

# Losing Ground: Urban Sacrifice Zones in the Mississippi River Basin

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## INTRODUCTION

“We harnessed it, straightened it, regularized it, shackled it.”  
US Army Corps of Engineers on the Mississippi River

“Every shopping center, every drainage improvement, every square foot of new pavement in nearly half the United States (accelerates) runoff toward Louisiana.” John McPhee, *Control of Nature: Atchafalaya*

The redesign of the Mississippi River Basin is an architectural project. As a constructed surface, the vastness of the Basin must be analyzed, understood, and reconsidered through its assemblies and their repercussions. Material undoes the abstraction of vastness and is an antidote to the haziness of the mega-scale. Each individual design from wall detail, to ‘every square foot of new pavement’, accumulates to the mass of the Basin: 11,400 square miles of decisions and consequences. The upland Basin is folded, controlled, and directed to maintain navigation, tame flooding, and prolong human settlement. Inheriting the results of this prioritization is Coastal Louisiana, the drainage outlet for forty-percent of the continental United States and part of two Canadian Provinces. Manipulation of the Basin’s surface resulted in the disruption of the sediment cycles and subsequent destruction of the Louisiana Coast, which is disappearing at a rate of 16.57 square miles a year, equal to the loss of a football field of coast every hour. (USGS Report, 2011) (Figure 1)

The Louisiana Coast reflects the aggregate consequences of the anthropocene sooner and faster than anywhere in the United States. Consequently, the present conditions of the Louisiana Coast represent several scenarios for the future of the nation’s coasts and provide context for examining the tools, methods, and practices that will be required to cope with those consequences. A possible tool, the US Board of Geographic Names, measures the loss of urban conditions in the Mississippi River Basin. The town of Leeville, Louisiana is presented here

as a surrogate for towns throughout the Gulf South. Unprotected by the levee system and exposed to the impacts of a changing climate, coastal land loss, and increasingly violent storms, fewer than thirty permanent residents remain on a sliver of land between the expanding Bayou Lafourche and beneath the now elevated Highway LA-1. As a harbinger of coastal Louisiana, the town of Leeville is from the future. The town represents the urban and environmental conclusion of current industrial socio-economic organization, while presenting opportunities for preservation, restoration, and renewal strategies. Leeville reveals the architectural and urban scale of the Basin's material construction and exposes that the ecological restoration or sacrifice of the Louisiana Coast as architectural issues. This paper introduces the concept of 'urban sacrifice zones', identifies the US Board on Geographic Names as a metric for urban loss, and presents the material scale, a graduate architecture studio about Leeville, Louisiana as a case study.

#### **DEFINING: SACRIFICE ZONE**

"SACRIFICE ZONE WARNING. The National Parks Service has declared this area to be a National Sacrifice Zone. The Sacrifice Zone Program was developed to manage parcels of land whose cleanup cost exceeds their total future economic value."

—Neal Stephenson, *Snow Crash*

'Mississippi River industrial complex – a sinuous arrangement of petrochemical plants and working-class communities set amid the sugarcane fields on the alluvial floodplain.'

—Craig Colten, *An Incomplete Solution: Oil and Water in Louisiana*

The term sacrifice zone derives from the study of traditional agricultural practices where 'cultivators deliberately degraded one area to increase productivity in another area'. The term has been appropriated into political and economic discourse and used to describe areas degraded by modern industrial societies in the pursuit of economic gain. (Colten, 2012) Coastal Louisiana has become an environmental sacrifice zone for continued operation of the Mississippi River Basin as a shipping and petro-chemical infrastructure. Often disconnected actions that over time have had an undeniable and lasting cumulative impact upon the Basin and consequently the environmental conditions inherited by Coastal Louisiana. Also lost to this process are the architectural conditions of Coastal Louisiana, including cities such as New Orleans and Baton Rouge, and the small towns and rural areas so often ignored in discussions of urbanization: urban sacrifice zones. Decisions made across the vast Basin, a dam on the Colorado River or in a sidewalk in a St. Louis suburb, are intrinsically linked to the failure of and possible resuscitation of towns such as Leeville. The choice to shackle the Mississippi River made Louisiana the Basin's sacrifice zone. The coast's ongoing degradation and abandonment are the result of preferencing the productivity of the upriver economies, national energy security, and global shipping. At the scale of Louisiana, Leeville is a sacrifice zone to the continued operation of Port Fourchon, Highway 1, maintaining existing levee and shipping infrastructure. (Figure 2)

#### **NATURE AS INFRASTRUCTURE**

"Infrastructure implies artifice; nature typically signifies its absence. Nearly every environment has been modified through human labor. Work, then blurs the nature-technology boundary, suggesting that a neat division is illusory." —Ashley Carse, *Nature as Infrastructure*

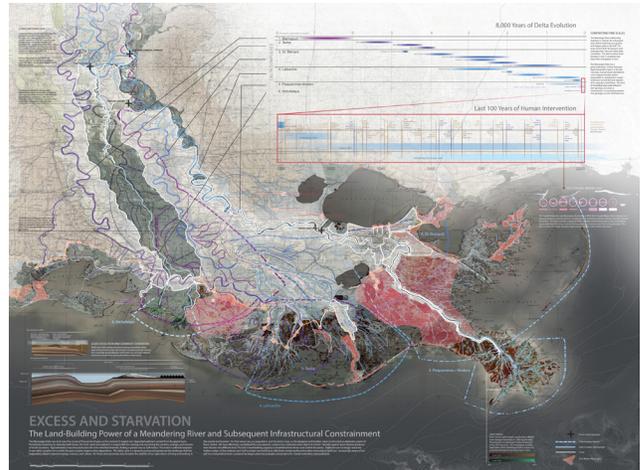
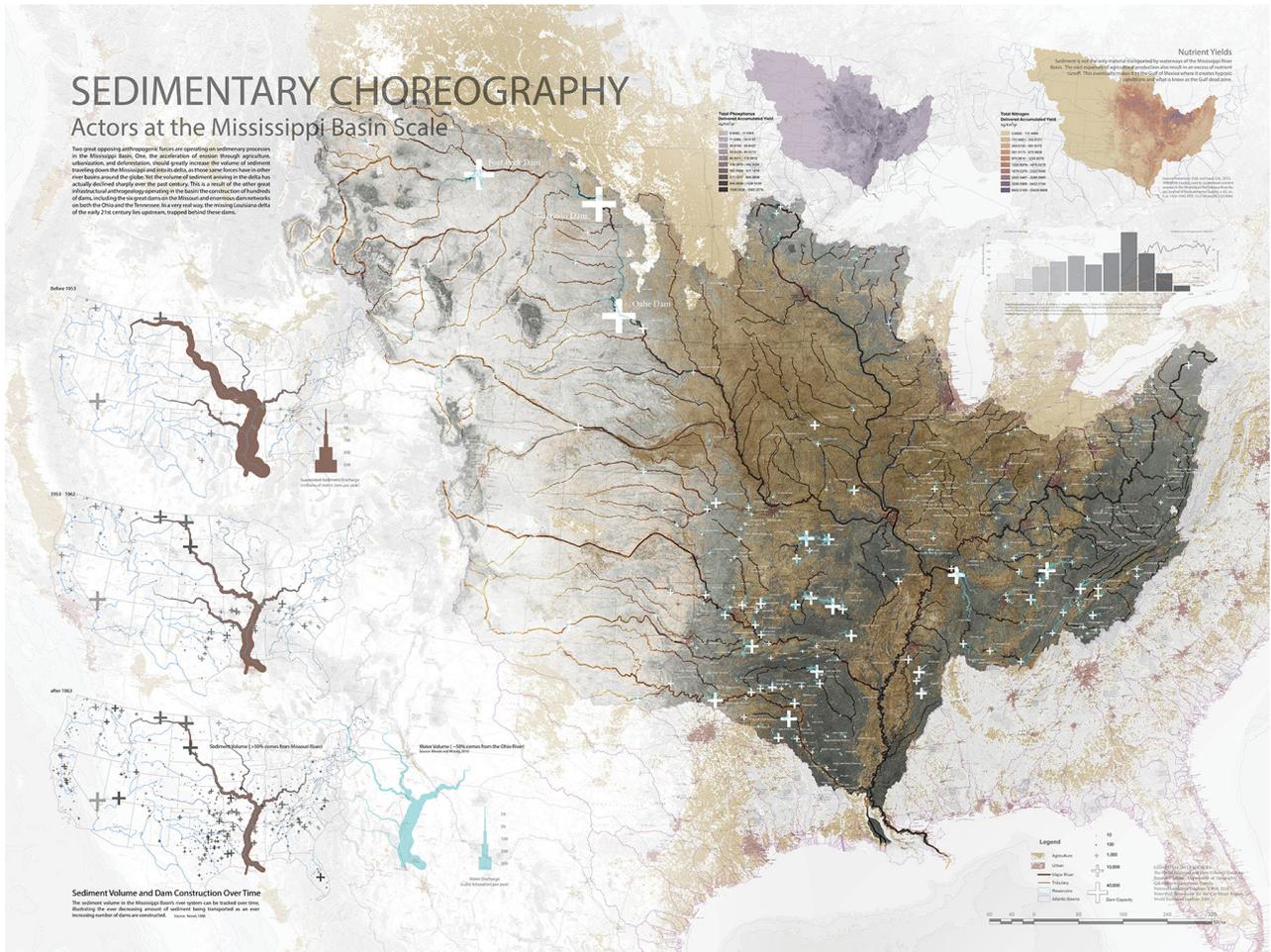


Figure 1: A - Mississippi River Basin Scale Map: Sediment distribution, nutrient yields, river locations, dam, levee and control structure locations. Map drawn by Matthew Seibert and author for the LSU CSS and Dredgefest, 2014. B - Interface between land and water: Wetlands in Leeville, Louisiana. Photo by author, 2014. C - Excess and Starvation: The Land Building Power of the Mississippi River, drawn by Matthew Seibert and author for the LSU CSS and Dredgefest, 2014.

The site for Leeville is the entire Mississippi River Basin. The town presents the inherent contradiction of whether a community has a right to exist – to rise, expand, and prosper – in the middle of now open water. This inundation is not due to the direct action of Leeville’s occupants but rather the accrued consequence of the settlement patterns of the entire Basin. The ‘natural’ infrastructure of Louisiana is defined by its 8,000 mile coastline, a land / water interface necessary for resource extraction ranging from commercial fishing to offshore oil drilling to shipping. Additionally, the Gulf Coast is home to largest tonnage port in the Western Hemisphere further underscoring the demand to maintain the shipping channels of the Mississippi River, even at the cost of coastal Louisiana’s settlement. Louisiana became infrastructure through work, inscribing human politics as values on the landscape, much as these values are embedded in arrangements of steel and concrete.

Leeville presents the consequences of infrastructural resource distribution as a method for controlling occupation of the receding wetlands. (Figures 2+3) Simultaneously Leeville serves as example of reverse engineering the vastness of the Basin through material intervention. By proposing localized design interventions architects can respond to the shortcomings of mega-scale decisions. Architecture becomes infrastructure through an acknowledgment of its network conditions and action upon these networks. Every plane, aperture, solid, and void in the entire Basin is part of a single architectural surface and cannot be considered isolated architectural objects. Beyond these formal considerations, the construction of the Basin, its material assembly, is a record of decisions and value assignments. It is here that architecture can operate as the arbitrator of material value by imagining, proposing, and constructing alternative material and spatial assemblies.

New infrastructures inevitably threaten to alter or eradicate existing way of life. Similarly, making architectural infrastructure has significant potential to produce ecological distribution conflicts around socially and spatially asymmetrical access. These conflicts often turn on material landforms and land cover – the infrastructure itself – but more fundamentally, they raise questions about which among a multitude of potential environmental services are to be emphasized and delivered and, crucially, whose societies and economies those services support.

#### **LEEVILLE: HISTORY**

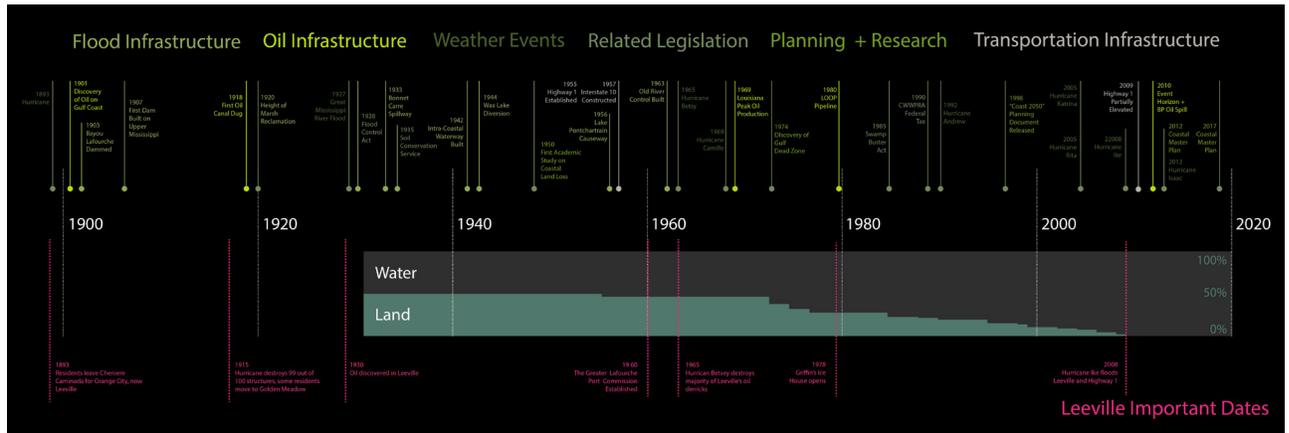
“It’s like putting makeup on a corpse.”

—Mark Schexnayder, LSU Sea Grant Program

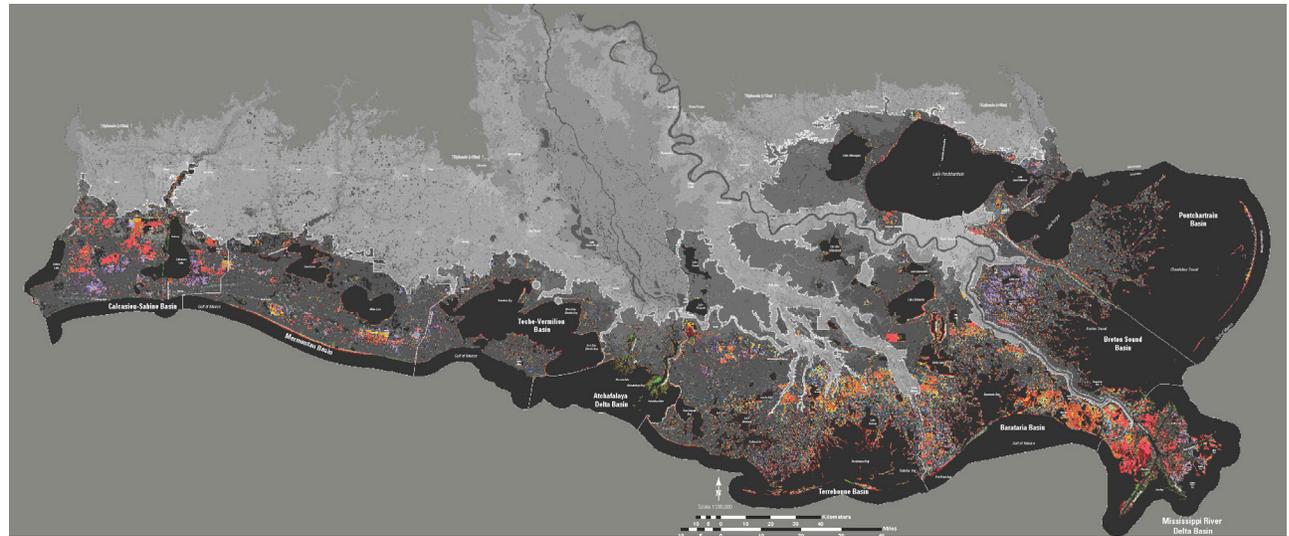
“To hear the old folks talk, as late as the 1930s the countryside along Bayou Lafourche from Golden Meadow to Leeville was something of a paradise. It was high, dry farmland blooming with cotton, rice and vegetables, and the air was filled with the sweet scent of citrus groves. There were villages on both sides of the narrow bayou. When residents weren’t working their productive fields, they were capturing bountiful seafood and fur harvests from the nearby marshes that stretched to the distant Gulf of Mexico.”

—Bob Marshall, Leeville, Losing Ground Website

In 1893 a hurricane destroyed the Gulf Coast town of Chenière Caminada and killed nearly 2,000 people, making it one of the deadliest hurricanes in United States history. Refugees from Chenière Caminada moved northward, away from the Gulf, and resettled in a place they named Leeville. The town was once



A



B



home to orange groves and cotton fields that have given way to wetlands and in turn these wetlands have given way to open water. The slow death of Leeville and its ground began shortly in 1903 when Bayou Lafourche was severed from the Mississippi River by a dam was built at Donaldsonville, halting the flow of water and sediment down the bayou and into the marshes around Leeville. This redirection protected major shipping lanes through the ports of Baton Rouge and New Orleans but halted the flood cycles and resulting sedimentation process that sustained Lafourche.

These localized infrastructural decisions were compounded by the Basin scale designs resulting from the Great Mississippi Flood of 1927, the most destructive river flood in the history of the United States with 27,000 square miles of the Mississippi River Basin inundated up to a depth of 30 feet. Under the Flood Control Act of 1928, Army Corps of Engineers was charged with construction the world's longest system of levees. Longer than the Great Wall of China, these levees 'harnessed, straightened, regularized, shackled' the River into a channel. The walls of the river are architectural and the river itself infrastructure, manipulated to serve the human settlement and economy of nearly forty-percent of the United States. In ninety years since, southern Lafourche Parish has become severed from its rivers and sliced up by canals for oil and gas, making it one of the most threatened landscapes on the planet. Research demonstrates that the wetlands surrounding Leeville are now sinking as fast as one inch every thirty months. (NOAA Report, 2013)

Leeville's location is its remaining asset. Situated at the intersection of Bayou Lafourche and to the Southwestern Louisiana Canal, the town continues to be a fuel and ice production post for the commercial and recreational fishing industries. Amenities such as the post office, bank, and school have relocated to Golden Meadow. Thirty permanent residents remain, others commute from Golden Meadow to work, and during the recreational fishing season the population grows to several hundred temporary residents. Leeville has lost nearly fifty-percent of its land cover since 1932, a consequence of the Basin's design disrupting sediment flows to Coastal Louisiana. The town was once a vibrant stopping point on Highway LA-1 running south from New Orleans through the wetland of Bayou Lafourche to Port Fourchon and the Gulf of Mexico beach town of Grand Isle. The recently elevated Highway LA-1 now bypasses Leeville. (Figure 2 + 3)

#### **PORT FOURCHON + HIGHWAY 1**

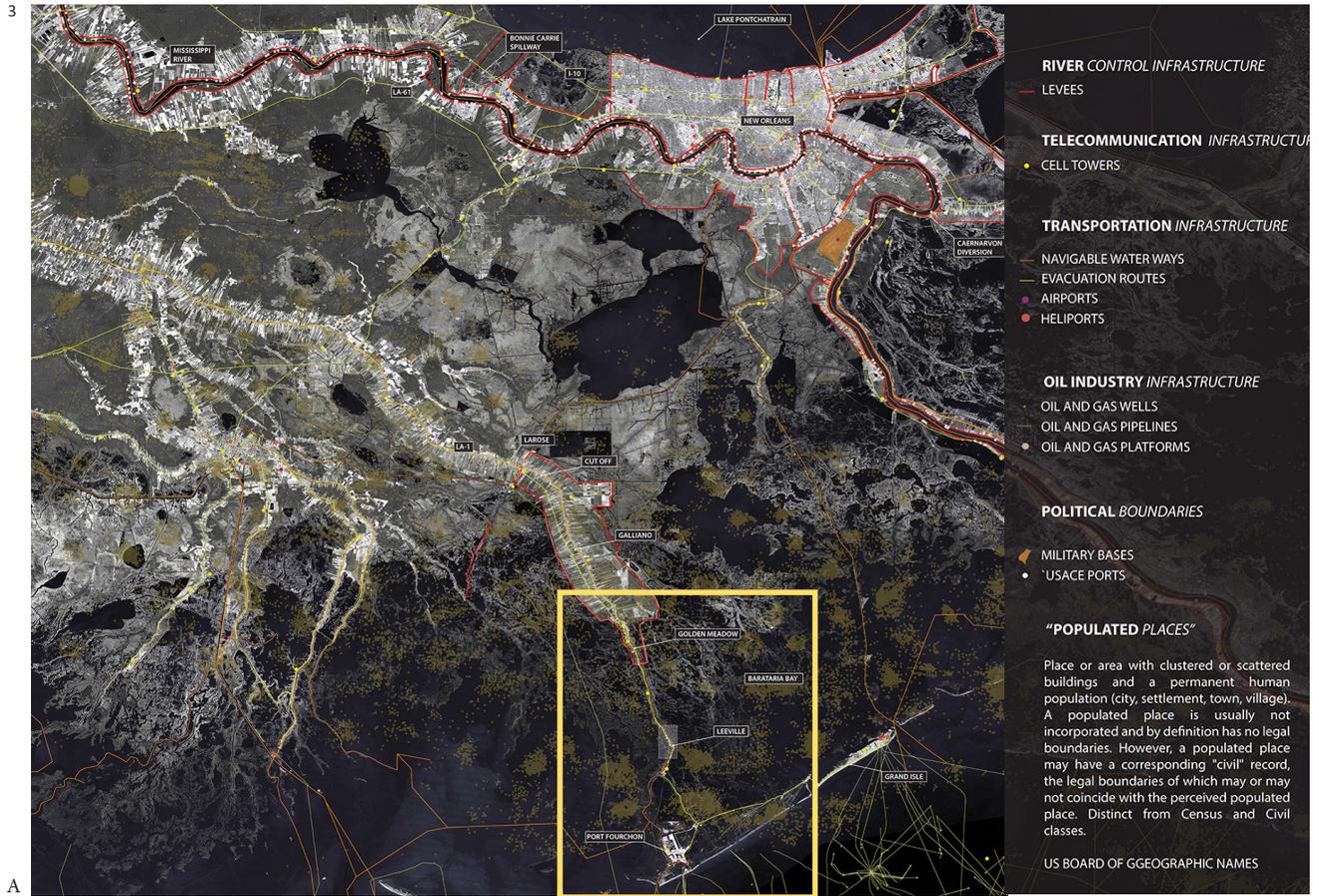
"...the national consequences of disruptions to LA 1, concludes that a 90-day closure of 7.1 miles along existing at-grade LA Highway 1 could result in up to an \$7.8 billion loss in American gross domestic product. A concurrent 90-day closure of Port Fourchon as a result of the loss of this highway access would significantly reduce domestic oil and gas supplies for ten years following the closure."

U.S. Department of Homeland Security Louisiana Highway 1/  
Port Fourchon Study 2009

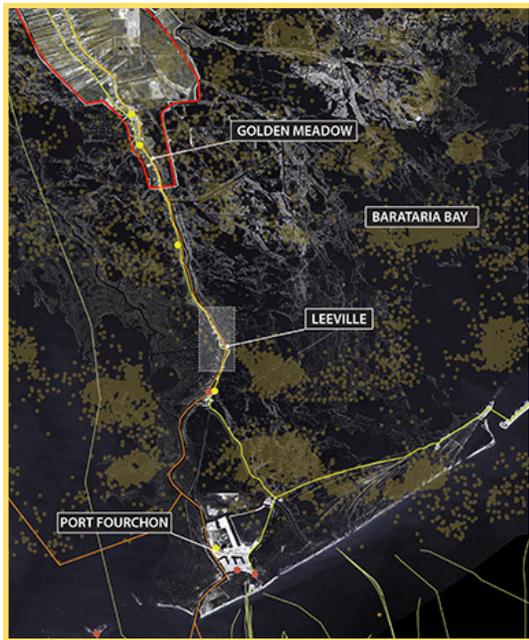
Southeastern Louisiana is critical to the economy of the nation. The region supplies much of the United States' domestic wild seafood, and contains half of the country's oil refineries, a matrix of pipelines that serve ninety-percent of the nation's offshore energy production and thirty-percent of its total oil and gas supply. Additionally the Port of South Louisiana serves thirty-one states, and is

Figure 2:(opposite) A - Timeline of the construction of the Louisiana River Basin and the correlating land loss in Leeville. B - A map excerpted from a USGS report on land loss rates in Louisiana. C - 1932 USGS Plate for Leeville. D - 1994 USGS Plate for Leeville. E - Photo of a print of Leeville hung in Griffin's Bait Shop. Artist unknown. F - Photo of a Leeville cemetery constructed on land, now sinking into the Bayou. Photos by author, 2014.

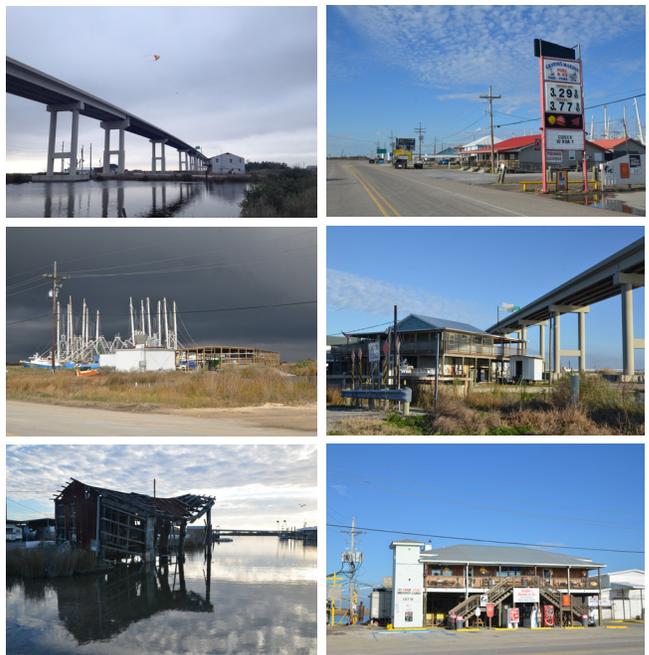
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A



B



C

Figure 3: A - Infrastructures of Southern Louisiana. Assembled by students for ARCH 7004 studio. B - Enlarged inset of area surrounding Leeville. C - Photos of Leeville, by author.

the largest tonnage port in the Western Hemisphere. Each of these resources is dependent upon the 8,000 miles of coastlines interfacing between land and water. As Louisiana loses ground to subsidence and climate change Leeville will become a precedent for all human settlement outside of storm protection infrastructures.

In 1930, oil was found in Leeville transitioning the economy from farming to oil. In 1960 Port Fourchon opened, now the largest oil port in the United States. The Elevated Highway now protects access to Port Fourchon. In 2008 during Hurricane Ike, floodwaters washed out highway LA-1, cutting off access to Leeville. In 2009, construction of an elevated highway began, raising Highway LA-1 above the disappearing wetlands to nearly one hundred feet where it is necessary to maintaining shipping channels. An industry that once brought fortune to Leeville now aids in its decline. Since 2009, Leeville has been economically bypassed by the oil industry while having still been impacted by the industrial canal's presence. Many residents have left the town, as there is no school, post office, bank, or official political boundary still associated with this place outside the levee.

#### **LOSING GROUND: STUDIO**

“The best stories take inside of storytelling so seamlessly, that when we emerge, the impossible is easier to imagine. This fiction creates a space in our minds to consider other perspectives and adopt new solutions.”

—Sheree Renée Thomas, *Imagination Will Help Find Solutions to Climate Change*, The New York Times

ARCH 7004 *Losing Ground: Methods for Leeville* is the fourth architecture studio in the six-studio sequence Master of Architecture Program at Louisiana State University. Each student imagined a possible future for Leeville, created a video narrative about that scenario, and proposed a method for designing in that future. This process of world building was introduced through Moira Crone's *The Not Yet*, set in the complex dystopian landscape of 22nd century New Orleans. Ms. Crone writes of the novel:

“The United States has shrunken, become the United Authority. States along the Gulf Coast and the Pacific Rim have been cut away – too many disasters, too hard to govern. The elite Heirs, who run the Authority for themselves, live hundreds of years on nearly foolproof life-extension programs. Their upkeep absorbs all the economy's resources. The poor eek out a narrow, illegal existence, working as slaves or performers, or hang on in restricted tribes called Enclaves.”

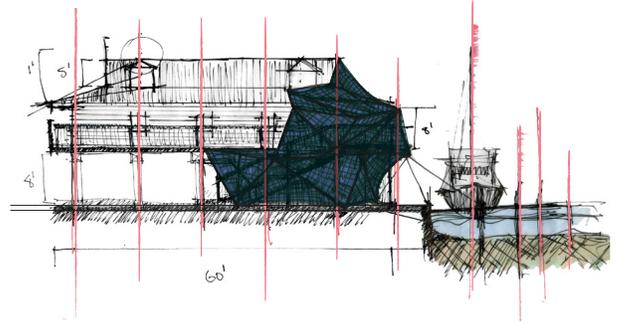
Rather than advocating for a traditional notion of 'saving,' the studio explored the concept of absence and questioned architectural methods for preserving, un-building, and designing possible futures for Leeville. The documentary film *Water Like Stone* set in Leeville provided a precedent for film narrative as a media for describing architecture and urban design.

Each student produced a method for Leeville, using drawing, photography, video, writing, and modeling. The methods and their resulting material were examined through multiple scales: basin, region, urban, architecture, and detail. The full-scale wall detail presented a material realization of the argued architectural, urban, and regional positions. These methods aim to reconsider the conceptual framework for the future of small towns often overlooked in discussions of

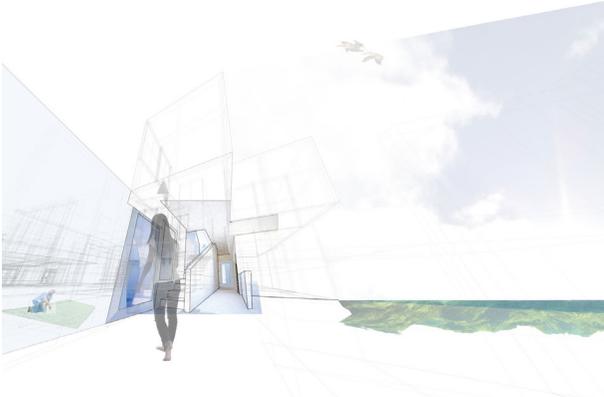
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A Katherine Bartkowiak, Protection



B Joshua Smith, Restitching



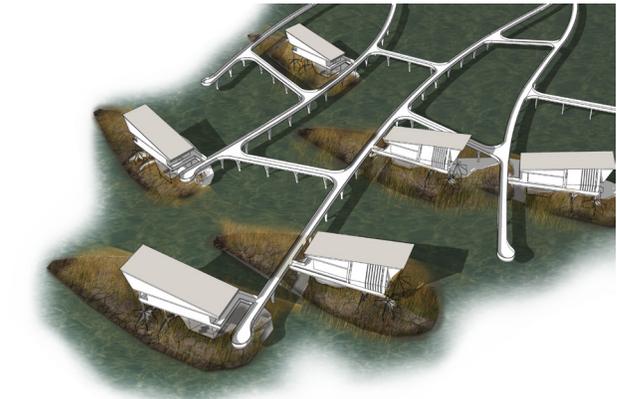
C JaLeesa Sims Smith, Collective Resilience



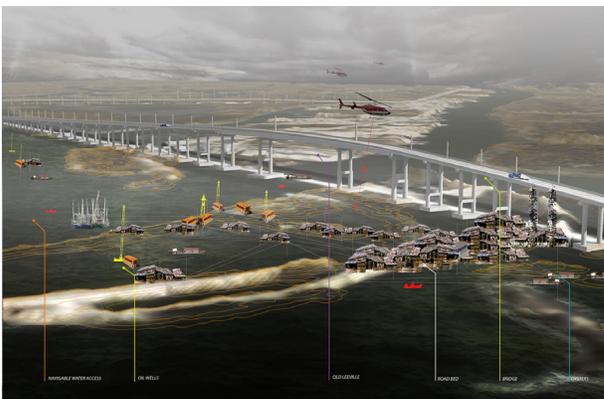
D Kevin Miller, Realism



E Landon Pugh, Symbiotic Defense



F James Canales, Adaptation



G Kelli Cunningham, Resistance



H Karl Schmidt, Radical Survivalism

urbanism. They are not intended to provide realistic or complete solutions but rather to use fictional narratives to make the 'impossible easier to imagine'. The methods for Leeville are as follows.

*Symbiotic Defense* (Landon Pugh) imagines a Leeville that inhabits LA-1 symbiotically protecting the highway from the climate events and re-purposing the town as a guardian of Port Fourchon's oil infrastructure.

*Collective Resilience* (JaLeesa Sims-Smith) imagines Leeville as an act of collective resilience, where residents develop architecture to continue the geographic location of the town regardless of the changing climate.

*Radical Survivalism* (Karl Schmidt) imagines Leeville as an infrastructural node that is attuned to natural functions and processes of its geography.

*Protection* (Katherine Bartkowiak) imagines Leeville as a protected outpost remaining outside of existing protection infrastructure even as land recedes.

*Restitching* (Joshua Smith) imagines Leeville as a seasonal fishing camp, re-stitched and rebuilt each year, changing and adapting to remaining structures.

*Adaptation* (Jimmy Canales) imagines a Leeville where architecture serves as the basis of a new infrastructure of land building, returning Leeville to its previous footprint.

*Realism* (Kevin Miller) imagines Leeville as a continuation of the existing flood protection infrastructure and re-purposes the town as a floodgate managing Bayou Lafourche.

*Resistance* (Kelli Cunningham) imagines Leeville as a series of contemporary three-dimensional arpent, capturing and redistributing the environmental and economic resources of the landscape.

This process of imagining a future in which to build culminated in an architecture that reconsiders the tectonic (constructed) occupation of the delta. Rather than discussing architecture as an object and site as a plane the studio argued that architecture is understood as the tectonic (material) bracketing of the deltaic system. Production was focused on model making, digital and analog, as a pedagogical approach for understanding the localized consequences of the entire Mississippi River Basin's assembly and fabrication. The process of Things Come Apart was introduced as design strategy for understanding how things are made, by taking them apart. This included the construction of Leeville, and the Highway 1 Bypass. Through this assembly analysis and understanding alternative narratives of assembly were proposed.

#### **USGS BOARD ON GEOGRAPHIC NAMES**

"...the courts have held that the coastline is ambulatory and will change by accretion and erosion. It is to Louisiana's... interests to have legislation passed by Congress establishing permanently the three-mile projections that have been fixed by courts decrees in these various cases, so that the line would not be ambulatory. This would not effect the relations between the United States and foreign governments; it would only be fixed for the purpose of the Submerged Lands Act."

June 22, 1981, the United States Supreme Court, in the case of United States v. Louisiana, No. 9.

Figure 4(opposite): Summary image and method name from ARCH 7004, Losing Ground: Methods for Leeville, the fourth graduate studio in the MArch sequence at Louisiana State University, Spring 2014.



The material choices of the Mississippi River Basin's fabrication have cost Louisiana its coast. Leeville is disappearing, the very ground on which it once stood is subsiding. Though the geographic location of the coastline was fixed through policy it was not fixed in its naming. Those places, human settlements, which were once on land, are now part of the Gulf of Mexico. At what point does it become unnamed? When does it cease to be a place or a name on the map? The USGS Board on Geographic Names determines when a geographic name is removed from the map. In this system, a geographic name requires a geographic entity. A geographic entity is any part of the landscape or seascape that has recognizable identity within a particular cultural context. A geographic name, then, may refer to any place, feature, or area on the earth's surface, or to a related group of similar places, features, or areas. The US Board on Geographic Names is a Federal body created in 1890 and established in its present form by Public Law in 1947 to maintain uniform geographic name usage throughout the Federal Government. The Board comprises representatives of Federal agencies concerned with geographic information, population, ecology, and management of public lands.

The original program of names standardization addressed the complex issues of geographic feature names during the surge of exploration, mining, and settlement of western territories after the American Civil War. Inconsistencies and contradictions among many names, spellings, and applications became a serious problem to surveyors, mapmakers, and scientists who required uniform, non-conflicting geographic nomenclature. Decisions of the Board are accepted as binding by all departments and agencies of the Federal Government. The names removed from the Louisiana State map are identified in Figure 5. These include those names that were removed from the USGS maps (land) and the NOAA maps (water). This map provides evidence of the un-naming of human settlements and the resulting urban sacrifice of the Louisiana Coast. If land loss continues at its current rate the ground of Leeville will be absorbed into the Gulf of Mexico by 2030 and its identity within the cultural context of Louisiana altered, and its name changed or removed to indicate this transformation.

## CONCLUSIONS

The destruction of the Louisiana Coast is an architectural issue. Construction of the Mississippi River Basin has created a vast surface, which drains its consequences upon the Louisiana Coast sacrificing ecological process, human settlement, and the very land, which is bounded and named Louisiana. The story of Leeville serves to represent this sacrifice at an architectural and material scale. The US Board on Geographic Names provides a metric to establish when an urban condition is altered and un-named: urban sacrifice zones to the continued operation of the Mississippi River Basin.

## ACKNOWLEDGEMENTS

The LSU Coastal Sustainability provided financial, planning, and institutional support for this course. Thank you to the directors of *Water Like Stone*, Michael Pasquier, Associate Professor of Religious Studies and Zack Godshall, Assistant Professor of English, for sharing their knowledge of Leeville. Thank you Janet Rhodus of the non-profit Launch Leeville for organizing a boat tour of Leeville and introducing the students to the joys of fishing. Thank you to LSU MArch/MLA Candidate Kelli Cunningham for compiling [methodsforleeville.wordpress.com](http://methodsforleeville.wordpress.com).

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