A coral's clues -A chance find off Hollywood could yield a goldmine of data going back 300 years

by David Fleshler
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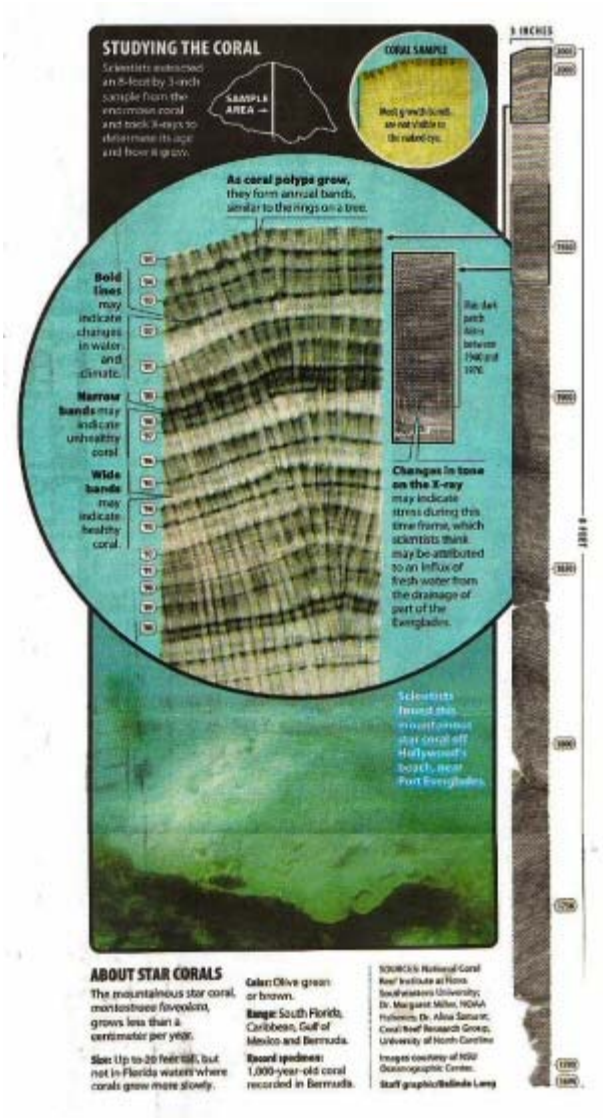

A huge cone of ancient coral has been discovered in the waters off Hollywood, offering scientists an unusual opportunity to learn about global warming, sewage pollution and the decline of the Everglades.

Researchers at Nova Southeastern University have dated the star coral to at least 1694, although they think its origin goes back at least another 50 years. They claim it's the oldest living animal in southeast Florida, and they plan to study its growth rates and chemical composition for clues to the effect of human activities on the environment.

Like tree rings and glacier cores, coral skeletons can yield information about climate and atmospheric conditions hundreds of years before records began. Such historical data are critical to scientists trying to study the effect of pollutants such as carbon dioxide, the leading greenhouse gas.

"We've got this great repository of environmental conditions locked into this coral skeleton, sealed up like a mummy," said Richard Dodge, dean of Nova Southeastern's Oceanographic Center and executive director of the university's National Coral Reef Institute.

In their initial analysis, they discovered low growth from the late 1940s through the 1970s, a period when the draining of the Everglades sent huge amounts of fresh water through the New River into the ocean. Dodge said this piece of evidence could influence government decisions over how to restore the Everglades, an initiative that hasn't given sufficient attention to the potential effect of fresh water on coral.

Considered a critical part of the ocean environment, corals are tiny animals that build up structures of calcium carbonate, providing habitat for a vast number of marine creatures. The coral off Hollywood, which is 8 feet by 14 feet, consists of a thin layer of living tissue at the surface of the calcium cone, which the coral has been building up since the 1600s. Over the years, as settlers trickled into South Florida, as developers dotted the beach with towers and engineers dredged a huge seaport to the north, the coral patiently budded off polyps and built up its calcium home.

Ken Banks, a reef expert for Broward County's Environmental Protection Department, saw it 20 feet below the surface while diving on the first reef from

Department, saw it 20 feet below the surface while diving on the first reef from shore. He reported it to scientists at Nova Southeastern, who set to work with researchers at the University of Miami and the National Oceanographic and Atmospheric Administration to sample and study the coral.

They extracted an eight-foot core sample, being careful to plug the gap and avoid harming the coral. Using a masonry saw, they sliced it into thin sections, X-rayed them and used the growth bands to establish the coral's age. Each pair of black-and-white bands represents one year.

SAMPLING HISTORY: A team of divers, drill samples of coral. Photo courtesy of the National Coral Reef Institute (NCRI) at Nova Southeastern University Oceanographic Center (NSU OC)

Peter Swart, a professor of marine biology and geophysics at the University of Miami's Rosenstiel School of Marine and Atmospheric Science, plans to study the coral's chemical composition for information on ocean temperatures and the effect of sewage. There has been a running debate about whether sewage from outfall pipes and underground disposal wells could be harming the southeast Florida reefs. Swart will analyze the coral for the presence of a nitrogen isotope associated with sewage, trying to see if it appeared in the coral only after people started disposing of sewage through pipes and wells.

"It is in a very interesting place," Swart said. "It has tremendous potential for unraveling a lot of the questions about the environment in South Florida."

Kevin Helmle of the National Coral Reef Institute at Nova Southeastern University rinses coral samples. Photo courtesy of the National Coral Reef Institute (NCRI) at Nova Southeastern University Oceanographic Center (NSU OC)

Kevin Helmle, a Ph.D. candidate at Nova Southeastern, is studying the coral to learn how increased levels of carbon dioxide in the atmosphere and oceans have affected coral growth. Produced by automobiles, power plants and various industrial sources, carbon dioxide is the most widespread of the human-caused gases that trap the sun's heat, causing global warming.

As carbon dioxide settles in the oceans, it causes the water to become more acidic, making it difficult for coral to grow. And as it traps the sun's heat, it raises ocean temperature, which has been linked to poor growth and an unhealthy condition called coral bleaching.

Its growth bands vary in thickness, providing initial indications of which years saw high or low growth. From an initial analysis, low-growth years appear to coincide with known incidences of El Niños, the Pacific warming phenomenon.

Other clues to climate will be found in the coral's chemistry. When water warms, coral incorporates less of the element strontium in its structure. So as they look for evidence of rising ocean temperatures over the past 300 years or so, they will seek trends in the percentage of strontium in the coral.

Beyond the evidence it can provide about the climate, the coral itself is a riddle. It lives off Hollywood, just south of a big seaport, subject to polluted storm runoff and all the other hazards of humans and nature that can shorten the life of any coral.

"That's the most interesting question," said Ken Banks, the diver who discovered it.

"It's right next to Port Everglades. There's disease in coral, there's boring sponges. Why is this one resistant to all that? Is this so genetically superior to others of the same species?"

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