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Offshore nurseries cultivate rare corals to rescue depleted reefs

Chance discovery off Key Largo leads to ocean farms for fragile, but enormously important, species.

By Carey C. Wagner and David Fleshler, Sun Sentinel

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About 30 feet below the ocean's surface above a colorful reef off Key Largo, Ken Nedimyer holds up a small slate on which he has written, "Let's plant corals."

With that, the volunteer divers who surround him scatter and busily begin using epoxy putty to give tiny bits of staghorn coral a toehold in the vast, blue-green sea.

In the ocean waters off Key Largo, Fort Lauderdale and a few other spots, Nedimyer, a one-time tropical fish collector from Tavernier, along with scientists and the volunteers are raising thickets of rare coral to repopulate the depleted reefs of the southeastern United States.

"These are my little children," Nedimyer, 54, said later that day, indicating the threatened coral he cultivates on rows of concrete blocks, growing like delicate seedlings in an underwater offshore nursery.

Staghorn and elkhorn corals are undersea architects, creating reef structures that support vast varieties of fish, sponges, lobsters and other marine creatures. Hit hard by disease, global warming and other stresses during the past 30 years, these corals have declined to a few isolated patches in the warm, sun-splashed waters that run from southern Palm Beach County

to the islands of the Caribbean.

But beginning with a chance discovery off Key Largo, where staghorn coral was found growing in an undersea farm for commercial aquarium rock, scientists have begun raising these corals in offshore nurseries with the goal of transplanting them into the wild.

Economic stimulus money from the Obama administration has financed an expansion of the $3.4 million project, which is expected to create 57 full-time jobs, according to Tom Moore of the National Atmospheric and Oceanic Administration's Habitat Restoration Center in St. Petersburg.

Healthy reefs, in turn, create jobs in tourism, increase habitat for fisheries, and provide hurricane protection, Moore said.

Today there is a row of 10 coral nurseries that stretch from Fort Lauderdale to the U.S. Virgin Islands, growing new stands of staghorn and elkhorn coral.

"These are two of the most important species of coral," said James Byrne, marine science program manager for The Nature Conservancy, an environmental group that applied for the federal money and is coordinating the work. "The staghorn coral provides very important habitat for juvenile fish, and elkhorn coral is one of the most important reef builders."

The attempt to grow them in offshore farms began with Nedimyer. At an undersea site he had established to grow encrusted rocks for home aquariums, he noticed the arrival of a few pieces of rare staghorn coral. As a 4-H Club project, he and his daughter successfully cultivated staghorn, helping it grow from pieces a few centimeters long to a foot or more, and they were able to transport the coral onto living reefs.

Working with the federal reef sanctuary at the Keys, he decided to expand the nursery and turn it into a full-scale operation to raise significant quantities of coral, a sort of captive-breeding operation for declining, but enormously important, species.

Today Nedimyer's nursery consists of parallel rows of concrete blocks about the length of a football field, located in 30 feet of water off Key Largo. Attached to the blocks with waterproof glue are live pieces of staghorn coral, each row representing a different genetic variety, with about 6,000 corals in all. He established the Coral Restoration Foundation to accept donations and volunteers, and has transported his corals to about two dozen reefs.

"I've been diving down here for 40 years, and I've watched the reefs die," Nedimyer said. "At the time, it was a helpless feeling. Now when I go out to Molasses Reef and see thousands of corals that we planted, the biggest thicket in the Florida Keys, it just gives you hope."

Other nurseries are run by the University of Miami, Mote Marine Laboratory, the Florida Fish and Wildlife Conservation Commission, The Nature Conservancy and Nova Southeastern University.

The nursery off Fort Lauderdale consists of two sites, just south and north of Hugh Taylor Birch State Park, where scientists from Nova are growing staghorn coral. The coral on one site started three years ago have grown large and are ready to be moved onto reefs, said David Gilliam, assistant professor at the university's Oceanographic Center.

"They're doing great," he said. "The only issue we have is during lobster season. We had damage related to people getting lobster; some fragments broken off."

Although people speak of coral "bushes" and growing crops of coral, these are tiny marine animals that live in cups of calcium carbonate, using tiny tentacles to sting and seize passing creatures small enough to eat. Over hundreds of years, generations of coral build up calcium carbonate structures that form the basis of reef ecosystems, providing habitat for a rainbow of species, from tiny worms and mollusks to groupers and lemon sharks.

Since the 1980s, staghorn and elkhorn corals have sustained sharp declines. Both have been classified as threatened under the Endangered Species Act, the only corals with that designation.

None of the conditions that led to the decline of these coral have gone away. And no one suggests that growing coral in a few offshore nurseries alone will rescue the reefs. But scientists have a specific goal that would improve their prospects: establish genetically distinct populations in close proximity to encourage sexual reproduction.

Currently, both corals tend to reproduce asexually, through budding off or breaking off branches. While this is adequate to keep the population alive, it simply produces genetic copies of the previous generation.

In sexual reproduction, in which corals emit sex cells that can fertilize the cells in other corals, descendents represent unique combinations of parental genes from their parents. This genetic diversity benefits the coral population as a whole because it allows it to respond to environmental changes — such as changes in ocean temperature, availability of types of food, water chemistry — and increases the chances that an environmental change will find some corals with the right genes to adapt.

"Our major goal is getting different genetic individuals in close enough proximity so they'll have reproductive success," Byrne said. "One of the limiting factors now is that genetically different corals aren't close enough together. If you're looking at a population, if you have all the exact same individuals, it's not a viable population. If you have different genetic types, you get more resilient individuals."

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