News
UT scientists hunt for sand for Texas coast

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It's crucial for projects to fight beach erosion

GALVESTON — On the gently rocking deck of Research Vessel Tommy Munro, Chris Lowery bent over a metal tube split lengthwise and filled with gray sludge. He poked it with a finger, then rubbed his fingers together, feeling for the sand he and other University of Texas scientists had spent eight days looking for.

The state's General Land Office and the federal Bureau of Ocean Energy Management were funding the scientists' work exploring where sand might be offshore. It's part of the land office's recent push for a large-scale look at potential sources of offshore sand. The Bureau of Ocean Energy Management wants to understand better where it's located.

The limited resource is crucial for projects designed to fight beach erosion along the Texas Gulf Coast.

Many factors cause erosion naturally, but global warming is exacerbating it. Sea levels are rising amid the warming climate, as ice melts and the water itself expands. Stronger storms such as those last summer are also expected to be more likely, devastating coastlines and highlighting the need for a so-called first line of defense such as natural dunes or wetlands, or projects that feature human engineering as in the proposed coastal spine.

Enter Lowery, a paleo-oceanographer, and other scientists. They're studying where the Trinity River flowed during the Ice Age, before glaciers melted and the ocean and a new layer of sediment covered it up. They want to find what kind of sand that ancient river valley might be storing — and where.

The answer could help them understand the characteristics of where other Texas rivers flowed before they were submerged, perhaps with all sorts of useful material to fight the sea's next big rise.

"It's a scientific mission," said John Goff, a marine geophysicist and the team lead, "and a practical mission."

Sand demand

Coastal restoration work is not new to Texas. Among the land office's efforts are projects that stem from the 1999 Coastal Erosion Planning and Response Act, which tasked the agency with reducing the impacts of erosion. They've replenished beaches, built dunes and restored marshes.

But the agency has more it hopes to do as sources for sand on land are depleted: In its updated coastal resiliency master plan, the General Land Office prioritized 123 projects that it wants to see carried out.

Climate change brings added pressure to strengthen the ever-eroding coast. University of Texas **Bureau of Economic Geology** researchers who map coastline changes say about 80% is eroding. And at the Harte Research Institute for Gulf of Mexico Studies, coastal geologist James Gibeaut finds that the sea level rise that has already changed shorelines is going to have a large impact in the future.

Whether Texas will adapt to climate change concerns Amanda Fuller, director of the Texas Coast and Water Program for the National Wildlife Federation. To her, erosion stands out as a major issue as violent storms accelerate the damage.

Fuller is among those pushing to build back natural ecosystems. Various groups in addition to the General Land Office have pursued their own projects. Penalties from the 2010 Deepwater Horizon disaster settlements notably paid for much restoration work, too.

Quality, size and location of available sand become critical to designing some projects because of cost, said Tom Kelsch, senior vice president of the Gulf Environmental Benefit Fund at the National Fish and Wildlife Foundation.

The state and federal agencies find it is critical to catalog what sediment resources there are to guide how they are used. The land office is building a sediment management plan; a national inventory of offshore sand guides decisions for the Bureau of Ocean Energy Management, which manages the waters beginning about 10 miles into the Gulf of Mexico.

The University of Texas work will add to those efforts.

Fossils and chirps

Lowery, 34, and Goff, 57, were bent over their cylinder of sludge last Thursday because bad weather had forced them to return for a few days to the marina. Goff wore a UT T-shirt. The Institute for Geophysics researchers ate shrimp and grits and slept in their bunks below deck.

Prior to that, they'd been collecting as much data as they could.

Two of the devices, called "chirps," that they used look like oversized yellow boogie boards. They dragged behind the boat to send sound waves through the sea floor. Goff likened the resulting image to an X-ray of the sea floor, showing a series of black squiggles that offer more detailed data of what's below the surface than has been gathered before.

In the squiggles, Goff could see the layers of sediment that filled in the river valley, which now ends at Trinity Bay. There was the river sand, then the delta sand from where the river dumped into what was the bay, then perhaps mud and tidal sand mixed on top of it. Each potentially had a different use for a different project.

Lowery was also dropping weighted pipes onto the seafloor, then pulling up long samples of sediment such as the one he studied on the deck. Somehow in that material he could see those different layers represented. He also will look for tiny fossils that can tell him about what the environment was like at the time the sediment was deposited.

When its research is complete, land officer will use the data to locate more specific places to survey where it might actually pump out sand.

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