

## Coral Crisis in the Caribbean

### An interview with Michelle Paddack, Ph.D.

By Katherine Cure

A recent study showed declines in coral reef fish along the entire Caribbean. The study, which pooled data from over 300 reefs and 273 fish species, shows declines in both fish we catch and those we don't. These falling species numbers are thought to be happening in response to massive declines in coral cover along the region since the 1970s. The findings, by lead researcher Michelle Paddack, were published in this year's April edition of *Current Biology*. Meta-analysis—the technique used—analyzes the result of multiple studies by pooling data. The methodology is a powerful tool for summarizing research done over long periods of time by multiple researchers. Paddack's quest, which included visits to all major marine labs in the Caribbean, looked at surveys from 48 different projects, some dating back to 1955. Most data used was unpublished, and required digging—asking hundreds of researchers for their data, and pulling in collaborators like Peter Mumby and Ross Roberston, renowned researchers in the field of coral reef fish ecology.



Researcher Michelle Paddack has documented coral reef fish declines across the Caribbean.

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**E Magazine:** Tell me about the declining fish populations in the Caribbean, and what you have discovered.

**Michelle Paddack:** What we are seeing in coral reefs is a 'fishing down of the food web,' a term introduced by fisheries biologist Daniel Pauly some years ago, meaning that we fish first the predatory fishes and then start collecting fish from lower trophic levels. At the beginning of this dataset, heavy fishing was common in the Caribbean and mainly targeted large predators; only recently has effort shifted into herbivorous fish, so we are just seeing that decline.

But the really significant thing that I am seeing is that the decline is occurring both for fish species that we fish and those that we do not fish, and the rate of change in both is pretty similar. This suggests that it's not just human fishing pressure causing these declines. Declines may be due to effects of declines in coral cover, which we know to be about 80% since 1970. It may be that this impact is only now starting to affect more fish species, like, for example, very small cleaner fish, which are declining very strongly.

**E:** So are ecological changes primarily to blame for the declines?

**M.P.:** I can't tell you if it's more, but I can definitely tell you that there's something besides fishing that's affecting fish populations.

My biggest constraint was finding data and having the resources to look for it, which in this case came from UK government funding. It doesn't matter that you went out to a little patch reef in San Blas and you counted only herbivores, for example, and I went out to a reef in Banco Chincorro and counted all fish species. Looking at the difference between my first and last survey, and the trajectory of change within my study, brings everything down to a common currency. Then I can compare my change to your change, and it's no longer apples and oranges, but variation.

**E:** How can we create Caribbean-wide solutions to this Caribbean-wide problem?

**M.P.:** It's tricky. The Caribbean is made up of more than 20 different countries and dependent territories, which makes the task of protecting it difficult. The Great Barrier Reef is the model in marine conservation and it took Australians quite a while to protect 20% of their reefs and they're a single country; a single developed country that can take a management action across their entire Great Barrier Reef system. But when we have different countries involved and many of those countries and territories lack the political will or the financial ability to take action, we are challenged. I believe that it's very important for the wealthier countries to take the lead and help do what we can. And there are a lot of good efforts occurring now, trying to pull the Caribbean together as a community of managers and conservation biologists.



Decline in fish species is thought to be linked to declining coral cover—80% of which has been lost since 1970.

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On the individual scale there are also a lot of excellent efforts to do some marine zoning and establish marine protected areas. St. Lucia has had marine reserves for a long time and their reserves really work because they have worked with the community. Fishermen from St. Lucia talked to Belizean fishermen about their experiences: What is a marine reserve? How did it affect them? What are the positive things for them? We have to transfer that knowledge from the ground level,

so that it's not just some person flying in saying 'Hey a marine reserve could help you, just trust me,' but instead it's other fishermen saying 'I was resistant but it worked. I have more fish now and I have more tourism.' This is what really works.

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