppress algal overgrowth and blooms of harmful bacteria, which are major drivers of coral mortality,” said Richards.

Another strategy to protect reefs is to protect the environment around them.

“Rehabilitating catchment areas, preventing clearing and erosion, along with protecting natural waterways and limiting herbicide and pesticide run-off are integral components of reducing nutrient pollution,” said Richards.

Even though climate change is warming the Great Barrier Reef, reducing the impact of other stressors could help maintain a healthy microbial balance.

“If we reduce ocean pollution and ensure that there are abundant fishes to remove the algae on reefs, corals can likely tolerate some increases in water temperatures,” said Thurber

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