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Reef Replacement

New Project Hopes to Restore Coral Reefs by Growing Them

Applied Marine Technologies grows coral, as shown here, using sea water, sunlight and patented bases. The coral is then secured to cement spheres underwater. (Darlene and Norman McCullough, www.greystonephoto.com)

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By Amanda Onion



Dec. 8 — They host such diverse life that they're known as the rain forests of the sea.

But more than a quarter of the world's coral reefs has been destroyed and the remaining communities may die within the next 20 years, according to a recent study released by scientists at a coral reef conference in Bali, Indonesia. The corals, which are spineless marine organisms, build latticed limestone structures around themselves. Since these structures are home to crustaceans and an estimated 25 percent of the world's marine fish — the coral's demise could also be that of many other marine species.

To nurse the reefs back to life, scientists have called for measures to stem pollution and warming. But a businessman believes he may have another, more immediate solution to reviving coral reef populations: He wants to grow them.

Tank Farm Cultivation

This December, Applied Marine Technologies, based on the Caribbean island of Dominica, launched its first effort to replace dead and dying natural coral reefs with corals grown in a controlled setting.

“People say it takes thousands of years to grow a coral reef — and that's true,” says Alan Lowe, the

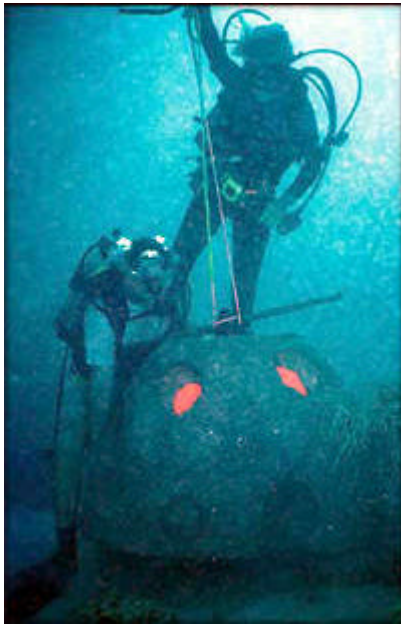
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Alan Lowe of Applied Marine Technologies lifts a 1,000-pound ball, lightened by an air bladder, and carries it underwater into position off the coast of Mustique. (Darlene and Norman McCullough, www.greystonephoto.com)
Reef Ball copyrighted by www.reefball.com

American owner of the coral cultivating company. “But individual pieces of coral grow rather quickly and can be put together into a reef.”

Since last July, Lowe began directing the cultivation of nearly 25,000 pieces of coral on what he calls a tank farm. The “farm,” which sprawls over a large swathe of land near the shore, includes 128 shallow tanks. Each tank holds 250 gallons of sea water. Every day, 8 million

gallons of water are pumped from the ocean, to the farm and back again to keep the tanks fresh. Inside the tanks, Lowe uses small chunks of existing coral and then a patented process to trigger the coral to multiply.

This December, Lowe and his crew are flying more than 900 pieces of cultivated coral to the Caribbean island of Mustique, where local, wealthy inhabitants (who happen to include Mick Jagger and Tommy Hilfiger) have pitched in \$60,000 for 29 concrete, oval structures that will each host about 30 pieces of coral. By installing the coral balls as well as several single pieces of coral, the team hopes to replace damage wreaked by Hurricane Lenny last year.

Divers have already installed bases — three-quarter cement spheres that are designed with holes for coral to take hold. And soon divers will lower hundreds of pieces of farm-raised coral and secure them to the bases using steel screws and plugs.

“It’s like plugging a dead lawn with new grass sod,” Lowe explains. “We’re plugging dead reef with living reef.”

‘Jury’s Still Out’

While scientists say cultivating and transplanting coral is possible, they caution it may not be an ultimate solution to the problem of dwindling coral

reefs. The hard part, they say, isn't in replacing the coral, but ensuring it survives.

"My concern is we might be raising pretty little bouquets of corals in the hothouse, but putting them into an environment that is not conducive to coral health can be problematic," says Harold Hudson, a coral reef specialist at the Florida Keys National Marine Sanctuary.

Hudson has spent more than three decades taking coral chunks from reef zones that are perpetually damaged by hurricanes and fastening them to shore bottoms where ships have grounded and damaged coral communities.

Hudson uses hollow concrete domes to host the coral, which he fastens using special glue. He installed his first transplanted reef into Florida's waters in 1976 as an experiment. So far the 4-foot-long reef and 90 percent of his subsequent transplanted reefs have survived.

But he points out 30 years is only a blip on coral reef time scales.

"The jury's still out on how successful planting coral will be," he says. "Even if what you do in the first couple years may seem successful, their lifespans are really decades or centuries so what may look successful today could be gone tomorrow."

Although Hudson doesn't grow his own coral like businessman Lowe, other scientists have. Robert Richmond, a specialist in coral reefs at the University of Guam's Marine Laboratory, explains there are a couple ways of cultivating coral.

Building by Breaking

One is to capture coral larvae that are spawned once or twice a year on a lunar cycle. The other is to fragment the corals. That works, he explains, because coral reefs grow through a relationship between an animal — polyps living inside the coral limestone — and algae.

The polyps exist in a thin layer of tissue over the coral's limestone base and multiply and expand at the tips of the coral. Tiny algae, dependent on sunlight, live inside the coral's tissue and produce nutrients that feed the polyps and help them grow. As the polyps grow, some of the polyps calcify algae and other organisms to secrete adhesives that form the reef.

Much like an inflated balloon will consume more space as it inflates, these calcium-producing polyps will grow and lay down limestone more rapidly if more coral surface is exposed by breaking.

In Guam, Richmond cultivates small amounts of corals in experiments to assess damage done to coral by pollutants and cyanide fishing. Throughout the South Pacific and Southeast Asia, he explains, fishermen occasionally drip cyanide into shallow water to stun fish, which they then capture and sell to aquariums or in some cases to restaurants that feature live fish.

By exposing homegrown coral to minute amounts of cyanide, Richmond and his colleagues have shown that the chemical is deadly for the reefs.

“We call it Dr. Doolittle science,” he says. “We’re essentially talking to the animals to hear what they need to grow and reproduce.”

While Richmond supports coral cultivation for such experiments, and for producing coral to be used in aquariums, he too is wary of planting cultivated coral as a solution to depleted reefs.

“The idea of putting corals back in the water is very sexy,” he says. “But we have to be careful not to sell people a false bill of goods. If we really want to help the problem we have to start with fixing what’s killing them.”

Sturdy Crops

But Lowe is more optimistic. He says his corals are cultivated under conditions that are designed to make them more hearty. His tank-raised corals grow in water that is 86 degrees Fahrenheit. That exceeds temperatures that coral reefs normally tolerate. Lowe argues his corals will be better at surviving in waters warmed by possible global warming.

Lowe’s first cultivated corals are scheduled to be installed into Mustique’s waters by the end of December. If the tank farm coral survives through the next year, Lowe hopes to launch his next project in Jamaica — an island dependent on its reefs for tourism.

“I have no doubt they’ll survive,” he says. “In the tank, everything you’d expect they’d die from, they’re thriving in. They should do fine.” ■

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