

# Probing Question: Is it possible to save coral reefs?

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Credit: Matt Aschaffenburg, University of Delaware

It's one thing for consumers to know intellectually that our gas-guzzling, polluting ways are taking their toll on the planet. It's another thing to connect all the dots in terms of actions and consequences. Yet, even as we continue to drive SUVs and convert wilderness areas into housing developments, we hold out hope that the environment will rebound.

Unfortunately, for [coral reefs](#), it's going to take a lot more than hope, says Todd LaJeunesse, assistant professor of biology at Penn State.

Coral reefs are suffering from overfishing and other types of resource

exploitation, LaJeunesse explains. In addition, they are being degraded by pollution from sewage and [agricultural runoff](#), and by increasing sea-surface temperatures and [acidification](#) as a result of global warming.

"Coral reefs are important not only for the beauty they provide to snorkeling tourists, but for the [ecosystem services](#) they provide to us all," says LaJeunesse. "They protect [coastal areas](#) by buffering the effects of hurricanes; they serve as habitat for food fish and other edible animals; and they are sources of medicines."

According to the [National Oceanic and Atmospheric Administration](#), reef-supported tourism alone generates an estimated \$30 billion annually, with additional environmental and economic benefits valued at ten times that amount.

LaJeunesse's own research focuses on the relationship between corals -- which are animals -- and the [symbiotic algae](#), known as [zooxanthellae](#), that live inside their cells. The [photosynthetic algae](#) provide food and energy to the corals, while the corals, in turn, provide a safe home for the algae.

"Heat disrupts the association between corals and their [symbionts](#)," explains LaJeunesse, "and this causes the algae to be expelled from the corals, leaving behind a dead, bleached skeleton."

Because of the barrage of human-induced pressures on corals, most places in the world have seen significant declines in coral cover over the last couple of decades, he adds. "Our own Florida Keys has been among the hardest hit. The area used to be covered with corals of all shapes, sizes, and colors; now there is just a whole lot of dead coral."

Many of the reefs in the Caribbean Ocean have taken a turn for the worse, adds LaJeunesse. "Elsewhere on the planet, they seem to be doing

a little better -- in the Indo-Pacific, for example -- but scientists think those reefs are just a couple decades behind the Caribbean in their decline."

"Not only is coral cover declining, but coral species diversity also is dropping," says LaJeunesse.

He uses genetic techniques to identify the species of zooxanthellae that associate with certain species of coral. Knowing exactly what species you're working with is the first step in really understanding the organisms, he says.

"No doubt in the future, some species of coral that are better adapted to heat and pollution and that associate with thermally tolerant species of zooxanthellae will survive," says LaJeunesse. But, he cautions, these species likely won't be robust enough to withstand the constant wave action and animal predation that, over time, breaks reefs down. And species-poor reefs won't, in any way, resemble the healthy reefs that we have seen historically and still see in a few places today.

"We don't want to underestimate life's ability to persist, but life needs a chance," he adds. "Whether you view it from a spiritual or an analytical perspective, life is remarkable and it should be cherished. It seems people are looking to scientists to tell them that everything is going to be okay, that technology will save our beloved ecosystems. But that's not going to happen.

"What I can tell people," concludes LaJeunesse, "is that, as a functioning ecosystem, [coral](#) reefs are in critical danger. "They likely won't exist in the future in any state resembling what they do now, and if we want to save even some of them, it is going to take major socio-political action that changes the way we exploit nature and use energy."

"To save what is left of the reefs," he says with conviction, "we need to drastically change the way we consume -- that's the bottom line."

Provided by Pennsylvania State University

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