

## A Mudscape in Motion

To illustrate how we might use the framework of Muddy Thinking, I will start with the unassuming perspective of mud and its powerful delivery system: the Mississippi River. I will reframe the river, not as a waterway bordered on either side by land, but as what the Army Corps of Engineers historian Todd Shallat calls a *mudscape* that constructed the alluvial delta on which South Louisiana sits. Many thinkers and spiritualists, philosophers, and scientists have noted a peculiar commonality among rivers. Paraphrasing Heraclitus, no one ever steps in the same river twice, for it is not the same river, and they are not the same person. A river is a locus of force and canvas of imagination. A river is always in motion. It is not so much an object but a procession where things happen. In this spirit, I open the chapter through the perspective of the river's most basic assemblage: the mud that constitutes it.

Imagine a collection of fragments: granite dust, animal waste, decomposed bone, flakes from an ancient pot shard collected into a fist-sized lump that slides down into a rain puddle. Let us give this lump the name "mud." Imagine the mud stuck to the leg of a bear that has wandered through. Dried now but with its structure intact, mud's interloper finds her way to a river in search of food. Now freed and reanimated by water, our mud begins to move—now pushed, now pulled—into an alluvial flow that empties as it travels through and around a cluster of stones and trees into a tributary or brook whose immediate aim is to join with other sediments and flows. By now, our lump of mud has grown, collecting unto itself a series of other castoffs: the remnants of rotted leaves, larvae, and feces.

Let us remember that the lump is alive, home now to a gathering of microbial agents whose work to digest its component parts continues with its interaction with hydrogen, carbon, and oxygen. This living lump now finds itself in a tidal pool: lurching, joining, and separating into a viscous torrent of carbon-based

fragments of limbs, bone, food, waste, and affluent—a changing manifest of geography and history intermixed with what we have dreamed as the natural world. They are suspended in animation together in confluent currents, pitting and prying against stratified forces within the water column that swirl and eddy against themselves—always in the inevitable urge toward the sea through the forceful momentum of movement that began when a tectonic collision buckled the continent at its center and lifted the Appalachian Mountains 300 million years ago. Into the resulting crease, a great basin of tributaries flowed, taking the continental face with it.<sup>1</sup>

Epochs of glacial movement and withdrawal followed by regular seasonal snowmelts have poured waters and sediments into this cleft from as far as the Rockies to the west and the Alleghenies to the east. In these upper portions of the Mississippi River's tributary basin, the current moves swiftly through old glacial groves toward and into the crevice of the watershed. In the less rocky lower valley, the Mississippi broadened and slowed because it was unconstrained by hard ridges. Before the arrival of Europeans and their levees, the Mighty Mississippi is said to have resembled an inland lake—a "shallow and wide glade of free-flowing tributaries from the western and eastern corners of the northern continent"—that seasonally flooded for miles and nourished an expansive milieu of hardwoods: oak, ash, elm, willow, cottonwood, tupelo, cypress, and sweet gum; habitats of fish, shellfish, reptiles, amphibians, panthers, wolves, raccoons, otters, muskrats, and opossums; and great flocks of birds.<sup>2</sup> From the great confluence of the Missouri and Ohio Rivers, the Mississippi drained into a flat delta south of Cairo, Illinois, and meandered "like a pianist playing with one hand—frequently and radically changing course."<sup>3</sup> Like those cultural iconoclasts who created the rhythmic register of the Delta blues, the river's abundant payload overflowed constraining boundaries of the day—scouring and consuming its banks in unexpected shifts. "Each time ice accumulated on the continents and sea level fell everywhere, the Mississippi River cut a broad trench along its lower course. With each succeeding interval of glacial decay, sea level rose and the Mississippi partially filled the extensive valley, thus gradually creating white deposits of river borne sediments."<sup>4</sup>

The mud directed the stream where to go—surging over to the left, slowing against a ridge of its own making—from which to push off into new directions. "If the flood waters are left free to act as they will, no one can predict from year to year where the next year's low water channel will be found, nor what will be the least depth in the bars," wrote William M. Black, chief of the US Army Corps of Engineers in 1927. "Under such conditions, a river port of one year may find itself inland the next, and river carriers may have to be tied up indefinitely at wharves."<sup>5</sup> As the channel meandered, it dropped sediment that added to the resistance of the land by adding to the land itself. The last 450 miles of the river's flow lies below sea level, which means that river bottom currents have no reason to flow at all. "But the water above it does. This creates a tumbling effect as water spills over itself, like

an enormous ever-breaking internal wave.”<sup>6</sup> It attacked its banks like a buzz saw until it forced passage, resulting in a torrent that would become a cascade.

A century ago, the Lower Mississippi River carried 400 million metric tons of sediment to the lowlands and Gulf Coast every year—enough to cover the entire state of Louisiana in almost an inch of mud.<sup>7</sup> Shallat describes the Mississippi as “curling and coiling like a snake in a sandbox,” bleeding soil from thirty-one states and weighing down on “butter-soft low-lands.”<sup>8</sup> The amount of mud carried in the Mississippi has historically ebbed and flowed by the runoff that drains from the continental basin’s rivers and streams.<sup>9</sup> Today an estimated 600,000 cubic feet of water and sediment flows down the Mississippi every second—equal to the 53 million residents in ten states along the river’s watershed from Minnesota to Louisiana flushing their toilets twice a minute every day.<sup>10</sup> In the mid-nineteenth century, the Mississippi was called “the great sewer” by Mark Twain’s mentor, Captain Marryat. “This mud, solidified, would make a mass a mile square and 241 feet high.”<sup>11</sup>

The land south of Baton Rouge consists of alluvial delta that began forming over eight thousand years ago as the great sediment flow from melting glacial ice pushed south beyond the Pleistocene Ridge onto a muddy shelf of its own making, unevenly dropping and pushing mud, clay, sand, and silt into the body of water named by Spanish explorers *Seno Mexicano*.

#### SOCIO-NATURAL EVOLUTION

When the conquistador, Hernando de Soto, set out from Tampa Bay in 1539, he reached the eastern Mississippi shores in spring 1541. His expedition’s quest for gold was slowed only by the river’s intransigent muddy edges. Garcilaso de la Vega’s direct account described a seasonal flood of the Mississippi. It was severe and prolonged—beginning March 10, 1543, cresting forty days later. The expedition of more than six hundred soldiers, retainers, captives, mules, horses, hogs, and hounds trudged through waist-deep marsh.<sup>12</sup> They waded through water, and when the river finally receded that summer and fall, they marched through mud. The next spring, the river returned, muddying the valley again. For de Soto’s men, the “pathless forests” were sometimes too muddy and inundated even on horseback. But they were too shallow for boats.<sup>13</sup> The men were beset by a problem of muddy marsh that impeded their progress yet provided ample supplies of fish and nourishment for the encampments. Fish were so plentiful they were killed with clubs.

They also encountered, sometimes resistant, complex societies. Over the three-year expedition, the conquistadors exploited, killed, and made alliances with many tribes. But it did not turn out well for de Soto. Just after reaching the eastern shores of the Mississippi, the expedition was met by Aquixo, ruler of the province of Quizquiz, a linguistic Tunica community on the western shore of what is now the Arkansas River. The chief arrived with a fleet of two

hundred dugout canoes outfitted with banners, shields, and warriors wearing colorful feathers. The party paddled across the river with Aquixo seated beneath a canopy over the back of a large canoe; Aquixo presented de Soto with three boatloads of fish and plum loaves.<sup>14</sup> According to some accounts, de Soto's men launched arrows against Aquixo's men out of fear. Other accounts claim that de Soto was initially fired upon.<sup>15</sup> Both versions foreshadow an uneasy and violent relationship.

The Tunica people claimed that Quizquiz was subject to an even more powerful leader, named Pacaha, who lived farther north. Five weeks later, the Spanish expedition successfully crossed the river on four large rafts they built from logs near present-day Memphis. "They entered the province of Casqui after two days of very difficult travel through swampy lands."<sup>16</sup> Pacaha several times sent presents of skins, shawls, and fish. The catfish alone weighed up to one hundred pounds. There were buffalo fish, paddle fish, large-mouth bass, bluegill sunfish, and fresh-water drum "the size of hogs."<sup>17</sup> In March 1542, after a severe winter, de Soto moved down the Ouachita River from Arkansas into current Louisiana. He likely went southward to a large prosperous agricultural settlement named Anilco, at present-day Jonesville, Louisiana, and turned eastward to Guachoya on the Mississippi near Ferriday, Louisiana.

At some point, de Soto died, leaving the expedition in the hands of Luis de Moscoso, who led the "weary Spaniards" overland, where they encountered a Caddoan tribe. They then marched southwestward, crossing paths with more linguistic Caddoan tribes, and eventually reached the Mississippi River, covering a total of 200 miles through wetlands.<sup>18</sup> "In July 1543, the surviving Spaniards embarked on small boats they had built and set off downriver on the long trip to Mexico."<sup>19</sup> For several days they were pursued and attacked by tribes that were probably Natchez. Nearing the mouth of the river, they were confronted by others, likely Chawasha, Quinapisa, or Washa, because of their use of atlatls, ancient devices developed in Mexico to throw spears. The Spaniards encamped on Timbalier Islands and, by September, finally reached Mexico.<sup>20</sup>

The expedition's account stood for one hundred fifty years as the only written record of Western contact with Indigenous Amerindians. But by the time Great Britain established Charleston in 1670 and the French began their exploration of the Lower Mississippi Valley in 1673, the complex societies that the de Soto expedition encountered had vanished.<sup>21</sup> Our direct knowledge of the expedition comes from three narratives by the expedition's surviving Spaniards and later archaeological and environmental studies on the river's former routes that attempt to clarify interactions and subsequent devastation of the Indigenous chiefdoms. The thriving population observed by the Spaniards had shrunk by 80 percent. One theory is that they may have already been on the decline, hastened by the diseases introduced by the Europeans such as influenza, whooping cough, measles, cholera, smallpox, and the common cold. The Amerindians may have reorganized

into more fragmented groups.<sup>22</sup> Research on trees has uncovered evidence of a drought at the time, as well as a possible “little ice age” of colder than average temperatures.<sup>23</sup> The towns on the west bank of the Mississippi were largely abandoned by 1700. Periodic increases in flooding, coupled with the desire to avoid older living sites that had been decimated by European diseases, may have pushed seventeenth-century Indigenous people out of the western flanks of the river onto the higher eastern bluffs in present-day Mississippi.<sup>24</sup>

The river itself, particularly in the lower delta, was in dynamic action, creating new land and shifting directions altogether—so much that René-Robert Cavelier, *Sieur de La Salle*, who “claimed” the river in 1682 for France when he sailed out of present-day Lake Pontchartrain, failed to locate the mouth of the river four years later.<sup>25</sup> He was following the cartographic writings of the de Soto expedition, which actually may have descended the Atchafalaya River, not the Mississippi.<sup>26</sup> Spanish and French chroniclers used entirely different names to identify the Indigenous Amerindians they encountered, which adds to the uncertainty.<sup>27</sup> La Salle was subsequently murdered in a mutiny after landing five hundred miles off course near present-day Galveston, Texas. Whether the mouth of the Mississippi shifted or was misdocumented, its change in appearance one hundred sixty years later is plausible given that the river and mud were forging new meander paths to the sea. The current path of the river downriver from New Orleans is by some estimates between 350 and 600 years old.<sup>28</sup>

#### WORKS PROGRESS ADMINISTRATION ARCHAEOLOGY

Digs funded by the Works Progress Administration (WPA) in the 1930s—which initiated modern archaeology in Louisiana—have identified sophisticated Indigenous settlements along the Mississippi River’s former path lobes and meander routes.<sup>29</sup> The earliest settlements along the Mississippi River are some of the oldest in North America, dating to 4,000 BCE. These Early Archaic sites exist near springs, around swampy lakes, and alongside hills and rivers. “Such locales provided deer and abundant small game, fresh water, vast quantities of beech, hickory, oak and Chinquapin mast, stone for tools, and hardwood for implements and fuels.” There were also salt workshops, produced by boiling spring waters around large salt domes in northwestern Louisiana near Shreveport and in South Louisiana among the “five islands” perched atop great salt domes: Avery, Weeks, Cote Blanche, Belle Isle, and Jefferson.<sup>30</sup>

During the Archaic period, projectile points evolved from large, fluted tips to shorter, wide, notched heads. Cutting edges were erratic, and notches gradually evolved into large barbs. “These are the familiar points that fill bags and boxes in countless private collections all over Louisiana. Few of the collectors know that their treasured ‘arrowheads’ antedate the bow.”<sup>31</sup> In the upland areas of Louisiana—whose highest point is the 535-foot Mount Driskill—Indigenous projectile points

of Clovis, Scottsbluff, and San Patrice are scattered across the hills. “Relics such as these are clear signs of prehistoric hunting Indians, marking their arrival in the area at about 10,000 or 12,000 years before the Birth of Christ.”<sup>32</sup>

Artifacts excavated at Poverty Point, located on Bayou Macon seventeen miles west of the current path of the Mississippi near Tunica, Mississippi, reveal a center of vast trade and exchange. Discoveries include hematite, magnetite, and banded flint from Tennessee; white and gray flint from Illinois; Schistose stones and steatite from Georgia; and copper from the Great Lakes Region. There have been “thousands upon thousands” of microlithic tools found, as well as rare ceramic pottery and millions of fired-clay objects used in earth-oven cookery.<sup>33</sup> The people of Poverty Point spent five hundred years constructing a concentric circle of six mounds surrounding a 37-acre plaza. The largest mound is longer than 1,300 yards. Canonical mounds were erected to cover scattered ashes of cremations. A town was laid out on the concentric circles to conform with the relationships between sun and earth. “A giant effigy mound, representing a bird with outstretched wings and tail, dominated the entire community. Towering 75 feet above the flat alluvial plain, the huge structure is probably the second largest mound ever built in the eastern woodlands of America.”<sup>34</sup> This may have been one of the earliest chiefdoms in the country.

De Soto’s expedition recorded thirty sizable towns along the west side between the mouths of the Red and Arkansas Rivers. They were heavily populated and fortified. Flat-topped mounds were used as foundations for buildings. Major settlements usually contained a central nucleus: a plaza ceremonial ground bookended with a temple containing a perpetual fire at one end and the home of a chief at the other.<sup>35</sup> Clusters of dwellings and individual houses would be dispersed widely around the nucleus and linked by irregular footpaths. Most dwellings had a small kitchen garden. Family-controlled, cultivated fields extended a mile or more from the center of the settlement. Some towns were neighborhoods scattered through the forests and interspersed over many square miles. “The inhabitants of these towns may have been Tunica, Koroa, or ancestral Taensa, the last Louisiana tribal group closely related to the Natchez.”<sup>36</sup>

Early Spanish maps of the Red River indicate a mound center near present-day Texarkana. There are also two well-known mounds on LSU’s campus in Baton Rouge. They have been rolled on by children, parked against by football fans, and generally treated cavalierly until recently. The mounds may be the oldest known man-made structures in the America. They predate the Egyptian pyramids. Radiocarbon dating by a research team in 2022 detected ash lenses with structural components of plants and bits of burned mammal bone to date construction around eleven thousand years ago.<sup>37</sup> “Building of the LSU Campus Mounds shows a hiatus when climate deteriorated during the 8200 Climate Event, which defined the end of the Holocene Greenlandian Stage and the beginning of the Northgripian Stage.” Construction resumed 7,500 years ago, and construction continued

on both mounds until about 6,000 years ago. LSU archaeologists speculate that scattered bands of tribes gathered there to exchange information, socialize, and perform rituals necessary for social maintenance. The oldest, Mound B, mainly consists of loess, a fine dust from glaciers in the north-central United States that can also be found along the river's east bank bluffs north of Baton Rouge up to Vicksburg, Mississippi, where the Tunica lived. It may have been used for ceremonial or cremation purposes. The younger mound, Mound A, was built from mud deposited by the Mississippi River. They stand where the Mississippi River once made a turn to the south. The Mississippi was always on the move, and mounds may have provided visible navigational points when the river was in high seasonal flood stages.

Prehistoric tribes also moved freely. Some settlements were occupied early and held for long periods; others were taken up by successive tribes. "Such places offered natural advantages like freedom from flooding, easily worked good soils, and abundant fresh water, game, fish, or salt."<sup>38</sup> Some lands were reoccupied after being already cleared for agriculture. Others were suitable for defense or trade. Some were associated with spiritual qualities.

There are several perennial sites along the Mississippi River, including the Houma site at present-day Angola; the settlement at Jonesville at the confluence of the Ouachita, Black, and Little Rivers; and the Marksville site, among others. Making news recently was the revelation through radiocarbon dating that a skull fragment found in 1985 at Lake Pontchartrain belonged to a woman who lived thirty-five hundred years ago.<sup>39</sup>

As late as 1700, Louisiana was home to several distinct native tribes. Early European observers between 1690 and 1794 reported the presence of more than thirty-two independent languages in Louisiana alone, as well as eleven languages brought by immigrant tribes being pushed out from the east. Dialects were from six major trees: Caddoan in northwestern Louisiana, Atakapa in southwestern Louisiana, Chitimacha in central South Louisiana, Tunica and Koroa in the northeast, Natchez along the Mississippi and lower Red Rivers, and Choctaw-related or Muskogean languages in southeastern Louisiana. Atakapa, Chitimacha, and Tunica were grouped as members of the Gulf stock of languages, yet to their speakers, other languages in the region would likely have sounded foreign. The Siouans, Biloxi, and Ofo moved to Louisiana after 1764 due to settlement pressures, raising the number of language families to seven.<sup>40</sup>

In 1682, the Quinapisa occupied a village on the right bank of the Mississippi near Hahnville and lived in several villages down toward the mouth of the Mississippi. They may have been the group that attacked La Salle's party and sent messengers to their allies, the Natchez and Koroa, to do the same. By 1700, they had joined with the Mugulasha and were allies of the Houma and Acolapissa. Shortly after 1700, the Acolapissa moved to Bayou Castine near Lake Pontchartrain to escape English and Chickasaw slave hunters. Fleeing a deadly epidemic in 1718, the



Acolapissa established a village on the Mississippi River above the new settlement of New Orleans. They eventually joined a mixed tribal group that came to be identified as Houma, among the “Petites Nations” of southern Louisiana.<sup>41</sup>

The Washa are believed to have originally lived in the Barataria area among many sites, including the Cote des Allemands (German Coast) post in 1739, and may have been the bison hunters reported by La Salle in a meadow below New Orleans. “The Koasati (also known as Coushatta) were driven from one site by ants and from another by rattlesnakes.”<sup>42</sup> An eighteenth-century Bayougoula town was built on the level floodplain near the Mississippi River. “Energized” by LaSalle’s journey, a host of missionary priests came to Louisiana, journaling observations while attempting to minister to Indigenous peoples.<sup>43</sup> Many of the French Jesuit priests lived in Indigenous settlements, detailing primary accounts that include firsthand knowledge of Taensas, Caddo, Natchez, Avoyal, and Bayougoula. Henri de Tonti, one of La Salle’s lieutenants, visited the Taensa villages on Lake St. Joseph in 1690 and pushed overland to Caddoan-speaking Natchitoches tribes on the Red River. “Near the end of the 18th century, Martin Duralde, who was commandant of the Atakapa and Opelousa posts, composed a manuscript on the Chitimacha and Opelousa that is now invaluable as virtually the only source on the latter.”<sup>44</sup> There are obvious limitations of such one-sided accounts. Some Indigenous people responded to the influx of whites by withdrawing from principal trade routes and white settlements. Others were misidentified by observers and may have mistaken for poor westerners.<sup>45</sup>

Excavations after Hurricane Katrina by the Federal Emergency Management Administration (FEMA) discovered pottery pieces, bones, and clay pieces of pipe dating to the late Marksville Period, 300–400 CE, at what is believed to be a mid-den mound at the mouth of Bayou St. John in New Orleans. The mound was subsequently used as a foundation for the French Fort St. Jean and, in 1823, as a hotel and amusement park.<sup>46</sup> “Though largely ornamental today, Bayou St. John was once the city’s primary natural drainage outlet. It served as a major nautical access point from Lake Pontchartrain to the Mississippi River.”<sup>47</sup> Other Indigenous settlements just prior to French colonization included the present-day French Quarter near Conti and Chartres Streets and upriver at what is now the Lower Garden District near Orange and Constance Streets. “Tchoupitoulas Street shares an origin with the ‘village of the Chapitoulas’ or ‘river people’ in Choctaw, as recorded in 1718. The Chapitoulas were one of the small groups that moved up and down the river according to trade routes and seasonal hunting in the 1600’s and early 1700’s.”<sup>48</sup>

In the garden behind St. Louis Cathedral at Jackson Square, archaeologists discovered the oldest known building from the colonial period: a palmetto thatch hut built in the Indigenous style, reinforcing the theory that Native American expertise helped build the city. “Hand-built pottery, smoking pipes, trade beads, and stone hide scrapers are found in underground layers scattered throughout modern-day New Orleans.”<sup>49</sup> Well after colonial settlement, the site behind



St. Louis Cathedral was used by Native American traders to exchange goods on market days. Native American hunters, fisherman, and herbalists supplied the French Market there well into the 1800s. "From New Orleans, natives were a ready source of trade. Furs, basketry, wild honey beeswax, and herbs were negotiable items until the 1930s."<sup>50</sup>

Bayou tribes modeled to the earliest white settlers how to cultivate corn, squash, potatoes, tobacco, and other Indigenous crops. The tribes, along with enslaved Africans, who were familiar with the cultivation of rice, literally saved the French.<sup>51</sup> "Many of the early French settlements of lower Louisiana began in Indian villages. During the frequent famines that gripped the colony, French soldiers were sent to live with Indian tribes so they would not starve to death."<sup>52</sup> New Orleans and Louisiana failed to prosper under French occupation. The population shrank dramatically between the original census of 1718 and the census of 1726. The 5,420 whites in the territory dwindled to only 1,952 French and German citizens (plus 276 people listed as indentured servants). The population loss was attributed to mortality rates. Then, in 1729, the Natchez and their allies revolted against the settlers, killing 10 percent of the white population.

While most of the Indigenous tribes lived along the natural levees of rivers and bayous, some like the Atakapa were coastal dwellers. They focused less on agriculture and instead gathered shellfish, fished, and hunted. "In some respects, the coastal marshes are hostile to man. The lowland is wet much of the time, the tall grasses are coarse and sharp, the swarms of deer flies and mosquitoes are nearly unbearable, and from time to time, the area is beaten savagely by the great tropical storms."<sup>53</sup> But it made up for these hostilities with food: mussels, clams, and oysters; and crabs, crawfish, and other crustaceans. Other foods included migratory ducks, geese, and herons, as well as mink, otter, alligator, and deer. In such a stoneless alluvial environment, shellfish also provided raw materials for containers and implements. Pottery and trade artifacts of copper, galena, and stone have also been found on the western coastal cheniers, fossil beaches named by the French that appear as low sand ridges. In Vermilion Parish near Lafayette, the Atakapa are linked to the construction of a great shell mound in the shape of an alligator 600 feet long that was visible at Grand Lake until the inundation of coastal waters from oil and gas activities.<sup>54</sup>

John Law's Company of the Indies, which had been granted ownership of the colony in 1717, returned Louisiana to the French crown in 1731 after fourteen years of failure. Writing from Mobile, Diron d'Artaguet described dire conditions in 1733: "Our planters and merchants here are dying of hunger, and those at New Orleans are in no better situation. Some are clamoring to return to France; others secretly run away to the Spaniards at Pensacola."<sup>55</sup> To the early colonialists, deltaic mud was a nuisance for the type of European knowledge they brought with them.

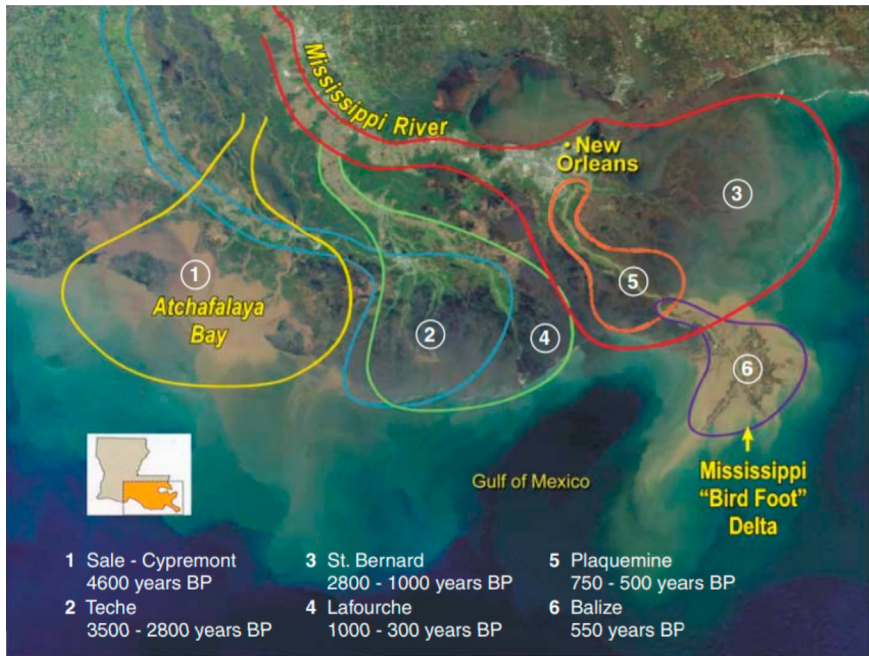


FIGURE 2. Path Lobes. Every 1,000 to 2,000 years the river made a major course change and extended new path lobes to the Gulf of Mexico, forming a new delta complex. The current Plaquemines-Modern path lobe complex, which reaches down to the Mississippi River's mouth, extends in three narrow channels that conjure the image of a claw that inspires the name, Bird's Foot Delta. Image available through Creative Commons by Angelina Freeman et al., *Water* 13, no. 11 (2021), <https://doi.org/10.3390/w13111528>.

## GREAT SEWER

The land itself was quite unusual. As the Mississippi's mudflow reached south of Baton Rouge, it built path lobes that extended the riverine delta into the sea. The longer the ridge held the channel, the farther out the path lobe extended, until the river jumped, and its avulsion began forming a new path lobe, effectively abandoning its former channel. Current barrier islands that protect contemporary coastal communities from storm surge are remnants of former path lobes.<sup>56</sup> Geologists identify six major episodes of natural land construction, resulting in six distinct delta complexes that comprise sixteen separate delta lobes. "Before recent artificial levee construction, channel avulsions created a new course for the Mississippi River every 1,000 to 2,000 years." Each time this happened, a new delta complex began and the former delta slowly deteriorated. Old path lobes often become distributary bayous, which, without the Mississippi's freshwater

flow, ultimately recede and subside under the counterforce of tidal surges and saltwater inundation.

The current Plaquemines-Modern path lobe complex that reaches down to the Mississippi River's mouth extends in three narrow channels that conjure the image of a claw, which inspires the name, Bird's Foot Delta. There is some disagreement among geologists as to whether this portion of the delta was already in retreat by the time of European arrival.<sup>57</sup> Later immigrants formed Bayou communities along former path lobes in the eighteenth, nineteenth, and twentieth centuries, including migrant Indigenous tribes pressured from the East. "Harassed tribes such as the Houma found refuge literally at Land's End, occupying the attenuated natural levees that extended toward the Gulf of Mexico."<sup>58</sup> Their main thoroughfares were the waterways themselves, which lie nearly even with the height of adjacent banks. Today historic civic buildings and houses face each other from opposite banks across the water on Bayou Lafourche, Bayou Terrebonne, and Grand Caillou. They are encircled by levees that lie a few leagues back on either side. These levees have become essential ramparts against encroaching water from subsiding delta marshes.

Where once the muddy river poured its sediment into its adjacent marshlands until it found new pathways to generate, western settlers demanded more control and set about building levees to protect against floods and allow for farming. With every flood that overflowed into the governed landscape, residents petitioned their local, state, and national governments for higher and stronger levees. The efforts led to a national project to control all of the nation's waterways, starting in the early decades of the nineteenth century, which pushed levee coverage up and down the nation's rivers.<sup>59</sup> After the great floods of 1927, the federal government enacted a massive levee program that permanently sealed off the Mississippi's sediment flow from its adjacent marshes. What had been one of the most productive wetlands in the world was effectively drained.<sup>60</sup>

Today, the river's sediment and water are trapped within a single channel, except for prescribed spillways maintained by the Army Corps of Engineers to regulate water flow during floods. As the largest river basin in North America, the Mississippi watershed is perhaps the most studied and controlled in the world, draining 41 percent of the continental United States: "It is not a matter of a few dams here and there. There are 40 dams on the upper Mississippi itself above St Louis. There 15 dams on the Mississippi above Yankton, South Dakota, and 21 dams on the Ohio. It's when you start to look at the tributaries to the tributaries, however, that the real picture begins to come into focus."<sup>61</sup>

There are more than 500 dams on the various forks of the Platte River. In the state of Kansas, there are 6,087 dams on tributaries to the Mississippi River, while the Missouri has another 5,099 and Oklahoma has 4,758. In Iowa, there are 3,340. Montana has 2,917. In the eleven states that lie entirely within the Mississippi River

watershed, there are more than 30,000 dams. The total number of dams that alter the Mississippi River watershed exceeds 50,000.<sup>62</sup>

Within this now-entrapped water column resides an archive of the nation's detritus. Along with mountainous minerals and continental dust that erode and find their way south, we find remnants of industrial manufacturing, agriculture, and municipal effluent, along with nitrogen and synthetic chemicals from fertilizer, herbicides, and pesticides. Microbial matter, plastic litter, coal ash, concrete morsels and clay, nails, Styrofoam, industrial lubricants, and runoff from paved midwestern surfaces carry all sorts of debris from various tributaries to concoct a dystopian stew.<sup>63</sup> Our mud lump has grown more toxic as it moves through the contemporary industrial landscape. Appalachia footprints mingle with Illinois corn husks and swiftly bounce against man-made jetties and concrete riprap set down by the Army Corps of Engineers. Just north of St. Louis, the Mississippi no longer resembles the rather picturesque and pastoral setting of its upper reaches. As the river passes the Ohio River tributary, its color turns dark brown. An image of this confluence shows two distinct waters hesitant to commingle: diachronic strips that uneasily commune into a brown hue south of Cairo. It is said that the Missouri gives the Mississippi its volume and the Ohio its color.

Some of our congregant sediment is forced to the bottom of the riverbed where it scours against other materials in the swift rush or joins with other fragments and castoffs. Some lumpy ooze will veer off just north of Baton Rouge through the Old River Control complex gates, which are situated in an old oxbow path of the Mississippi that nearly touches the Red River. Prior to the fifteenth century, the Red River and the Mississippi River flowed parallel to each other to the Gulf of Mexico. Just as Europeans were arriving in Louisiana, the Mississippi created a natural oxbow that briefly intersected into the Red River. This created a confluence with the Red River that drew the Upper Red into a tributary to the Mississippi and the lower portion of the Red into the Atchafalaya distributary. The Atchafalaya/Red complex was also congested by a massive raft of logs referred to as the Great Red River Raft. As McPhee describes it, "The raft was so compact that El Camino Real, the Spanish trail coming in from Texas, crossed the Atchafalaya near its head, and cattle being driven toward the Mississippi walked across the logs."<sup>64</sup>

During the riverboat period of the early nineteenth century, vessels took as long as twenty hours to travel the oxbow, called Turnbull's Bend, to advance one mile as the crow flies. In 1831, an enterprising riverboat captain named Henry Shreve proposed to quicken the journey by cutting a mile-long canal from the Mississippi to the Upper Red River complex across a narrow tuft that shaved off nineteen miles from the oxbow route. It also avoided the massive logjam in the Lower Red that blocked passage. Shreve's cut would later be reframed as an act of immense hubris that contributed to a permanent "crevasse" of the Mississippi River into the Atchafalaya distributary.

Since the Atchafalaya system was deeper (and closer to the sea), the Mississippi River would periodically flood during high water through Shreve's cut into the Atchafalaya distributary. "Snag boats worked on it, and an attempt was made to clear it with fire. The flood of 1863 apparently broke it open, and at once the Atchafalaya began to widen and deepen, thus increasing its draw on the Mississippi."<sup>65</sup> Shreve's cut at Turnbull Bend had two effects: it opened the Red River Valley to steamboat commerce, and it created the unintended consequence of promoting a new path lobe by the Mississippi into the Atchafalaya. Although this is conventionally accepted, it has likewise been challenged. The river may have jumped without Shreve's nudge. "Since most of the problems at Old River arose after Captain Henry Shreve constructed his cutoff in the area in 1831, it has often been argued that Shreve was responsible for the difficulties."<sup>66</sup>

As early as 1829, Samuel Cummings of the *Western Pilot* commented that the river was rapidly wearing away the neck of land in the bend, which was then only 200 to 300 yards across. "Islands No. 119, No. 120, and No. 121 (called the Three Sisters) had already been completely washed away."<sup>67</sup> By 1900, river gauges indicated that 10 percent of the Mississippi River was flowing into the Atchafalaya. With each flood, the gap widened. By 1930, about 20 percent of the Mississippi flowed through the crevasse, and by 1950, 30 percent flowed. At the time, the Corps estimated that by 1970 the entire Mississippi would be irreversibly captured by the Atchafalaya distributary, which would turn New Orleans and Baton Rouge into bayou cities. Such a dramatic shift in course also had the potential to spoil the drinking water for the 1.5 million people that relied on the Mississippi River Delta. Meanwhile, a corridor of petrochemical plants had grown up in the second half of the twentieth century between Baton Rouge and New Orleans: "As a result of settlement patterns, this reach of the Mississippi had long been known as 'the German coast,' and now, with B. F. Goodrich, E. I. du Pont, Union Carbide, Reynolds Metals, Shell, Mobil, Texaco, Exxon, Monsanto, Uniroyal, Georgia-Pacific, Hydrocarbon Industries, Vulcan Materials, Nalco Chemical, Freeport Chemical, Dow Chemical, Allied Chemical, Stauffer Chemical, Hooker Chemicals, Rubicon Chemicals, and American Petrofina—with an infrastructural concentration equaled in few other places—it was often called 'the American Ruhr.'"<sup>68</sup>

Just as colloquially, this stretch is commonly known for the distinction of having the highest emission concentration of carcinogens in the United States. The industrial plant operators, who purchased large parcels from sugar plantations, had moved there to take advantage of the river's deep-draft access to fresh water—and little regulatory oversight. "They would not and could not, linger beside a tidal creek. For nature to take its course was simply unthinkable."<sup>69</sup> Congress authorized the Old River Control Structure, a dam that opened in 1963.

The Corps continually monitors water levels of the Mississippi and Red (and Ouachita) Rivers to apportion 30 percent of their combined volume down the Atchafalaya to prevent the Mississippi from permanently changing courses and

claiming the Atchafalaya. Through more than fifty years of existence, the Old River Control Structure has nearly been lost twice and now comprises five man-made canals, including two control channel spillways, a lock from the Red River to the Mississippi, and a hydroelectric dam, in addition to the nearby Morganza Spillway.<sup>70</sup> The entire footprint sprawls over 250,000 acres of easements within the project area, having displaced several historic towns and farmsteads to keep the Mississippi from repeating the disaster of the great flood of 1927. Such regimes of technopolitics to control nature are often the children of earlier failures.<sup>71</sup>

Old River Control is part of the ongoing Mississippi River and Tributaries Project, known as Project FLOOD, that was authorized after the great flood of 1927. Project FLOOD is the largest flood control project in the world, intended to provide protection for the 36,000-square-mile lower Mississippi River Valley of 1.5 million homes, 33,000 farms, and 4 million people. Its interventions include meander cutoffs, jetties, diversion spillways, and a levee system 2,203 miles long, including 1,607 miles of levees along the Mississippi River itself, and 596 miles of levees along the south banks of the Arkansas and Red Rivers and the boundary of the Atchafalaya Basin.<sup>72</sup> This protection required social sacrifices in the form of expropriated farmlands and displaced minority communities to allow for large spillway easements for the controlled floods.<sup>73</sup>

Here we say good-bye to some of our mud as it forks to the west through the sluice gates and canal of Old River Control into the Atchafalaya River and Swamp, which is the largest wetland swamp in the United States. The rest of our mud and matter will continue down the Mississippi's main stem past Baton Rouge as it enters Cancer Alley, the 85-mile-long cluster of plants in the "River Parishes" of Ascension, Iberville, St. James, St. John the Baptist, and St. Charles. This corridor continues to open its banks to newer and more sophisticated plants that produce industrial materials, fertilizers, and lubricants impervious to biodegradation. Their production is imminently harmful to *fence line* neighbors, who are disproportionately African American and low income. Lately, the corridor has been touted by the Louisiana governor and fossil fuel advocates for its potential to host Industrial carbon capture projects. The state is actively recruiting more plants, which are supercharged by a boost in federal subsidies under the Biden administration and a ten-year state property tax exemption that shields heavy industry operators from paying hundreds of millions of dollars a year.<sup>74</sup>

Gaining in toxicity, our mud lump continues toward New Orleans. It nears the site of four former plantations, Delhomme, Roseland, Myrtle Land, and Hermitage, which became the townships of Sellers and Montz. Between the two former townships sits the Bonnet Carré Spillway, which is a huge drainage canal that connects the Mississippi River to Lake Pontchartrain. It was constructed in 1931 as the last line of flood defense for New Orleans. The Army Corps of Engineers opens it when the Mississippi exceeds the designated 17-foot flood stage. The spillway was built atop two African American cemeteries for people enslaved on the four



plantations and their descendants. The cemeteries were still being used when the Army Corps of Engineers began excavation for the spillway. The Corps was supposed to relocate the cemeteries, but there is no record of it happening.<sup>75</sup>

The Bonnet Carré Spillway consists of 350 bays of giant cypress planks along a mile-long trellis. They must be opened individually by hard-hat crews using cranes to remove the planks one by one. The open bays allow the river to flood into the marshes and brackish tidal waters of Lake Pontchartrain. In ninety years, the spillway has been opened thirteen times. But the frequency has dramatically increased in recent years. In 2019, the river broke the record set in 1927 for the most continuous days at flood stage. For seven months, the Mississippi towered over the rooftops of New Orleans.

Our lump passes out of Cancer Alley into the western edge of the New Orleans metropolitan area, which is demarcated by the \$14.5 billion federal levee system rebuilt by the Army Corps of Engineers after its levees failed in two dozen spots during Hurricane Katrina. Much of the land within the levee system sits below sea level, which means that rainwater must be pumped up and out by giant pumping stations. Suburban areas of metro New Orleans were built on drained marshland in the twentieth century. However, the oldest historic settlements follow the snaking embankment of the river, which offered the highest alluvial ridge, at around sea level.

As our toxic lump enters the New Orleans city limits, it will whip around and flow due north at the French Quarter—site of the original colonial settlement in 1718. La Nouvelle-Orléans was chosen by the French Canadian naval officer, Jean-Baptiste Le Moyne, Sieur de Bienville, and his brother, Pierre Le Moyne d'Iberville, who believed that the settlement would provide the French crown with access to the Gulf of Mexico in order to stake a claim deep into the interior of a contested continent. The site was accessible not only by the great river but also by a short portage to Lake Pontchartrain used as a fishing, hunting, and gathering point for regional Indigenous tribes. Before the establishment of New Orleans, there were corn feast celebrations at the bayou's terminus behind today's French Quarter known as Congo Square.<sup>76</sup>

Just past New Orleans, the lump passes the Chalmette Battlefield where British forces attempted to lay siege to the city in 1812. The curated battlefield, which is a popular tourist attraction, was actually "reclaimed" by the National Park Service in 1968. The service evicted people living there in an African American "freetown" called Fazendeville that consisted of thirty families in 1964. After the Civil War, the plantation of Ignacio de Lino de Chalmet was shuttered and eventually purchased in 1870 by a free man of color, Jean-Pierre Fazende, who divided the land into thirty-three lots and sold it off. The community of Fazendeville was referred to as "the Village" by its residents. It had grocery stores, a baseball diamond, two churches, a one-room school, and a few dozen homes. Today the community is entirely erased. It is memorialized only by a slight depression in the landscape and



a line of Louisiana irises that some believe were planted by the residents who were forcibly relocated to make way for the national park to commemorate the 150th anniversary of the Battle of New Orleans.<sup>77</sup>

As our mud lump flows by the city and makes its final twist at the Ninth Ward, it will veer dramatically southeast toward the Head of Passes just above the Bird's Foot Delta 90 nautical miles from New Orleans.<sup>78</sup> Along the final stretch of river, some of our material will collect in sandbars, where it is dredged by the Army Corps of Engineers to maintain the channel, reflecting a recent political push to deepen the river from 45 feet to 50 feet for the larger, Panamax supertankers that can now traverse the Panama Canal. In 2016, Panamanian officials opened a third lock that increased the 39.5-foot draft for container ships to a 50-foot draft. The new lock set off a proverbial arms race among US port cities to capture deeper cargo ships that had previously sailed around the tip of South America and avoided the Gulf of Mexico and the Caribbean.<sup>79</sup> The Louisiana Port Association hired an LSU economist to write a report about the importance of the shipping industry to Louisiana's economy by providing "one in five" Louisiana jobs. This report has become a standard talking point and rationale for any port expansion.<sup>80</sup>

A sharp southwestern turn in the river—known as English Turn for the famous bluff by Bienville—creates a protective elbow peninsula that shields New Orleans from a relatively direct route to the Gulf of Mexico 75 river miles away.<sup>81</sup> Today the peninsula houses a few large estate homes and an upscale neighborhood, as well as the Audubon Institute Species Survival Center, which is leased from the US Coast Guard to care for sick animals. Along the river, anchored bulk cargo tankers await an open berth at the Port of New Orleans. A small clearing of trees provides a nice casting spot for small groups of fishermen hoping for catfish. Blue herons, white egrets, and turkey vultures perch along the batture forest. They are more visible these days in a canopy that has been severely thinned in successive storms: Hurricanes Harvey in 2017, Barry in 2019, Zeta in 2020, and Ida in 2021. Across the wide breadth of the river, the thirteen-deck Carnival Cruise liner *Valor* speeds downriver at a fifteen-knot clip, towering above a fully loaded tanker crawling its way upriver.<sup>82</sup> In the grass that edges up to the levee's concrete armor, remnants of plastic cups, buckets, and Styrofoam containers have washed ashore. Seagulls and insects chirp through the industrial soundscape. The fishermen tend their rods after casting, place them against stands, and smoke a cigarette or peer down at their phones. Just upstream, excavators and dump trucks work a sand quarry, Parish Sand LLC, which uses a river water intake method from pipes, which when dried leaves behind sand and sediment.

From the water, some of our dredged sand and slurry will be sucked through large pipes and directed into scattered clumps of vegetation to try to reclaim Louisiana's disappearing barrier islands and marshes at a cost of about \$3.7 million per acre.<sup>83</sup> Natural crevasses are also opening and widening above the Bird's Foot Delta, which is setting off tension between the Corps of Engineers, which wants to

seal them back in order to maintain a scouring effect for shipping, and state coastal interests, which would like the openings to demonstrate if sediment diversions can rebuild adjacent marsh there.<sup>84</sup> Redirecting sediment upstream also spells trouble for the Bird's Foot Delta, which is sinking despite constant dredging by the Corps and using "beneficial material" to reinforce its edges and interior at the forest.

Most of the lump will plume out in brown wispy tendrils into the green and cobalt waters of the Gulf of Mexico. From high in the sky, its coherence appears sanguine, but on the surface, we discover an aquatic dead zone for hundreds of square miles. This procession of nutrient-rich material is digested by blooms of algae that quickly die and decompose in a bacterial metabolism that consumes the water's surface oxygen. A resulting hypoxia suffocates fish and shrimp and kills off stationary species like oysters. It worsens in the summer months as the warmer river water glides over colder, dense salt water below. Less oxygenated water is trapped at lower depths. The zone grows as human-activated climate change amplifies the natural fluxes of this area. According to scientific measurements, this hypoxic zone equals the size of Vermont.<sup>85</sup> As we try to frame what this entire journey and changing landscape implies for the land and the inhabitants, let us return to the modern imagination that took hold of this landscape.

#### CONCLUSION: BUILDING A MODERN SETTLEMENT

The project to build a modern settlement in a delta required erasing the ubiquitous mud that created it. It required a constant redoubling of interventions that paradoxically increased its vulnerability. For all of its existence, the communities of the Mississippi River Delta—including New Orleans—have lived in a state of hypervigilance of their surroundings: the Mississippi River on its front side and the swamps to its rear. The river was historically framed as the region's greatest asset if not also its threat. Urban footprints relied on intensive drainage, levees and labor, pumps, and money to erase mud altogether. This battle of erasure historically sustained the geographic, administrative, social, and economic structures of the region.

As interests compete over a shrinking footprint, mud is pulled from the floor of the river mechanically by dredgers to allow shipping interests to prosper. It is pumped into the marsh. It is used to bolster barrier islands. It is trapped in spillway gates. It even lives in the form of wetland mitigation credits that can be purchased from private mitigation banks that own land being reforested as "offsets" to allow industrial construction in vulnerable marsh. Mud builds estuaries by holding vegetation together. It is used in oil and gas drilling to cool the drill bits and stabilize bore holes. It produces value for contractors that are studying it, capturing it, and moving it. It is rendered and represented in scientific reports, software modeling, and maps. In some cases, it is produced through sewerage and municipal effluence.

It has been the mud that sustained the people of New Orleans and Mississippi River Delta, despite their historic aversion to it. "Mud is, or was, the essential building block of the Mississippi Valley. Mud was the substance that held together all the pieces and components—animal, vegetable, human of the floodplains' wetland ecology."<sup>86</sup> Mud is today desperately needed. But there is simply not enough to replenish the subsiding boundary of Louisiana as hurricanes roll up marshland too quickly for the ecology to recover and subdivisions clear-cut the remaining bottomland forests to accommodate inland coastal migration. As the marsh transforms into open water, inland the root systems of hardwood are being stressed by growing salinity and saturated bottomlands.

By examining how delta mud was written about, defined, discussed, and otherwise represented, we can track attitudes about mud through colonial and racializing discourses that persist today. This may allow us to disentangle some of the associations at work that conceal troubling values tied to coastal interventions. By reconsidering mud as a primary building block, rather than an afterthought, we come to realize the story of mud is also the story of the people of this delta.