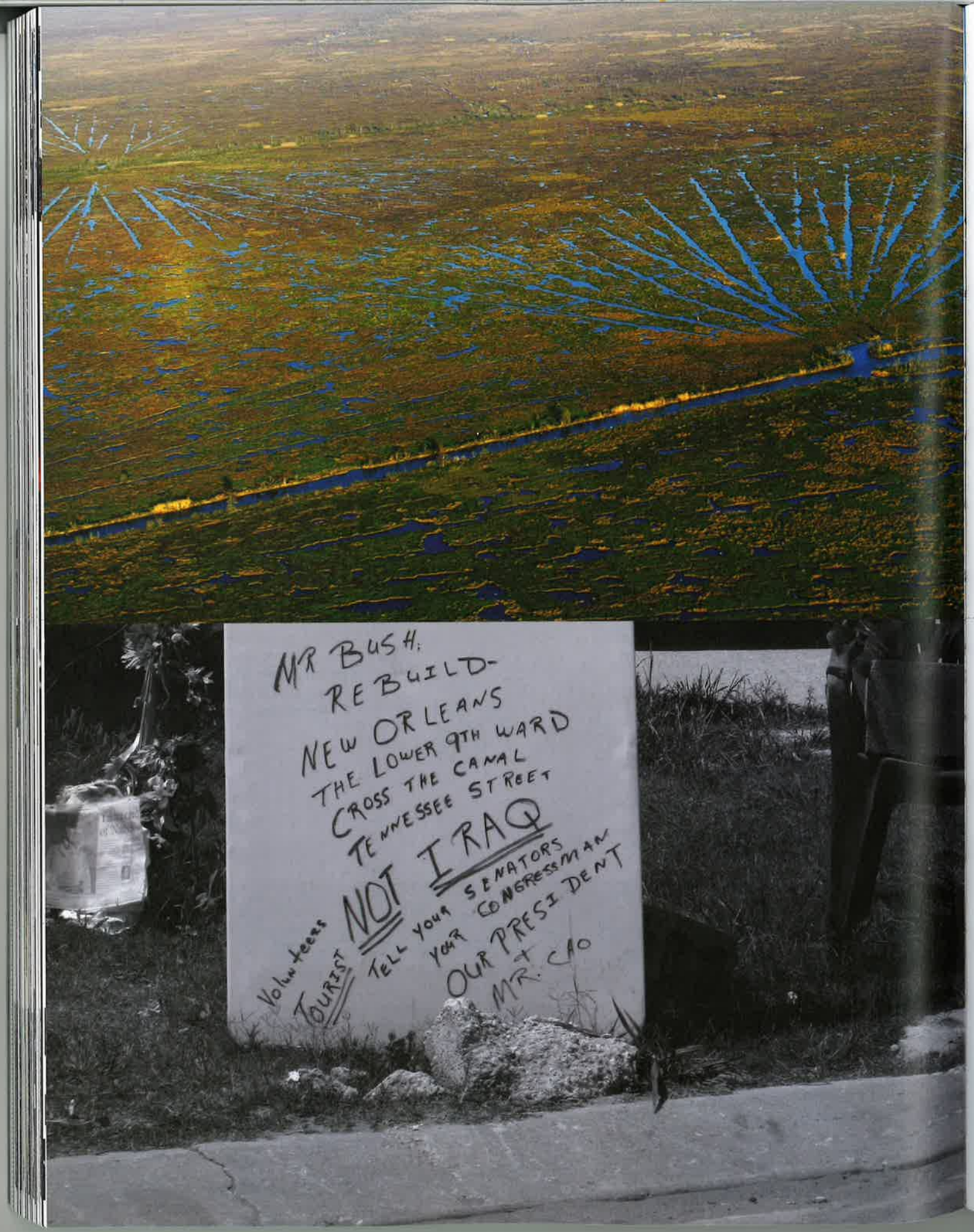
# design in the terrain of water

Edited by

ANURADHA MATHUR / DILIP DA CUNHA

with REBEKAH MEEKS
MATTHEW WIENER




# ELIZABETH MOSSOP

## MISSISSIPPI DELTA PROJECT



### ISSUES OF WATER AND RIVERS AND DELTAS EPITOMIZE

THE DISJUNCTURE BETWEEN NATURAL SYSTEMS AND THE HUMAN SYSTEMS OF ADMINISTRATION, PROPERTY, AND POLITICAL STRUCTURES. WITH ITS GENERALLY STRONG DISTASTE FOR PLANNING, THE US HAS BEEN SLOW BOTH TO ALIGN PLANNING OR ADMINISTRATIVE BOUNDARIES WITH THE NATURAL BOUNDARIES OF WATERSHEDS, AND TO CREATE MULTIFUNCTIONAL MANAGEMENT AGENCIES (WITH SOME NOTABLE HISTORICAL ANOMALIES SUCH AS THE TENNESSEE VALLEY AUTHORITY). QUESTIONS OF FLOODING, LAND LOSS, AND STORM PROTECTION IN THE MISSISSIPPI DELTA ARE PLAGUED BY AN INABILITY TO EVEN CONCEPTUALIZE THE ISSUES IN A SYNTHETIC WAY. THE MOST DIFFICULT TASK SEEMS TO BE HOW TO BRING TOGETHER A DISCUSSION OF THE FORMS AND PROCESSES OF HUMAN INHABITATION AND ACTIVITY, AND THE BROADER QUESTIONS OF ECOLOGICAL SUSTAINABILITY, WITH THE SCIENCE AND ENGINEERING OF RIVER MANAGEMENT AND COASTAL PROTECTION. IN THIS CONTEXT, THE ACADEMY CAN PLAY AN IMPORTANT ROLE IN TRYING TO CONTRIBUTE TO PUBLIC DISCOURSE BY DEVELOPING INFORMED SPECULATION THAT IS GROUNDED IN BOTH ACCURATE DATA AND A REAL UNDERSTANDING OF THE LOCAL POLITICAL AND CULTURAL CONTEXT.

Louisiana State University's Coastal Sustainability Studio (CSS) brings together scientists, designers, and engineers to collaborate on specific projects with the aim of developing techniques for reducing environmental vulnerability and enhancing community resilience along the Louisiana coast. This drives a project approach that incorporates political and economic realities as well as research-based investigation into possible scenarios, thus placing the work in an interstitial zone between academic speculation and the politically sanctioned proposals of the various levels of government. The CSS is also unique within the regional context because of its central involvement of designers and planners and the cross-disciplinary methods that are applied to projects at all scales.

The confinement of the Mississippi River by flood protection levees interrupted the annual cycles of flooding across the river's floodplain, and the deposition of the silt that provided both the raw material for agriculture, and continued to build new land in the delta. The resulting withdrawal of this delta-building sediment, combined with the impacts of the oil industry and catastrophic storms, has resulted in the dramatically escalating land loss we see here. Current projections of continued land loss combined with sea level rise over the next 100 years dramatically changes the picture for the existing communities of south Louisiana and forces a major rethinking of options for the future. Without massive land-building efforts, the coastal region will disappear within a relatively short time.

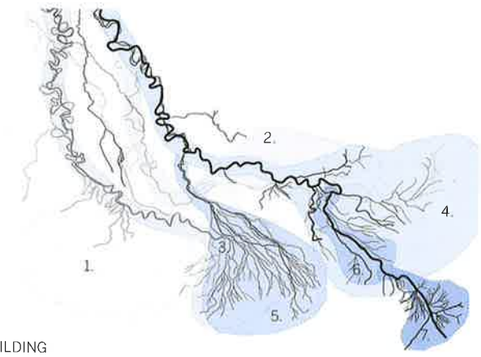
So at the regional scale it is necessary to return the Mississippi River to its role as delta builder. The primary action proposed is a series of five spillway diversions constructed at strategic locations along the gulf, at the endpoints of the five historic basins of the delta. Each diversion would be designed as a hybrid between soft and hard infrastructure, strategically placed with regard to ecological, economic, and settlement patterns. The spillway gates would be periodically opened when the Mississippi is high, providing a steady pulse of sediment that over the century will build up, maintain, and protect large expanses of land.

In order to test this strategy, it is necessary to also zoom in and explore how these issues operate at the metropolitan and neighborhood scales. The project's area of focus is the Central Wetlands Unit, the Lower Ninth Ward and Saint Bernard Parish on the eastern border of the city with Lake Borgne. It is an area of great vulnerability to storms, particularly because of its location in relation to major industrial shipping infrastructure. Our work here is informed by a long-standing interaction with the community and a specific consultation process over the course of the project. The L9 Centre for Sustainable Engagement and Development is our partner in this work and has collaborated with us to focus the four main project goals: a balanced regenerative ecosystem, intelligent storm protection, a productive innovative economy, and a dynamic and sustainable community.

For these goals to be achieved, the neighborhood as we know it will have to evolve—to become better integrated with natural systems and flexible to changing water levels. Its architecture will have to become nimble, and increased open space will be needed to absorb seasonal floodwaters. Much of the Lower Ninth Ward, for example, was formerly wetlands, and will need to be re-imagined as a flexible urban/protective/middle zone once again.



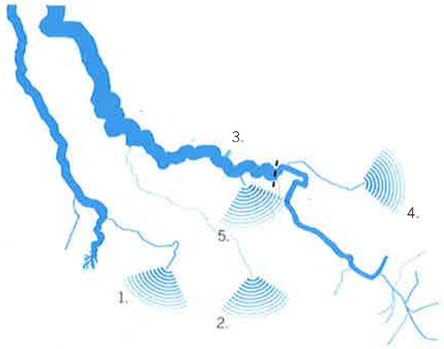
DISAPPEARING DELTA: The Mississippi Delta is a landscape shaped by the underlying conditions of the river system and the imposition of the engineering control system. The dominance of the latter has resulted in a rapid rate of land subsidence throughout the delta region.




DELTA BUILDING

| | DELTA SYSTEM | STAGES |
|---|---|---|
| 1. | SALE CYPREMORT | 4600 BCE |
| 2. | COCODRIE | 4600-3500 BCE |
| 3. | TECHE | 3500-2800 BCE |
| 4. | ST BERNARD | 2800-1000 BCE |
| 5. | LAFOURCHE | 1000-300 BCE |
| 6. | PLAQUEMINE | 750-500 BCE |
| 7. | BALIZE | 550 BCE |

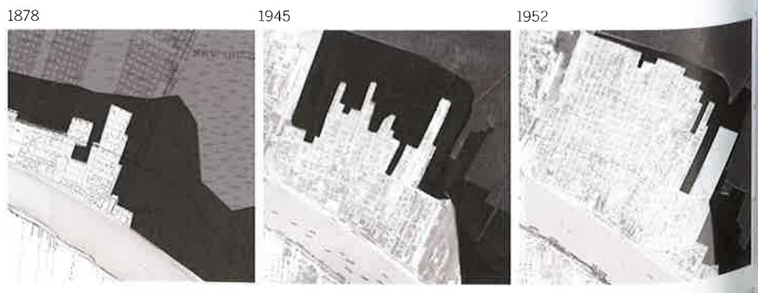
SEDIMENT SPILLWAYS



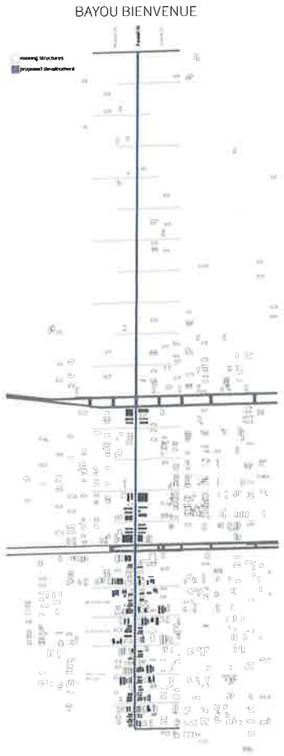

| | SPILLWAY DIVERSION | CAPACITY |
|---|---|---|
| 1. | TERREBONNE | 100,000 CFS |
| 2. | BAYOU LAFOURCHE | 100,000 CFS |
| 3. | BONNET CARRE | 250,000 CFS |
| 4. | MRGO/BAYOU LA LOUTRE | 100,000 CFS |
| 5. | DAVIS POND | 100,000 CFS |



9TH WARD: Looking at historical maps of the Lower Ninth Ward illustrates what has happened over time to the protective buffer of wetlands that used to exist between the settlement and the bayou. Prior to Hurricane Katrina in 2005, this landscape demonstrated an idiosyncratic settlement pattern encompassing both the colonial urbanism of New Orleans and the post WWII suburban expansion.




Landscape of the Lower 9th Ward

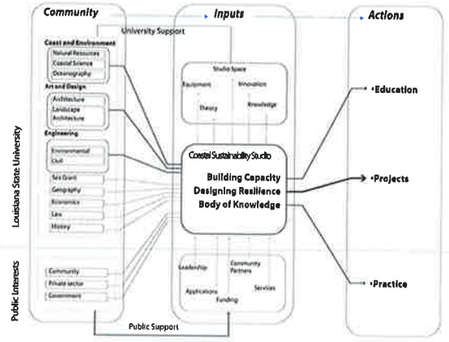



It cannot be overstated how politically contentious post-storm proposals to change the form of New Orleans urban development have been. With little faith in any level of government to act in the interest of all citizens, it has been impossible to consider alternatives to a restoration of the pre-storm status quo. So it needs to be stated very clearly that this work is aimed specifically at empowering the local community to take an effective role in shaping the discussion of these issues. A key driver has been the need for primarily incremental solutions that can be flexible at the scale of individual properties and also the assumption of a viable land tenure system. The proposals have come about through an extensive process of engagement and discussion and are a testament to new understandings of the urban conditions six years on from the storm. There is a broad understanding that new solutions are required for these neighborhoods although it is far from clear how this change will be achieved.

Much of the neighborhood is now open land with emergent vegetation, in some areas there are new houses and in others there has been significant restoration and reoccupation. There has been a succession since the storm, of flooding, debris, clearing, and regeneration and there remains a transition from more to less density, between the river and the bayou. The bayou is largely open water with the ghost of the cypress swamp still visible, edged by a sea wall built in the 60s after Hurricane Betsy that protects the neighborhood. Unfortunately, the wall completely disconnects the neighborhood from its traditionally close relationship with the bayou (where residents once trapped and fished in the extensive wetland environment), making an artificial delineation between water and land.

So rather than preparing yet another New Orleans master plan, we identified key topics of speculation through consultation, research, and analysis. And from this developed a series of themes for our investigation: housing and neighborhoods, productive landscapes, recreation, industry and jobs, and wetland restoration. Each area of focus was analyzed through precedent research, community and site investigation, and design speculation and then developed into a series of single-issue scenarios. The individual scenarios were then evaluated against a series of environmental performance criteria, including carbon footprint, sea level rise, storm and flood defense, investment, and potential return.

We have further combined a series of these scenarios into a complete vision of the place intended to animate a possible long-term future for the neighborhood within a re-generated coastal environment. This is a snapshot of selected scenarios, rather than a comprehensive or exclusive plan. It is a key means of communication with our stakeholders to illustrate how different scenarios could make a new neighborhood.

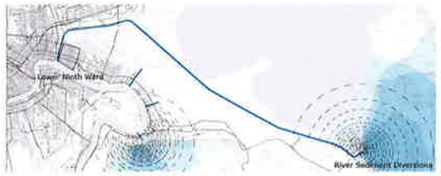




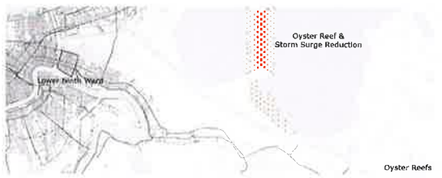



INVOLVING COMMUNITY:
Proposals are aimed specifically at community engagement and empowerment. They reflect a new understanding of urban conditions after the storm, and the role of local community members in shaping new solutions for their neighborhoods.


SNAPSHOT PROPOSALS: The northern part of the Lower Ninth Ward (and the extension into Saint Bernard Parish) is uniquely located on the edge of water and settlement. This position and its relationship with the Central Wetlands Unit offers a number of opportunities for both enriching the Lower Ninth Ward as a vibrant community and protecting it from future hurricanes and storm surge.




The vision is driven by the concept of a robust wetland zone that supports the needs of a thriving and resilient natural environment alongside a growing and sustained human settlement. The northern part of the Lower Ninth Ward is transformed to take greater advantage of its location on the edge of water and settlement. Dense housing and community buildings are concentrated in infrastructural corridors reaching to the wetland where schools and institutions utilize the unique qualities of the location. Large open spaces between these neighborhood concentrations return productivity to the landscape through community and large-scale agriculture and increase the resilient capacity of the neighborhood environment by dramatically increasing open space areas for stormwater retention.


Claiborne Avenue is important as the line that separates the neighborhood roughly between above and below sea level. Traditionally, it separated the urban from the rural parts of the neighborhood. Claiborne Avenue once again takes on the role of threshold between different types of dwelling. To the south the neighborhood is densified while to the north the neighborhood is developed along infrastructural corridors along Tennessee, Caffin, and Tupelo streets that historically extended into the wetlands at the north of the neighborhood. New housing and commercial space along the main corridors are elevated to withstand flooding. The space in between becomes farmland and open space for recreation and stormwater retention. The

farmer's market would become an important hub in the neighborhood that links the productive landscape of the Lower Ninth Ward to the urban consumers of New Orleans and the region beyond.

Returning the massive amounts of vacant land in the northern parts of the Lower Ninth Ward to productive and resilient use was a major focus of the project. A combination of backyard farming, community gardening, large-scale commercial farming, and aquaculture are possible ways to utilize land that has too great a flood risk for rebuilding. Galvez Street becomes a focus of agricultural activity and contains both small farm cottages to the south and larger commercial farming operations to the north.


The lowest and emptiest part of the neighborhood becomes public open space. The low point in the northwest corner becomes a wetland park with significant water storage and cleansing in the landscape, taking pressure off the overstretched pumping and drainage infrastructure. A regional park provides sports and recreation facilities much needed by the city and there is the opportunity to take advantage of the bayou's proximity for educational and tourist facilities. Subsidence has created roughly four hundred acres of open water at the western end of Bayou Bienvenue, which is a great potential recreational amenity for fishing, birding, kayaking, canoeing, sailing, and crabbing, while the rest of the Central Wetlands Unit would be reforested as cypress swamps. All of these offer a substantial range of economic development possibilities based in tourism and recreation.

The development of this project has allowed the illustration of some key ideas in relation to techniques for exploring resilience at the intersection of water systems and urban development. The complexity of current issues related to the settlement of the Mississippi Delta requires this broad disciplinary collaboration that can bring together the three poles: research and data, planning and design, and cultural issues. We also have to be able to zoom in and out from regional, to metropolitan, to neighborhood to site strategies as the means of testing the validity of both broad-scale strategies and understanding the implications of physical design decisions. Using design scenarios as the basis for the development of future visions provides a flexibility missing from many master-planning processes, as well as being a useful means of communicating to communities the possibilities of how different strategies combine in an integrated plan. The process has also reinforced the overriding importance of appropriate methods of communication. Strategic thinking, development alternatives, and physical proposals have to be translated into models and images that will have resonance with key stakeholders and communicate ideas effectively.