

ANNOTATED BIBLIOGRAPHY OF WATER MANAGEMENT

IN NEW ORLEANS AND COASTAL LOUISIANA

This bibliography is intended to serve as an introductory reading list to the multifaceted issues of water management in the city and on the coast, referencing key primary plans for action and a multitude of interpretive sources representing a wide cross section of expert perspectives.

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“New Orleans was created because of the coast.
We have to live with water.”

-Mayor LaToya Cantrell

As an emerging field of research and practice in coastal Louisiana, the water management sector has seen an explosion of interest following the spotlight being placed on the region after Hurricane Katrina. While a multitude of efforts have yielded an immense amount of work on the threat of water to the coast and its cities, the multitude of parties involved are still in the process of organizing and specializing. As a result, the web of relevant neighborhood groups, NGOs, government bureaucracies, corporate interests, philanthropies, and research institutions is daunting and the literature involved is multilayered and often overlapping.

This bibliography was initiated as part of a three week research project undertaken by The Small Center’s 2018 Public Interest Design Fellows that sought to make sense of the multitude of actors working on water issues in the region. The purpose of this bibliography is to provide readings that give a comprehensive overview of the history, technologies, philosophies, and politics of water management on the coast and in New Orleans, and to empower designers to think comprehensively about the multitude of intersecting systems at play.

Politics is used to tag entries that deal with the relations of power between various actors in the water arena.

History is used to tag entries that give context or backstory to Louisiana's water issues today.

Economics is used to tag entries that address the funding structures necessary to implement water infrastructure projects.

Disaster refers to entries that describe a pivotal historical catastrophe, like the 1927 Mississippi River Flood or Hurricane Katrina in 2005.

Living Infrastructure describes natural systems that work in cycles to self-sustain and regenerate. While inherently rendered somewhat artificial by anthropogenic intervention, working in concert with these natural infrastructures is essential to the continued human habitation of the Mississippi Delta and the Earth at large.

Grey Infrastructure, in contrast to “green” natural systems, describes the western industrial built environment of the region's urbanized areas: levees, canals, pumps, highways, even buildings. While new grey infrastructure is inherently destructive to natural systems, upkeep of existing grey infrastructure remains tantamount to the preservation of the region's urban areas.

PART I: VISIONS FOR CHANGE

AN OVERVIEW OF STATE AND MUNICIPAL PLANS FOR ACTION

Part One provides an overview of the most salient plans for restoring the coast and retrofitting the city to manage water resiliently. In contrast to the more interpretive content of the following sections, these texts are primary sources put together by city and state agencies and industry professionals to call for action. Taken together, a number of these plans read in harmony, providing a resiliency framework with multiple lines of defense against water. It's important to bear in mind, however, that these visionary documents don't always reflect the perspectives of every regional stakeholder; thus, an equity framework will be necessary to prevent new infrastructural investments from reinforcing historical power discrepancies.

Louisiana's Comprehensive Master Plan for a Sustainable Coast¹

Agency: Coastal Protection and Restoration Authority of Louisiana

Published: June 2, 2017 (updated every 5 years)

Tags: Coastal, Living Infrastructure, Grey Infrastructure

Recommended: Executive Summary (pp. ES-1-ES-21)

2017 Coastal Master Plan (pp. 93-126)

"Above all, the Louisiana coast is home to more than 2 million people – nearly half of the state's population. Our people have a deep and abiding love for their coast and a rich cultural heritage closely connected to the land and water."

In this master document, Louisiana's Coastal Protection and Restoration Authority (hereafter CPRA) outlines a multifaceted strategy for coastal restoration and risk reduction. Outlined in chapter four are the six restoration and two risk reduction tactics considered for the plan, detailed maps of implementation sites, and a breakdown of funding for the \$50 billion needed to enact the plan by 2065. Worth noting here is that the CPRA is nowhere close to having funding secured for the enormous scope of the project; in fact, the majority of funds available come from BP's Deepwater Horizon settlements (\$8.7B).

The CPRA is also clear that the Master Plan is an iterative document and that changes to the strategy can and should be part of its evolution every five years. Though public engagement strategies for the plan are still developing, CPRA is forthright in seeking to better their process with each iteration.

Further Reading:

[CPRA's Fiscal Year 2019 Annual Plan²](#)

[Master Plan Data Viewer³](#)

Greater New Orleans Urban Water Plan: Vision⁴

Authors: Waggoner & Ball Architects

Published: November 2013

Tags: Urban, Living Infrastructure

Recommended: Skim the whole Vision Report (it's mostly images)

“A new approach to stormwater and groundwater management suggests an integrated living water system that provides measurably higher levels of safety, reduces the rates at which the land is sinking, and establishes the reputation of Greater New Orleans as a driver of innovation for climate-adaptive planning, design, and technology.”

Funded by the Greater New Orleans Foundation and developed by Waggoner & Ball Architects, the Urban Water Plan provides a comprehensive vision for a New Orleans that embraces water in the urban landscape. By supplementing the modern industrial paradigm of “pave, pipe, and pump” with an organicist approach to “slow and store” rainwater using green infrastructure, the plan proposes a strategy to reduce flood risk, minimize continued subsidence, and beautify the city’s public corridors. While this proposed grey-green hybrid system would greatly reduce flooding due to rainfall, it’s important to note that it would not prevent flooding in the event of levee failure; thus, its success relies upon the implementation of coastal strategies outlined in the CPRA Master Plan to comprehensively protect the city.

Further Reading:

Greater New Orleans Urban Water Plan: [Urban Design Report⁵](#)

Greater New Orleans Urban Water Plan: [Implementation Report⁶](#)

Resilient New Orleans⁷

Agency: City New Orleans

Published: August 25, 2015

Tags: Coastal, Urban, Economics, Living Infrastructure

Recommended: “Adapt to Thrive” (pp. 30-49),
skim “Connect to Opportunity” + “Transform City
Systems” (pp. 50-80)

“When we imagine the future New Orleans, we see a dynamic urban landscape that is aligned with its natural environment— we embrace living with water.”

The City of New Orleans’s resiliency plan, this document outlines strategies in three key categories of adaptation, equity, and city systems. Most salient to issues of water management is the first, which outlines the following five actions for hazard mitigation amidst a changing environment: (1) advancing coastal restoration, (2) investing in urban water infrastructure, (3) involving and incentivising homeowners to take risk reduction measures, (4) educating both children and adults about water ecology, and (5) mitigating the city’s environmental impact. Follow up sections addressing equity and city systems mutually reinforce the issues of adaptation at hand and are helpful to understand the city’s social vision and values as they intersect with more tactical issues of water management and flood risk reduction.

Further Reading:

[Climate Action for a Resilient New Orleans⁸](#) (2017)

City of New Orleans Master Plan, [Chapter 7⁹](#) and [Chapter 12¹⁰](#)

Comprehensive Zoning Ordinance [Article 23: Landscape, Stormwater Management, & Screening¹¹](#)

Connecting Our City and Coast¹²

Author: Asakura Robinson Company for The City of New Orleans

Published: April 2018

Tags: Urban, Coastal, Economics, Living Infrastructure

Recommended: Skim The Whole Report

“Just as decisions along the coast have shaped our past and present, we know that the future of New Orleans will be equally tied to the coast.”

A visioning document produced for the New Orleans Office of Resilience and Sustainability, this report compiles recommendations that arose out of the 2018 Coastal Convening, the purpose of which was to discuss “how the city of New Orleans can take an active role in making coastal Louisiana a more physically, economically, and socially resilient system.” The report catalogs the three major themes to work toward this goal: (1) “coordinate with regional partners and across city departments,” (2) “communicate the rationale for immediate and sustained action,” and (3) “promote equitable solutions that enable our city and region to thrive.” The report defines its goals broadly, but in many ways outlines concrete actions and priorities to make New Orleans a major player in regional coastal conversations to an extent that it previously had not been.

Further Reading:

National Institute of Building Sciences, [Natural Hazard Mitigation Saves: 2018 Interim Report](#)¹³

Mirabeau Water Garden Presentation¹⁴

Agency: City of New Orleans Office of Resilience and Sustainability
Published: August 5, 2017
Tags: Urban, Living Infrastructure
Recommended: The Whole Presentation

“The Mirabeau Water Garden is a public works project that will transform a 25-acre empty site into a recreational and educational amenity.”

Currently in the design phase, the Mirabeau Water Gardens are the flagship project of the Gentilly Resilience District, a \$140 million HUD investment and the first neighborhood in the city to be extensively retrofitted with green infrastructure in the vein of the *Urban Water Plan*. This public presentation (delivered in August 2017 at a charter school in Fillmore) highlights the issues with current drainage systems and delineates how this project represents a paradigm shift in the way New Orleans lives with water.

The presentation summarizes the purpose of the Resilience District, then moves into specifics of the Mirabeau project and explains the ecology and precedents for the project. Important to the presentation are both technical information and easily understood images and drawings. Also included are ideas for programming to get the Gentilly neighborhood involved in the stewardship of the project upon its completion.

Further Reading:

Gentilly Resilience District [Fact Sheet](#)¹⁵

Gentilly Resilience District [Creative Engagement and Communications Plan](#)¹⁶

PART 2: A LEGACY OF WATER

UNDERSTANDING THE CHANGING DELTA

Part Two seeks to acquaint the reader with the historical, geological, political, and anthropogenic processes that have brought about New Orleans' and Coastal Louisiana's current state of crisis. The articles in this section detail the mechanisms behind land loss on the coast and subsidence within the levees, and taken together, paint a clear picture of the existential threat of water to the region.

Losing Ground¹⁷

Authors: Bob Marshall of The Lens, Brian Jacobs and Al Shaw of Propublica

Published: August 28, 2014

Tags: Coastal, Politics, History, Disaster, Living Infrastructure, Grey Infrastructure

Recommended: Whole Article and Interactive Map

“In just 80 years, some 2,000 square miles of its coastal landscape have turned to open water, wiping places off maps, bringing the Gulf of Mexico to the back door of New Orleans and posing a lethal threat to an energy and shipping corridor vital to the nation’s economy.”

This interactive map outlines coastal land loss from 1922 to 2014 through an easily navigable set of satellite images as well as localized maps of key areas that have been heavily dredged or seen significant land loss. By pairing narrative journalism with interactive graphics, this portal makes it easy to visualize land change in the region as it relates to industrial processes of drilling, dredging, and the leveeing of the Mississippi. For individuals just getting acquainted with these transformations, this website is an excellent place to start.

Washing Away

Author: Mark Schleifstein, John McQuaid | NOLA.com | The Times Picayune

Published: 2002

Tags: Coastal, Urban, History, Disaster

Recommended: [Exposure's Cost](#)¹⁸, [Cost of Survival](#)¹⁹, [Shifting Tides](#)²⁰, [In Harm's Way](#)²¹

"If hurricanes haven't seriously scarred coastal Louisiana or swept it out to sea in the next 50 to 100 years, the very process of protecting the region may still end up altering it almost beyond recognition."

Through this Times-Picayune *Washing Away* series in 2002, environmental journalist Mark Schleifstein (who has a number of entries in this bibliography) explores the historical disasters, engineering breakthroughs, economic complications, and ecological processes that have shaped the landscape of Greater New Orleans today. Schleifstein provides an early (pre-Katrina) warning that New Orleans and Coastal Louisiana are at risk of a catastrophic disaster and that the odds of the region surviving a changing climate without immediate action are growing increasingly slim.

How Humans Sank New Orleans²²

Author: Richard Campanella

Published: February 6, 2018

Tags: Urban, History, Disaster, Grey Infrastructure

Recommended: Whole Article

“Engineering put the Crescent City below sea level. Now, its future is at risk.”

A history of the development of New Orleans’s pumping system and the unexpected subsidence that followed, this article clearly articulates how half of the city came to sit below sea level. These processes have had dire results for the Greater New Orleans area in the last century and have led to the last decade’s discussions about green infrastructure coming to supplement the pumping systems. Campanella’s storytelling gives a clear historical context and scientific basis for this cultural and geographical phenomenon.

The article includes great archival material and introduces a critique of engineered resilience as a way to explain current topographies in the city.

Further Reading:

[New Study Maps Rate of New Orleans Sinking²³](#), NASA

[New Orleans Area Sinking Assisted by Industry Groundwater Use²⁴](#), NOLA.com

Multiple Lines of Defense Strategy²⁵

Organization: Lake Pontchartrain Basin Foundation

Published: 2006

Tags: Urban, Coastal, Living Infrastructure, Grey Infrastructure

Recommended: Home Page, Lines of Defense (pp. 6-11)

“...Coastal Louisiana must be protected from hurricane surge by both man-made features... and by the natural coastal wetland buffer along the Louisiana coast. Levees alone will not work. Together, a healthy coastal estuary and appropriately designed levees system can sustain Louisiana’s ecology and economy of the coast. ”

The first organization to promote the “Multiple Lines of Defense” strategy around the time of Katrina, The Lake Pontchartrain Basin Foundation had throughout the 1990s been serving as environmental activists for rehabilitating the rapidly degrading ecosystems of Lake Pontchartrain. By the mid-2000s, however, LPBF had realized that the extent of regional environmental problems stretched beyond the Pontchartrain Basin itself, and published the Multiple Lines of Defense strategy shortly after Hurricanes Katrina and Rita. The strategy, which argues for a green-grey hybrid system of coastal and urban storm surge defense, has since been adopted as a conceptual framework Louisiana’s Coastal Master Plan as well as a majority of the organizations working to restore the coast.

Historic Lawsuit Seeks Billions in Damages from Oil, Gas, Pipeline Industries for Wetlands Losses²⁶

Author: Mark Schleifstein

Published: July 24, 2013

Tags: Coastal, Politics, History

Recommended: Whole Article

“The lawsuit filed in the New Orleans Civil District Court asks the court to order the companies to immediately begin filling in canals and restoring wetlands, and to provide money to the authority to compensate for past damage, tasks that could cost billions of dollars.”

Part of Mark Schleifstein’s continued environmental journalism in the region, this article details a lawsuit filed by the Flood Protection Authority (levee board) of the Mississippi’s East Bank against 97 oil, gas, and pipeline companies. The lawsuit claims that the companies had been operating under permits that “explicitly require the operators to maintain and restore the canals they dredged,” and insists therefore that the companies be ordered to take immediate action to restore the wetlands they helped erode. While as of the writing of this bibliography the companies have not yet been held accountable, the article provides clear insight into the ways in which industry has caused irreparable damage to Louisiana’s coast.

PART 3: DISASTER IN THE DELTA

HURRICANE KATRINA AND DEEPWATER HORIZON

Part Three contains three sources that detail the catastrophic effects of Hurricanes Katrina and Rita in 2005 and the BP Deepwater Horizon oil spill in 2010. In many ways, Katrina especially has served as a catalyst for change at least in the discourse of those involved in the water arena, bringing about the formation of the CPRA and the drafting of the first Coastal Master Plan in 2007 and helping spawn the Dutch Dialogues that led to the Greater New Orleans Urban Water Plan in the 2010s.

“Hurricane Katrina” in **Bienville’s Dilemma**²⁷

Author: Richard Campanella

Published: 2008

Tags: Urban, Diasaster, Grey Infrastructure

Recommended: Whole Chapter (pp 329-335)

“Many residents, evacuated and otherwise... learned a jolting new truth - one that, in fact, was as old as the city itself: the flood protection and drainage system had not neutralized topography and hydrology; New Orleans’ ancient geographies of risk, supposedly subjugated by technology a century ago, came rushing back to life. The various hydrological sub-basins comprising the New Orleans bowl were filling up.”

For those unfamiliar with the levee failures during Katrina, Campanella offers a concisely detailed overview of the disaster as it unfolded day by day. Situated in *Bienville’s Dilemma*, his excellent human-geographical history of the city, Campanella’s account of the storm reads as the climax to the city’s long and complex ecological history. Beginning his account the weekend before the catastrophe, Campanella weaves daily Times-Picayune headlines into his characteristically compelling narrative style to give a gripping account of the flood and its aftermath. Detailed descriptions of each levee failure, as well as the governmental failures to respond in the days following, are all chronicled herein.

Further Reading:

“Restoring the Landscape” (pp 337-357)

Degradation and Resilience in Louisiana Salt Marshes After The BP–Deepwater Horizon Oil Spill²⁸

Author: Brian R Silliman, et. al.

Published: June 25, 2012

Tags: Coastal, Disaster, Living Infrastructure

Recommended: Skim the whole article, read “Biomorphological Feedback”

“The edges of healthy marshes are typically characterized by more gently sloping banks and therefore tend to be more resistant to erosion than subsiding, deltaic-plain marshes in Louisiana that are often characterized by erosive cliff edges. This study highlights the enhanced vulnerability of these already degraded marshes to heavy oil coverage...and provides a clear example of how multiple human-induced stressors can interact to hasten the loss of a critical marine ecosystem....”

A study conducted in the year following the BP Deepwater Horizon spill, this article details the link between the oil spill and its consequence on the continued coastal land loss. It provides conclusive evidence that salt marsh edges, once stripped of cordgrass by oil poisoning, eroded at rates more than double that of healthy marsh edges. In other words, because of the lack of a subterranean “plant architecture” of cordgrass roots, wave action stripped the marsh edges before they were able to regrow, resulting in permanent land loss despite the cordgrass being relatively quick to regrow following the oil spill.

Further Reading:

[Industry Keeps Marching Through State’s Wetlands²⁹](#), NOLA.com

Last Chance: Louisiana's Disappearing Coast³⁰

Author: NOLA.com team

Published: 2007

Tags: Coastal, Politics, History, Disaster, Living Infrastructure, Grey Infrastructure

Recommended: Whole Series

"As early as the 1970s, researchers had documented the scope of the state's coastal land loss. They knew the causes: a combination of levee construction, which prevented rivers from rebuilding deltas, and the thousands of canals dredged across the fragile wetlands, primarily at the behest of oil, gas and shipping."

A 2007 Time-Picayune series examining coastal erosion in narrative and graphic forms, this series looks at the state of the coast, examines efforts to address coastal land loss, and discusses what a worst case scenario would mean for Louisiana and the country. Looking both backwards and forwards in history, the series takes an urgent tone in order to convey the immensity of change needed to stall the acceleration of land loss, as well as introducing many of the major players in the coastal arena.

While some of the graphics are lost links, the articles offer some great explanations of the complex ideas surrounding these issues. Article 1 ("The Fight to Save a Disappearing Coast") gives an overview of the many issues at play. Article 2 ("Losing Ground: Barely Making a Dent") details the mechanisms behind coastal erosion through the lenses of both ecology and politics. Article 3 ("Industry Keeps Marching Through State's Wetlands") discusses the catastrophic effect that oil and gas industries have had on the Gulf Coast, and Article 4 ("Laying the Groundwork") gives some hope by looking to the Atchafalaya wetlands as a productive precedent for sediment diversion.

PART 4: LOOKING TO THE FUTURE

CAUTIOUS OPTIMISM AND DEEP-ROOTED DIVISIONS

Part Four includes sources from the last half decade that enhance and at times complicate the vision of coastal Louisiana's path forward. More so than in previous sections, the content here showcases the social complexities of the diverse stakeholders in the region and dispels any simplistic top-down thinking of a single layered solution, as some of the plans in Part One can be guilty of doing. This section highlights the need for a radically democratized approach to solving the coastal crisis; without equity for all people, engineering alone cannot bring justice to the Mississippi Delta.

Fortified But Still in Peril, New Orleans Braces for Its Future³¹

Author: John Schwartz and Mark Schleifstein

Published: February 24th, 2018

Tags: Urban, History, Disaster, Grey Infrastructure

Recommended: Whole article

“New Orleans today is a fortress city, equipped with the best environmental protection it has ever had — probably the strongest, in fact, that any American city has ever had. Yet even the system’s creators have conceded that it may not be strong enough.”

As one of three entries in “The Drowning Coast,” a 3-part series by The Times-Picayune and The New York Times’ shared Louisiana coastal reporting initiative, this article summarizes New Orleans’ status as a fortress city following completion of its updated risk reduction system.

The feature is set in the Lower 9th Ward, which is used to explain the multiple infrastructure systems at play -- including levee wall stabilization, US Army Corps of Engineers’ new Lake Borgne Surge Barrier, and the city’s increasingly insufficient pumping stations. The article ties in the compounding hazard of future wetland erosion, sea level rise, and urban subsidence to the cost required to maintain engineered defenses. These hazards and defenses, calculated to the 100-year storm standard, federal insurance flood zones and safety standards inequitably apply to New Orleans-like cities facing imminent flooding.

Left to Louisiana's Tides, A Village Fights for Time³²

Author: Kevin Sack and John Schwartz

Published: February 24th, 2018

Tags: Coastal, Politics, Living Infrastructure, Grey Infrastructure

Recommended: Skim the whole article

“Jean Lafitte may be just a pinprick on the map, but it is also a harbinger of an uncertain future. As climate change contributes to rising sea levels, threatening to submerge land from Miami to Bangladesh, the question for Lafitte, as for many coastal areas across the globe, is less whether it will succumb than when.”

A longform article with accompanying photo and video documentation of the disappearing coastal region of Jean Lafitte discusses the threat saltwater intrusion, subsidence, sea-level rise and coastal erosion. Narratively, it chronicles the difficulty Lafitte has had in securing funding for a levee system, noting how Lafitte mayor Tim Kerner has invested heavily into civic and community infrastructure in order to bolster the city's economic value in the State's cost-benefit analysis, which does not weigh in Lafitte's favor (\$1 billion to protect fewer than 7,000 people.) The embedded video outlines the projected coastal land loss if nothing is done over the next 50 years and shows an image of the proposed ring levee for Jean Lafitte.

Further Reading:

[Louisiana Loses Its Boot³³](#)

[Our Drowning Coast: A conversation with Mark Schleifstein³⁴](#)
(Video)

[Insects Feast on Louisiana Wetlands, Inviting the Gulf In³⁵](#)

Managing Water in New Orleans³⁶

Author: Dana Brown & Associates

Published: 2016

Tags: Urban, Living Infrastructure, Grey Infrastructure

Recommended: The whole 6-minute video

“On the surface, localized flooding can damage property and render streets useless, trapping people in their homes and stranding people in their cars, but underneath the surface, something far more destructive is happening...”

This professionally produced educational video, written and directed by Dana Brown & Associates and published by Nathan Lott of the New Orleans Water Collaborative, discusses the importance of green infrastructure to reduce street flooding in New Orleans. Through maps, sectional diagrams, and dynamic infographics, the video explains underground pumping systems, above ground planted infrastructure and the city’s past and current ecological conditions. It highlights the importance of green infrastructure as means to ‘slow, store, and infiltrate’ rainwater in order to stabilize the water table and mitigate subsidence.

Contesting the Coast: Ecosystems as Infrastructure in the Mississippi River Delta³⁷

Author: Joshua A. Lewis, Henrik Ernstson

Published: 2017

Tags: Coastal, Politics, History, Economics, Disaster, Living Infrastructure, Grey Infrastructure

Recommended: Whole article if time permits, pp 19-27 if not

“The diversion of river water into [St. Bernard] Parish’s wetlands is ostensibly intended to rectify this ‘coastalcrisis,’ not reproduce an historical environmental injustice. Yet, over a century of contentious politics and human suffering has yielded intense suspicion that any large-scale transformation of the ecosystems in New Orleans’ periphery typically benefits elite economic actors in New Orleans... while offloading environmental hazards and ecological uncertainty to peripheral communities with less political and economic power.”

An excellent scholarly deep-dive into the political complexities of infrastructural implementation, this article details the history of St Bernard Parish’s conflicted relationship to water projects implemented by the powers of New Orleans. By tracing the history of the parish through the 1927 flood, the dredging of the industrial canal, and the dredging of the Mississippi River Gulf Outlet (MR-GO), the article gives validity to St Bernard’s tendency to resist large scale infrastructure implemented by the powers of Orleans Parish. Through this lens, the article validates St Bernard’s opposition to proposed sediment diversions, complicating the often simplistic picture of coastal restoration means and ends. This is dense but essential reading for anyone working to advance coastal restoration beyond theory to implementation.

Further Reading:

[Plaquemines Leaders Warn About Effects of River Diversions](#)³⁸

The Costal Index³⁹

Author: Allison Plyer | The Data Center

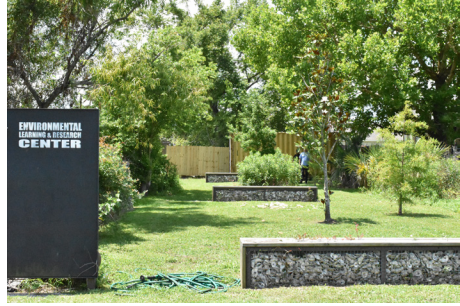
Published: 2017

Tags: Economics

Recommended: Skim Whole Report (if interested in economic and business aspects of water management)

“Leaders project that billions of dollars will be spent on the coast over 50 years. Such a massive investment of funds has the potential not only to help stabilize Louisiana’s coast, but also to form a vibrant new economic cluster – driving prosperity and sustainability for the region well beyond this initial investment.”

A New Orleans data analysis nonprofit, The Data Center is a regional leader in independent analysis for the regional business community. Principally focused on economics, this report investigates the emergent cluster of regional expertise in the water sector and advocates for its continued growth. By detailing the social, economic, and political drivers of water management industry growth, the report describes both the strengths of the region and its relative competitive weaknesses. Ultimately, The Coastal Index suggests that sustained investment in the Louisiana water sector would produce a competitive and exportable cluster of water expertise in the age of climate change.





APPENDIX

REGULATION:

FEMA NFIP: National Flood Insurance Program
Office of Community Development
NORPC: N.O. Regional Planning Commission
City Planning Commission
Hazard Mitigation Office

IMPLEMENTATION:

SWB: Sewerage and Water Board
DPW: Department of Public Works
NORD: New Orleans Recreational Development Commission
NORA: New Orleans Redevelopment Authority
Growing Green
Dana Brown, Waggoner & Ball
Urban Conservancy Front Yard Initiative

GREYSCAPE PROTECTION:

USACE: US Army Corps of Engineers

LEVEES:

FPA-W: Southeast LA Flood Protection Authority-West
FPA-E: Flood Protection Authority-East
Levees.org
*pre-Katrina, each parish had its own levee board

CITY DRAINAGE:

SWB: Sewerage and Water Board
DPW: Department of Public Works

GREENSCAPE & BLUESCAPE ADVOCACY:

Friends of the Lafitte Greenway
Green Light New Orleans
NOLA Tree Project
SOUL: Sustaining Our Urban Landscape
TPL: Trust for Public Land

WATER EDUCATION:

Ripple Effect
Groundwork NOLA
ISeeChange
New Harmony High School

VISIONING FOR URBAN WATERSCAPING:

Greater N.O. Urban Water Plan (2013)
Waggoner and Ball Architects
Dana Brown and Associates
Dutch Dialogues

Water Collaborative of Greater N.O.
LA Urban Stormwater Coalition
Water Works
Water Wise NOLA

URBAN WATER MANAGEMENT

EMERGENCY MANAGEMENT:

FEMA
GOHSEP: Governor's Office of Homeland Security and Emergency Preparedness
NOHSEP: N.O. Office of Homeland Security and Emergency Preparedness

EVACUATION:

DOT: Department of Transportation
NOLA Ready
Evacuateer

CRISIS MANAGEMENT:

NWS: National Weather Service
LA National Guard

RECOVERY:

FEMA
OCD-DRU: Disaster Recovery Unit
NORA: N.O. Redevelopment Authority

RESILIENCE

Resilient New Orleans (2015)
Climate Action for A Resilient
Mayor's Office of Resilience
100 Resilient Cities
Common Ground Relief

CITIZEN ENGAGEMENT

CSED: Lower 9th Ward Community
Engagement and Development
Global Green
Water Wise NOLA

FUNDING

FEMA HMGP: Hazard Mitigation Grant
HUD: Housing and Urban Development
CDBG-NDR: HUD's Community Development Block Grant - National Disaster Resilience Competition
SELA: USACE's Southeast Louisiana Control Project
GOMESA: Gulf of Mexico Energy Security Act
RESTORE Act: Resources and Ecosystems of the Gulf of Mexico
Foundation For LA
GNOF: Greater New Orleans Foundation
Greater New Orleans, Inc.
BP's Deepwater Horizon Settlement

WATER RESEARCH

USGS-WARC: Wetland and Aquatic Research
Louisiana Sea Grant
The Water Institute of the Gulf
The Water Campus (Baton Rouge)
PIES: UNO's Pontchartrain Inshore Ecosystem
Sciences
TERS: Gulf Estuarine Research

SOCIAL-ENVIRONMENTAL RESEARCH

Lowlander Center
Tulane Bywater Institute
Tulane Small Center
LSU Coastal Sustainability
UNO-CHART: Center for Urban
Response, and Technology

URBAN WATER MANAGEMENT

ARENA OF ACTION

PLANNING:

(5)

nt New Orleans (2017)

e and Sustainability

SAGEMENT:

enter for Sustainable

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ING:

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development

nity Development Block

Resilience Competition

ouisiana Urban Flood

nergy Security Act (2006)

and Ecosystems

ortunities, and Revived

ast States Act (2012)

s Foundation

ttlements

RESEARCH:

Aquatic Research Center

ulf

Rougue)

nstitute for Environmental

rch Society

RONMENTAL

ARCH:

y Studio

-Hazard Assessment,

y

VISIONING FOR COASTAL RESTORATION:

LA Coastal Master Plan (2017, '12, '07)

CPRA: Coastal Protection and Restoration Authority

Gulf Coast Ecosystem Restoration Council

GRN: Gulf Restoration Network

LPBF: Lake Pontchartrain Basin Foundation*

Restore the Mississippi River Delta:

LPBF

CRCL

Audubon LA

Environmental Defense Fund

National Wildlife Federation

CRCL: Coalition to Restore Coastal LA

Restore or Retreat

America's WETLAND Foundation

*LPBF does not endorse the LA Coastal Master Plan

anti-petro

OK with petro

COASTAL RESTORATION

INDUSTRIES:

Navigation Industry

Fishing, Shrimping, Oystering

Save Louisiana Coalition*

Tourism & Hospitality

*SLC says "dredge don't divert" to protect fisheries; Plaquemines, St Bernard Parishes echo this thinking

PETROCHEMICAL:

Grow Louisiana Coalition

Oil & Gas Drilling (deep gulf waters)

Oil Refineries (coastal communities)

Chemical Plants (cancer belt)

COLOR-SCALE KEY

- Federal Government
- State Government
- Local Government
- Community Groups
- NGOs
- Institutions
- Private Companies

Bold type indicates players with the most power

REGULATION:

EPA: Environmental Protection Agency

CWPPRA: Coastal Wetlands Planning, Protection, and Restoration Act (1990)

NOAA: National Oceanic & Atmospheric Administration

DOI: Department of The Interior

DEQ: Department of Environmental Quality

DNR: Department of Natural Resources

WLF: Department of Wildlife and Fisheries

IMPLEMENTATION:

USACE: Army Corps of Engineers

NFWF: National Fish and Wildlife Foundation

GCERC: Gulf Coast Ecosystem Restoration Council

CPRA: Coastal Protection and Restoration Authority

COMMUNITY ADAPTATION:

LA-SAFE: LA's Strategic Adaptations for Future Environments

DOCUMENTATION:

Lake Catherine Community

ISeeChange

Coastal Reporting Team (New York Times & Times Picayune)

ENVIRONMENTAL ADVACY:

United Houma Nation

LEAN: LA Environmental Action Network

LA Bucket Brigade

Another Gulf Is Possible

WATER EDUCATION:

SLWD: South Louisiana Wetlands Discovery Center

UNO Coastal Education and Research Facility

LUMCON: The Louisiana Universities Marine Consortium

REFERENCES

- 1 *Louisiana's Comprehensive Master Plan for a Sustainable Coast*. State of Louisiana: Coastal Protection and Restoration Authority of Louisiana, Baton Rouge, LA (2017). http://coastal.la.gov/wp-content/uploads/2017/04/2017-Coastal-Master-Plan_Web-Single-Page_CFinal-with-Effective-Date-06092017.pdf
- 2 "Integrated Ecosystem Restoration & Hurricane Protection in Coastal Louisiana: Fiscal Year 2019 Annual Plan." Coastal Protection and Restoration Authority of Louisiana, Baton Rouge, LA (2018). http://coastal.la.gov/wp-content/uploads/2017/04/AP_FY2019-Web.pdf
- 3 "Master Plan Data Viewer." Interactive online portal. Coastal Protection and Restoration Authority of Louisiana, Baton Rouge, LA (2017). <http://cims.coastal.louisiana.gov/master-plan/>
- 4 *Greater New Orleans Urban Water Plan: Vision*. Waggoner and Ball Architects, New Orleans, LA (2013). <https://www.dropbox.com/s/ov3t7r8i4vwx2sk/UWP%20Vision.pdf?dl=0>
- 5 *Greater New Orleans Urban Water Plan: Urban Design*. Waggoner and Ball Architects, New Orleans, LA (2013). https://www.dropbox.com/s/1vdd13nzdxdqdxv/GNO%20Urban%20Water%20Plan_Urban%20Design_23Oct2013.pdf
- 6 Maria Papacharalambous. *Greater New Orleans Urban Water Plan: Implementation*. Waggoner and Ball Architects, New Orleans, LA (2013). https://www.dropbox.com/s/u3938pl4vhd9ywi/GNO%20Urban%20Water%20Plan_Implementation_03Oct2013.pdf
- 7 *Resilient New Orleans*. City of New Orleans, LA: Office of Resilience and Sustainability (2015). http://resilientnola.org/wp-content/uploads/2015/08/Resilient_New_Orleans_Strategy.pdf
- 8 *Climate Action for a Resilient New Orleans*. City of New Orleans, LA: Office of Resilience and Sustainability (2017). <https://www.nola.gov/nola/media/Climate-Action/Climate-Action-for-a-Resilient-New-Orleans.pdf>
- 9 "Parks, Open/Green Spaces and Recreation." *City of New Orleans Master Plan*: Chapter 7. [https://www.nola.gov/nola/media/City-Planning/Master-Plan-Chapter-7-FINAL-ADOPTED\(vol-2\).pdf](https://www.nola.gov/nola/media/City-Planning/Master-Plan-Chapter-7-FINAL-ADOPTED(vol-2).pdf)
- 10 "Adapt to Thrive: Environmental Stewardship, Disaster Risk Reduction, and Climate Change." *City of New Orleans Master Plan*: Chapter 12. [https://www.nola.gov/nola/media/City-Planning/Master-Plan-Chapter-12-\(including-former-Ch-13\)-FINAL-ADOPTED.pdf](https://www.nola.gov/nola/media/City-Planning/Master-Plan-Chapter-12-(including-former-Ch-13)-FINAL-ADOPTED.pdf)
- 11 "Landscape, Stormwater Management, and Screening." *Comprehensive Zoning Ordinance*, Article 23: City of New Orleans, LA. <https://www.nola.gov/getattachment/fb8342eb-0370-437a-8ced-beef2072d36b/Article-23-Landscape-Stormwater-Management-Screening.pdf>
- 12 Asakura Robinson. *Connecting Our City and Coast*. Prepared for the City of New Orleans, LA (2018). <https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/a1/5c/dc0bd50c4fb8936add1ea8e07274/coastal-convening-report-final.pdf>

13 *Natural Hazard Mitigation Saves*. National Institute of Building Sciences, Washington, DC (2018). <https://www.nibs.org/page/mitigationsaves?&hhsearchterms=%22natural+and+hazard+and+mitigation+and+report+and+2018%22>

14 "Mirabeau Water Garden Project." Public presentation: City of New Orleans: Office of Resilience and Sustainability, and Waggoner and Ball Architects (2017). <https://www.nola.gov/resilience/resources/community-outreach/mirabeau-comm/>

15 "Gentilly Resilience District Fact Sheet." City of New Orleans: Office of Resilience and Sustainability (2018). <https://www.nola.gov/resilience/resources/fact-sheets/gentilly-fact-sheet/>

16 "Gentilly Resilience District Creative Engagement and Communications Plan." City of New Orleans: Office of Resilience and Sustainability (2017). <https://www.nola.gov/resilience/resources/community-outreach/gentilly-comm-strategy/>

17 Marshall, Bob, Brian Jacobs, and Al Shaw. "Losing Ground." The Lens and Propublica. 2014. <https://projects.propublica.org/louisiana/>

18 McQuaid, John and Mark Schleifstein. "Exposure's Cost." The Times Picayune, 2003. https://www.nola.com/environment/2003/06/exposures_cost.html

19 McQuaid, John and Mark Schleifstein. "Cost of Survival." The Times Picayune, 2002. https://www.nola.com/environment/2002/06/cost_of_survival.html

20 McQuaid, John and Mark Schleifstein. "Shifting Tides." The Times Picayune, 2002. https://www.nola.com/environment/2002/06/shifting_tides.html

21 McQuaid, John and Mark Schleifstein. "In Harm's Way." The Times Picayune, 2002. https://www.nola.com/environment/2002/06/in_harms_way.html

22 Campanella, Richard. "How Humans Sank New Orleans." The Atlantic, 2018. <https://www.theatlantic.com/technology/archive/2018/02/how-humans-sank-new-orleans/552323/>

23 "New Study Maps Rate of New Orleans Sinking." NASA, 2016. <https://www.jpl.nasa.gov/news/news.php?feature=6513>

24 Schleifstein, Mark. "New Orleans Area Sinking Assisted by Industry Groundwater Use." NOLA.com, 2016. https://www.nola.com/environment/2016/05/new_orleans_area_sinking_asis.html

25 *Multiple Lines of Defense Strategy*. Lake Pontchartrain Basin Foundation and Coalition to Restore Coastal Louisiana, 2006. <http://www.mlods.org/home.html>

26 Schleifstein, Mark. "Historic Lawsuit Seeks Billions in Damages from Oil, Gas, Pipeline Industries for Wetlands Losses." NOLA.com, 2013. https://www.nola.com/environment/2013/07/historic_east_bank levee_autho.html

27 Campanella, Richard. "Hurricane Katrina," in *Bienville's Dilemma: A Historical Geography of New Orleans*. Lafayette: Center for Louisiana Studies, University of Louisiana at Lafayette, 2008.

28 Silliman, Brian R., Johan Van De Koppel, Michael W. McCoy, Jessica Diller, Gabriel N. Kasozi, Kamala Earl, Peter N. Adams, and Andrew R. Zimmerman. "Degradation and Resilience in Louisiana Salt Marshes after the BP-Deepwater Horizon Oil Spill." *Proceedings Of The National Academy Of Sciences Of The United States Of America* 109, no. 28 (2012): 11234-1239. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3396483/>

29 Brown, Matthew. "Industry Keeps Marching Through State's Wetlands." NOLA.com, 2007. https://www.nola.com/environment/2007/03/industry_keeps_marching_throug.html

30 "Last Chance: Louisiana's Disappearing Coast." NOLA.com, 2007. https://www.nola.com/environment/page/louisiana_coastline.html

31 Schwartz, John and Mark Schleifstein. "Fortified But Still in Peril, New Orleans Braces for Its Future." New York Times, 2018. <https://www.nytimes.com/interactive/2018/02/24/us/new-orleans-flood-walls-hurricanes.html>

32 Sack, Kevin and John Schwartz. "Left to Louisiana's Tides, A Village Fights for Time." New York Times, 2018. <https://www.nytimes.com/interactive/2018/02/24/us/jean-lafitte-floodwaters.html>

33 Anderson, Brett. "Louisiana Loses Its Boot." Medium, 2014. <https://medium.com/matter/louisiana-loses-its-boot-b55b3bd52d1e>

34 "Our Drowning Coast: A conversation with Mark Schleifstein." NOLA.com, video, 2018. <https://www.youtube.com/watch?v=VM9mQlXxCsQ>

35 Baurick, Tristan. "Insects Fest on Louisiana Wetlands, Inviting the Gulf In." New York Times, 2018. <https://www.nytimes.com/interactive/2018/02/24/us/louisiana-wetlands-insects.html>

36 "Managing Water in New Orleans." Dana Brown & Associates, Inc, video, 2016. <https://vimeo.com/151548702>

37 Lewis, Joshua A., and Henrik Ernstson. "Contesting the Coast: Ecosystems as Infrastructure in the Mississippi River Delta." *Progress In Planning*, 2018. https://drive.google.com/file/d/1y6Xq2QqJ0MBp6kfOKSei7pF7_liv8DS/view

38 Roberts, Faimon A. III. "Plaquemines Leaders Warn About Effects of River Diversions on Fishing Industry." The New Orleans Advocate, 2018. https://www.theadvocate.com/new_orleans/news/environment/article_b4f3c592-5d3f-11e8-b286-0fb5aa7c854d.html

39 Plyer, Allison. *The Coastal Index: Tracking Development of the Water Management Cluster in Southeast Louisiana*. The Data Center, 2017. https://s3.amazonaws.com/gnocdc/reports/TheDataCenter_TheCoastalIndex2017.pdf