

## Making Land June 6, 2012 Oceans, Restoration 2 Comment

*Southern Louisiana is one of the world's fastest-disappearing landmasses. Cutting the losses may mean letting in the floods.*



**By Hal Herring**

**In the Wax Lake Delta near Morgan City, Louisiana.** The land here is low and verdant, threaded with the wide arterial channels of the mighty Atchafalaya River. The river water is the color of strong coffee cut with cream, the current carrying the heartland itself—suspended mud from Montana and Minnesota, fine sand from eastern Tennessee, pulverized stone from Colorado, Oklahoma, the Ozarks. It is raucous with birds. Snowy egrets, a flock of dramatic white ibis, teal that rocket overhead with the sound of tiny jets. Little anole lizards scurry in the branches of vine-hung willows. A languorous alligator, eight feet and more of midnight black, sleeps on a small promontory of sandy mud and flood debris—what geomorphologists call “coffee grounds,” a rich mix of seeds, leaves, and other organic matter.

The gator’s nap pad may not look like much. But it is some of North America’s newest land—a precious resource here in southern Louisiana, which scientists say is one of the world’s fastest-disappearing landmasses. More than a century of monumental engineering along the Atchafalaya and Mississippi Rivers has helped create an equally monumental ecological calamity as dikes and levees designed to contain floods have also choked off the supply of sediment that once sustained a vast coastal wetland.

Jerome Zeringue, the executive director of the state’s Office of Coastal Protection and Restoration, calls it unequivocally “the largest ecological disaster in the U.S.” But the sheer scale of the land lost has yet to truly imprint upon the national consciousness. Every year, 44 square kilometers of marshland becomes open water. Barrier islands recede by an average of 20 meters, and many disappear entirely. Where once was a vast expanse of lowland forests and ancient ridges, swamp, and seemingly endless marsh grass, there is now open water.

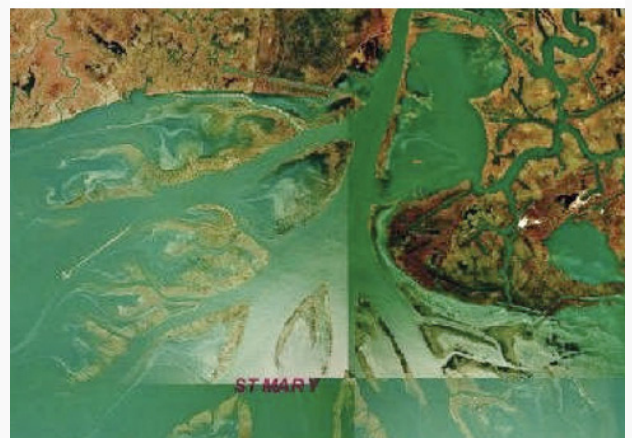
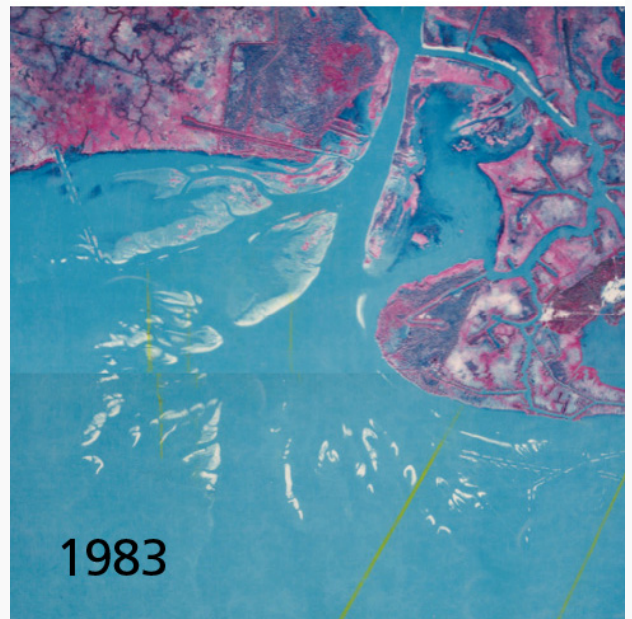
The problem is not just an ecological one. The steady drowning of the coast is imperiling marshes that provide 40 percent of America's seafood harvest and are home to human communities and cargo infrastructure that have made the Gulf Coast an awesome engine of economic and ecological wealth. "We used to talk about people moving down to the coast," says Robert Twilley, a wetlands ecologist at Louisiana State University in Baton Rouge who has been studying the region for years. "Now we talk about the coast moving up to the people."

Here in the Wax Lake Delta, however, Twilley and other ecologists argue that there's a way out of the morass. More than 60 years ago, to prevent the small community of Morgan City from being drowned during floods, engineers intentionally punched a hole into the banks of the Atchafalaya, digging a gun barrel–straight, eleven-kilometer-long canal out to the Gulf of Mexico. During big floods, the Wax Lake Outlet allows sediment-heavy flood waters to spill out of the river and into Atchafalaya Bay. In the beginning, the spillway emptied into open water. Then, in the 1970s, the new delta began to appear. Now, an estimated 34 million tons of fresh sediment forms one of the world's newest land masses—25 square miles of delta that, from space, looks like a giant bird's foot. And the massive floods of 2011 only added to the land-building, with new sandbars and mudflats appearing seemingly everywhere.

"The flood completely rewrote that landscape," says Twilley, who has become a leading advocate for using the Wax Lake Outlet as a model for revitalizing the entire Mississippi Delta. The Wax Lake Delta "is by far the best example of what can be done to restore coastal wetlands that I've ever seen. It is incredible."

Replicating it elsewhere, however, will be no easy task. It would mean punching expensive new holes into the levees and dikes that now straitjacket the Mississippi and the Atchafalaya, allowing sediment to spill back into eroding wetlands. And it would mean taking on powerful shipping interests and government bureaucracies that are heavily invested in keeping things as they are. In particular, they see sediment as the enemy, something that needs to be dredged out of shipping channels and dumped out at sea. Currently, officials "treat sediment as the problem, dredging it, moving it," says Twilley. But "for wetlands scientists, and for anyone who wants to see the restoration of the Delta, sediment is the whole answer."

## Gaining Ground in the Wax Lake Delta



**The mudslinging is nothing new.** Even in the late 1800s, some engineers recognized that choking off the flow of sediment could ultimately speed up the sinking of Louisiana’s wetlands, which are naturally sinking anyway. But “the great benefit to the present and two or three following generations” of the levees “far outweighs the disadvantages to future generations,” noted an 1897 article in *National Geographic*.

By mid-century, engineers had managed to levee more than 2,000 miles of the Mississippi and its tributaries. With the river confined and delivering little new sediment to build land, existing wetlands began to “subside,” or naturally compress and sink. Human activities, meanwhile, hastened the losses. We drained and filled marshes. We cut canals to build and maintain oil and gas rigs, splitting wetlands into small blocks susceptible to the subsidence caused by boat wakes, wind, and storms. The canals allow saltwater to penetrate inland, killing freshwater and brackish-water plants whose dense matrix of roots held the soil in place. It took the Mississippi River about 7,000 years to build coastal Louisiana. It took just a century of engineering to lose about one-third of it.

“What was once the huge bird’s-foot of the Mississippi Delta no longer has any webbing,” says Paul Kemp, a salt-marsh ecologist with the National Audubon Society who describes himself as “an oceanographer who works in water that is knee-deep.” And with the subsidence, “What is left of the Delta is getting pretty close to sea level . . . You are basically looking at a lake.”

That is no small issue for the region’s shipping interests, he notes, which move more than \$100 billion worth of cargo each year through the Mississippi ports of New Orleans and Baton Rouge. Subsidence is making it almost impossible to keep key channels clear, because sediment is falling out of the slow-moving waters more easily, choking the waterways. The dredging needed to keep open Southwest Pass, a key 45-foot-deep channel, now costs the U.S. Army Corps of Engineers and its allies between \$80 million and \$100 million per year. And the 2011 floods overwhelmed the dredgers, dumping an estimated 5 million cubic yards of sediment that had to be removed from Southwest Pass during the flood’s crest and dumped into the deep waters of the Gulf of Mexico. As a result, “The Corps spent more money dredging Southwest Pass [in 2011] than the budget for dredging all the rest of the channels in the U.S. combined,” notes David Muth, Louisiana State Director of the National Wildlife Federation’s Coastal Louisiana Campaign. And dredging costs are likely only to rise, predict many observers. “The era of cheap fossil fuels is closing,” says National Audubon’s Kemp. “All you have to do is chart the price of diesel to know for certain that we are not going to be able to keep dredging as we have in the past.”

And dredging isn’t just expensive: it also essentially throws away sediment that could be used to rebuild the Delta. Muth, for example, notes that after the 2011 flood, “They dredged out barge loads of silt, silt that could be rebuilding our Delta, and they dumped it over the edge of the Mississippi Trench.” In essence, taxpayers are paying to hasten the Delta’s demise.

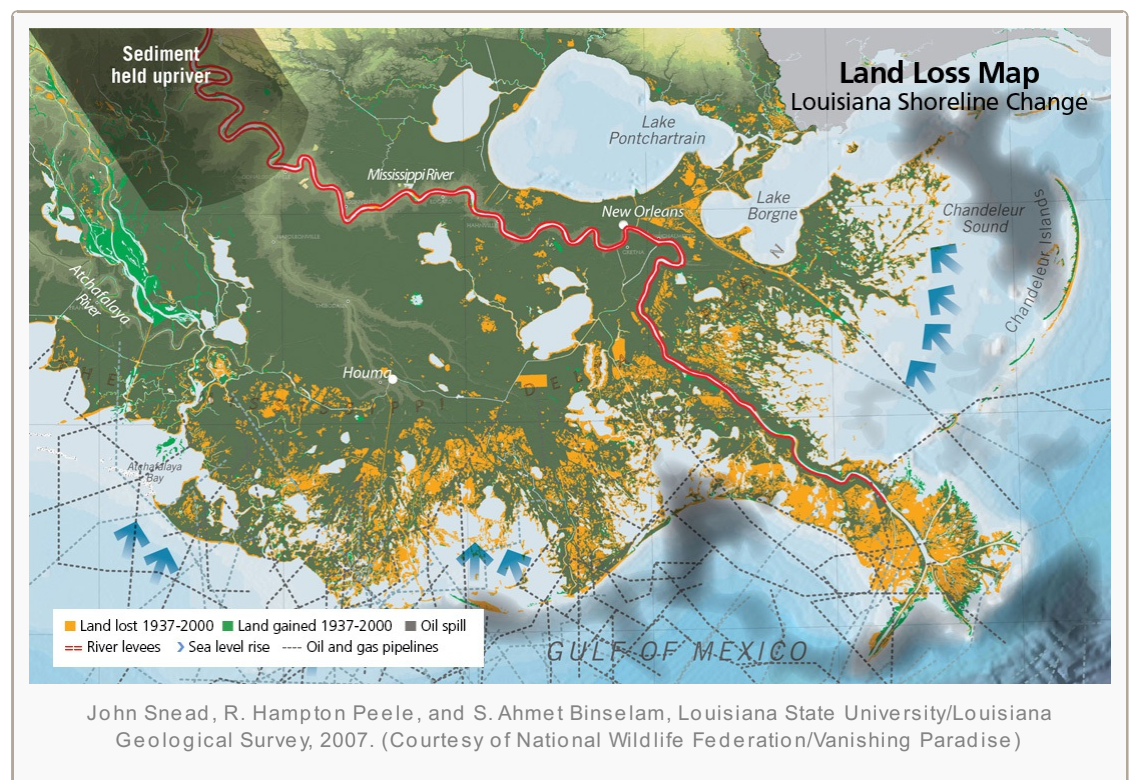




**Yet Twilley remains an optimist.** He's seen first-hand the ways in which large and vibrant, if broken, coastal systems can be ecologically restored. He's worked in his native North Carolina coastal wetlands, in the Everglades, and on the Chesapeake Bay. His work on mangrove ecosystems has taken him all over the tropical world. In Colombia, working on a World Bank-funded mangrove restoration project on the Magdalena River, he witnessed what he calls a "phenomenal, life-changing" success. Mangrove swamps there were disappearing—a huge system lost—because the river had been leveed and cut off from its flood plain. Saltwater had replaced the freshwater of the river, to the point where mangroves were dying for miles around. The water there, five times saltier than seawater, was just killing them all. As soon as the levees were removed and the river's freshwater was allowed to reoccupy some of its floodplain, the recovery of the mangroves—and the life-filled swamps they created—was almost immediate. "The recovery was far beyond any of the models we'd created, far beyond any expectations we had," Twilley said. It was the kind of experience that would make any ecologist hopeful.

In 1600, Sir Francis Bacon famously wrote, "For nature to be commanded, it must first be obeyed." In the case of the lower Mississippi River Delta, commanding and obeying must be done on a scale to match the immensity of the losses. So far, efforts to restore the Delta have been timid and tentative. Twilley notes that, perversely, efforts to constrain the river and control flooding have been massive.

If restoration were undertaken on a similar scale, we might stop or even reverse the steady drowning of the Delta. For example, Twilley says, the Bonnet Carré ("Bonnie Carrie") spillway on the Mississippi River north of New Orleans can be opened during floods to lower the river and protect the city. The Bonnet Carré, built shortly after the monster 1927 floods, spills east into Lake Pontchartrain. In addition to saving the Big Easy, the massive 225,000 cubic feet of water that it carries at maximum flow recharges and cleans the lake, providing an endless supply of sediment. "We need at least two more Bonnet Carré-sized spillways north of New Orleans," Twilley says, "but on the west side of the river, where we are losing the marshes." That would be, he says, a great start.



Next on Twilley's restoration "to do" list is realigning the Mississippi's main navigation channel so that the outlet to the Gulf is not at Southwest Pass. "That pass is right at the edge of the abyss of the Mississippi Trench," Twilley explains, "and we are losing all the sediment that could solve our problems."

Third on the list of major operations is using the Inter-coastal Waterway to transfer water from the Atchafalaya River Basin to the east, bringing water and critical sediments to help restore the saltwater-bleached and dying marshes of Terrebonne Parish and the Barataria Basin. “We need to start transporting water and land (i.e., sediment) through the Intercoastal, rather than just shipping goods through it,” Twilley says.

Such intentional land building can bring more than ecological benefits, advocates note. The Wax Lake Delta, for instance, is helping protect communities such as Morgan City from the encroaching Gulf of Mexico. Insurance companies have pointed out that such protection could be potentially worth billions of dollars in avoided claims from damage caused by floods and storms.

**Given such potentially great benefits,** why are Delta restoration projects stuck in their own quagmire, limited to just a few small-scale experiments? One answer, says Twilley, is that remaking the Mississippi’s century-old flood control system isn’t a win-win endeavor. “People have a misconception about the term ‘restoration,’” he says. “It’s such a nice word, and it makes people feel like there’s something in it for everybody. But what it really means is the restoration of ecosystem services, and there are winners and losers in that.” Letting sediment once again build up in the Delta, for instance, means that “you fill up the places that would hold the flood water. So where is the next flood going?” In practice, it means some communities would have to be abandoned while others might need more flood defense, not less. As a result, “Right now, everybody is trying to protect their own interests, rather than agreeing to a compromise that would serve a more regional interest.”

Re-engineering the Delta also makes two major players—the Corps and the Port of New Orleans—nervous. Although both recognize that business as usual probably isn’t sustainable, they’ve also suggested that they won’t support any major restoration projects until they have a guarantee that not a day of navigation will be lost. “At this point, the Corps seems perfectly willing to wait until there is a disaster and then go fix it,” said Paul Kemp. “They seem gun-shy, and that is understandable, because there are no consequences for them not being proactive.” Corps engineers have also pointed out that researchers still do not fully understand how the Delta system works and that trying to do good could have unintended and unforeseen consequences.

Finally, there is the question of cost—and who pays. Cutting levees isn’t as easy as it sounds, and experts estimate that the price tag for a fully functioning restoration effort could easily run into the tens of billions. Ironically, a big part of that cost could be covered as a result of the most recent and tangible disaster to assail this beleaguered coastline: the 2010 Deepwater Horizon oil spill. Local officials and restoration advocates have been pushing Congress—with some success—to pass the RESTORE Act, which would dedicate 80 percent of the Clean Water Act fines collected for the spill to ecological and economic restoration efforts along the Gulf Coast. The fines could range from \$5 billion to \$20 billion, creating a “concrete, actual source of funds dedicated to restoration efforts,” says Twilley. But Congress has yet to finalize the legislation, and it could take years to settle on a final number for the fine.

In the meantime, restoration advocates are baffled that the oil and gas industry has been largely silent in the restoration discussion. “It amazes me,” says Twilley. “All of that infrastructure investment, and the Delta is degrading right out from underneath it. All those facilities and pipelines—none of that will work in open water. The highway to Port Fourchon, the stores where the workforce shops, the places where they live, —all of that is at full risk.” If he were an industry executive, Twilley says, he’d insist that at least some of the billions of dollars that oil companies pay in federal royalties each year be used to help restore the Delta. “I don’t get it,” he says. “These are extremely smart people, and so far they have not asked for anything nearly commensurate with the risks they face.”



As the salty waters of the Gulf continue to edge inland, those risks are rising with every day that the river is allowed to carry its daily load of silt out to sea, away from the hungry marshes that need it. The question is no longer whether the change is coming—but what kind of change we choose. “The situation will be decided,” Twilley says with certainty. “We will accommodate the processes of the river, or we will accommodate the ocean.”

**Hal Herring** has been an environmental and conservation writer since 1997. He is a contributing editor at *Field and Stream* magazine and writes the *Conservationist* blog for the *Field and Stream* website. He lives in Augusta, Montana, with his wife and children.

*NASA image of the Mississippi Delta created by Jesse Allen*

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