

Bringing Back



F

rom the air, it is clear that East Timbalier Island is just a shadow of its former self. One in a series of barrier islands that protects about a third of the fragile Louisiana coastal wetlands from the eroding winds and waves of the Gulf of Mexico, East Timbalier used to stretch four and a half miles from east to west. It was a gently curved, shallow crescent where migrating shorebirds rested and where, in the 1940s, Cajuns came to camp and fish. Now the outline of the original is-

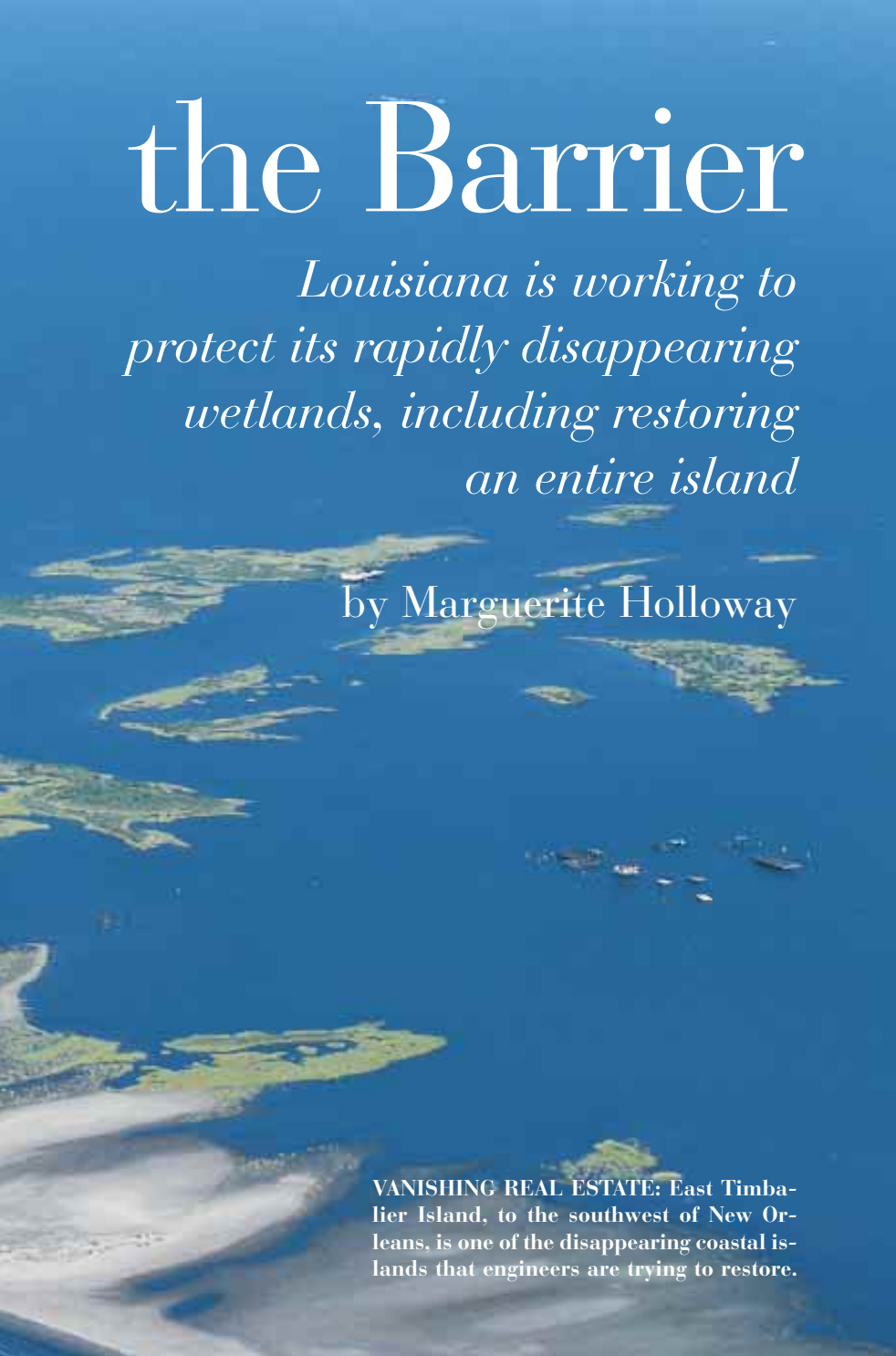
land can be traced only by connecting the dots—those patchy remains of dune or marsh that make up the battered bits of East Timbalier. Narrowed and nipped by subsidence, hurricanes and erosion and gouged by canals from oil and gas exploration efforts, East Timbalier has been expected to disappear in just a few years, perhaps even as early as 2004.

And so it would have if Al Mistrot and his team hadn't spent this summer turning back the tide. Mistrot, an engi-

the Barrier

Louisiana is working to protect its rapidly disappearing wetlands, including restoring an entire island

by Marguerite Holloway



VANISHING REAL ESTATE: East Timbalier Island, to the southwest of New Orleans, is one of the disappearing coastal islands that engineers are trying to restore.

Timbalier a federal bird sanctuary, and although it no longer holds that status, black skimmers, royal terns and sandwich terns have recently nested there. The barrier islands and their marshes also provide nurseries for fish and shrimp. And Louisiana State University researchers are discovering that barrier islands are crucial nurseries for sharks.

By reducing wave energy, the barriers also keep waters calmer in coastal bays, thereby protecting fishermen, oil and gas infrastructure, and the critically important shoreline marshes. Louisiana contains 40 percent of the coastal wetlands in the contiguous U.S., and 80 percent of wetland loss occurs there: about 25 square miles (66 square kilometers) disappear every year. At this rate, according to one recent study, New Orleans will be a coastal city in just 50 years. And if East Timbalier disappears, Port Fourchon—the nearby hub for the oil and gas industry—will wash away well before the French Quarter becomes beachfront property. “If we lose our barrier island, this facility will become an island,” explains Ted Falgout, director of the port. “We need a restrictive force; otherwise huge currents and tidal exchange suck the land right out of the marsh.”

For these many reasons, Mistrot and his colleagues found themselves on this slip of land for the summer. Their work moving sand began in early July with the arrival of a dredge called the *Beachbuilder*. The dredge is stationed to the west of East Timbalier in a channel called Little Pass, where, like a gargantuan vacuum cleaner, it inhales the bottom of the Gulf. Powerful jets of water loosen the sediment, which is then sucked up and injected into a floating pipe that runs 1,850 feet (562 meters) away from the boat before plunging 20 feet to the bottom and connecting with a steel pipe that workers laid down on the Gulf floor. Like an umbilical cord, the buoyant flexible part of the pipe allows the *Beachbuilder* to move back and forth as it does its work, as well as up and down with the often four-foot waves of the channel.

Once on the bottom, the pipe runs about three miles to East Timbalier, where it spews out the mixture of sand

neer who is working for the Louisiana Department of Natural Resources, and his crew of 57 men have been laboring in two shifts, 24 hours a day, to rebuild East Timbalier to its late-1950s condition. By moving massive amounts of sand and shaping it into dunes and marshes, they are building in just a few months what it took currents and wind and the Mississippi Delta thousands of years to create. They are building it with the knowledge that their handiwork will be

washed away, that the new East Timbalier will be as temporary as the old one, that in the long run, the Gulf will win.

But, for the time being, the important thing is to keep East Timbalier afloat beyond 2004. Barrier islands—those shifting ribbons of offshore sand—are important habitats. Those along Louisiana, in particular, provide wintering places for 70 percent of the waterfowl migrating through the central U.S. In 1907 President Theodore Roosevelt designated East

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and water at the feet of the land crew. The men on the island let the water drain off and the sediment accumulate. The quantity of runoff is carefully calculated to ensure that enough sand builds up. The engineers have estimated a cut-to-fill ratio of 1.5 for this project; in other words, about a third of what is taken from the Gulf floor washes away when it reaches the island. By the end of the project, nearly three million cubic yards of watery sand will have been pumped into East Timbalier.

After enough sand has accumulated to fill in a gap in the island, backhoes push it into place. To approximate East Timbalier as closely as possible, the sand must be shaped into the right elevations for dunes and marshes. To protect the island for what the experts term a nine-year storm return—which, oddly, translates into an 18-year life span—the dunes need to be at an elevation of five feet. To function optimally, the marshes need to be lower, at a height of two feet—which will allow for subsidence and an ultimate elevation of about one foot. “You want the water to flush in and out,” Mistrot says. If the sand is packed is too high, it won’t become a marsh, even after it is planted next spring, which could have devastating consequences, he adds. Mistrot, who is on loan from the Army Corps of Engineers, has worked on many restoration efforts in the region and remembers one failed marsh that led to an outbreak of

avian botulism because the birds’ waste was not being regularly flushed out of their feeding site.

By mid-July the westernmost section of East Timbalier has been filled in. The wet sand looks gray, and the elevations are clearly cut, like steppes. White herons, sandpipers, skimmers, terns, gulls and pelicans ply the recently upheaved sand for small crustaceans and other benthic treats. A remnant of the original marsh on this part of the island has been carefully protected, and the exacting Mistrot talks with the backhoe operators again to make sure they keep the machines away from the wetlands.

Because this western section is complete, the pipe has just been extended east—segment by segment—from the outflow point toward the next lacuna in the island. By the time they are finished, the workers will have stretched pipe all the way to the remote eastern fragment of East Timbalier, which lies across a mile and a half of water from the more intact body of the island. Filling this huge, watery divide will be a challenging part of the project because no marsh or remnants of beach exist to build on. But in July no one is worrying about that much. They have a bigger problem.

The project engineers chose Little Pass as the place to remove sediment because it is where the eroding sands of East Tim-

balier have been flowing. And the *Beachbuilder* was chosen because it has several long anchor lines, which means it can ride out the large waves of the Gulf with relative ease and stability, explains David Rabalais of Picciola and Associates, the engineering company overseeing the project. It also has about eight feet of freeboard—that is, the distance between the water and the deck—so it can handle high seas. The trade-off was that the *Beachbuilder* can only loosen sediment using its high-pressure water jets and then pump it away. It does not cut into sand, as a traditional cutter dredge would. A cutter dredge can chop through tough material such as clay, but it has less freeboard—only about two to three feet—and several rigid columns, or spuds, that keep the dredge in position but that can also be snapped during rough weather. A week or so into the project, however, it was clear that Little Pass was full of densely packed clay that the *Beachbuilder* simply couldn’t remove.

In August, after about a month of struggling to increase the water pressure of the jets and thereby move more sediment onto the island, the dredge contractor—Weeks Marine in Kenner, La.—gave up and brought in a cutter called the *Arkansas*. They had been pumping an average of only 12,000 cubic yards a day with the *Beachbuilder*, as opposed to the anticipated 40,000 cubic yards. Because their contract pays them for how



REBUILDING AN ISLAND: The restoration of East Timbalier Island entails several stages (*from left to right*). Two dredges pump sediment into a pipe that runs several miles to East Timbalier. The watery sediment gushes out of the pipe and gradually accumulates. Backhoes then push this sand and clay into the right elevations for dunes and marshes. Recently filled-in sections of the island appear light gray; restoration will ultimately join the main part of the island with the remnant seen in the distance.

much they cut, Weeks Marine was watching money wash away almost as fast as East Timbalier was.

By late August the new dredge was finally extracting more than 30,000 cubic yards daily, according to Rabalais and Mistrot. But the project was by then two months behind schedule and may not finish until the end of October. As the fall hurricane season approaches, “we are very likely to get rough weather,” Rabalais says. “In thunderstorms it can get real choppy and rough. They would have to stop dredging.”

The question of constructing offshore dikes presents yet another complication for the restoration effort. The eastern part of the island has several strips of rocks that sit way off in the water—along the original shoreline of East Timbalier—and that were placed there in the 1960s and 1970s to protect the oil and gas infrastructure on the island from hurricane damage. But there is a gap of more than a mile in the dike between the western end and the easternmost tip of the island. Putting down a five-foot dune along that section without also putting in an offshore dike makes little sense to Mistrot, Rabalais and Dave Burkholder of the Louisiana Department of Natural Resources. “If I were designing the project today, I would put rock all along there,” says Burkholder, noting that East Timbalier lost about 25 acres just in the past year because of storms. He adds

that Hurricane Bret alone washed away about 3,300 cubic yards of recently dredged dune.

And so, during a recent visit by officials from the National Marine Fisheries Service and the secretary of the Department of Natural Resources, Mistrot and others made a pitch for more funding. They estimated that they need about \$250 to \$300 a foot for four tons of rocks and the durable plastic material, called geotextile, that rocks must be laid on so the ocean floor doesn’t wash away beneath the dike. The additional \$1.5 million or so would push the total cost of the project over \$13 million—85 percent of which is paid for by the taxpayer-funded National Marine Fisheries Service and the remainder by the Louisiana Department of Natural Resources. But the agencies decided not to put up money this season.

Whether it will be allocated to East Timbalier in the future is anyone’s guess. East Timbalier is just one of 18 restoration projects that the National Marine Fisheries Service oversees in Louisiana. In 1990 Congress passed the Coastal Wetlands Planning, Protection and Restoration Act, setting aside \$35 million a year to protect Louisiana’s wetlands. The National Marine Fisheries Service works with other state and federal agencies to manage about 90,000 acres of wetlands in the state. Several of these projects entail protecting the barrier islands to the

west of East Timbalier, and in large part the biologists and engineers have been figuring out the science as they go. “Seven or eight years ago no one knew how to do this,” says Tim Osborn of the National Marine Fisheries Service.

In that time, Osborn adds, expectations of what restoration means have also changed. Scientists are not trying to re-create the original exactly—an impossible task, given that the ecosystems of Louisiana have been so altered by people. Indeed, that would mean getting rid of the 29 locks and dams on the Mississippi River, letting its sediment run down into the delta again to rebuild the marshes and barrier islands and letting the mighty river jump 100 miles—right over New Orleans—to join the Atchafalaya River, the channel it has been wanting to flow into for about a century. A complete restoration would also mean removing much of the oil and gas infrastructure.

So in this highly engineered system, the goal of restoration is simply to bring back some of the characteristics and functions of the original site. In the case of East Timbalier, these include the bird and fish habitats as well as the protection offered many nearby oil and gas heads and Port Fourchon. And then, if the money and the will are there, to manage the site—but if these resources are not, to let it all wash away. “We don’t expect to have what we are building in 20 years,” Burkholder says. “It is just a question of where we would be without the project.” SA

About the Author

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