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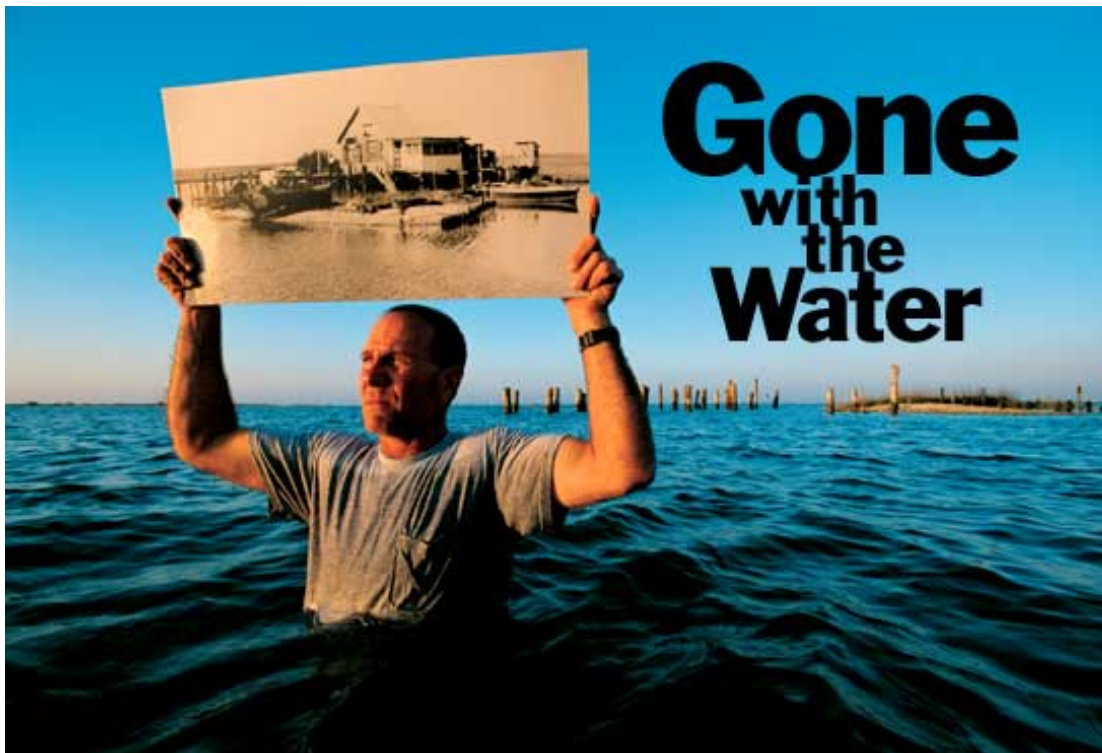
On Assignment



Field Notes From
Author
Joel K. Bourne, Jr.

Louisiana's Wetlands

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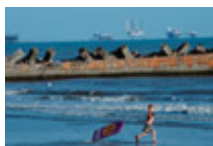


Photograph by Tyrone Turner

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By Joel K. Bourne, Jr.

Photographs by Robert Caputo and Tyrone Turner

The Louisiana bayou, hardest working marsh in America, is in big trouble—with dire consequences for residents, the nearby city of New Orleans, and seafood lovers everywhere.

It was a broiling August afternoon in New Orleans, Louisiana, the Big Easy, the City That Care Forgot. Those who ventured outside moved as if they were swimming in tupelo honey. Those inside paid silent homage to the man who invented air-conditioning as they watched TV "storm teams" warn of a hurricane in the Gulf of Mexico. Nothing surprising there: Hurricanes in August are as much a part of life in this town as hangovers on Ash Wednesday.

But the next day the storm gathered steam and drew a bead on the city. As the whirling maelstrom approached the coast, more than a million people evacuated to higher ground. Some 200,000 remained, however—the car-less, the homeless, the aged and infirm, and those

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The Lost Coast



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die-hard New Orleanians who look for any excuse to throw a party.

The storm hit Breton Sound with the fury of a nuclear warhead, pushing a deadly storm surge into Lake Pontchartrain. The water crept to the top of the massive berm that holds back the lake and then spilled over. Nearly 80 percent of New Orleans lies below sea level—more than eight feet below in places—so the water poured in. A liquid brown wall washed over the brick ranch homes of Gentilly, over the clapboard houses of the Ninth Ward, over the white-columned porches of the Garden District, until it raced through the bars and strip joints on Bourbon Street like the pale rider of the Apocalypse. As it reached 25 feet (eight meters) over parts of the city, people climbed onto roofs to escape it.

Thousands drowned in the murky brew that was soon contaminated by sewage and industrial waste. Thousands more who survived the flood later perished from dehydration and disease as they waited to be rescued. It took two months to pump the city dry, and by then the Big Easy was buried under a blanket of putrid sediment, a million people were homeless, and 50,000 were dead. It was the worst natural disaster in the history of the United States.

When did this calamity happen? It hasn't—yet. But the doomsday scenario is not far-fetched. The Federal Emergency Management Agency lists a hurricane strike on New Orleans as one of the most dire threats to the nation, up there with a large earthquake in California or a terrorist attack on New York City. Even the Red Cross no longer opens hurricane shelters in the city, claiming the risk to its workers is too great.

"The killer for Louisiana is a Category Three storm at 72 hours before landfall that becomes a Category Four at 48 hours and a Category Five at 24 hours—coming from the worst direction," says Joe Suhayda, a retired coastal engineer at Louisiana State University who has spent 30 years studying the coast. Suhayda is sitting in a lakefront restaurant on an actual August afternoon sipping lemonade and talking about the chinks in the city's hurricane armor. "I don't think people realize how precarious we are,"

Suhayda says, watching sailboats glide by. "Our technology is great when it works. But when it fails, it's going to make things much worse."

The chances of such a storm hitting New Orleans in any given year are slight, but the danger is growing. Climatologists predict that powerful storms may occur more frequently this century, while rising sea level from global warming is putting low-lying coasts at greater risk. "It's not if it will happen," says University of New Orleans geologist Shea Penland. "It's when."

Yet just as the risks of a killer storm are rising, the city's natural defenses are quietly melting away. From the Mississippi border to the Texas state line, Louisiana is losing its protective fringe of marshes and barrier islands faster than any place in the U.S. Since the 1930s some 1,900 square miles (4,900 square kilometers) of coastal wetlands—a swath nearly the size of Delaware or almost twice that of Luxembourg—have vanished beneath the Gulf of Mexico. Despite nearly half a billion dollars spent over the past decade to stem the tide, the state continues to lose about 25 square miles (65 square kilometers) of land each year, roughly one acre every 33 minutes.

A cocktail of natural and human factors is putting the coast under. Delta soils naturally compact and sink over time, eventually giving way to open water unless fresh layers of sediment offset the subsidence. The Mississippi's spring floods once maintained that balance, but the annual deluges were often disastrous. After a devastating flood in

POLL

Should the federal government spend billions of dollars to stem the tide of wetland loss in Louisiana? Cast your vote then [join the Forum](#).

[Yes](#) [No](#)

FLASHBACK

Flashback to 1938 when an ivorybill woodpecker [jumped from its nest](#) in a Louisiana swamp, climbed up guide J. J. Kuhn's arm, and perched on his cap.

1927, levees were raised along the river and lined with concrete, effectively funneling the marsh-building sediments to the deep waters of the Gulf. Since the 1950s engineers have also cut more than 8,000 miles (13,000 kilometers) of canals through the marsh for petroleum exploration and ship traffic. These new ditches sliced the wetlands into a giant jigsaw puzzle, increasing erosion and allowing lethal doses of salt water to infiltrate brackish and freshwater marshes.

While such loss hits every bayou-loving Louisianan right in the heart, it also hits nearly every U.S. citizen right in the wallet. Louisiana has the hardest working wetlands in America, a watery world of bayous, marshes, and barrier islands that either produces or transports more than a third of the nation's oil and a quarter of its natural gas, and ranks second only to Alaska in commercial fish landings. As wildlife habitat, it makes Florida's Everglades look like a petting zoo by comparison.

Such high stakes compelled a host of unlikely bedfellows—scientists, environmental groups, business leaders, and the U.S. Army Corps of Engineers—to forge a radical plan to protect what's left. Drafted by the Corps a year ago, the Louisiana Coastal Area (LCA) project was initially estimated to cost up to 14 billion dollars over 30 years, almost twice as much as current efforts to save the Everglades. But the Bush Administration balked at the price tag, supporting instead a plan to spend up to two billion dollars over the next ten years to fund the most promising projects. Either way, Congress must authorize the money before work can begin.

To glimpse the urgency of the problem afflicting Louisiana, one need only drive 40 minutes southeast of New Orleans to the tiny bayou village of Shell Beach. Here, for the past 70 years or so, a big, deeply tanned man with hands the size of baseball gloves has been catching fish, shooting ducks, and selling gas and bait to anyone who can find his end-of-the-road marina. Today Frank "Blackie" Campo's ramshackle place hangs off the end of new Shell Beach. The old Shell Beach, where Campo was born in 1918, sits a quarter mile away, five feet beneath the rippling waves. Once home to some 50 families and a naval air station during World War II, the little village is now "ga'an pecan," as Campo says in the local patois. Gone forever.

Life in old Shell Beach had always been a tenuous existence. Hurricanes twice razed the community, sending houses floating through the marsh. But it wasn't until the Corps of Engineers dredged a 500-foot-wide (150-meter-wide) ship channel nearby in 1968 that its fate was sealed. The Mississippi River-Gulf Outlet, known as "Mr. Go," was supposed to provide a shortcut for freighters bound for New Orleans, but it never caught on. Maybe two ships use the channel on a given day, but wakes from even those few vessels have carved the shoreline a half mile wide in places, consuming old Shell Beach.

Campo settles into a worn recliner, his pale blue eyes the color of a late autumn sky. Our conversation turns from Mr. Go to the bigger issue affecting the entire coast. "What really screwed up the marsh is when they put the levees on the river," Campo says, over the noise of a groaning air-conditioner. "They should take the levees out and let the water run; that's what built the land. But we know they not going to let the river run again, so there's no solution."

Denise Reed, however, proposes doing just that—letting the river run. A coastal geomorphologist at the University of New Orleans, Reed is convinced that breaching the levees with a series of gated spillways would pump new life into the dying marshes. Only three such diversions currently operate in the state. I catch up with Reed at the most controversial of the lot—a 26-million-dollar culvert just south of

New Orleans named Caernarvon.

"Caernarvon is a prototype, a demonstration of a technique," says Reed as we motor down a muddy canal in a state boat. The diversion isn't filling the marsh with sediments on a grand scale, she says. But the effect of the added river water—loaded as it is with fertilizer from farm runoff—is plain to see. "It turns wetlands hanging on by the fingernails into something quite lush," says Reed.

To prove her point, she points to banks crowded with slender willows, rafts of lily pads, and a wide shallow pond that is no longer land, no longer liquid. More like chocolate pudding. But impressive as the recovering marsh is, its scale seems dwarfed by the size of the problem. "Restoration is not trying to make the coast look like a map of 1956," explains Reed. "That's not even possible. The goal is to restore healthy natural processes, then live with what you get."

Even that will be hard to do. Caernarvon, for instance, became a political land mine when releases of fresh water timed to mimic spring floods wiped out the beds of nearby oyster farmers. The oystermen sued, and last year a sympathetic judge awarded them a staggering 1.3 billion dollars. The case threw a major speed bump into restoration efforts.

Other restoration methods—such as rebuilding marshes with dredge spoil and salt-tolerant plants or trying to stabilize a shoreline that's eroding 30 feet (10 meters) a year—have had limited success. Despite the challenges, the thought of doing nothing is hard for most southern Louisianans to swallow. Computer models that project land loss for the next 50 years show the coast and interior marsh dissolving as if splattered with acid, leaving only skeletal remnants. Outlying towns such as Shell Beach, Venice, Grand Isle, and Cocodrie vanish under a sea of blue pixels.

Those who believe diversions are the key to saving Louisiana's coast often point to the granddaddy of them all: the Atchafalaya River. The major distributary of the Mississippi River, the Atchafalaya, if left alone, would soon be the Mississippi River, capturing most of its flow. But to prevent salt water from creeping farther up the Mississippi and spoiling the water supply of nearby towns and industries, the Corps of Engineers allows only a third of the Mississippi's water to flow down the Atchafalaya. Still, that water and sediment have produced the healthiest wetlands in Louisiana. The Atchafalaya Delta is one of the few places in the state that's actually gaining ground instead of losing it. And if you want to see the delta, you need to go crabbing with Peanut Michel.

"Peanut," it turns out, is a bit of a misnomer. At six foot six and 340 pounds, the 35-year-old commercial fisherman from Morgan City wouldn't look out of place on the offensive line of the New Orleans Saints. We launch his aluminum skiff in the predawn light, and soon we're skimming down the broad, café au lait river toward the newest land in Louisiana. Dense thickets of needlegrass, flag grass, cut grass, and a big-leafed plant Michel calls elephant ear crowd the banks, followed closely by bushy wax myrtles and shaggy willows.

Michel finds his string of crab pots a few miles out in the broad expanse of Atchafalaya Bay. Even this far from shore the water is barely five feet deep. As the sun ignites into a blowtorch on the horizon, Michel begins a well-oiled ritual: grab the bullet-shaped float, shake the wire cube of its clicking, mottled green inhabitants, bait it with a fish carcass, and toss. It's done in fluid motions as the boat circles lazily in the water.

But it's a bad day for crabbing. The wind and water are hot, and only a few crabs dribble in. And yet Michel is happy. Deliriously happy. Because this is what he wants to do. "They call 'em watermen up in Maryland," he says with a slight Cajun accent. "They call us lunatics here. You got to be crazy to be in this business."

Despite Michel's poor haul, Louisiana's wetlands are still a prolific seafood factory, sustaining a commercial fishery that most years lands more than 300 million dollars' worth of finfish, shrimp, oysters, crabs, and other delicacies. How long the stressed marshes can maintain that production is anybody's guess. In the meantime, Michel keeps at it. "My grandfather always told me, Don't live to be rich, live to be happy," he says. And so he does.

After a few hours Michel calls it a day, and we head through the braided delta, where navigation markers that once stood at the edge of the boat channel now peek out of the brush 20 feet (six meters) from shore. At every turn we flush mottled ducks, ibis, and great blue herons. Michel, who works as a hunting guide during duck season, cracks an enormous grin at the sight. "When the ducks come down in the winter," he says, "they'll cover the sun."

To folks like Peanut Michel, the birds, the fish, and the rich coastal culture are reason enough to save Louisiana's shore, whatever the cost. But there is another reason, one readily grasped by every American whose way of life is tethered not to a dock, but to a gas pump: These wetlands protect one of the most extensive petroleum infrastructures in the nation.

The state's first oil well was punched in south Louisiana in 1901, and the world's first offshore rig went into operation in the Gulf of Mexico in 1947. During the boom years in the early 1970s, fully half of the state's budget was derived from petroleum revenues. Though much of the production has moved into deeper waters, oil and gas wells remain a fixture of the coast, as ubiquitous as shrimp boats and brown pelicans.

The deep offshore wells now account for nearly a third of all domestic oil production, while Louisiana's Offshore Oil Port, a series of platforms anchored 18 miles (29 kilometers) offshore, unloads a nonstop line of supertankers that deliver up to 15 percent of the nation's foreign oil. Most of that black gold comes ashore via a maze of pipelines buried in the Louisiana muck. Numerous refineries, the nation's largest natural gas pipeline hub, even the Strategic Petroleum Reserve are all protected from hurricanes and storm surge by Louisiana's vanishing marsh.

You can smell the petrodollars burning at Port Fourchon, the offshore oil industry's sprawling home port on the central Louisiana coast. Brawny helicopters shuttle 6,000 workers to the rigs from here each week, while hundreds of supply boats deliver everything from toilet paper to drinking water to drilling lube. A thousand trucks a day keep the port humming around the clock, yet Louisiana 1, the two-lane highway that connects it to the world, seems to flood every other high tide. During storms the port becomes an island, which is why port officials like Davie Breaux are clamoring for the state to build a 17-mile-long (27-kilometer-long) elevated highway to the port. It's also why Breaux thinks spending 14 billion dollars to save the coast would be a bargain.

"We'll go to war and spend billions of dollars to protect oil and gas interests overseas,"

Breaux says as he drives his truck past platform anchors the size of two-story houses. "But here at home?" He shrugs. "Where else you gonna drill? Not California. Not Florida. Not in ANWR. In Louisiana. I'm

third generation in the oil field. We're not afraid of the industry. We just want the infrastructure to handle it."

The oil industry has been good to Louisiana, providing low taxes and high-paying jobs. But such largesse hasn't come without a cost, largely exacted from coastal wetlands. The most startling impact has only recently come to light—the effect of oil and gas withdrawal on subsidence rates. For decades geologists believed that the petroleum deposits were too deep and the geology of the coast too complex for drilling to have any impact on the surface. But two years ago former petroleum geologist Bob Morton, now with the U.S. Geological Survey, noticed that the highest rates of wetland loss occurred during or just after the period of peak oil and gas production in the 1970s and early 1980s. After much study, Morton concluded that the removal of millions of barrels of oil, trillions of cubic feet of natural gas, and tens of millions of barrels of saline formation water lying with the petroleum deposits caused a drop in subsurface pressure—a theory known as regional depressurization. That led nearby underground faults to slip and the land above them to slump.

"When you stick a straw in a soda and suck on it, everything goes down," Morton explains. "That's very simplified, but you get the idea." The phenomenon isn't new: It was first documented in Texas in 1926 and has been reported in other oil-producing areas such as the North Sea and Lake Maracaibo in Venezuela. Morton won't speculate on what percentage of wetland loss can be pinned on the oil industry. "What I can tell you is that much of the loss between Bayou Lafourche and Bayou Terrebonne was caused by induced subsidence from oil and gas withdrawal. The wetlands are still there, they're just underwater." The area Morton refers to, part of the Barataria-Terrebonne estuary, has one of the highest rates of wetland loss in the state.

The oil industry and its consultants dispute Morton's theory, but they've been unable to disprove it. The implication for restoration is profound. If production continues to taper off in coastal wetlands, Morton expects subsidence to return to its natural geologic rate, making restoration feasible in places. Currently, however, the high price of natural gas has oil companies swarming over the marshes looking for deep gas reservoirs. If such fields are tapped, Morton expects regional depressurization to continue. The upshot for the coast, he explains, is that the state will have to focus whatever restoration dollars it can muster on areas that can be saved, not waste them on places that are going to sink no matter what.

A few days after talking with Morton, I'm sitting on the levee in the French Quarter, enjoying the deep-fried powdery sweetness of a beignet from the Café du Monde. Joggers lumber by in the torpid heat, while tugs wrestle their barges up and down the big brown river. For all its enticing quirkiness, for all its licentious pleasures, for all its geologic challenges, New Orleans has been luckier than the wetlands that lined its pockets and stocked its renowned tables. The question is how long Lady Luck will shine. It brings back something Joe Suhayda, the LSU engineer, had said during our lunch by Lake Pontchartrain.

"When you look at the broadest perspective, short-term advantages can be gained by exploiting the environment. But in the long term you're going to pay for it. Just like you can spend three days drinking in New Orleans and it'll be fun. But sooner or later you're going to pay."

I finish my beignet and stroll down the levee, succumbing to the hazy, lazy feel of the city that care forgot, but that nature will not.

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MORE TO EXPLORE

In More to Explore the *National Geographic* magazine team shares some of its best sources and other information. Special thanks to the Research Division.

Did You Know?

Louisiana's Department of Wildlife and Fisheries estimates that currently over 63,000 acres (25,000 hectares) of coastal wetlands have been demolished, or *chomped*, by the now ubiquitous nutria. The large, marsh-loving rodent, somewhere between a muskrat and a beaver, was brought to Louisiana from South America in the 1930s for the fur industry and has since claimed Louisiana's coastal wetlands as home. The Department of Wildlife and Fisheries is hoping to control nutria populations by encouraging Louisianans to trap them. And eat them.



Nutria meat, also called ragondin, is likened to rabbit or dark turkey meat. It is higher in protein and lower in both fat and cholesterol than beef, chicken, and even turkey. Though nutria is difficult to find on menus, the department hopes it will one day become a popular dish and has even posted recipes on its website: www.nutria.com. So remember, "Nutria: Good for You. Good for Louisiana."

—Mary Jennings

Related Links

LACoast

www.lacoast.gov

Maintained by the National Wetlands Research Center, this is an excellent site for articles, newsletters, and general background information on Louisiana's disappearing coastline and the restoration efforts to save it.

Save Louisiana Wetlands

www.savelawetlands.org

Find out more information about this program run by Louisiana's Department of Natural Resources.

Louisiana Coastal Area Ecosystem Restoration Plan

www.lca.gov

A comprehensive site that includes history and statistics on the coastal area, land change maps, and a link to the LCA draft plan.

National Wetlands Research Center

www.nwrc.usgs.gov

Read factsheets, news releases, and hot topics on Louisiana's coastline and wetlands in general, from this research center of the U.S. Geological Survey.

[Top](#)

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[Top](#)

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[Top](#)

The Louisiana bayou, hardest working marsh in America, is in big trouble— with dire consequences for residents, the nearby city of New Orleans, and seafood lovers everywhere. It was a broiling August afternoon in New Orleans, Louisiana, the Big Easy, the City That Care Forgot. Those who ventured outside moved as if they were swimming in tupelo honey. Those inside paid silent homage to the man who invented air-conditioning as they watched TV "storm teams" warn of a hurricane in the Gulf of Mexico. With warm weather throughout the year and a varied and distinctive landscape unlike any other in America, the state at the mouth of the Mississippi River provides a wealth of opportunities for outdoor adventures, whether they be urban hijinks in New Orleans, wilderness escapades in the Louisiana backwoods, or explorations in the open water of the Gulf of Mexico. Any outdoor lover who has visited Louisiana knows why the state earned its nickname, the Sportsman's Paradise. 1. Paddling and Kayaking. With its Gulf Coast, marshes, swamps, bayous, and rivers, more than 15 percent of Louisiana is cov