A River Runs Through It

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Everyone agrees that the only way to fix the Gulf of Mexico dead zone—the largest off the United States—is to fix the Mississippi, but not everyone agrees how.

Dennis Chamberlin

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To get an idea of how American coastal waters might look just before they succumb to all the degradations they have suffered these past five centuries, it would be worth taking a July trip to Mobile Bay, an Alabama inlet that feeds into the Gulf of Mexico. If the air is still and hot, an event may occur that Gulf Coast residents call a “jubilee.” The bottom-dwelling flounder will be among its first victims, growing agitated as each successive gulp of water brings less and less oxygen across their gills.

In a panic, the fish will head shoreward toward the only breathable water they can find—the tiny oxygenated riffle the sea makes as it bumps lazily against the beach. At the shoreline, they will find humans waiting for them armed with "gigs," crude sticks with nails protruding. With an easy stab, each gigger will impale a suffocating fish, sometimes two at a time. Wading out farther, the fishermen will find sluggish pods of blue crab and brown shrimp. As the bay slowly asphyxiates and the free-for-all reaches its climax, the human whoops coming from the darkness will give the impression of a happy time—a celebration of the ocean's seemingly endless gifts.

But make no mistake. The Mobile Bay jubilee, while generally accepted as a naturally occurring phenomenon, is no cause for celebration. It is, in fact, a harbinger of a much larger unnatural jubilee occurring next door in the Gulf of Mexico. At least since the 1970s, an oxygen--depleted "dead zone," orders of magnitude larger than the Mobile event, has been forming and growing in the Gulf to the point where it now averages 5,700 square miles, bigger than the state of Connecticut. Nancy Rabalais, the executive director of the Louisiana Universities Marine Consortium and the dead zone's leading researcher, likens the phenomenon to the equivalent of "stretching a sheet of plastic wrap from the mouth of the Mississippi River west to Galveston, Texas, and sucking out all the air."

That this suffocation is taking place atop one of the most important commercial fishing grounds off the United States is alarming. Yet, as environmental issues go, the Gulf dead zone, indeed all dead zones around the world, remains persistently below the public's perception. Unlike strip-mining or deforestation, the Gulf dead zone is hard to observe. It forms miles from shore in an area only fishermen and oil prospectors frequent. And unlike other ocean problems, such as overfishing and offshore oil drilling, no immediate culprit can be identified at the scene of the crime.

But the more one examines dead zones (or "eutrophication-induced hypoxic areas," as they are scientifically termed), the more one comes to understand they are critical to the future relationship between land and sea. Yes, dead zones are only now becoming a serious global problem. As they spread and worsen, they begin to reveal a terrible truth: That around the world humans are sacrificing seafood for land food.

Let me explain: Dead zones begin when rivers carry nitrogen and phosphorus-based nutrients—primarily agricultural fertilizers—into the ocean. In the case of the Gulf of Mexico, it is the Mississippi River that delivers nitrates, nitrites, and phosphates from the American heartland into the Gulf at a rate of 1.7 million tons per year. Once this stew of nutrients reaches the ocean, algae bloom in prodigious amounts. When those algae die and settle to the bottom, bacteria consume them, sucking life-giving oxygen from the water. Compounding the problem: The freshwater that brings in these nutrients is less dense than the hypoxic saltwater and acts as something of a lid on the crypt below.

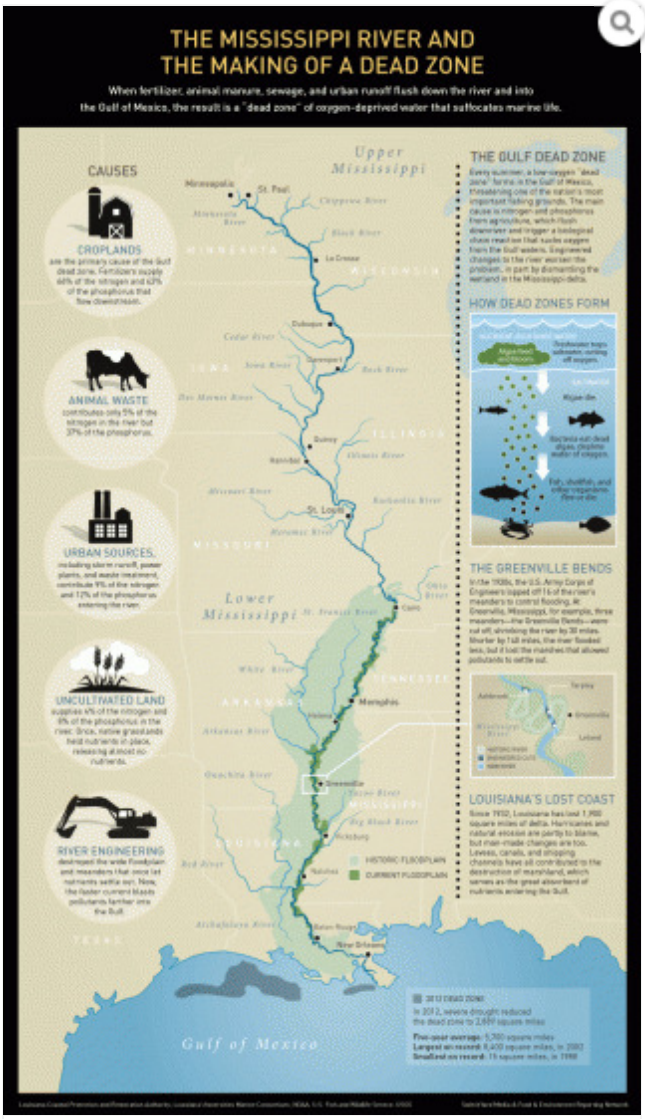
As industrial agriculture and animal feedlots have spread around the globe, dead zones have been spreading exponentially along with them. According to a 2008 study published in the journal *Science*, dead zones now affect 95,000 square miles of water in 400 different systems. They can be as small as the one in Mobile Bay or as large as the nearshore of Europe's Black Sea. They are as far away from the United States as the dozens of dead zones off the coast of the booming economies of Asia or as close to home as the ones in the Chesapeake Bay and Long Island Sound.

But there is something about dead zones that makes them different from many other seemingly intractable environmental crises: Dead zones can be fixed. As the international dead-zone researcher Laurence Mee points out, the Black Sea dead zone—then the world's largest—vanished in the 1990s when the Iron Curtain countries bordering the Danube River collapsed and fertilizer subsidies fell. Indeed, as the Danube/Black Sea system showed, the equation is simple: Turn off the flow of nutrients into rivers, and dead zones go away.

The question for Americans is, can we save our coastal waters before they choke to death? The collapse of the Iron Curtain countries, not choice, salvaged what remained of the Danube/Black Sea ecosystem. Americans, though, will have to choose to eliminate their dead zone.

In an effort to figure out whether we have the wherewithal to make this choice, I decided to travel the American equivalent of the Danube: that epic muddy python of a river called the Mississippi, which drains a 1,200-mile-wide swath of fertilized farmland stretching from the Rockies to the Appalachians. The more time I spent with the river, the more I realized it held the answer to the dead-zone question.

The Mississippi begins clear and cold at Minnesota's lovely Lake Itasca, a place where wild rice flutters in the shallows and remnant stands of old-growth oak and maple hint at what things looked like two centuries ago, a time when millions of acres of riverside forest and hundreds of millions of acres of native prairie covered the Mississippi Valley. But not long after the Mississippi exits Itasca State Park, the forest is replaced by agriculture and the river begins picking up tributaries from the modern world. Along one of these tributaries lives the corn and soybean farmer Brian Hicks of Tracy, Minnesota, who exemplifies the complex relationship between American farming and the Gulf dead zone.



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It's apparent when you begin talking with Hicks that he feels deeply about environmental issues, but he is also the father of ten children and uppermost in his thinking is the agricultural machine that maintains his family. "I tell lots of people that this farm is my factory," he said to me as we drove through the snowbound expanse of his 1,500 acres that straddle the Cottonwood River, which feeds the Minnesota River, which, in turn, feeds the Mississippi. "Some factories make shoes. Mine makes corn and soybeans."

Hicks's Nettiewyynnt Farm, which is more than 120 years old, lies only a few miles from the *Little House on the Prairie* hamlet of Walnut Grove and the Laura Ingalls Wilder homestead. Over the past four generations, the farm has transitioned from a pioneer venture enriched by natural manure and tilled with human and animal labor into a mechanized operation that focuses exclusively on chemically fertilized, genetically modified corn and soy ("commodity crops" in ag parlance). According to the U.S. Geological Survey, commodity-crop production contributes 52 percent of the total nitrogen and 25 percent of the phosphorus load that goes into the Mississippi and the Gulf of Mexico every year. This share appears to be growing. "The production of commodity crops like corn has just exploded," says Alex Echols of the land conservation and management organization Sand County Foundation. "A lot of new land has been put into cultivation—land that had never been in cultivation, range lands, marginal lands—and the conversion to grains accelerates nutrient loss."

Two things have happened that have caused this acceleration. First has been the rise of the economies of the Far East. With so many more Asians entering the middle class and eating meat, farmers in China and elsewhere in Asia have begun importing American corn and soy to feed their growing herds.

Second has been the Unites States' push to produce corn ethanol fuel. In the past ten years ethanol production has risen by a factor of six. "Do we produce a product that is good?" Brian Kletscher, CEO of Highwater Ethanol, asked me and Brian Hicks in his office, as a line of freight trucks loaded down with corn rumbled past the window into his ethanol facility. "We do. I think we've got it right. The U.S. farmer has been able to make some dollars this year."

Corn prices are now 300 percent higher than they were a decade ago. With these kinds of prices, corn begets more corn; because it is so valuable, corn has become just about the easiest crop to insure, something that makes planting anything else a considerable risk. Add to this costs that have spiraled along with corn prices, and many farmers are caught in a bind. Nevertheless, whether you find yourself outside the Highwater plant in Lamberton, Minnesota, or a few miles up the road in Walnut Grove at one of the county's railroad corn--transportation hubs, you have the impression that the Mississippi has faded from the consciousness of a region that once depended upon it. A river-oblivious industrial infrastructure has been overlaid on the American heartland, where a golden torrent of corn flows east and west by rail or truck, servicing alternately the movement of hydrocarbons in and out of refineries or the transfer of goods to and from China.

This redirected flow of money has dramatically affected how farmers treat their land and correspondingly, how they treat the Mississippi. Up until corn prices' recent surge, a government initiative called the Conservation Reserve Program (CRP) did a lot to keep dead zone–forming fertilizers from entering rivers. The CRP pays farmers *not* to farm highly erodible lands. Another government initiative, called the Wetlands Reserve Program, fosters the restoration of wetlands that have previously been farmed. Wetlands sequester and process fertilizers by giving wild vegetation a chance to process runoff and transform those nutrients back into gaseous nitrogen; if kept in forest or prairie, steep slopes prevent nutrients from flowing into watersheds. The price farmers were paid to refrain from farming these marginal lands usually bested what farmers could earn from planting corn in them. Throughout the postwar years, nutrient runoff was kept somewhat in check. But today with Asian and ethanol buyers competing for corn, crop prices are now higher than any government conservation program can pay. Much of the land that was key to preventing nutrients from entering the Mississippi is now getting planted.

Brian Hicks, though, is trying to find a compromise. As we cruised his fields in his 4≈4, we came to a three-foot-high metal box that offers a window into the heart of the problem as well as perhaps a solution. Few of us are aware when we fly over the grid of farmland in the Mississippi Valley that beneath that grid lies another grid—a human-created reworking of the Mississippi's natural drainage system known as "tiling." "In Minnesota before settlers arrived, we had 18 million acres of wetlands," says Jeff Strock, a professor at the University of Minnesota, who works with Hicks on several nutrient--retention experiments. "But when people moved here, water was seen as the common enemy." Starting in the 19th century, pioneer towns were tiled in an attempt to drain off standing water that was associated with diseases and mosquitos. The practice soon spread to agriculture. Farmers began laying clay pipe beneath wetland to make land suitably dry for planting. Today, something like 80 percent of Midwest cropland has been tiled with even-more-efficient plastic pipe, routing water off the land and fertilizers into drainage ditches. These empty into tributaries of the Mississippi.

Hicks is trying to fix his tiling system. The three-foot-high box he showed me was, in essence, a switch that had the capability to shut off the flow of nutrients into the river. Whereas many other farmers let their tiling flow continuously, Hicks can time the opening and closing of his outflow, allowing water and fertilizers to be strategically retained in the soil. This also allows his crops to prosper even during drought conditions. "It's a win-win situation," Strock says.

Hicks has other fixes. As I sat with his family eating a Tater Tot casserole, the combination of good intentions and determination was evident. In one room, I looked through Hicks's daughter's scrapbook of prairie flowers that she'd plucked from her family's wild prairie hay field—a field the Hicks maintain in its natural state to further sequester nutrients. In another room, I took in Hicks's PowerPoint presentation with all of its stewardship ideas. Whether through GPS-based monitoring that allows him to pinpoint portions of his land that require less fertilizer or through better tiling, it is in Hicks's interest to keep nutrients on his land because it makes his crops grow better.

"My feeling is that most farmers," he says, "they realize the dead zone is there, but I think they all feel like, 'You know, I'm one little farmer. ... What I do can't really affect the Gulf of Mexico.' But what I'm reading and what I'm feeling and seeing is I know what we are doing as far as managing outflow is positively impacting the environment."

This kind of can-do, voluntary effort is echoed and encouraged at the highest level of U.S. agriculture. When I talked to Tom Vilsack, the secretary of agriculture, he was eager to point out that the administration was working to get the agricultural Midwest to address the problem of the dead zone. The Upper Mississippi Basin Healthy Watersheds Initiative, a program that has spent $341 million on various watershed-protection projects since 2010, encourages many of the practices that Hicks is pursuing: "low till" and "no till" cultivation methods that limit the annual turnover of soil; GPS monitoring of fertilizer application; installation of untilled buffer strips along streams; use of cover crops in winter. The incentive for farmers is that by employing these best practices, they may protect themselves against future water-quality regulations. But it's important to note that none of these efforts is directed at the core of American agricultural activity—the production of corn and soy. Rather, what the department seems concerned with is a complicated dance with other regulatory bodies, particularly the Environmental Protection Agency, to avoid telling the politically important constituency of swing-state Midwestern farmers what to do.

"If you have a voluntary operation and you are able to measure and quantify the benefits from that voluntary effort," Vilsack told me, "then it may not be necessary that you establish requirements or mandates. This is an incentive-driven system, which is designed to provide a reason for people to do something as opposed to force them to do something."

There are some who believe that everything Vilsack is proposing and that farmers like Hicks are executing is nothing more than a Band-Aid on a gaping hemorrhage that started the moment settlers began their free-for-all on the prairie and sliced into the Midwest's native sod. In other words, the problem of nutrient loading into the Mississippi isn't the *methods* of commodity-crop farming but commodity-crop farming itself: a system that destroys how water should naturally move from the plains to the Mississippi River to the Gulf of Mexico. Chief among those critics is Wes Jackson, director of the Land Institute in Salinas, Kansas, and an oft-quoted spokesperson for the ending of farming as we know it.

"The essential problem is this," Jackson told me. "Humans went from perennial polyculture to annual monocultures. This in my view was the biblical fall."

Jackson's goal is to create, through plant breeding, a set of crops that function like the plant communities of the native prairie. His research has shown that the root structure of the perennial and diverse prairie grasses of the primeval Midwest extended their roots as much as three feet down into the soil. When nutrients flowed toward the Mississippi and its tributaries, they were intercepted by these root structures, processed, and dissipated. Indeed, Jackson's monitoring of a plot of prairie left in its native state on the Land Institute's grounds reveals that almost zero nutrients leave a system planted in native grasses.

Once the native prairie was destroyed, artificially produced nitrogen fertilizers had to be created, something that occurred as a result of innovations in the early 20th century. Today, more than a third of a corn farmer's annual budget is spent on fertilizer. Jackson wants to get away from all of this. After 20 years of plant breeding, the Land Institute has developed its first perennial grain crop, *Thinopyrum intermedium*, or kernza, a grain resembling wheat, which can be used to make flour, beer, and even whiskey. Whereas annual crops like corn and wheat are planted and torn up every year, Jackson's perennial crops stay in place, allowing humans to harvest again and again without disturbing the soil. In such a system, soils would be stabilized and artificial fertilizer would be greatly diminished. The loading of nutrients into the Mississippi would be greatly reduced.

Of course, the kinds of grains that would be produced from a Jacksonian agricultural system would be of a different nature than the ones currently grown in the Midwest. Unlike corn and soy crops, which feed into industrial products like ethanol, high-fructose corn syrup, and cattle feed, Jackson crops would primarily feed people. Instead of a commodity-based agriculture system, which sacrifices the health of the Mississippi and by extension, the Gulf of Mexico, Jackson has proposed a "Fifty-Year Farm Bill," which would serve as a blueprint for this redirection and reprogramming of the heartland. "If you take our 328 million acres of cropland, right now it's 80 percent in annuals and 20 percent in perennials," Jackson told me. "My proposal is that at the end of 50 years, we would have 20 percent annuals and 80 percent perennials. We just reverse it."

Some doubt such a system of agriculture could work in its primary task: feeding us. Alex Echols of the Sand County Foundation sees the agriculture–dead zone relationship as immensely more complex that no "silver bullet" can solve. "Projections are that we will have to produce more food in the next generation than we have in the combined history of 8,000 years of agriculture," he says.

Jackson, though, is insistent that his concept can work. "We can do it," he told me, "but it will take a commitment from our society to get that done. This is what the U.S. Department of Agriculture should be working on instead of accommodating the cattle and pig welfare program and the biofuels industry."

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Floodgates: Natural marshlands like Bayou Bienvenue, a few miles from New Orleans, filter the nutrients coming down the Mississippi.

The Mississippi has suffered many ills requiring solutions that go beyond agriculture. A thousand miles downriver from the corn-growing heartland, I tried to get a sense of what those other options might be—what else we could do to get out of our dead-zone predicament. I found part of the answer in Vicksburg, Mississippi, where I met up with Paul Hartfield, a spry 63-year-old biologist with the U.S. Fish and Wildlife Service. Hartfield has been working on the river this past quarter–century, doing everything from tracking the endangered pallid sturgeon to cataloging freshwater mussels to mapping the migrations of shrimp that once traveled from the Gulf of Mexico all the way north to Ohio.

As we set out in a battered skiff, he explained how the degraded condition of the lower river got that way. “Once upon a time,” Hartfield said, “we had a floodplain that was over 100 miles wide. Now along most of the river it’s probably not more than five.” In the past, the river regularly overflowed its banks, allowing nitrogen and phosphorus to spread out into a vast floodplain. When it did this, the current slowed, sediment settled, and the water became clear enough for sunlight to penetrate. This would allow photosynthetic algae to bloom and process nutrients. As a result, a significant part of the nutrient load was consumed before it could reach the Gulf of Mexico. Decisions made 150 years ago, though, have largely destroyed all that.

The Mississippi has been called “the most engineered river on the planet,” and the reason it was engineered to such an extent was so that farmers could gain access to the tremendous fertility the river deposited in the meandering floodplain. As early as 1857, a geologist predicted that if the river could be contained and the floodplain secured, the Mississippi Valley would become “the central point—the garden spot of the North American continent—where wealth and prosperity culminate.”

As John Barry relates in his Mississippi River history, *Rising Tide*, James Buchanan Eads was one of the first to figure out how to control the river and claim the rich floodplains. In 1833, Eads arrived in the frontier town of St. Louis at the age of 13, penniless; he soon launched a lucrative salvage business, rescuing everything from steamboats to blocks of lead from the river. Inventing a primitive diving bell, Eads walked the river bottom. He intimately “felt” the river and understood the nature of its power. Eventually he would imagine a river-long system of levees and diversions that would start in Cairo, Illinois, and extend to the eponymously named Port Eads, Louisiana, pinching the river and draining the floodplain.

Eads’s most devastating idea was even more radical: Turn the river from a lazy wandering affair into a straight line. Although this did not occur in Eads’s lifetime, his proposal was taken up after the record flood of 1927. Throughout the 1930s and 1940s, the Army Corps of Engineers systematically lopped off what had been called “The Greenville Bends” and a dozen other large river bends, shortening the river by 150 miles. Floods were indeed reduced, but afterward the lower Mississippi transitioned from being a complex marshy wetland into a fire hose that blasted nitrogen and phosphorus straight into the Gulf. It is this fire hose that Hartfield is hoping to adjust.

Heading upstream across the broad muddy river, Hartfield spoke about his long-standing negotiations with the Army Corps of Engineers. “The Corps are focused on what’s out here,” he said, indicating the main part of the river where government engineers try to maintain a safe and efficient navigable channel. Up ahead, we came to a turnoff, and he veered his skiff off to the left. “Me, I’m focused on what’s in here.”

In a little while, we turned into a different habitat called a “backswamp.” Carefully he guided the boat through an eerie forest of half-submerged trees. A pair of green and red navigation buoys and other random refuse, which had been flushed from upstream, bobbed by. “This is a peaceful spot to contemplate the dissolution of the elements,” Hartfield mused.

What Hartfield envisions is a series of little fixes on the model of this quiet little patch of backswamp. He has been trying to persuade the Army Corps to create modest redirections of current that do not affect navigation but at the same time move more water into floodplain channels and swamps. “These small local modifications,” he said, “can be constructed during routine maintenance and construction activities, at no extra cost to the taxpayer.”

The swamp’s impact on water quality is immediately visible. On the upstream side of the backswamp, several miles away, the water entering the floodplain was a milk-chocolaty brown, rife with all the sediments and nutrients the river holds. As we emerged on the downstream side, water flowed out of the vegetation almost translucent with the deep green color of living algae luxuriating in a liquid feast.

“All the leaves and stems of the vegetation growing in the swamp slow that water down, and the sediment drops out,” Hartfield said. “When the water clears and sunlight gets in, the algae bloom and consume the nitrogen and phosphorus in the water. Really, when you think about it, a floodplain is a river’s kidney.”

All the work Hartfield is doing makes an intrinsic sense. The river is not being allowed to do what it is supposed to do. Its wetlands, its kidneys, are failing, and it needs some kind of dialysis to set things straight. This is one of those points that naturalists like Hartfield contemplate their entire careers. But unlike many who have moved through the ranks of government bureaucracy, Hartfield allows himself to imagine the river of the future—a river where backswamps abound. When I prepared to leave Hartfield for southern Louisiana, I asked him what he would do if by some miracle he could have all the money in the world.

"If I had all the money in the world? Hmm—" he said, smiling in his cheerful way and peering downstream. "I'd move the levees back five miles, then turn it all into a park from Cairo, Illinois, to Baton Rouge, Louisiana. Then I'd leave it alone and let the river fix itself."

All the money in the world, though, is not at Hartfield's disposal. But tens of billions of dollars could be there for him and other river-delta dreamers. That is, if BP will ever settle the Clean Water Act lawsuit it faces in the wake of its 2010 Deepwater Horizon oil spill. But as I stepped into the Federal Court building on Poydras Street in New Orleans, a few blocks west of the Mississippi, it seemed clear that BP, having paid out $10.7 billion to environmental groups, fishermen, and other private and public entities, had no great desire to spend money on the river or improved agricultural techniques or any other thing besides its own legal defense. BP had recently balked at a $16 billion settlement offer from the Environmental Protection Agency. In the grand balconied federal court building, thousands of dollars in legal fees were pouring through the floorboards as 20-odd lawyers and other suited professionals listened to mind-numbingly boring testimony by Transocean's chief electronics technician aboard the Deepwater Horizon on an "integrated automatic control system" and how it may have allegedly been disabled. This felt surreal given the much more urgent alarm system blaring from the failing Mississippi Delta. For thanks to a combination of a half-century of bad behavior by the oil industry and the changes to the Mississippi's course, the land where the Poydras Street courthouse sits is in danger of disappearing. The state of Louisiana is currently losing delta land at a rate of one-third of Manhattan a year, land that was once critical to preventing the Gulf dead zone.

Just as the Mississippi floodplain upstream has been radically altered by engineering, the boot of Louisiana in the far south, once the largest chunk of marshland in the continental United States, has been markedly changed by engineering. The wild, pre-20th-century Mississippi, with its constantly shifting watercourse and wide floodplain, built much of Louisiana. But now that the river has been leveed, sediment shoots out into the Gulf's deeper water and builds nowhere near the amount of land it used to. Added to this are the incursions by the oil companies that some scientists believe are even more devastating than the river's containment. As Rowan Jacobsen notes in his book Shadows on the Gulf, throughout the 1950s, oil companies built pipelines and shipping channels to facilitate the delivery of petroleum offshore to inshore refineries. Once channels were dug, water flows were altered. Natural winding shallow channels were replaced by man-made straight deep canals; the levees of the dredged materials were built in an unbroken line parallel to the canals. These "spoil banks" interrupted what's known as sheet flow across the wetlands, rotting them from the inside out. The Louisiana marsh, that great nutrient filter at the end of the river, is falling apart.

The BP oil spill, of course, is not directly responsible for land loss or, for that matter, the Gulf dead zone. But the money that comes out of the BP suit could do a lot toward fixing both. The state has drawn up a "Comprehensive Master Plan for a Sustainable Coast," a 50-year, $50 billion effort that seeks to stop Louisiana from sinking into the sea and by extension decrease the dead zone. A major part of the plan is the granddaddy of all dead-zone mitigators: the rebuilding of the Louisiana marsh, an area so degraded that it requires not just a nutrient dialysis machine but a multibillion--dollar kidney transplant.

A day after my visit to the BP trial, I went on a road trip to one of these transplant operations with a group of officials and contractors working with the state's Coastal Protection and Restoration Authority (CPRA). In the community of West Pointe à la Hache, I saw a cluster of enormous white tubes rising up over the Mississippi's levee and extending into the sea. Hopping onto a boat, we followed this expensive piece of plumbing called a "sediment diversion" to its end. There, at the outflow, sat some of the newest land on earth, land that state officials hope will save the Poydras Street courthouse and all the settled territory upstream, while at the same time helping to fix the dead zone.

“There’s been some work on nutrient--assimilation capacity of coastal wetlands,” Richard Raynie, senior scientist with the authority, told me as we tromped around the brand-new mud. “The numbers we’ve seen show that when you divert river water through wetlands, as much as 45 percent of nitrogen can be removed and assimilated.” While Raynie can’t say how much of the Mississippi’s total nitrogen load could be removed by a fully restored marsh, the hope is that it will be considerable. That hope is fueled by a recent study Raynie mentioned that found that nutrient assimilation within vegetated wetland soils may be as much as ten times higher than that within degraded open-water soils, which result from marshes falling apart.

It is hard to say if all of this is futility. Given that sea levels may rise as much as seven feet before the end of the century, the project can have the feel of expensive sand-castle building. Still, the vision of marshland with all its potential for filtration being created before my eyes was powerful. After West Pointe à la Hache, the CPRA van took me to a second reconstruction project a few miles up the river near the town of Myrtle Grove. This older human-made mudflat was home to grasses and even some low-lying bushes. It looked like marshland. It felt like marshland. At least in theory, it should filter some of whatever the river was bringing down to the Gulf. Would it last? Was it “real” marsh? Or was it just a mirage created to mask the bad agricultural practices upstream? As I paced along the new land, I heard a loud “hsssssssss” and looked down to see a venomous cottonmouth snake, fangs bared, ready to strike. As if nature and the state government were saying with one mouth, “Watch out. This might be fake land, but it’s our land now.”

What is real and what is mirage? What will fix the Gulf dead zone and what will just seem like it’s fixing it? These questions dogged me as I skirted the edges of the Mississippi and wandered into the bureaucracy that attends it. At the end of my research, I sat down in Baton Rouge with MacArthur Foundation “genius” grantee Nancy Rabalais and her husband, R. Eugene Turner, two scientists who perhaps more than any others have awakened the public to dead zones. In talking to them, it is easy to get the impression that no matter what we did in the delta, nothing could accommodate the growing flood of nutrients being unleashed in the upper valley. To them, even something as nice--sounding as “Louisiana marsh creation” carries within it the biblical fall Wes Jackson had mentioned: the moment when we turned to the industrialization of our agricultural heartland.

“Those sediment diversions bringing in inorganic matter,” Turner told me, referring to all that expensive plumbing and land building at West Pointe à la Hache, “are filled with the effluent of nitrogen-rich fertilizers of industrial agriculture. In the end, the diversions don’t help the marsh but harm it. The plants that grow in these new marshes will have shallower roots, because they don’t have to go looking for nutrients, and the organic soils decompose faster.” Pointing to the 55 square miles of marsh lost during Hurricane Katrina, he and Rabalais doubt that the rebuilt marshes will last, and they are not optimistic about their capacity to assimilate nutrients.

What it comes down to, they assert, is our agricultural policy: a policy that overwhelmingly encourages corn. Like Jackson, with whom Turner collaborated in forming the organization Green Lands Blue Waters, they believe the Department of Agriculture itself needs to be reformed to fix the dead zone. “I’d like to have a social system that has healthy farms imbedded in healthy communities,” Turner says. “We are trying to get demonstration watersheds where the whole community is involved in the watershed. I’d like to use agricultural subsidies to help transition to an alternative system.” Turner applied to the state of Louisiana for a portion of the BP settlement money to be directed to this kind of model community. That application has gone, as he puts it, “nowhere.”

What will happen to the Gulf dead zone? Rabalais shakes her head at this question and recalls what occurred 20 years ago in that other dead zone, the one caused when nutrients flowed in abundance from the heart of Europe into the Black Sea and, for a time, maimed it. “It’s exactly like the Danube,” she says.

Later, as my homeward-bound plane rose above New Orleans and arced low over the Mississippi Delta and the Gulf beyond, I thought of the life they contain. All the shrimp, oysters, flounder, crab, snapper, tuna, swordfish—a cornucopia, an expression of the very hope of the New World, full of wild food that satisfies millions of stomachs and could satisfy many more if the waters were treated better. And I thought of the Black Sea, a sea of the Old World, which was once as rich, a sea that humans pushed to its breaking point before their societies collapsed. The dead zone in the Black Sea has indeed been fixed. The sea has come back to life, but only to a point. According to scientists who studied the Black Sea's transition, the communities that once lived there will never fully recover. Invasive jellyfish have taken up residence since its waters were re-oxygenated, and its once-rich mussel beds no longer pave the sea's floor. Yes, fish, mostly little ones, still swim in the Black Sea. An important anchovy fishery persists. But the big fish are mostly gone, the food chains are broken, and the great seafood economy, famous since the time of Byzantium, is now a matter of history.

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