



THE DREDGE UNDERGROUND

A LOOSE NETWORK OF AFICIONADOS IS TRACKING THE LITTLE-SEEN
BUT ROUTINE RESHAPING OF WATERWAYS ON A GIGANTIC SCALE.

BY JENNIFER REUT

THE MORGANZA SPILLWAY LOOKED GREAT ON A HAZY JANUARY AFTERNOON. TO THE SMALL GROUP OF PEOPLE CLIMBING OUT OF CARS ALONG THE ROUTE BETWEEN NEW ORLEANS AND BATON ROUGE, THE MASSIVE STRUCTURE WAS A THRILLING PIECE OF THEATER.

The spillway, built in the 1950s, is one of dozens created to support the levee system of the Mississippi River after floods in 1927; it has 125 enormous gates that open when the river rises to divert the water and deluge the low, flat agricultural land. Suspended in the ambient moisture that engulfs everything in Louisiana, the spillway is a fascinating machine that intercedes between a huge amount of water and soil. Seeing it up close makes perfectly clear the scale of human engineering in the water infrastructure of the region. Systems like the Morganza Spillway have become integral to the survival of Louisiana's settlements and their economy along the waterways, but they are among the many reasons Louisiana has dissolved an estimated 25 percent of its land mass through erosion. This has led to the loss of life and ways of living along the water, both before and after Hurricane Katrina.

The group that had come to see the spillway was on a tour as part of a gathering called DredgeFest Louisiana, drawn together by a curiosity about dredging and where it fits into the spectrum of designed landscapes. They'd spent the previous two days in downtown New Orleans, talking about the spectacularly complicated mess that the Missis-



sippi River Basin has become from trying to channel, redirect, and otherwise control the mightiest of North American rivers. The Louisiana DredgeFest was the second of these gatherings (the first was in New York) organized by the Dredge Research Collaborative or DRC, a loosely knit group of four landscape designers, a project manager, and a journalist. This DredgeFest brought engineers and biologists (and bioengineers), students and teachers, landscape architects and architects. A few of the

OPPOSITE

Rob Holmes (left) and Brett Milligan (second from right) lead a tour of dredge landscapes during DredgeFest Louisiana.



JENNIFER REUT

THE MORGANZA SPILLWAY

The spillway and floodway are a two-part system, 20 miles long and five miles wide.





→ teams in town for the interview phase of *Changing Course*, a design competition to develop water and sediment strategies for the next Louisiana coastal master plan, wandered in and out. There were some unexpected participants: Maker Faire-style environmental activists, a pair of filmmakers, some local political types, and an artist or two.

There were presentations that collectively mapped the footprint of dredge on the land and water and other presentations about topics such as Louisiana's surprisingly progressive coastal restoration policies, highly technical water and sediment modeling, spoil islands as designed landscapes, and historical river patents. Tucked into all this were stories that began to reveal how dredging is seemingly behind, or beneath, everything. By the end of the first day, it had become apparent that static solutions to dynamic systems will always fail.

The meeting touched on shallow dredging and deep draft dredging, the difference between cutter-head dredges and hopper dredges, and why it matters. There were the unintended effects of dredging in Louisiana, and how the dredging of canals and estuaries creates open water that leads to wetland loss, which is part of why the damage during Katrina was so great. The group heard about the beneficial uses of dredge for creating habitat and public space and the economic op-

portunities that the Port of South Louisiana has provided and could build on if it could just have 50 feet—five feet more than the current dredged depth—to accommodate the new ships being built to take advantage of the Panama Canal's expansion. And then there were the restoration projects, the pocket habitats, the slow backfilling of canals that could stitch up some of those lost wetlands, if only the state and the federal government could come up with the billions upon billions of dollars it will likely cost to put it all back together again.

Behind the scenes, four of the six members of the DRC—Rob Holmes; Brett Milligan, ASLA; Tim Maly; and Gena Wirth, ASLA—quietly directed the events. They were out in the field, on the tours to the Morganza Spillway, the Old River Control complex, and other dredge-related sites. They led us through the muck for a slightly surreal screening of the dredge documentary *The Fluid and the Solid* (see “Muddy Water,” *LAM*, March 2014), where we drank beer out of cans on a rough edge of the Industrial Canal in New Orleans. And they were in the studios at Louisiana State University in Baton Rouge, where *DredgeFest* finally wrapped up. At the end of the week, they were each going back to their full-time jobs, because the DRC isn't a firm or a university-funded research center but a group of people joined only by their shared obsession with dredging.



STEPHEN BECKER is the project manager for two very large building developments in New York City and a coauthor of the blog *mammoth*. “If the way in which these projects come together starts to reflect the kinds of groupings and interdisciplinary approach that we take at the [DredgeFest] events, that’s what I would really like to see.”



LEFT
A workshop at DredgeFest Louisiana created a scale model of a river diversion.

RIGHT
The workshop coleader Justine Holzman uses crushed walnut shells to approximate the flow of sediment.

OPPOSITE
The Old River Control complex was constructed to keep the Mississippi from changing course and following the Atchafalaya River.

The DRC has an origin story that illustrates something about the ways designers work and create in the post-Internet age. In 2006, Holmes and Stephen Becker, an architect, started a blog called *mammoth* about landscape, infrastructure, and urban design that served as a catchment for the kinds of speculative architectural ideas that interested them. They were not blogging into a vacuum. Maly, a journalist interested in the built environment via networks and cyborgs, describes the next few years as a kind of golden era, when Twitter and blogging, no longer new but not yet ubiquitous, were emerging as platforms for talking about architecture. Along with *mammoth*, there were Geoff Manaugh of *BLDG BLOG*; Alexis Madrigal, who was then at *Wired*, now at the *Atlantic*; the design writer Sarah Rich; and a few others. Though geographically dispersed, they connected through tweet-of-mouth and began following one another's work, and then began to talk about collaborating offscreen.

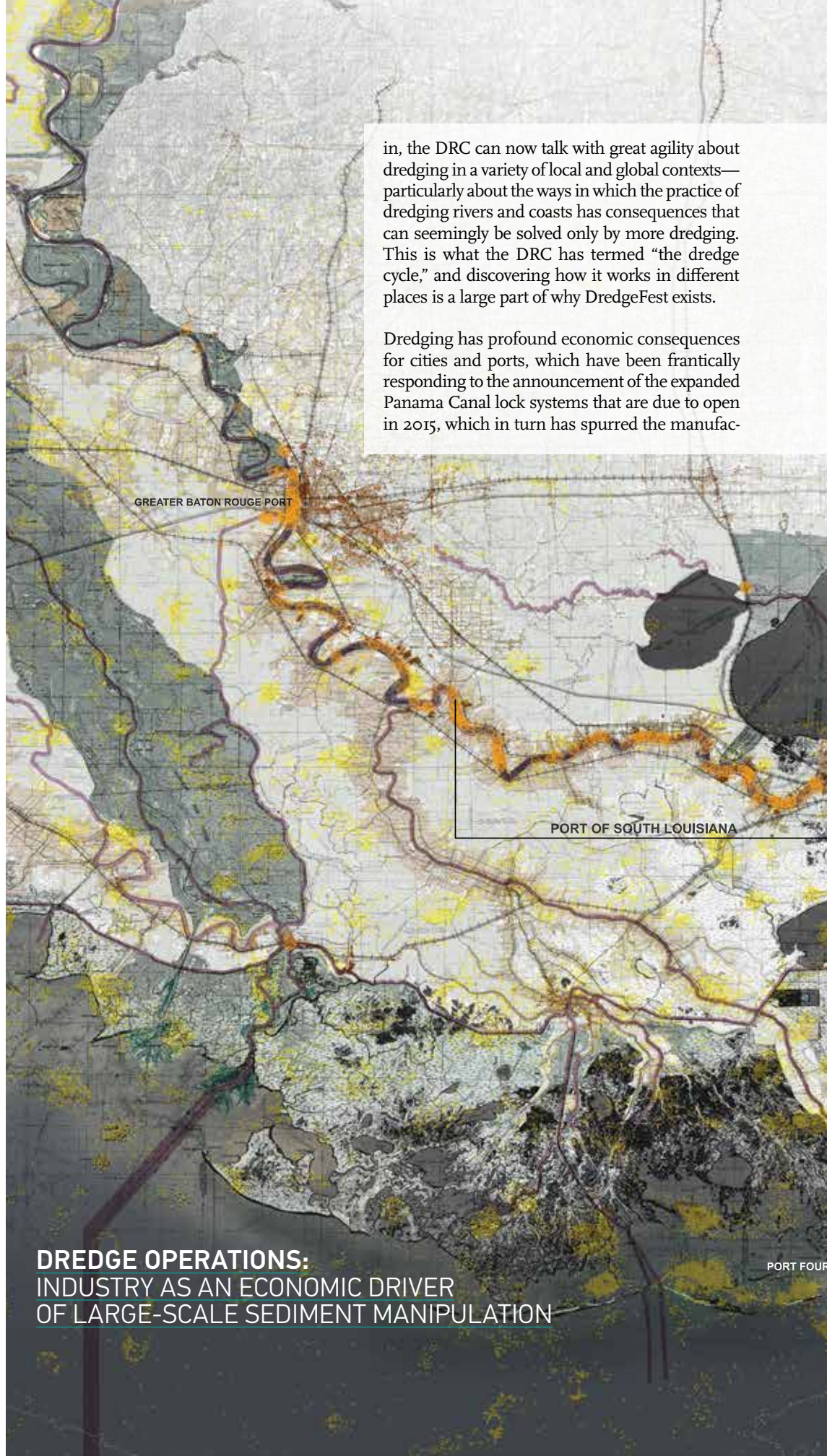
When the journal *bracket* put out a call for projects on "soft architecture" in 2010, Becker, Maly, and Holmes finally got together in a room with Milligan, who was on Skype. Dredge was one of many possible ideas they tossed around that day, but it was the one that had the right combination of strangeness, mystery, massive scale, and dynamism to satisfy the group's diverse interests. Maly

and Holmes, who both cite "speculative futures" as a major interest (part sci-fi, part urban design), say that the more they learned about the world of dredge, the weirder and more complicated it seemed. "The original idea for the article was to write proactive scenarios about the future of dredging," Maly says. "As we began to research the present of dredge, our wild ideas were routinely falling short of reality." The world of dredge, which initially seemed to be one of relatively ordinary actors in government and industry operating in huge, inaccessible landscapes, turned out to be as strange and multifaceted as any speculative urban world that they could have dreamed up. The DRC grew out of that first piece in *bracket*. The first DredgeFest gathering was held in New York City in the fall of 2012, just two years later.

It seems almost inevitable, after two successful DredgeFests and several massive coastal floods, that this group of people would have gravitated to this subject at this moment in time. The practice of dredging the coastal waters and rivers in the United States has reached a critical moment. Anxieties about sea-level rise and vulnerable coastlines as well as those from the pressures of a globalized economy on the U.S. shipping and transportation sectors can be tied back to dredging. It's a kind of covert force with impacts that hopscotch across national, geographic, and cultural borders. Five years



BRETT MILLIGAN, ASLA, is an assistant professor of landscape architecture at the University of California, Davis. "Landscape architects are really good as linkers and integrators and we can really pull from those people who have [dredging] experience."



in, the DRC can now talk with great agility about dredging in a variety of local and global contexts—particularly about the ways in which the practice of dredging rivers and coasts has consequences that can seemingly be solved only by more dredging. This is what the DRC has termed “the dredge cycle,” and discovering how it works in different places is a large part of why DredgeFest exists.

Dredging has profound economic consequences for cities and ports, which have been frantically responding to the announcement of the expanded Panama Canal lock systems that are due to open in 2015, which in turn has spurred the manufac-

GREATER BATON ROUGE PORT

PORT OF SOUTH LOUISIANA

PORT FOUR

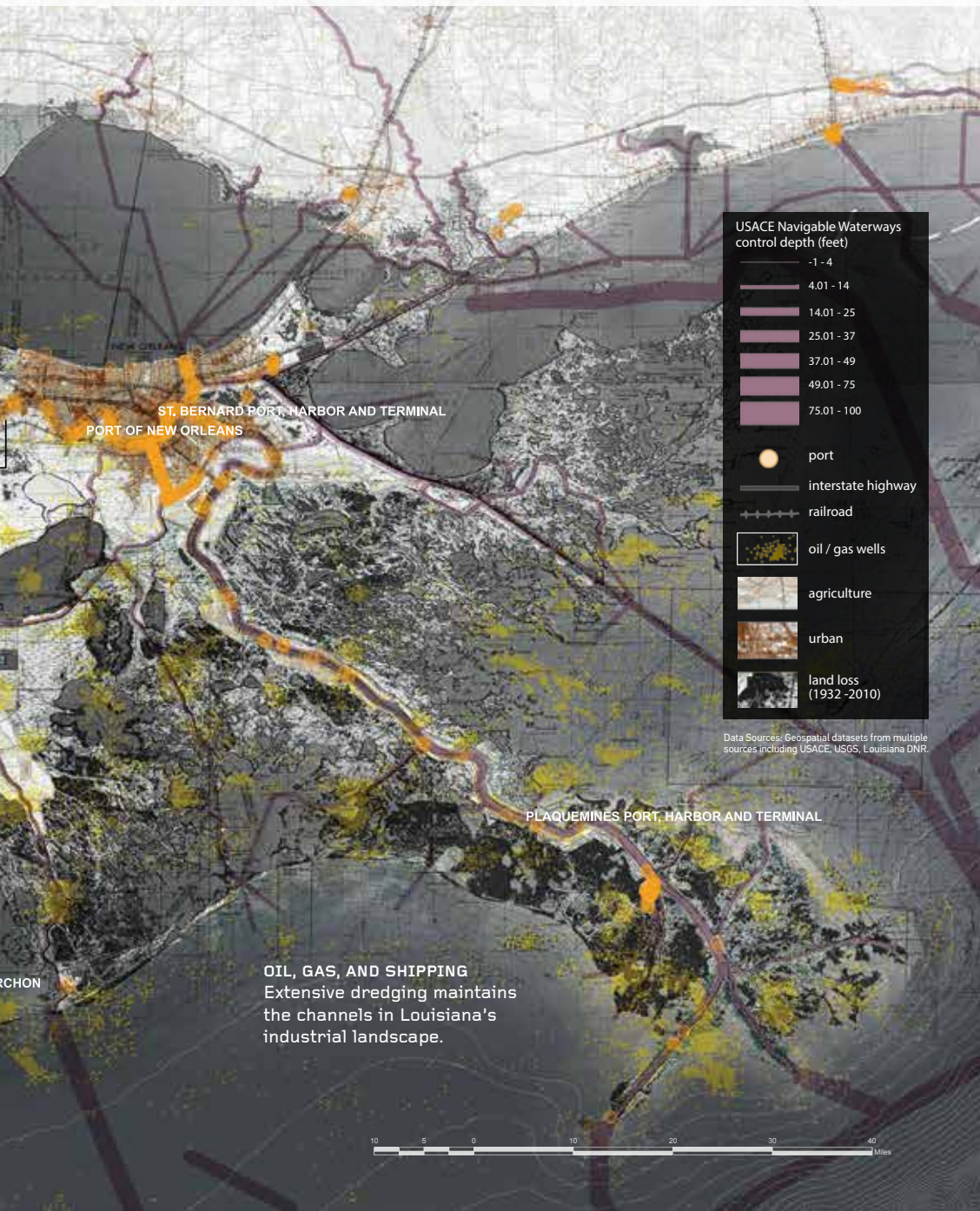


GENA WIRTH, ASLA, is an associate at SCAPE Landscape Architecture in New York City. “We’re trying to articulate the questions to an audience that hasn’t always asked.”

DREDGE OPERATIONS: INDUSTRY AS AN ECONOMIC DRIVER OF LARGE-SCALE SEDIMENT MANIPULATION

ture of the post-Panamax container ships that U.S. ports currently cannot accommodate. The recent passage of the federal Water Resources Reform and Development Act of 2014 authorizes but does not fund new dredge projects for U.S. ports at Savannah, Georgia; Boston; and several other cities so that they may compete for this new superlarge container shipping business. The Panama Canal, Maly points out, is not an isolated, distant landscape but one with global environmental effects. “Cities completely reshape their shores and channels because of the pressures of this one canal. These systems end up reaching into all aspects of architecture and landscape.”

Brian Davis of the DRC, an assistant professor at Cornell’s Department of Landscape Architecture, says the canal also has a surprising history with landscape architecture that points squarely at the present. Working with Milligan and Holmes, Davis presented a paper at the 2014 Council of Educators in Landscape Architecture conference on a 1913 report on the canal for the U.S. Commission of Fine Arts by Frederick Law Olmsted Jr. and Daniel Chester French. “One of the arguments we are making is that things might have been really different if that moment had marked the beginning of a long history, rather than a footnote.” It’s one of many points at which landscape architects might



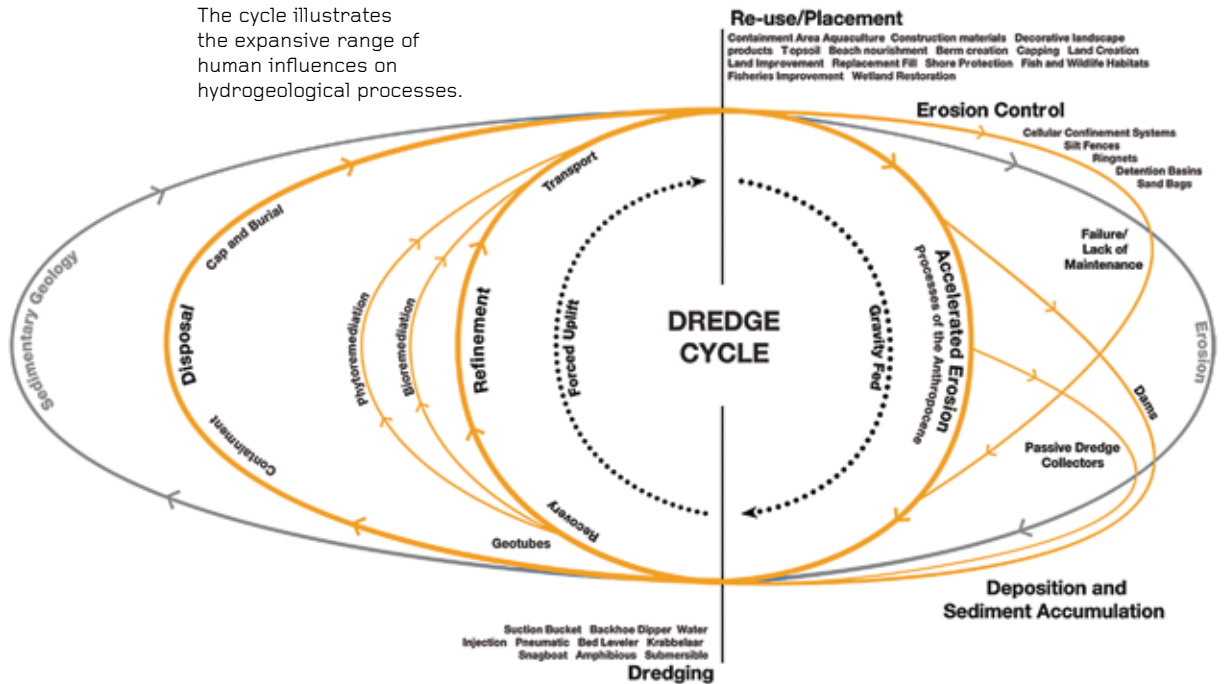
MATTHEW SEIBERT WITH THE LSU COASTAL SUSTAINABILITY STUDIO AND THE DREDGE RESEARCH COLLABORATIVE. MAP: JESSICA HOLMES, RIGHT: GENA WIRTH, ASLA, OPPOSITE



ROB HOLMES is an assistant professor of landscape architecture at the University of Florida and a coauthor of *mammoth*. “In a lot of ways, building a conversation around dredge is the easy part—implementation on the ground is the hard part, but that would make me feel like we’d gotten what we really wanted.”

THE DREDGE CYCLE

The cycle illustrates the expansive range of human influences on hydrogeological processes.



have made themselves a place alongside the engineers and politicians who ended up shaping the world's massive landscape infrastructure systems.

But perhaps that time has come again. “That’s the question we’re constantly asking, because the territory has been claimed largely by engineers,” Milligan says, “but we’re expanding that realm due to environmental concerns.” The environmental costs of dredging—wetlands erosion and chemical runoff that creates dead zones are just two—are only part of dredge’s intrigue. There is also what dredge material can become. The members of the DRC see in dredging’s processes and consequences, including the landforms it creates, compelling opportunities for landscape architects. Where dredge was once seen as a problematic by-product of an industrial process, it’s now recognized as a flexible platform for design.

Gena Wirth has the most day-to-day involvement in designing dredge materials as part of her work at SCAPE, a landscape architecture studio in New York. Although she came to the New York DredgeFest as a member of the public, her work on aerial maps of Jamaica Bay brought her into the DRC sphere, and she joined shortly afterward. When you talk to Wirth, you realize that dredge isn’t just dirt and water; it’s at the core of how she sees the world. To her, sediment is a fundamental element of landscape and a natural material for

landscape architects, yet designers remain on the margins. “We are intimately familiar with it. We all do it. It’s one of these materials we all use, but once it begins to scale up, it becomes controlled by civil engineers. Why aren’t we involved in these larger sediment projects? It’s a great opportunity for designers to expand the realm,” she says.

What the DRC wants is to demonstrate that landscape architecture has a huge stake in dredging’s consequences, not just as stewards of the environment, but as designers of the land. Dredged material is typically expelled out into nearby channels, used as construction fill, or, if particularly toxic, contained in holding cells, dewatered, and carted off. Geotextiles and other environmental technologies, some of which appear to have derived from a dystopian sci-fi art film, offer new architectural possibilities for the use of dredge and, with them, the possibility to design these places that dredge creates. Part of what the DRC wants to show is that this is already happening, whether as accidental landscapes or as “beneficial use” projects of the U.S. Army Corps of Engineers. Holmes says dredge landscapes and spoil islands in places like the port of Baltimore or Hampton Roads, Virginia, can be encouraged as conservation sites or as links in larger ecological networks. Dredge landforms have become unplanned habitats, major ground-nesting sites, and stops along flyways owing to their physical isolation and lack of predators.



BRIAN DAVIS is an assistant professor of landscape architecture at Cornell University. “The Panama Canal expansion is an economic reality for port cities like Savannah and Norfolk, and this means more and deeper dredging. We are interested in complicating the narrative and figuring out what might be done.”

SEDIMENT VOLUME AND DAM CONSTRUCTION

NUTRIENT YIELDS

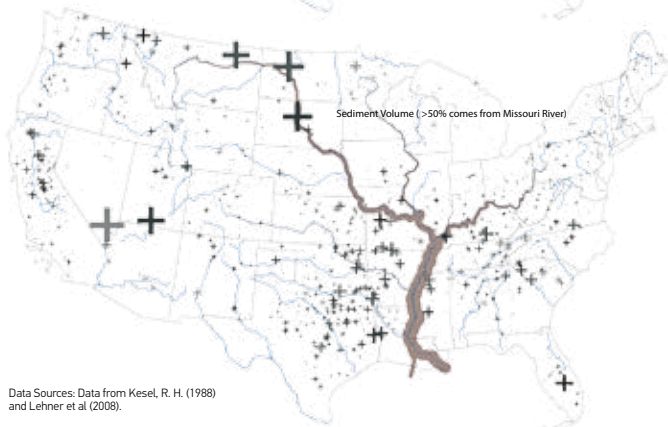
Before 1953



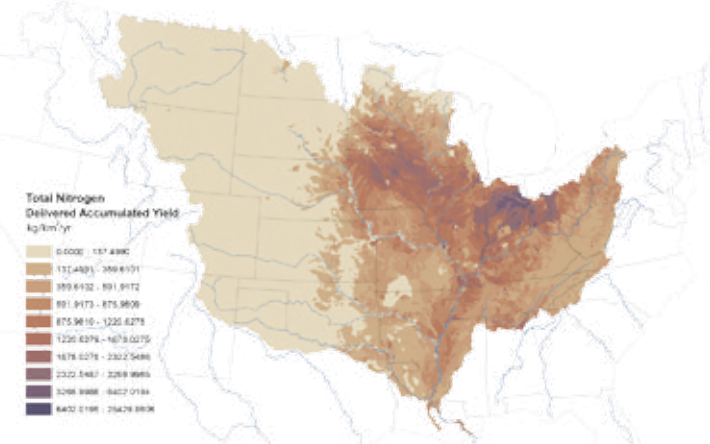
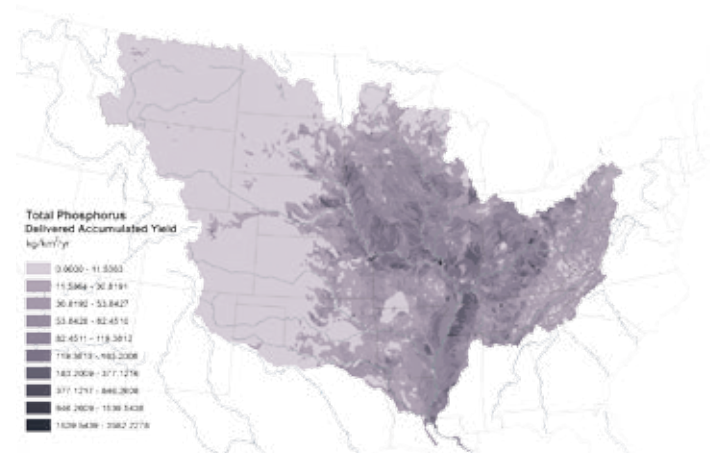
1953 - 1962



after 1963



Data Sources: Data from Kesel, R. H. (1988) and Lehner et al. (2008).



Data Source: Robertson, D. M. and Saad, D. A., *Journal of Environmental Quality*, 42:5.

MATTHEW SEIBERT WITH THE LSU COASTAL SUSTAINABILITY STUDIO AND THE DREDGE RESEARCH COLLABORATIVE, TOP; JESSICA YURKOFSKY, BOTTOM

In addition to designed ecological restorations, dredge landscapes create possibilities for public recreation near urban waterfronts or on preexisting dredge sites. When I met Sean Burkholder, ASLA, at DredgeFest Louisiana, he was preparing for the launch of the North Coast Design Competition, which would elicit ideas for dredge landscape designs for Toledo, Ohio. Burkholder, an urban landscape designer, isn't a member of the DRC but could be called an affiliate, and he works on dredge as faculty at the University of Buffalo. He was the faculty adviser for the undergraduate Matthew Moffitt's 2013 ASLA award-winning

project, "Dredge City: Sediment Catalysis" (see "Dredge in Many Flavors," *LAM*, February 2014), while at the Pennsylvania State University. In his own practice, he worked on the master plan for the Cleveland Lakefront Nature Preserve, a project that transformed an 88-acre site from a dumping ground for dredged material into a publicly accessible nature preserve. He later told me that a diverse range of ecosystem types had developed naturally on the Cleveland site, and that they had worked with them in the master plan. He mentioned that Duluth, Minnesota, and Green Bay, Wisconsin, were both investing in designing



TIM MALÝ is the principal of the *Quiet Babylon* site and a fellow at Harvard University's metalAB. "Dredging is interesting because it appears to be uninteresting. There is this almost showman's reveal when I'm talking to people about dredge for the first time."

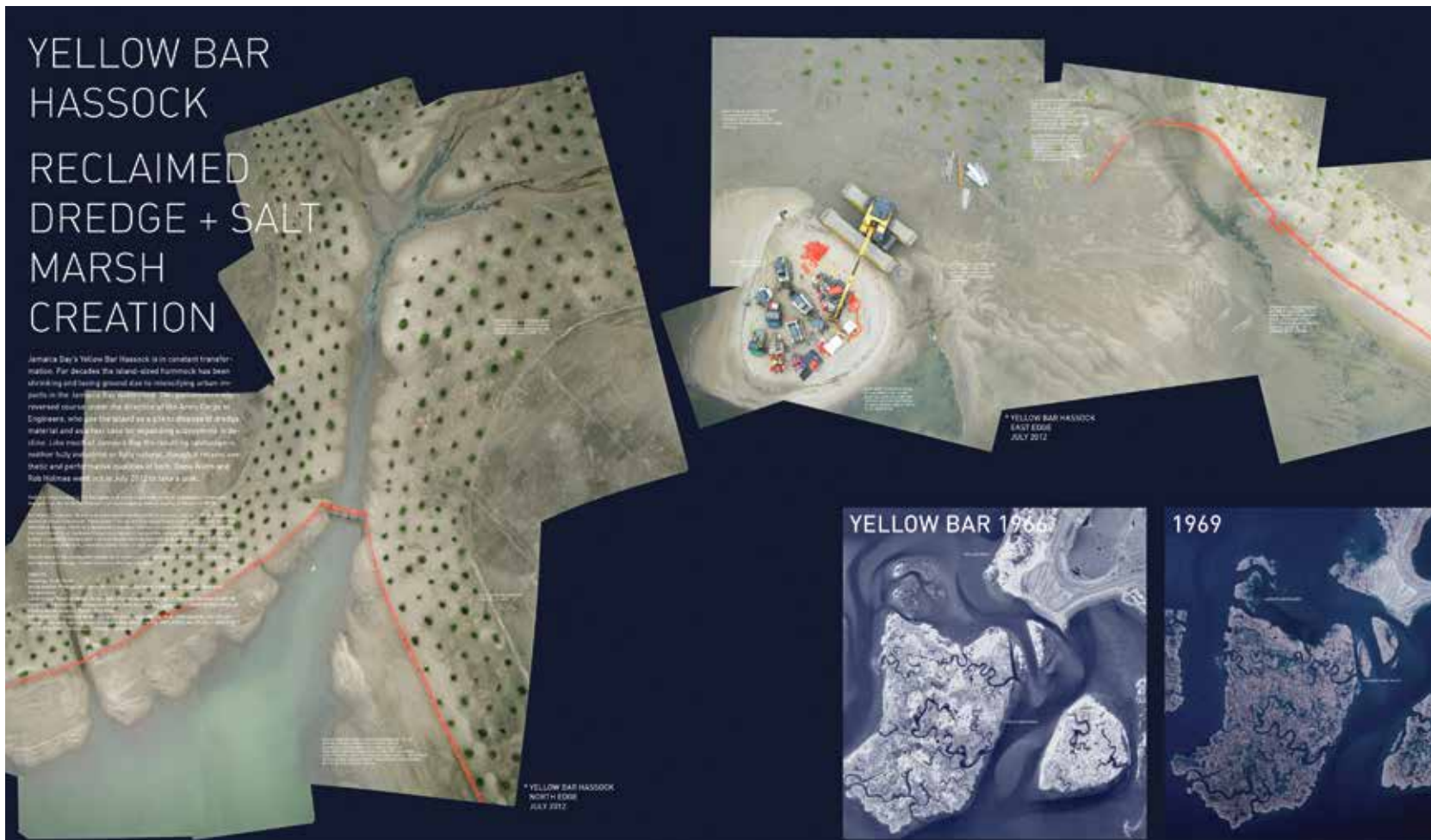
dredge landscapes, but innovative projects like the nature preserve were still fairly exceptional, especially around the Great Lakes, where there is little pressure for waterfront redevelopment.

Though distinct in their individual avenues into the dredging world, the members in the DRC agree that one use—facilitating coastal resilience and climate change adaptation—is dredge’s greatest imperative. Wirth has been closely involved with the Rebuild by Design competition, sponsored by the U.S. Department of Housing and Urban Development and the Rockefeller Foundation, as part of a team led by SCAPE, and she believes that many of the issues that concern landscape architects—climate change, resilience, economics, food systems, sustainability—can be

tied to dredging. “The more you look into [these issues], the more they connect back to the dredge cycle and sediment management. Climate and coastal issues are directly affected by Mississippi River Basin management in Louisiana. It’s not just about landscape architecture, but what does the nation have at stake?”

There is plenty at stake. The New York Dredge-Fest in 2012 (see “Sedimental Journey,” *LAM*, January 2013) brought people from around the region to talk about the role of dredging in reshaping the coastal landscape of New York and New Jersey. About a month later, Hurricane Sandy hit the region. The storm’s widespread effects underscored, almost to an unsettling degree, the urgency of many of the issues that had been

DRC (GENA WIRTH, ASLA); BOTTOM: BEN MENDELSON, RIGHT AND FAR RIGHT

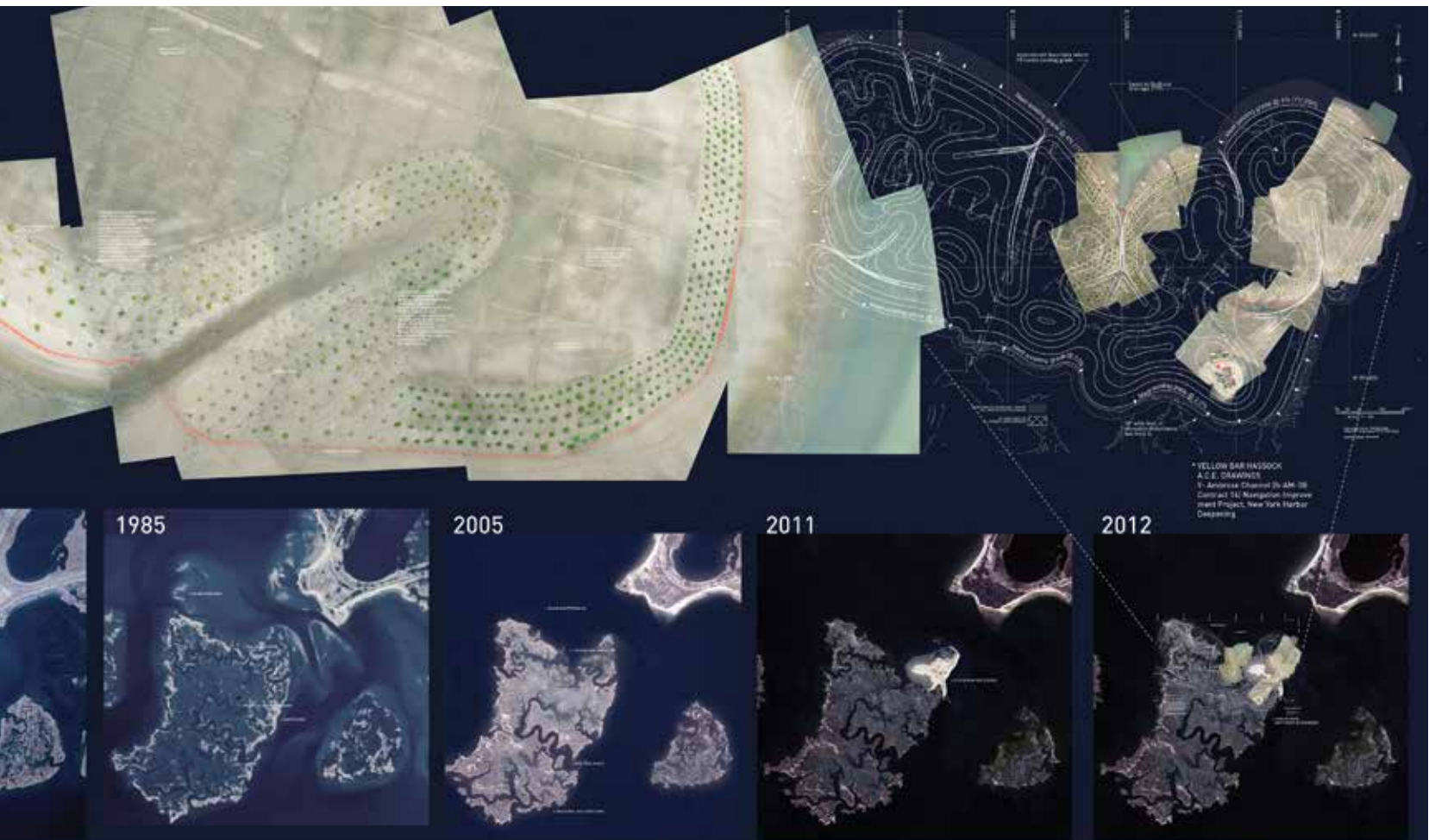




LEFT
Gena Wirth and Rob Holmes prepare a balloon and camera for an aerial mapping expedition on Yellow Bar.

RIGHT
Alex Chohlas-Wood carries film gear off Yellow Bar as the tide comes in.

BOTTOM
Wirth's balloon mapping project documents Yellow Bar in Jamaica Bay.





TOP
Alex Chohlas-Wood films sediment spewing out of a dredge pipeline at the mouth of the Mississippi River.

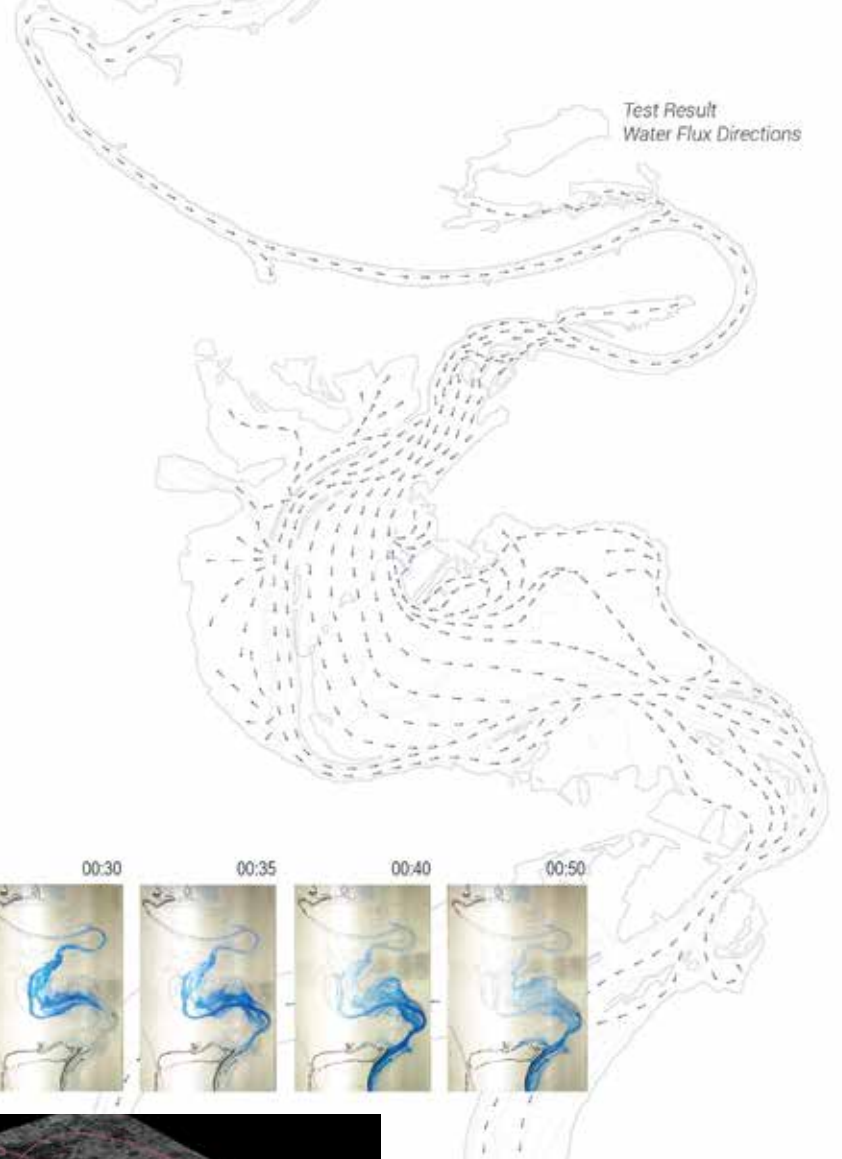
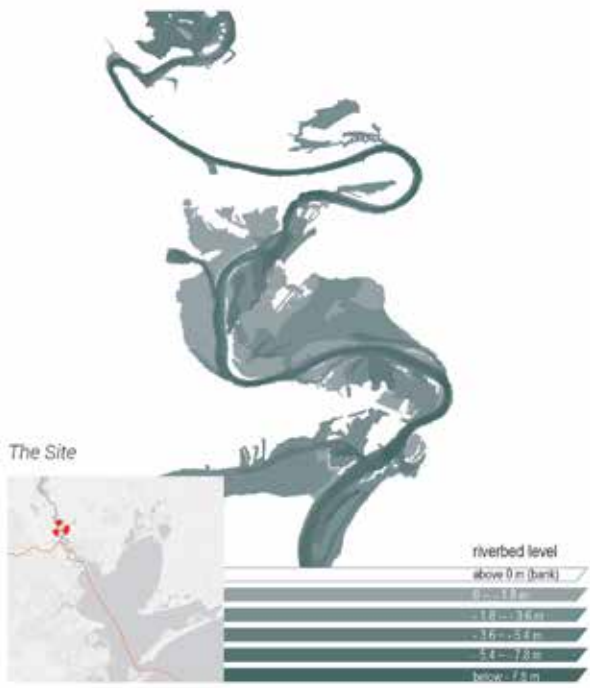
BOTTOM LEFT
A dredge pipeline crosses freshly built land near Head of Passes.

BOTTOM RIGHT
An outdoor screening of *The Fluid and the Solid* during DredgeFest Louisiana.

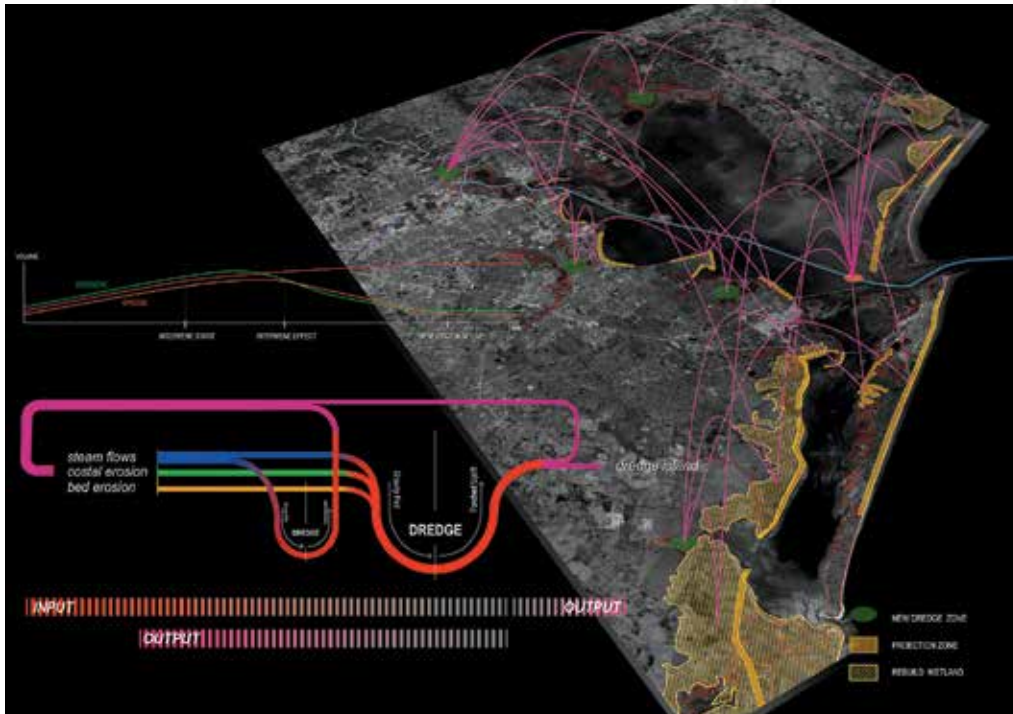
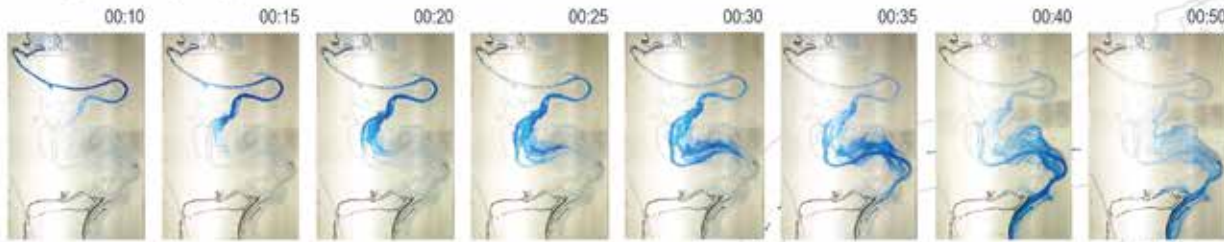
raised at DredgeFest about the role of dredging in coastal erosion. What has become clearer now that there have been two DredgeFests is how important the local and the particular are to each situation. There are commonalities in dredging practice—much of which is overseen federally by the U.S. Army Corp of Engineers—but the local culture, economy, and landscape history play as much a role as any land-use policy in how dredging is done, who benefits, and who loses.

Regional differences don't just show up in the landscape. One difference about that first DredgeFest was that the staff from the corps were active participants and presenters, though Milligan says funding cuts might account for why they may not have been as much in evidence in Louisiana. There are also the nature of the projects, the variable culture of the corps among regions, and the sensitive environmental politics of post-Katrina Louisiana to take into account, and these are not constraints that are easily grasped by people

outside the region. There is the potential hazard of the DRC and its followers' waltzing into the dredge world and "discovering" its landscape potential, which, of course, has been there all along as far as the dredging industry and the corps are concerned. But the DRC is careful not to occupy this role—the corps and the heavy equipment manufacturers have a lot to teach them, and the DRC members recognize how they have benefited and continue to learn from the corps staff like Ed Creef, an environmental resources specialist from the New Orleans District, as well as from the dredgers and allied professionals who attended. Rather than dominate the conversation, the DRC sees its role at DredgeFest as facilitator and more or less gets out of the way while it's going on. "Dredge and sediment are really interdisciplinary realms, and we're trying to connect those people and projects," Wirth says. To her, the New York DredgeFest was a revelation. "It was a great collection of people who had never been in the same room at the same time—artists, corps, introverted



The Progress of a Hydrological Test



STUDENT WORK

TOP
Student research on flow patterns from a studio at Louisiana State University led by Rob Holmes.

LEFT
Student analysis of the regional geography of sediment capture and distribution.



engineers, community advocates from Gowanus. It is a fest, so it's meant to be kind of weird and fun—I talked to a whole range of people I never would have talked to before.”

Part of what makes the DRC a lively model is that its individual members take dredge in whatever directions their own interests drive them, and that doesn't necessarily overlap with their day jobs, nor does it need to. The designers—Wirth, Milligan, Holmes, and Davis—each use dredge as a jumping-off point for their own work or teaching but focus on different aspects. Becker, who works for a New York real estate developer, founded *mammoth* with Holmes and shares his preoccupation with infrastructure, but he now works as a project manager on large

development projects. Maly, currently a fellow at Harvard's metaLAB, is working on several projects, including one on 3-D printing landscapes, but his primary medium is the written word rather than design. DredgeFest allows their shared interests to manifest in tangible projects that have a life outside academic or professional circles.

The DRC is planning two more DredgeFests, both in the United States, although various overseas sites had been proposed. Next up is the Great Lakes region in summer 2015, followed by the West Coast in summer 2016—a “four coasts” framework that is meant to help focus the sometimes overwhelming consequences of Anthropocene human actions. Milligan points



LEFT
Concrete mattresses made at the St. Francisville Casting Fields are sunk into the Mississippi River to create revetments that fix the river's banks and maintain navigation channels.

out that though dredging ties the four coasts project together, there are many variables in practice as well as effects. Holmes says that whereas New York and the Gulf Coast were both contending with sea-level rise and climate change impact, around the Great Lakes, dredging is reaching a critical impasse because the region is running out of places to dispose of toxic dredge material. Holmes sees this as a period when the DRC is primarily documentary and revelatory, when they themselves are trying to understand what's happening on these four coasts and trying to find ways to make that open to other people. "At the same time, we also have this strong interest in seeing landscape architects become involved in dredge as designers, not just as citizens or people whose interests overlap, but as active agents."

The idea of dredging, and all landscape infrastructure, as a circular rather than a linear process is not a novel one, and Maly points out that there's a growing community of people interested in these questions. "We've caught a wave," he says. "It's becoming clear that the heroic version, building dams and cut channels, in the long run—that is not going to cut it. There are people all over the world who are doing interesting experiments." What role the DRC can play is wide open, and that's the way they like it right now. Maly says, "There's no way I can see what is coming—the speed with which we went from the first article to the first event—at each step I don't think I would have predicted the next." ●