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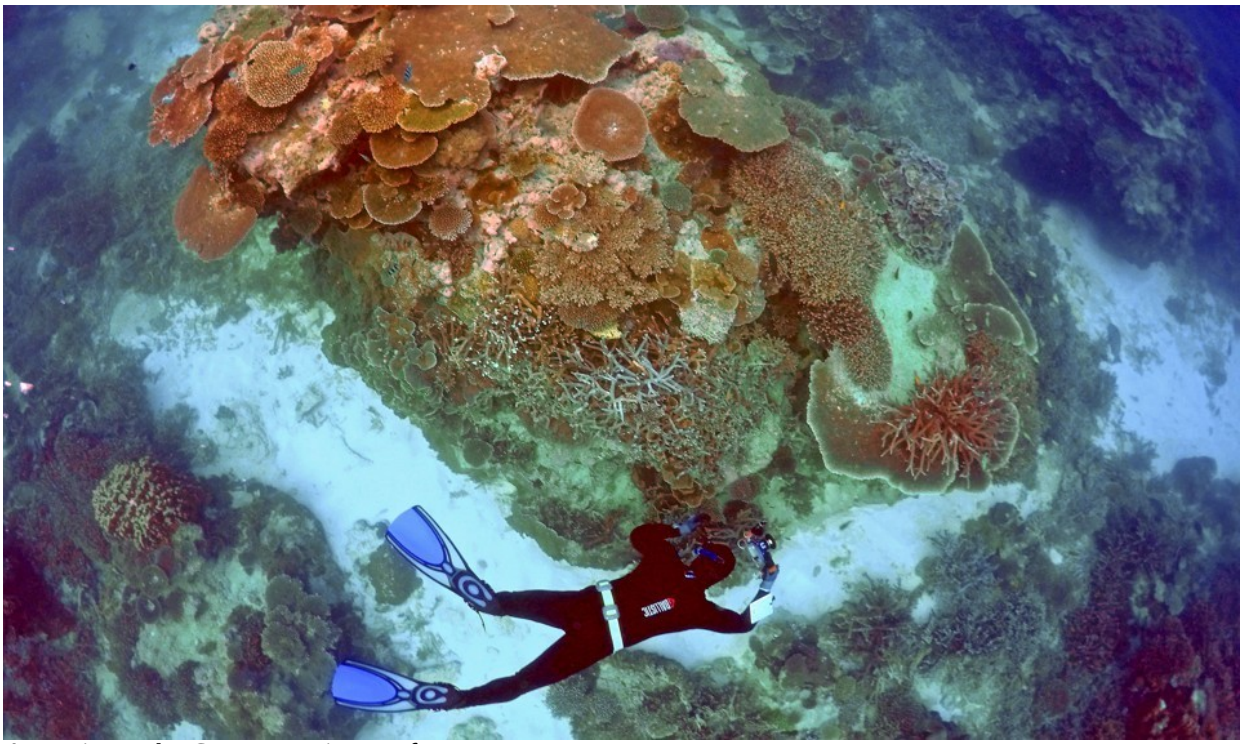
How Coral Researchers Are Coping With the Death of Reefs

The drumbeat of devastating news can take its toll on the mental health of people who have devoted their lives to coral.

By Ed Yong



A tourist at the Great Barrier Reef
Credit: David Gray / Reuters

When she was in high school, Madhavi Colton was known as Miss Enthusiasm. "I've always been a die-hard optimist," she says. "I tend to be perky. In my family, I was always the one who thought that everything was going to be fine, that we can do this."

Recent years have tested her optimism. Colton is now a director at Coral Reef Alliance, a nonprofit dedicated to protecting coral reefs. And corals need all the help they can get. A third of reef-building corals are in danger of extinction, and their growth rates

have plummeted by 40 percent since the 1970s. They have been pummeled by hurricanes, disease, and pollution. Acidifying water makes it harder for them to create their rocky reefs. Rampant overfishing kills off the grazing fish that keep competitors like seaweed and algae in line. Rising temperatures force them to expel the symbiotic algae in their tissues, which normally provide them with both food and vivid colors. Without these partners, the corals starve and whiten. Once-lush ecosystems full of kaleidoscopic fish become spectral wastelands, where scuzzy green algae grows over the bleached white skeletons of dead and dying corals.

The continuing desecration has taken an immense toll on the mental health of people like Colton who have devoted their lives to studying and saving these ecosystems. How do you get up and go to work every day when every day brings fresh news of loss? When everything you are working to save is collapsing, how do you stop yourself from collapsing, too? Maybe everything isn't going to be fine, after all. Maybe we can't do this. "Are we going to lose an entire ecosystem on my watch? It's demoralizing. It's been really hard to find the optimism," she says. "I think Miss Enthusiasm has gone away."

There was a time, just a few decades ago, when this crisis seemed unimaginable, when reefs seemed invincible. Phil Dustan, from the College of Charleston, similarly remembers being fresh out of grad school and telling the famed explorer Jacques Cousteau that "reefs are so big that humans couldn't hurt them." Those words seem hopelessly naïve now. Dustan recently dove at Dancing Lady Reef in Jamaica—a place that he had studied as a graduate student in the 1970s, and where scientists "first became intimate with the science of reefs," he says. "I dropped into the water and I just choked. It was like someone going through their home after a forest fire has gone through, picking through the ashes." Elsewhere in the Caribbean, he took his son snorkeling at Carysfort Reef, another site of once-legendary beauty. "He stayed real close to me and he wouldn't range around because he was fearful," Dustan says. "Finally, he said: Dad, we have to leave this place. It creeps me out. It's all dead."

This catastrophe has unfolded slowly. Nancy Knowlton, from the Smithsonian Institution, says that when it comes to corals, the bad news is usually incremental, and only obvious to those who work in the affected places. "But what happened in the Great Barrier Reef was so spectacularly bad that you didn't need to work there to know it was bad," she says.

What happened was this: In 2015, the world experienced a mass-bleaching event, where heat waves started killing corals in all three oceans where they thrive—the Pacific, Atlantic, and Indian. Two such global crises have happened before, in 1997 and 2010, but the 2015 one was unprecedented in its severity, and in its implications. Just 9 percent of the individual reefs that make up the 1,400-mile-long Great Barrier Reef, off the coast of northeastern Australia, were unscathed. All told, more than a quarter of the corals have died there, with a much higher proportion in the northern sections. No one had seen anything like it before. When the coral researcher Terry Hughes revealed the scale of the devastation to his students, they all reportedly wept.

"The news has been especially upsetting, because of the scale of the event, the iconic nature of the Great Barrier Reef, and the fact that there were gifted filmmakers on site to document it," says Knowlton. "It was a perfect storm of attention."

For many coral aficionados, it was also a tipping point for despair. One year of bleaching would be bad enough, but the Great Barrier Reef experienced a second in 2016 and there are signs that a third wave might hit by the end of this year. Corals bounce back, but consecutive blows could take even these resilient animals down for the count. "Our models said that wouldn't happen for a long time, and I'm worried that we've underestimated the pace of change," says Colton. "Things are even worse than we thought, and that's been hard to cope with." For her, that gnawing unease has led to sleepless nights, and curtailed her ability to deal with other worrying world events. "My barrel is full," she tells me. "One more drop and it spills out. My resilience is gone."

The feeling is ironic, because that's exactly the problem that corals are facing. "I'm a coral reef," Colton says. "I'm also failing to cope."

But she also recognizes that she and other scientists are privileged. They care about reefs, but they're not like the 450 million people around the world who rely on reefs for tourism revenue, food from fish, and protection against storms. For them, the losses are a daily reality. The last time Bette Willis, from James Cook University, went out to the Great Barrier Reef, the woman who ran her boat "would alternate between rants and depression," she recalls. "She's out there several times a week. She knows each coral. She could see her whole livelihood go down the drain."

Everyone I spoke to talked about becoming very good at compartmentalizing—at acknowledging the scale of the tragedy, but also putting it aside to focus on their work. "I don't find it productive to be angry or depressed all the time. It's corrosive, and it isn't going to solve the problem," says Knowlton. She is perhaps the poster child for ocean optimism, having created a movement called ... Ocean Optimism. "I started that because there was no way to get people engaged in doing something about these problems, if they didn't realize that there was something they could do."

There *is* reason to hope, she says. Large protected areas have been established around coral reefs, which will protect them from overfishing and pollution, and make them more resilient. That won't ward off bleaching events, which will continue as long as the climate keeps changing. But Knowlton thinks that the rise of electric cars and the increasingly competitive costs of renewable energy will reduce the pace of global warming, even if the current administration refuses to enact policies to mitigate it.

Willis also notes that corals have been around for millions of years, and are less fragile and more adaptive than people give them credit for. They might be able to swap the algae in their tissues for more heat-resistant varieties, or alter the composition of microbes on their surface to improve their health. Willis's coping mechanism is to believe in the corals' coping mechanisms. "It's almost a faith," she says.

Ruth Gates, from the Hawaii Institute of Marine Biology, finds solace in action. She remembers what her therapist told her several years ago, for reasons unrelated to corals: You can't really control what happens around you; you can only control your response. "That was a profound statement," she tells me. "My response to the gloom and doom is to ask what we can do about it." She is now trying to breed "super-corals" that can better withstand a warming world, either because they've partnered with heat-tolerant algae, or been conditioned from an early age to take the heat.

Whatever the eventual strategy, Gates at least wants to try *something*—and she fears that the cautious inertia of academic science will stop her peers from pursuing interventionist approaches. "In the last five years, I've come to terms with the fact that we'll have to do something to help reefs get through 2050," she says. "I find it worrying that people think we have time to plan, and the research is telling us that we have to act."

Phil Dustan agrees. When he started studying corals as a young scientist, he was interested in questions of basic ecology, like how the reef community responds to light. But now, "we really don't have the time to be interested in how light structures the community because it's going to be gone," he says. Instead, he has shifted his attention to working with communities in Bali, teaching them to care for their reefs and helping them to set up their own protected areas.

This sense of shared purpose is perhaps the greatest vaccine against looming despair. Every four years, coral-reef researchers gather for the International Coral-Reef Symposium. The latest meeting took place last June. It was a rough five days, full of talk of decline and death. But "it was the most level playing field we've ever had," says Gates. "There was a greater sense of community than I've ever seen—a sense that we're going to have to bring our skill sets together to solve the problem."

She was also relieved to see that younger scientists were not, as she once feared, dissuaded from studying ecosystems that could conceivably die out within their lifetimes. "It's a very weighty thing to take on at the start of one's career, but the young people coming into the field are extraordinarily driven to solve problems," she says. "That's very heartening."