

Delta mud

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Objektyp: **Article**

Zeitschrift: **Pamphlet**

Band (Jahr): - **(2017)**

Heft 20: **Delta dialogues**

PDF erstellt am: **22.07.2024**

Persistenter Link: <https://doi.org/10.5169/seals-984676>

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DELTA MUD

Christophe Girot

To speak about any river delta always leads to the same, unequivocal conclusion: deltas count among the environments on our planet which are most vulnerable to change though they, too, are always in the making. They are the product of repeated sedimentary and human upheavals forming geological and societal concretions layer upon layer. Scientifically speaking, a delta is a place where a river discharges its sediments as it merges with coastal forces; it is a place where sweet and salty waters meet, turbulently, to form infinite, capillary gradients, briny streams that alternate their mix by the hour. A delta is a material environment in perpetual flux where all things are destined to decay. Every delta also has its entangled layers of human histories, some transient and others long-lasting, which tell the stories of those who bore the brunt of recurrent environmental alterations and political changes. And with its countless natural and unnatural intricacies, a delta can either be productive or destructive, welcoming or hostile, bountiful or sterile, industrial or rural—sealing with it the destiny of an entire territory and its people.

It is my understanding that all deltas tell us a similar tale—namely, one of overlapping human struggles at the interface of land and sea. It is here that historic deeds get irretrievably engulfed, digested, and trapped in the dredges of time. This struggle reminds me of Marguerite Duras' autobiographical novel *The Sea Wall*, which tells the love story of a young woman and an older man somewhere in the Mekong Delta in the 1920s during French colonial times.¹ It is a devastating yet very effective story where nothing particular ever happens. It is told through the plight of the young woman who finds herself surrounded by latent poverty, environmental misery, and starvation. Her survival reflects the relentless struggle for life that occurs in the hostile coastal conditions of a delta. There is nothing but waiting in this story, waiting fatalistically in a place where nature continues to erode human efforts without abandon. There is something profoundly tragic and useless about this story, for it seems to exemplify the greater, failing dialogue between mankind and the natural environment.

¹ Marguerite Duras, *The Sea Wall* (New York: Pellegrini and Cudahy, 1953).

To further engage this dialogue, I want to speak about the Mississippi River Delta, for its history best illustrates the improbable environmental, human, and political story of our times. It is a tale of precipitous human decision-making causing irreversible damage to a system in tenuous equilibrium. What may have stemmed from a desire to protect local people from the grips of environmental adversity through a simple relation of cause and effect, has gradually evolved into a complex chain of actions and reactions with unforeseen consequences. When considering the role and responsibility of the landscape architect or engineer in managing and imagining future scenarios for such flood-torn regions, we must attempt to uncover the changes that affected such dramatic consequences in the first place; the complex anthropological bond that has prevailed in one of the muddiest places in the world should invite us to exercise caution—to recognize how induced and natural changes came together to give birth to a set of paradoxical problems that are only beginning to emerge today. Like Duras' novel—though tragically less fictitious—this is a tale about the struggle between the power of nature and the power of enterprise, along with the immediate consequences this ongoing struggle has had on both the fragile natural and urban environments of the delta, which were artificially separated. It is incredible to think how in such a relatively short span of time, the entire geological history of this region was upturned, for better or for worse, to satisfy the hungry needs of an industrious nation.

Let us begin our re-reading of the story some 12,000 years ago, near the end of the Pleistocene, when the Mississippi River Delta region was a much drier and colder place. At that time, its extensive prairie, scattered with oak stands and pine forests, was still populated by the dire wolf, giant bison, saber-toothed tiger, and mammoth. The local dryness and coldness resulted from incredible quantities of water that were still trapped in massive ice caps on the North American continent. Because of this extreme climatic condition, sea levels were roughly 120 meters lower than they are today. However, ten thousand years ago the climate changed, the globe warmed up quickly, provoking an ice melt at a scale: waters charged with glacial alluvium sifted through a vast continental territory extending

from the Appalachians to the Rockies and down into the Lower Mississippi Delta, which became permanently inundated as it met the sea. This rise in sea level caused a decrease in the gradient of all coastal rivers; because of the general lack of slope at the river's mouth, the muddy arms of the Mississippi, charged with sand, silt, and clay, meandered endlessly in search of a shorter way to the Gulf of Mexico.

Soon the river began to avulse across the established delta roughly once every thousand years, and as it changed its course, the natural flow of fresh water and sediment changed, too. Each time this happened, a new delta lobe was produced by progradation, an alternating process of sedimentary accumulation. At the same time, this produced a natural loss of land to subsidence and erosion in other parts of the delta. The Mississippi River Delta is a vast, swampy "mud pudding" layered on top of a massive alluvial fan dating back to an event known as the "Mississippi Embayment" that occurred one hundred million years ago. During the latest events of the recent Holocene Epoch, billions of cubic tons of glacial effluents were discharged into the Mississippi watershed, spilling out into the Gulf of Mexico and engaging the shoreline in a relentless, muddy battle.

The natural environment of the Mississippi River Delta as we know it today, covering an area of more than 12,000 square kilometers, is less than 7,000 years old. The rapid rise in sea level at the onset of the Holocene provoked a radical change in the overall topology and climate of the delta. Natural factors had to adapt rapidly in order to keep up with this highly dynamic environment. The subarctic oak and pine forests and prairies of the Pleistocene glaciation period were soon replaced by a vast subtropical swamp forest composed of bald cypress, turpentine and longleaf pines, water oaks, sweetgum, black willow, and tupelo; the dire wolf and saber-toothed tiger were replaced by alligators, deer, bottlenose dolphins, and Louisiana black bears. At this time, the bird population and aquatic fauna comprising myriad invertebrates and fish represented one of the richest and most diverse biotopes on the continent.

The story of human settlement on the North American continent began relatively recently, when a small group of humans arrived via the Beringia land bridge less than 15,000 years ago. The earliest

genomic records show them stemming from the Ainu population still found today in Siberia, Korea, and northern Japan. This small population became the common ancestor of all First Nation descendants.² The Bering Strait as we know it today emerged only 11,000 years ago when sea levels rose dramatically due to global warming, thus submerging Beringia. Early nomadic tribes survived on hunting and gathering, often relying on the occasional kill of a great bison, mammoth, or elk. In turn, these early migrants were probably also occasionally devoured by a saber-toothed tiger or dire wolf. They hunted with stemmed point arrowheads produced by a method of flint carving that can be traced back to Paleolithic Korea.³ During the Paleo-Indian Period from approximately 10,000 BC to 6,000 BC, populations multiplied and dispersed into smaller nomadic bands that followed migratory herds seasonally.

By the Archaic Period that followed, from 6,000 BC to 2,000 BC, global warming had already induced another radical shift in the environment. The large animals that the nomads had been used to hunting gradually disappeared and were replaced by smaller species. This shift coincided with the appearance of the first man-made monumental mounds in North America, located at Watson Brake in the Ouachita River Valley of northern Louisiana. Records indicate that eleven mounds were begun around 3,500 BC and worked upon for over 500 years. They were disposed in oval rings roughly 250 meters wide.⁴ These mounds made of sedimentary mud and shells were probably used as a summer base, but the extraordinary time and effort put into the making of them also attests to the occurrence of strong rituals. The Poverty Point culture in the Mississippi River Delta, lasting from 2,200 BC to 700 BC, also produced phenomenal earthworks. These earthworks—consisting of concentric, semi-circular earth ridges almost three quarters of a mile in diameter—

2 Anna Azvolinsky, “First Ancient North American Genome Sequenced: Analysis of 12,600-year-old DNA Refutes the Idea that Native Americans Originated in Western Europe,” *The Scientist* (Feb. 12, 2014), accessed on Feb. 12, 2017, <http://www.the-scientist.com/?articles.view/articleNo/39153/title/First-Ancient-North-American-Genome-Sequenced/>.

3 Morten Rasmussen, Sarah Anzik, et al., “The

Genome of Late Pleistocene Human From a Clovis Burial Site in Western Montana,” *Nature*, no. 506 (MacMillan Publishers, Feb. 13, 2014), 225–229, accessed on Feb. 12, 2017, doi:10.1038/nature13025.

4 Joe W. Saunders, Rolfe D. Mandel, et al., “A Mound Complex in Louisiana at 5400–5000 Years Before the Present,” *Science*, no. 19, vol. 277, iss. 5333 (Sept. 19, 1997), 1796–1799.

were framed by the arms of a bayou and enveloped a central plaza used for rituals. In addition, some conical mounds and large avian effigies marked other important ceremonial spots around the village. Mound building practices prevailed for thousands of years and among most Mississippian tribes up until the seventeenth century. We might say that today we are practicing another kind of mound building—namely the construction of earthen barriers or levees.

People dwell in the delta much in the way that the delta labors with its mud; like the tides, populations come and go, thrive, merge, and disappear, soon to be replaced by others. The fusion and dispersal of delta populations in the Mississippi River Delta region throughout history reminds us of the process of sedimentary discharge and avulsion. The Lower Mississippi and Red River valleys were gorged with sediment that spilled out over the delta. When cleared, tilled, and drained properly, the loamy silt of these river banks provided bountiful crops. Mississippian tribes adapted quickly to the new riverine condition and became gradually less nomadic, relying much more on fishing and the collection of seeds, fruits, and leaves from various plants in an early form of proto-agriculture. They settled in palisaded villages along the river banks and began to diversify their activities. The new-found abundance of fish and agricultural products enabled tribes to develop craft and trading networks with neighboring regions. But in the process, a ranked society akin to those found in Meso-America at the time, with a Big Chief named at the head of the tribe, also emerged.

Then came the first indigenous peoples of the Mississippi River Delta to meet the Spanish conquistadors. Among them were the Acolapissa and the Bayougoula (“bayou people”) who gave their name to the wetlands. They were followed, in the eighteenth and nineteenth century, by the mixed tribes of the Biloxi and the United Houma Nation of Louisiana with their local independence hero Rosalie Courteau. However, the Houma were soon denied their land rights by virtue of their tribal mixing and only recovered a

5 Mark Edwin Miller, *Forgotten Tribes: Unrecognized Indians and the Federal Acknowledgement Process* (Lincoln, NE: University of Nebraska Press, 2006).

semblance of state recognition in 1972.⁵ The earlier Plaquemine and Caddo tribes of the Lower Mississippi to which the Biloxi belonged, who were likewise forced to cede their homeland to Louisiana in 1835 and duly relocated in a dismal reservation in Oklahoma, were equally cynically recognized as the Caddo Nation of Oklahoma in 1972.

The first European to ever set foot in the Mississippi River Delta was Hernando de Soto of Spain, who entered northern Louisiana with 600 soldiers in May of 1541. De Soto had set foot in Florida two years earlier in the quest for gold. He was a veteran of the infamous 1531 expedition against Tawainitsuyu, the Inca Empire of the Andes led by Francisco Pizarro. He probably believed that he could find the same treasures in the Mississippi Delta that Hernán Cortéz had discovered when he conquered Tenochtitlan, the Aztec capital of Mexico, two decades earlier. But the muddy Mississippi River, with its endless tangle of swamps and river bends harboring indigenous peoples and ferocious reptiles, proved too much to handle for de Soto and his men. Christopher Morris describes this first, failed European conquest of the Mississippi Delta in *The Big Muddy*:

In the Mississippi Valley, Hernando de Soto waded through water and into a human-environmental history already 8,000 years in the making. The valley was a landscape in motion: people trading and warring, building towns and abandoning them for new locations, hunting, gathering, fishing, planting. All the while, water advanced then receded, and mud collected and washed away, in what river ecologists call a flood-pulse pattern. Floods discouraged some but not all people from planting, and the distinction between agriculturalists and hunter-fisher-gathers was probably the most significant legacy of the valley's ecological pattern. Exhausted cornfields had forced Chickasaws to relocate, putting them in Soto's path. Crop failure may have weakened defenses at Quizquiz. Perhaps because they depended less on agriculture and more on resources of the wetlands, some towns put up an especially stiff resistance to the Spanish intrusion. Their history of adaptation to the wetlands led them to depend on fleets of small vessels filled with warriors that de Soto tried so hard to avoid...⁶

After having wreaked a bit of havoc among the tribes of the Southeast, de Soto died of a fever on the banks of the Mississippi in northern Louisiana exactly three years after first setting foot in Florida with his men. Following this failed expedition, in great part due to the region's permanently flooded condition, the Spanish considered the Mississippi River Delta a place to avoid. Mud had, in fact, saved this region from an irreverent invasion. But the legacy of de Soto's expedition was unwittingly devastating: it brought infectious diseases such as smallpox, chicken pox, and measles, decimating entire populations. Another significant contribution to the mud was the handful of swine de Soto left behind, which turned feral and became the now environmentally devastating razorback pigs. Until the French returned to claim Louisiana 140 years later, the Mississippian First Nation tribes with their longstanding tradition of mud mound building enjoyed their relative innocence and freedom. This Mississippian culture, which was the only known sedentary civilization in North America at the time, had accepted flooding quite naturally and built its towns and villages to the rhythm of the muddy shores of that great river.

When the French officer René-Robert Cavelier de La Salle first reached the Louisiana River Delta in April of 1682, he immediately claimed the dominion of the entire Mississippi watershed for King Louis XIV of France.⁷ Accordingly, he named the river delta on which he had set foot La Louisiane. Earlier that year, La Salle and twenty-three of his men from the upper reaches of *Nouvelle France* (New France) in Ontario, Canada, had set off on an expedition by boat, paddling swiftly down the entire Mississippi watershed to the river's mouth at the Gulf of Mexico. Ten years after La Salle's passage, the French Canadian colonist Pierre le Moyne d'Iberville and his brother Jean Baptiste le Moyne de Bienville reached the Mississippi River Delta, made peace with local Biloxi tribes by smoking the calumet, and received tributes and food from them. By the end of

6 Christopher Morris, *The Big Muddy: An Environmental History of the Mississippi and its People, from Hernando de Soto to Hurricane Katrina* (New York: Oxford University Press, 2012), 14.

7 Jean-Adolphe Bocquin, *Taking Possession of Louisiana and the River Mississippi, in the Name of Louis XIVth*, by Cavalier De La Salle [From Rouen] on April 9, 1682, c. 1870, color lithograph, 59.3 x 75.5 centimeters, The Historic New Orleans Collection, acc. no. 1970.1.

the seventeenth century they betrayed the Biloxi Indians, killing some and enslaving others including the Chitimachas, Bayougoulas, and Chickasaws.⁸ What was the reason for killing men, raping women, and ransacking indigenous settlements since there was no gold to be found? The French needed manpower to help drain waters out of the mighty delta—to dry up all this mud for the establishment of settlements.

To plant bountiful crops of tobacco and indigo for the *Compagnie des Indes* (French East India Company) the French needed considerable investment. Consequently, a financial plan by the English banker John Law provided the first investments, which were based on the enforcement of indigenous slavery. But the French soon realized that local Indian tribesmen made poor slaves and so instead reverted to the import of chattel African slaves. They had brought about 6,000 chattel slaves to Louisiana by 1731 when the French colonial economy collapsed following Law's default. Most of these slaves originated from West African countries including Guinea, Senegal, Benin, and Congo, constituting a cohesive group of people in which many African tribal traditions could survive. They brought their culture to the Mississippi River Delta where it came to be known as Creole. While the common definition of Creole is a person born to slavery in the New World, in Louisiana—following the Code Noir laws of France—Creole also came to denominate free *gens de couleur* (mixed race people) who were even allowed to own property.⁹ However, the vast majority of Africans and Creoles remained enslaved, contributing vital human efforts to the draining of the delta wetland and subsequent establishment of New Orleans. They dug ditches, raised levees, built streets, and pulled the town out of the mud.

Jean Baptiste le Moyne de Bienville ordered the town of La Nouvelle Orléans to be founded in 1718 at the heart of the delta, between a bend in the Mississippi River and what would become Lake Pontchartrain. The city was named in honor of the French Regent Philippe Duke of Orleans who ruled France from 1714 to

⁸ Fred B. Kniffen, Hiram E. Gregory, and George A. Stokes, *The Historic Indian Tribes of Louisiana from 1542 to the Present* (Baton Rouge: Louisiana State University Press, 1987).

⁹ Gwendolyn Midlo Hall, *Africans in Colonial Louisiana: The Development of Afro-Creole Culture in the Eighteenth Century* (Baton Rouge: Louisiana State University Press, 1995).

1723, an interregnum of eight years between the death of Louis XIV and the coming of age of the young king Louis XV. The grid plan of the *Vieux Carré* (the French Quarter of New Orleans) was drafted up by Bienville's architect Adrien de Pauger. For quite a long time, however, the town remained nothing more than a handful of wooden shacks. Swamp fever, ferocious animals, and belligerent Indians meant that new settlers did not come easily or willingly. This prompted French authorities to send prisoners and condemned whores to settle there instead. But it is probably the plight of the Acadians and their fortuitous landing in Louisiana that brought the added ethnic blend to the delta region. Following the loss of *La Nouvelle France* to the English in Canada, the entire population of French-speaking Acadians in Nova Scotia was duly abandoned by the French monarchy; they were finally deported in a brutal act of ethnic cleansing in 1755. Of the 20,000 Acadians who were driven from their homes by white, Protestant Anglo-Saxon settlers, many of whom died of cold and starvation on their way to New England, only about two hundred refugees eventually made it down to New Orleans in 1765, that is, ten years later. By then, New Orleans was already under Spanish rule yet the Acadians chose to settle nonetheless because French was still the dominant language of the region. They began farming the Attakapas Prairie to the west of the city and succeeded in procuring sustenance for their families. These first Louisiana Acadians were later joined by a couple thousand more who chose to settle down along the Bayou Lafourche.

The Acadians of Louisiana came to be known as the Cajuns. In the 1790s, the Cajuns also incorporated other French-speaking refugees who were escaping a growing slave rebellion in Santo Domingo, which eventually led to the foundation of Haiti in 1804. Although they also welcomed Hispanic *Isleños* from the Canary Islands as well as German and Italian migrants, Cajuns and Creoles comprised the two most significant, new ethnic groups in Louisiana in the late eighteenth century. This forced the layering of fiercely independent cultures and the intermingling of repressed slaves, displaced natives, and uprooted refugees. This "human sedimentation" forged a new identity for the delta early on—one based on the exchange of traditions and mutual respect. It prevails to this day, finding

continued expression in the musical and religious syncretism of Mardi Gras, jazz and Bayou culture. Along with the cultural intermingling, agricultural practices also diversified with the arrival of the Acadians. The region went from growing only tobacco and indigo to including more ambitious crops such as sugarcane—more ambitious because of the landscape infrastructure that was required. To regulate, drain, and irrigate these sugarcane fields, levees and canals were built following methods introduced by the newly arrived refugees from Santo Domingo.

The disastrous Seven Year War, which the French lost against the English in 1763, sealed the political destiny of the Mississippi River Delta: After the western bank had already been given to Spain in compensation, the eastern bank was handed over to England. Spain subsequently ceded the use of the Mississippi River and its harbor in New Orleans to the freshly independent United States of America shortly after 1776. When Napoleon briefly regained control on the western banks of the Mississippi in 1800, he renounced any French colonial pretenses in North America and passed the Louisiana Purchase Agreement with Thomas Jefferson a mere three years later. But even before that time, the shift to white, Protestant Anglo-Saxon rule in Louisiana coincided with a peak in American slavery, for it provoked the forced migration of slaves from the Upper South to the Deep South to provide much needed manual labor for the growing cotton and sugarcane industries. Between 1802 and 1853, alone the sugar production in Louisiana expanded almost a hundredfold, going from producing 5,000 to 449,000 barrels in the span of fifty years.¹⁰ To support these industries, gridded townships and farms appeared along the rivers—at a continental scale and in what came to be a characteristic method of shaping townships across North America following the Jeffersonian Land Ordinance of 1785. In fact, soon the entire Mississippi and Missouri watersheds were gridded. And in order to grow sugarcane, and especially cotton, the old bayou swamps had to be [re]claimed as arable land through a vast system of engineered dykes, drains, and channels. As levees went up and the

10 “Antebellum Louisiana II: Agrarian Life,” Louisiana Department of Culture Recreation and

Tourism’s website, 2017, accessed Feb. 12, 2017, <http://www.crt.state.la.us>.

“new land” was developed as township or plantation and then sold to new white settlers, much of the existing subtropical vegetation of the delta, which had been regularly flooded in manifold gradients of brininess, began to disappear. As a result, the entire topology of the Mississippi River Delta underwent rapid change in the early nineteenth century.

The American Civil War that began on Abraham Lincoln’s inauguration in 1861 rose out of a conflict between nascent, coal-driven industrial mechanization and slavery; protectionism and free trade; agriculture and industry. In the aftermath of this bloody conflict, three-quarters of a million people were left dead and one American president assassinated. This led to the Reconstruction Era in which slavery was officially abolished. But the end of the Civil War brought new Jim Crow racial laws to the Deep South. The Black Codes of 1865 took effect in the Louisiana legislation immediately. These sought to limit both the right to movement and assembly among black people as well as grant white people full authority over black people in the absence of police authorities. This shift from slavery to racial segregation had immediate repercussions on the shaping of the delta landscape, for it was only in the hinterland that black people were allowed to rent small plots for their own subsistence. But this quickly led to the birth of a system of sharecropping, in which white people would grant black people access to some farmland in return for a portion of their crop. The conditions of sharecropping were so extreme in Louisiana that complete misery and exploitation prevailed. Black people were kept illiterate and became socially segregated and excluded from the entire political process. In the northern and eastern districts of Louisiana, the lynching of free blacks was commonplace and lasted well into the twentieth century. Nevertheless, the great majority of these crimes went unpunished. Only a hundred years later when the Civil Rights Act was signed in 1964 were Jim Crow racial laws finally pronounced unconstitutional.¹¹

¹¹ Nikki Brown, “Jim Crow,” *Know Louisiana, The Digital Encyclopedia of Louisiana*, ed. David Johnson, Louisiana Endowment for the Humanities (Jan.

21, 2015), accessed on Feb. 12, 2017, <http://www.knowlouisiana.org/entry/jim-crowsegregation>.

The actual form given to the Mississippi River by two hundred years of civil engineering speaks for itself; it explains a great deal about the present plight of the Delta. Currently, the Mississippi River shoots through the delta and discharges its sediment deep down into the Gulf of Mexico. Due to the lack of sediment deposits on its shores, the Louisiana coastline is now receding rapidly. In a relatively short span of time (geologically speaking), the US Army Corps of Engineers achieved the feat of actually inverting the delta's basic environmental condition—shifting from wet to dry and from slow to fast in what had been one of the slowest and muddiest places in the world. How did this happen and at what cost? It all began with the Louisiana Purchase and the urgent need for a young nation to render the Mississippi more navigable for the movement of goods and people. At the time of the Purchase, the Mississippi was still a very shallow and broad meandering monster unfit for commercial navigation. But the raising of new levees to narrow the main channel helped achieve the engineers' stated goal: In 1811, the first steamboat arrived in the delta and less than fifty years later there were almost two hundred paddleboats steaming up and down the great river. The General Survey Act of 1824, and the Rivers and Harbors Act of 1826, placed the river under direct federal authority for the first time in history. In the meantime, large tracts of land that had dried up under the protection of the levees were sold, cleared, and developed by plantation owners for the intensive production of sugar and cotton. Only with the great Mississippi flood of 1828, and the damages incurred by towns and crops, did the US Army Corps express deep concern about floods. Finally, the Swamp Land Grants of 1850 marked the first step in the federalization of flood control, promoting the sale and development of swamp lands adjacent to the river for the construction of levees.¹² It is in this way that the impetuous river became a "problem" to be solved by engineers.

Following the Civil War, the levees along the Mississippi River were in great need of repair. Some had been destroyed by acts of war and others by the mighty river itself, which had broken the man-

12 "Mississippi River Engineering Timeline," Primary Documents, MRC History, US Army Corps of Engineers Mississippi Valley Division, accessed on

Feb. 12, 2017, <http://www.mvd.usace.army.mil/About/Mississippi-River-Commission-MRC/History/>.

made bounds. This led Congress to establish the Mississippi River Commission (MRC) in 1879. It was given two priorities: (1) to improve as well as give safety and ease to navigation, and (2) to prevent destructive flooding along the Mississippi River. Ever since the “new” land was sold and cultivated, and townships developed behind levees, river flooding became something which needed to be controlled. The MRC’s policy defended the idea of a continuous levee, which was to run from the delta all the way up to St. Louis and Cairo. It contracted the main river channel and protected river banks from erosion by raising levees further. Each time another flood came, budgets were voted in Congress to raise more levees and dredge the Mississippi further. And in 1917, a series of federal flood control acts gave the MRC permission to control all tributaries of the Mississippi watershed. In addition, a new cut-off policy was initiated with success in the 1930s, allowing engineers to cut through the bends of the Mississippi River with straight channelized bypasses in order to accelerate discharge in the event of flooding. With World War II came the strategic necessity to increase the depth of the main navigation channel from nine to twelve feet between Baton Rouge and Cairo so as to secure the Mississippi as a major north-south transportation corridor for industry. With the coal mining and industrial activities of the Midwest releasing large quantities of untreated effluent into the watershed in addition to all the fertilizers and pesticides from agriculture, the waters of the Mississippi became highly contaminated. The National Environmental Policy Act of 1969, followed by the Water Pollution Control Act in 1972, mandated a policy change toward water quality melioration.

Even while “environmental protection” became the new motto, devastating, record-breaking floods ensued in the upper Mississippi watershed in 1993, followed by Hurricane Katrina in 2005, which destroyed much of New Orleans and the coastline. The hurricane was one of the most violent storms in living memory, causing the biggest and costliest natural disaster in US history. It provoked more

13 Charles F. Anderson, Jurjen A. Battjes, et al., “The New Orleans Hurricane Protection System: What Went Wrong and Why,” a report by the American Society of Civil Engineers Hurricane Katrina

External Review Panel (Reston, VA: American Society of Civil Engineers [ASCE], 2007), accessed on Feb. 12, 2017, <http://biotech.law.lsu.edu/katrina/reports/ERPreport.pdf>.

than fifty breaches in the levees of the New Orleans surge protection system and caused nearly two thousand deaths.¹³ This event acted as a reminder of the extraordinary natural forces at work, which had helped brace the Mississippi River Delta in the first place. It was determined that the Army Corps of Engineers, which had been federally mandated to build the surge protection system of New Orleans under the Flood Control Act of 1965, grossly neglected the execution of the principal levees. The devastating images of gulf water inundating the city several miles inland finally told the story of two hundred years of engineering deceit. The entire chain of federal commandment had failed, aptly captured by the images of the then US President staring haplessly out of his Air Force One jet as he circled over the deluge below. The costs incurred by the damages reached over a hundred billion dollars and, in the end, it became clear that building a wall against the sea was not a menial task, not even for the most powerful nation on Earth. The photographs of the Lower Ninth Ward shocked the entire world, not so much because of the devastation, but because of all the extant misery which it revealed. How could the United States government foster such poverty in its cities? And could a correlation be drawn between the return of mud and a culture of poverty?

The history of the Mississippi River Delta is one of human struggle, cohabitation, and survival, but it is also one of neglect, environmental violence, and greed. There is little difference between the pointless wall-building hero in Marguerite Duras' *The Sea Wall* and those who—for billions of dollars in public spending—have contributed to the engineered debacle of Hurricane Katrina. The storm was certainly violent, so violent, in fact, that it displaced entire barrier islands such as the Dauphin Island into the Mississippi Sound. But in its aftermath, as twenty percent of the marshes were definitively overrun by seawater, there was a greater reason for concern: The Mississippi River had been engineered to such an extent that it now shot all of its sediment so far out into the sea, that the fundamental mode of protection through vegetation and mud had been lost. In other words, because of this accelerated, channelized discharge, the river could no longer bring the much needed

sediment back to the delta and its coast. As a consequence, the mangroves receded rapidly, and were no longer able to offer the necessary storm protection that they had in the past. One really has to wonder how far against the delta environment the US Army Corps of Engineers had gone in its conception of flood protection. One might also ask, candidly, whether there was any form of collusion at the top when Halliburton, an engineering company owned by then Vice President, was granted millions of dollars from the federal government to “clean up” and re-engineer the Mississippi River Delta in and around New Orleans.

Throughout its history, the Mississippi River Delta has witnessed how people exchanged, mixed, merged, and settled under a more traditional form of governance. From the earliest sedentary tribes to the newer settlers in the bayous, the Delta served as one great and ingenious multi-ethnic laboratory. Delta water and mud were not only part of the inhabitants’ daily reality, but also part of their livelihood—it signaled an entire way of life. This gave birth to a plurality of contrasted cultural expressions such as Zydeco, Cajun, and Dixie music. But when British Petroleum’s Deep Water Horizon oil rig exploded seventy kilometers off the coast of Louisiana in 2010, spilling five million barrels of oil into the environment over a three month period, it was clear that the entire world of the Mississippi River Delta had been deeply disturbed.¹⁴ The petroleum that was spilled dated back several million years, originally belonging to some of the deepest sedimentary layers of the delta, which had been accidentally upturned and cast on top of the delta’s most recent and fragile coastal sediments. The spill provoked the oily death of countless wildlife and fish, hampering the region’s entire livelihood. The company was fined twenty billion dollars (tax deductible for the clean-up) but not a single individual went on trial for the worst environmental crime in US history.

It would seem that environmental negligence of this kind is prepared to perpetuate errors of the past, only this time with the consent of the current US president, who, by decree, supports the

¹⁴ United States Environmental Protection Agency, *Deepwater Horizon Response*, EPA (April 2010), accessed on Feb. 12, 2017, <https://www.epa.gov>

[/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill](https://www.epa.gov/enforcement/deepwater-horizon-bp-gulf-mexico-oil-spill).

reinstatement of the coal mining industry in the Upper Mississippi region with nauseous and highly polluting hydrocarbon effluents. It also seems as though the Environmental Protection Agency will in due course lose its prerogatives to act and to maintain the fragile balance necessary to achieve good river water quality. And last but not least, climate change will apparently cease to have effect in the US by simple presidential tweet. With all these alternative facts in mind, in addition to the illegal alien cleansing now in preparation, the Mississippi River Delta will need to brace itself to tell yet another story about polluted waters, hidden refugees, and vanishing mud.

That is, unless landscape architects choose to enter the resistance. *Missi Sepe* meant “great river” or “father of waters” in the Iroquois language, and its delta was undoubtedly the cradle of the most advanced pre-Columbian civilization in North America.¹⁵ It behooves any landscape architect working on the delta today to understand the significance of this environmental legacy, and to decide on which side of the levee to stand. We must develop approaches that enable the Mississippi River to slow its course, regain room, and deposit some of its mud across the delta bayous once more. We can look to the vast Room for the River program recently launched by the Dutch, in which agricultural land and urban territory were again ceded to the greater intertidal floodplain of the Rhine-Meuse Delta. Toward these efforts even a part of the seawall in Zeeland has been permanently opened to the North Sea.¹⁶ We are entering an age of accelerated environmental change; soon the sinking cities and farms of the Mississippi River Delta will have no choice but to cope with recurrent flooding from rivers, hurricanes, and high tides combined. It will be our job as landscape architects to envision an entirely new mode of life for these delta cities, one in which we accept the mud by abandoning some of the levees and joining forces with the river’s relentless ebb and flow.

¹⁵ Alban Dignat, “Cavelier de La Salle baptise la Louisiane,” *Herodote* (Paris, March 2, 2016), accessed on Feb. 13, 2017, Herodote.net 2017.

¹⁶ Frédéric Rossano, *Floodscapes: Contemporary Landscape Strategies in Times of Climate Change*, doctoral dissertation with Prof. Christophe Girot, Department of Architecture, ETH Zurich, 2015.