

12-17-2010

## The Petrochemical Industrial Complex of the St. Charles Parish Industrial Corridor and its Influence on Urbanization Patterns

Darin Acosta  
*University of New Orleans*

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The Petrochemical Industrial Complex and its Influence on Urbanization Patterns in the St.  
Charles Parish, Louisiana Industrial Corridor

A Thesis

Submitted to the Graduate Faculty of the  
University of New Orleans  
in partial fulfillment of the  
requirements for the degree of

Master of Science  
in  
Urban and Regional Planning  
Land Use/Environment

by  
Darin Acosta  
B.A. University of New Orleans, 2007

December, 2010

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## **ABSTRACT**

This thesis explores the impact that the petrochemical industry has had on the built environment of Norco, St. Charles Parish, Louisiana. Previous scholars have suggested that heavy industry in Norco consumes a majority of the Mississippi River's natural levee, which is the most elevated and flood resistant land in the town. In order to test these observations, the author of this thesis has collected parcel-level land use data in Norco to determine the flood hazard and topographical characteristics of these various land uses. Spatial calculations, run using Geographic Information System software, have determined that heavy industrial land uses in Norco consume a vast majority of the Mississippi River's natural levee.

**KEY WORDS:** PETROCEMICAL INDUSTRY, NORCO, ST. CHARLES PARISH, LOUISIANA, LAND USE, FLOOD HAZARDS

## INTRODUCTION

### *THE PETROCHEMICAL INDUSTRY IN AN URBAN CONTEXT*

#### *A Quasi-Urban Environment*

Few sources reveal the sheer enormity of Southeast Louisiana's oil industry as well as the online geographic database of the Louisiana Oil Spill Coordinator's Office (LOSCO). The website maintains datasets of petroleum and gas infrastructure for the entire state. These data include primary infrastructure such as pipelines, extraction sites, injection wells, and abandoned barges and rigs, as well as public assets heavily utilized by the petroleum industry, such as heliports, highways, and shipping facilities. When I began my research on Louisiana's "petrochemical industrial complex" (Hemmerling 2007), I included all available datasets of primary oil and gas infrastructure in a single Geographic Information System. I added to it Louisiana's Toxic Release Inventory (TRI) data, available through the Environmental Protection Agency, which documents all polluting facilities in the state.<sup>1</sup>

The composite was a mess, scarcely comprehensible. The entire Southeastern portion of the Louisiana boot was coated in oil-related infrastructure. Those utilities that were hidden from me in my everyday landscape, running through the subterranean conduits of coastal marshlands, or deep in the rolling salt domes where chemical waste is injected, lit my screen like so many nighttime lights. I was reminded of the public utilities that I use daily as an urban resident—sewerage and water, electricity, Ethernet cables, wireless networks, etc.—which are also hidden, placed behind walls, below ground, or dispersed through the air.

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<sup>1</sup> LOSCO's entire dataset is available at <http://lagic.lsu.edu/loscoweb/>. The EPA's TRI data can be downloaded from <http://www.epa.gov/tri/>.

It was as if, staring at that map, I was looking at a second system of cities hiding within the Baton Rouge-New Orleans metroplex; one whose boroughs are connected by heavy rail, helicopter flyways, and mineral pipelines; whose domain expands from the marshy backwaters of derelict rigs and storage tank farms to the luminous industrial skylines along the Mississippi River. Beverly Wright, founding director of Dillard University's Deep South Center for Environmental Justice, calls this quasi-urban landscape "industrial sprawl," suggesting a parallel between the industry's physical development and the haphazard growth of postwar suburbia (Wright 2005).

But the petrochemical complex, though equally as expansive as most public infrastructures, is still entirely private, and the exact functions of its components are carefully disguised. The oil pipelines that dissect the state<sup>2</sup> reemerge beyond the fences of heavily guarded refining facilities.<sup>3</sup> Injection pits lie dormant below the aquifers of the Gulf Plains, untouched and undiscussed, like sixty-five thousand forgotten time capsules.<sup>4</sup> The complex is, perhaps more than any urban infrastructure, what many sociologists call a "black box"—it is so hidden from our daily lives as to almost seem nonexistent.<sup>5</sup> The transnational nature of the industry only heightens this opaqueness and secrecy. In the absence of local planning

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<sup>2</sup> The Pipeline and Hazardous Materials Safety Administration, administered by the U.S. Department of Transportation, maintains a nationwide Geographic Information System (GIS) that documents oil pipelines carrying hazardous liquids: <https://www.npms.phmsa.dot.gov/>. Due to alleged security concerns, the data can only be viewed by parish, making it difficult to visualize the full breadth of this pipeline network. The data available through LOSCO documents only a fraction of the pipelines in the network.

<sup>3</sup> In his chapter on petrochemical facility hazards, Perrow (1984) discusses the difficulty he met in attempting to tour petrochemical sites. Willie Fontenot's experience while serving as community liaison officer for the Louisiana Attorney General's office is also germane to this issue. While escorting a group of college students on a tour of various petrochemical facilities in the region, private security guards and off-duty police detained the entire group for taking pictures of a chemical plant. The students were photographing the facility from public property. When the officers asked Fontenot to collect the driver's licenses of all the students, he refused. The sheriff's office of East Baton Rouge Parish lodged a formal complaint against Fontenot with the Attorney General's office for this lack of compliance. Despite having been within his constitutional rights, Fontenot was asked to either "resign or be terminated" due to the incident (St. Clair 2005).

<sup>4</sup> 65,536 by LOSCO's 2007 count (Louisiana Department of Natural Resources 2007).

<sup>5</sup> See Graham (2010) for a comprehensive review of black box literature.



interventions, corporate planning in the headquarters of Houston, London, Dubai and other petroleum command posts determines the future of Louisiana's peri-urban environments.

Of course, the complex is not equally opaque to everyone. To industrial workers, it is highly visible, as it is to civilian groups who are negatively impacted by its externalities. Residents, researchers, and activists have effectively told this story, calling global attention to how these black boxed infrastructures reveal themselves in the lives of vulnerable populations. What the available literature has discussed less, however, is the physical landscape itself, and the planning process that has produced it. The present research helps to fill this void by highlighting a hidden trend in urbanization that the petrochemical complex has influenced.

### *Research Purpose and Design*

The primary research question of this thesis is: how has the petrochemical industry affected urban growth and development in Southeast Louisiana? I chose the town of Norco, in the heavily industrialized Southeast Louisiana parish of St. Charles, as a case study to apply this research question. I selected this locality because both the town and its surrounding areas host many petrochemical facilities. The town is also heavily urbanized—its footprint is completely developed. It provides an interesting microcosm for exploring the interactions between petrochemical infrastructures and the built environment.

Before settling on Norco as a case study, I began my research by first conducting field surveys of the entire parish: walking its streets, following the Mississippi River along the its industrialized corridor, exploring its wetlands by boat, conducting informal interviews, taking photographs, and ensuring my general understanding of the area. I then began to review every

article of literature that I could find relating to St. Charles Parish and the broader region. A noticeable trend emerged from this exploratory research: it appeared that petrochemical interests had acquired a significant amount of the most developable real estate within the parish. Much of the land immediately along the Mississippi River, which was the best drained, most compact, most flood resistant, and least susceptible to hurricane-force storm surges, belonged to various heavy industrial enterprises, particularly petroleum and gas-related facilities. Conversely, owing to the over-saturation of development within these prime lands, more recent residential and commercial developments have gravitated to lower-lying, more flood-prone areas. This phenomenon soon became the focus of my Norco case study.

I constructed this case study to determine whether this process of industrial levee monopolization, which I have termed simply “levee monopolization,” has occurred in Norco. In order to determine this, my case study answers the following specific questions:

1. What is the land use composition of Norco?
2. What are the flood hazard characteristics of this community?
3. How much of the total land within Norco is owned by industrial concerns?
4. What are the flood hazard characteristics of the land that is owned by these concerns?
5. What are the flood hazard characteristics of non-industrial land within Norco?
6. Do industrial land uses consume more of the best-drained real estate in Norco than other land uses?

In order to answer these questions, I created an extensive database that includes parcel-by-parcel land use data of these communities; an inventory of the parish’s petrochemical facilities; residential and commercial properties purchased by industrial concerns; geomorphic features

of the parish; and digital flood elevation data produced by the Federal Emergency Management Agency. The details of this database are discussed in the Methodology section.

## *Results*

The results of the case study illustrate very clearly that industrial land uses within Norco's border—specifically, the Shell Chemical facility and the Shell Motiva oil refinery—consume an overwhelming amount of the town's most elevated land. Heavy industry consumes 558.589 acres—approximately 73%—of the town's most flood-resistant land, which is the “500-year flood plane” that runs directly along the Mississippi River and is roughly contiguous with its natural levee (FEMA B 2008, dataset).

Beginning in the 1970s, and gaining speed in the late 1990s, Shell acquired large residential areas of Norco through a negotiated buyout process with the property owners. The last buyout transaction occurred in 2008. The land acquired through this process totals 57.2 acres. Of this land, approximately 48 acres are located within the 500-year floodplain. This raised Shell's holdings of the 500-year flood plain by 6.3%, bringing it to its current level of 73%.

The petrochemical industry has affected the built environment of Norco by accumulating a large share of the town's most elevated land, forcing urban growth to occur in lower lying areas. Petrochemical concerns have also removed part of the town's urban fabric from the high ground natural levee of the Mississippi River, thus affecting an overall increase in the community's flood hazard vulnerability. While this case study can only attest to the fact that the petrochemical industry has had this influence in Norco, scholarly research conducted

for the purpose of this thesis's literature review suggests that the industry has had a similar influence on urbanized areas elsewhere in Southeast Louisiana.

## **LITERATURE AT THE INTERSECTION OF PETROCHEMICAL INDUSTRIALIZATION AND URBAN DEVELOPMENT**

This thesis explores the impact of Louisiana's "petrochemical industrial complex" on the built environment of Norco, Louisiana. I have adopted the phrase "petrochemical industrial complex," or simply "the Complex," from Hemmerling (2007). This term refers specifically to the *physical* elements of the oil and gas industry. For an operational definition, I have referred to, with limited alterations, the Louis Berger Group's (2004) identification of oil and gas related infrastructure. The categories of infrastructure included in my operational definition are: petrochemical facilities, refineries, oil and natural gas storage facilities, natural gas processing facilities, pipelines, pipe coating yards, waste management facilities, transportation facilities, ship yards and ship building yards, and offshore oil platform fabrication yards.

While it is beyond the scope of this thesis to identify the specific actors that have participated in the Complex, the literature reviewed below is intended to situate outcomes in Norco within a broader socio-political context. The first section explores the physical features of Southeast Louisiana's petrochemical industry, followed by a discussion of the planning decisions that facilitated the present pattern of industrial development. In the second section, I explain the relevant growth theories that allow for potential interpretations of Louisiana's industrial growth process and I analyze which of these theories best describes the outcomes in Norco. In the concluding section, I discuss the implications of my findings to local planning practice.

## *THE PHYSICAL DEVELOPMENT OF THE COMPLEX & HOW IT INTERACTS WITH URBAN AREAS*

The physical impact of Louisiana's petrochemical industrial complex on urbanization patterns receives less attention than the social, health, and environmental impacts typically covered by environmental justice and planning scholars. However, the body of work that investigates this topic is the most relevant to my research, and I therefore draw much of my theoretical foundation from a handful of key sources.

### *Locational Factors of the Complex*

Shanafelt's (1977) sprawling dissertation on the Southeast Louisiana Petrochemical Industrial Complex, which he terms the "Baton Rouge-New Orleans Petrochemical Industrial Region," provides t5bvaluable insights into the physical behavior of the Complex. In his work, he explores the logic of its growth and development, starting with the most basic factor: mineral access. The Gulf of Mexico (GOM) is rich in oil and gas deposits. The region's geographic location at the mouth of the Mississippi River and along the Gulf of Mexico is an additional strategic factor. This allows easy shipment of minerals to both foreign and inner-continental markets. Six railroad systems also connect the New Orleans region to the rest of North America. A pro-growth attitude on the part of elected leadership at both state and local levels of government further incentivize oil and gas development.

### *Locational Factors within the Complex: the Lower Complex and the Corridor*

Within the Complex, locational decisions are based on the nature of the oil and gas-related services. Hemmerling (2007) distinguishes "pre-extractive" and "extractive" oil and gas

related services from “post-extractive” services. These two service categories largely occupy two separate subregions of the Southeast Louisiana Complex.

The first subregion includes the coastal parishes of Terrebonne, Lafourche, lower Jefferson, and Plaquemines. It hosts a majority of onshore and near-shore oil extraction sites in the region, along with support industries for Outer Continental Shelf (OCS) oil extraction and exploration. These support industries involve shipbuilding and fabrication, pipe coating, and oilrig construction and maintenance (Hemmerling 2007). The subregion’s landscape is fiercely horizontal, proffering little natural shade save for oaks that grow along the occasional “cheniers,” or elevated ridges. It consists largely of “emergent” wetlands, denoting low, herbaceous plant cover with dense root networks that hold most of the plain’s loose alluvial soil in place (USGS 2006). For its geographical concentration in these lowland coastal marshes, as well as its position relative to the second subregion, I will refer to this subregion as the “Lower Complex.”

Davis and Place (1983) summarize some of the impacts that the oil extraction industry has had on this subregion. As wildcatters discovered increasing numbers of oil deposits in the Louisiana coastal area during the early to middle twentieth century, canal dredging emerged as a lucrative and popular trade. A canal was dredged for each newly discovered extraction site, quickly creating the artificial canal network that is now ubiquitous in coastal Louisiana. These canals invite saline water from the Gulf of Mexico into the brackish wetlands along the coast. The salt-intolerant coastal vegetation withers as a result, and the vegetative root systems can no longer hold the delta’s loose silt in place. Davis and Place call this canal-induced land loss the “canal builder’s effect.”

Davis and Place also discuss the impacts that the industry has had on urbanization in the subregion. As technology evolved to allow extraction further offshore, canal dredging continued in order to lay pipelines and allow maritime navigation. During this phase of development, population growth in the lower parishes exploded, and settlement patterns shifted from isolated fishing, shrimping, and trapping villages dispersed throughout the marsh to high-density strip settlements along the elevated natural levees of the region's major bayous. Fisherfolk and trappers proved a valuable asset to the emerging petroleum industry, lending their shipbuilding and navigation skills to the extraction effort.

The second subregion runs in a linear fashion along both banks of the Mississippi River from Baton Rouge to the GOM, with a majority of its industrial services located between Baton Rouge and New Orleans. Petrochemical refining, manufacturing, and storage facilities are concentrated in multiple nodes along the river, lending it the appearance of "a twisted string of beads, with each bead being a cluster of industrial plants" (Shanafelt 1977, p 15). Industry representatives often refer to this stretch as the "Chemical Corridor," while politicians and boosters tend to use the phrase "Industrial Corridor." During an extended labor lockout in the mid 1980s, union workers in Geismar, Louisiana popularized the name "Cancer Alley" (Allen 2003, p 26; Markowitz and Rosner 2002). I will address it simply as "the Corridor."

The Mississippi River is the primary magnet for attracting post-extractive industries to the Corridor. The river serves as a shipping channel, waste sink, and coolant facility; and the natural river levees provide well-drained land and compact soil for high-intensity developments, reducing construction costs significantly (Shanafelt 1977). Large tracts of plantation land were also amply available along the river during the Complex's early stages of



growth. This allowed petrochemical companies to purchase property from single owners rather than gradually assembling smaller individual lots (Markowitz and Rosner 2002).

### *Industrial levee monopolization and urban displacement*

Focusing on St. Charles Parish, which sits at the heart of the Corridor, Rigamer (1971) explores some of the unanticipated consequences of the Corridor's geographic proclivity toward industrial development. In 1954, the Monsanto Chemical Company developed a petrochemical facility on a vast tract of land that sits upon the Mississippi River's natural levee in Luling, Louisiana. This development spurred rapid population growth, but because Monsanto consumed the last remaining parcel of high ground in Luling, the city was forced to accommodate this influx by developing residential subdivisions in flood prone areas. As Rigamer notes, the most significant aspect of this pattern is the fact that "industrial concerns are rapidly buying the best land in the parish. As they continue to expand their operations, they enjoy more control of parish development" (Rigamer 1971, p 38).

Rigamer characterizes the industrial morphology of the St. Charles Parish river corridor as "strip industrialization" (p 32). Industries are distributed linearly along the corridor, rather than consolidated into a single district. This creates an extremely discontinuous urban landscape in which neighboring towns along the river are entirely disconnected by vast tracts of industrial development.

Burby (2000) recounts the physical development of the Baton Rouge industrial complex throughout the 20th century. He describes a similar process to that of Rigamer (1971), whereby post-war suburban sprawl collided with the vast Exxon petrochemical refinery on the banks of

the Mississippi River, displacing sprawling subdivisions into the flood-prone backswamps of East Baton Rouge parish.

Included in Appendix A is a historical analysis that I have conducted on real estate speculation in the LaBranche Wetlands of St. Charles Parish that seems to corroborate Rigamer and Burby's notion that heavy industrial development along prime high grounds displaces urban growth into more vulnerable areas. In the 1970s, as demand rose for residential development associated with ongoing industrial growth, private real estate developers began to purchase tracts of land deep in the LaBranche wetlands—an extremely low-lying cypress swamp habitat. However, these developments were never realized. Many investors in the area believed that the Army Corps of Engineers planned to extend the East Jefferson Hurricane Protection levee through St. Charles Parish (Charpentier 2007).

Wetland preservation policies forced the Army Corps to reroute the St. Charles Parish portion of the levee, which now runs roughly parallel to Airline highway and less than a quarter of a mile to its north (CEMVN 2008). The speculative developments, as planned, would have fallen outside of the protection of this levee and been ineligible for federally subsidized flood insurance. As such, the developments never came to fruition. The parcels for these unrealized developments are immortalized in a dataset produced by the St. Charles Parish GIS department (St. Charles Parish n.d.), and are illustrated in Appendix A. Though these developments never occurred, these plans were drafted only after all remaining high-ground real estate was consumed in the area—largely by heavy industry. Additional qualitative research is required in order to establish a direct causal relationship between industrial development on the St. Charles Parish east bank and this real estate speculation, but as mentioned before, the data

collected and research conducted seems to support Burby and Rigamer's notions of industry displacing urban growth.

### *Urban-industrial interactions through the lens of environmental justice*

Environmental justice scholars were among the first to critically analyze the petrochemical industry as an urban spatial phenomenon, observing that heavy industrial facilities often locate near low-income neighborhoods of color, creating an unjust "economic geography" of industrialization (Wildgen 1998, p 1). Robert Bullard, Beverly Wright, and other early scholars in the field often cited the Mississippi River industrial corridor as the frontline in the struggle for environmental justice in the United States. Bullard's classic, *Dumping in Dixie: Race, Class, and Environmental Quality*, is an excellent primer on environmental justice theory and the origins of environmental injustices in southern communities of color.

Roberts and Toffolon-Weiss (2001) bridge the connection between the levee monopolization process observed by Rigamer (1971) and Burby (2000) and environmental Justice communities along the Corridor. Following the Civil War, many freed slaves along the Mississippi River continued to labor at plantation sites, eventually earning enough money to buy small parcels of land on the edges of their slave masters' estates. These former-slave villages were almost always concentrated on the high levee ground of the river. When the lower Mississippi became a site for rapid industrial development at the opening of the twentieth century, developers purchased plantation tracts and turned them over to industrial development. Thus, the nearby freed slave communities slowly became the unwitting neighbors of heavy industry.

Many of these “fence line” communities fought for their industrial neighbors to buy out their properties. Those communities that have succeeded in this struggle have left behind vacant company-owned subdivisions that Roberts and Toffolon-Weiss (2001) term “extowns” (p 44). Rigamer (1977, p32) describes the downward spiral in quality of life that catalyzes this process:

*As industrial operations expand, they become more obtrusive and force residents to leave the community. As they do, the industry buys the property, and it remains vacant. The vacant homes add to the deterioration of the area and accelerate the exodus of the remaining residents. As they leave, the cycle is repeated. The industrial concern quickly gains control of the area, and the entire community is displaced.*

Thus, the petrochemical industry is monopolizing prime high-ground real estate by purchasing vast tracts of land outright, as well as by driving homeowners to quit their properties due to industrial disamenities.

#### *HAZARDS*

“Hazards,” Hemmerling (2007) explains, “arise from the interaction between social, technological, and natural systems.” “Risk” is a rather technical term within hazard literature which quantifies the likelihood of a hazard event occurring. Southeast Louisiana finds itself enmeshed in a “mosaic of risks” (Hemmerling 2007). It is nested within various natural and technological hazardous risks, many of which the growth of the Complex has helped to create or greatly exacerbate.

As Rigamer (1977) and Burby (2000) examine, the Complex within the petrochemical corridor of Southeast Louisiana drives a physical process that I have termed “levee monopolization” in this subregion, which displaces residential development into vulnerable backswamps. In many of the areas bordering Lake Pontchartrain, these backswamps have been severely dissected with navigation channels for cypress logging, interstate building, and oil extraction, allowing the saline tides of the lake to wash in and eat away at the interior freshwater wetlands (Cambre 2007). These wetlands serve as a natural buffer from hurricane storm surges. However, as human activities compromise the integrity of these ecosystems, the US Army Corps of Engineers must construct increasingly sophisticated drainage infrastructure to protect inhabited areas from disaster (CEMVN 2008). Such infrastructure becomes a hazard itself, as its increasing complexity also escalates the likelihood of cascading infrastructural failures caused by major hazard events (Graham 2010; Freudenburg, et al. 2009).

### *PLANNING*

In order to understand the impacts that the complex has on urbanized areas of Southeast Louisiana, it is helpful to understand the role of planning in this process. Both local and state-level planning agencies are responsible for controlling and mitigating the deleterious effects of industrialization. However, based upon the planning literature reviewed below, it appears that planners at both levels of government have often failed at this process, and even placed corporate industrial interests ahead of its own citizenry. Because of this, many Louisianians are confronted with the landscapes such as those described by Burby (2000) and Rigamer (1971): disjointed urban webs dominated by heavy industry.

### *Local Planning*

Mendy's (1998) account of one community's struggle against the Formosa Plastics Corporation in the Corridor parish of St. John investigates the planning environment of the area. In the late 1980s, Formosa Plastics announced plans to construct a polyvinyl chloride (PVC) plant at the former Whitney Plantation in the low-income and predominately African American community of Wallace. The local political establishment zealously promoted the development, disregarding the concerns of near-by residents. Parish president Lester Millet met privately with St. John Planning and Zoning Commission president Keith Gillies, who served at his appointment, and instructed him to change the parcel's zoning status to industrial. The planning commission consented to this request without conducting any study to determine the impact that the plant would have on human health or the environment. Furthermore, St. John's zoning regulations are tailored to industrial uses, requiring no setbacks when abutting residential or commercial areas. Facilities are "allowed to expand and construct to the adjoining property lines of nearby districts that are zoned residential" (Mendy 1998, p23).

The environmental group Save Our Wetlands filed a lawsuit against the parish, alleging that the rezoning decision failed to account for potential impacts to nearby residents. While the presiding judge ultimately determined that the parish "did not act arbitrarily and capriciously" in making its zoning decision, the lawsuit still proved an effective delay tactic until Wallace residents could mobilize their defenses. Residents formed the River Area Planning Group (RAP) and began to network with other environmental organizations. Before the group was able to file a lawsuit, however, Formosa abandoned plans to develop the Whitney Plantation site, fearing that the impending judicial process would prove too exhaustive.

Barbara Allen's *Uneasy Alchemy* (2003) focuses on the role of experts and outside environmental organizations in Louisiana's Environmental Justice movement, but her analysis extends far beyond these actors to include a wide range of people, institutions, and agencies involved in the making of the petrochemical industrial complex and its counter-currents. Though infrequent, there are insights into local planning issues throughout the book. During her discussion of industrial tax exemptions, which are covered at great length in Chapter Three, she alludes to the tension that exists between state and local agencies. She observes that "education and other public infrastructural systems in [the Petrochemical Corridor] are directly affected by the ten-year industrial tax exemption in that these exemptions are local property taxes that would otherwise go into parish coffers. The tax exemption is granted by the state government in Baton Rouge, thus circumventing parish government and local input" (p 77).

The National Academy of Public Administration (NAPA) explores the connection between environmental justice and land use planning in the corridor parish of St. James (NAPA 2003). The Academy found that the parish lacks a comprehensive land use plan, is without zoning ordinances, and that land use controls in general only have modest support from elected leaders. The government of St. James, NAPA claims, does not even identify environmental justice as a problem or a priority. Elected leadership prioritizes accommodating industry and growth, and unless a facility purposefully locates next to a minority community, government leaders consider industrial siting decisions to be innocuous.

In 2001, the Louisiana Urban and Technical Assistance Center surveyed the planning departments of eleven parishes along the Mississippi River industrial corridor, interviewing key planners and staff. Their findings echo those of NAPA. The Center discovered an anti-regulatory

and ambivalent culture within key planning institutions along the corridor. Their survey found that

*...while planning officials [in most parishes surveyed] carried an official title in the planning arena, responses would indicate that the planning function was not a significant part of the individual's duties. When the official made referrals to others in the local government structure to obtain more detailed data, it was often not forthcoming...Basic questions on existing plans required explanation and often elicited confusing answers. Some answers given to questions, such as "Do you have a home rule charter?" were later found to be incorrect.*

The Center also notes that

*...numerous municipal planning officials appeared to be actively supporting local manufacturing industry by highlighting the various community related activities in which they were involved. The survey had not requested that anyone select a position on local industry; however, questioning on air and water quality and the other categories appeared to naturally move respondents to a defensive posture.*

### *State-level Planning*

In addition to local planning, concerns over state-level planning of industrial development are a common theme throughout planning and environmental justice literature. According to NAPA (2003), state level planning agencies, particularly the Louisiana Department



of Environmental Quality (LDEQ), provides little guidance to the parish on environmental issues. The LDEQ “lack[s] vision, strategy, and tools that could help local governments in Louisiana understand the health and environmental implications of their siting decisions” (p///).

Allen (2003) recounts the highly publicized “Shintech dispute” that occurred between proponents and detractors of a Japanese-based petrochemical company seeking to locate their polyvinyl chloride (PVC) plant in the corridor parish of St. James (pp 82-115). From the onset, then-governor Mike Foster and other state officials offered the company over one hundred million dollars in property tax credits and wrote letters of encouragement and support to woo the company. The St. James parish planning commission’s president voluntarily assembled a “personality profile” of commission members in order to illustrate their relaxed attitude toward industry (p. 85). The LDEQ approved the facility’s decision to locate next door to the community of Convent without soliciting any input from nearby residents. As soon as they caught wind of this, Convent residents organized themselves against this siting decision and requested the help of the Tulane Environmental Law Clinic (TELC).

Rather than fielding the concerns of this citizen organization, Mike Foster and the Department of Environmental Quality sought to discredit and defang TELC. The Louisiana Environmental Action Network compiled a list of public statements made by state officials against TELC during the time of the Shintech Dispute (LEAN, n.d.). Here is but one instance of Foster’s many vitriolic tirades against the clinic:

*During a broadcast on Louisiana Public Broadcasting regarding the Shintech controversy, Governor Foster described the Clinic using the terms “vigilantes,”*

***“bunch of yahoos” and “big fat professors drawing the big salaries” and accused the Clinic of being a “law unto themselves.” The Governor also stated that “their [the Clinic’s] job is to make sure we turn Louisiana back into a swamp and don’t have any more jobs around here” and that the Clinic “would like to see the whole state trees.” (LEAN, n.d., p1)***

Janice Dickerson, head of the Community Industry Relations Group within the Department of Environmental Quality, conspired with Shintech to assemble a pro-industry minority organization in Convent to combat and discredit the anti-Shintech contingent. After cultivating this organization, the Community Industry Relations Group continued to nurture it, while offering no assistance of any sort to industry detractors. In the meantime, Foster continued with his campaign against TELC, threatening many times to rescind state funding to Tulane should they not reign in the clinic’s activities.

Shintech ultimately decided to locate a smaller facility elsewhere in the parish, nullifying the Convent dispute, but state-level intimidation of TELC, as well as the DEQ’s pro-industry bias, are ongoing.

### ***SYMPTOMS OF GROWTH***

While the geography of Southeast Louisiana may produce unique spatial patterns of urban-industrial development, the conditions for such growth are typical of capitalistic expansion and development elsewhere in the United States and abroad. At both the state and local level, government agencies within Louisiana work to accommodate corporate citizens in order to increase tax revenues. This behavior is typical of the “growth machine” phenomenon

observed by Logan and Molotch (1987). Owing to the nature of the capitalist political economy, municipalities, regions, and states constitute individual competitive actors all toiling for economic survival or striving to maintain their economic primacy. Public institutions, politicians, universities, and other facets of public culture have a vested interest in attracting economic growth in order to boost enrollment, fill coffers, gain more contracts, etc. Thus, these parties form “Growth Coalitions” that strive to perpetuate growth in their areas (Logan and Molotch 1987, p 62).

Because of this overwhelming push for growth, the most basic concerns of public planning are often sidelined. A vested interest in growth encourages politicians and government agencies to undermine the role of planning in mitigating externalities (Klosterman 2006, p 89). This “externalization” of operating costs by private interests onto the general public can take the form of pollution, explosions due to deregulated safety standards, and even the displacement of entire neighborhoods. By overlooking, downplaying, and deregulating these externalities, municipalities are able to compete internationally with other cities and regions to attract “footloose,” highly mobile industries such as oil and gas, which travel the globe in pursuit of lower operating expenses. Natural resource scholars have described this relationship among political, business, and regulatory actors as an “iron triangle” in which stable policy relationships, such as that between the LDEQ and major petrochemical concerns inside of Louisiana, are based on a “close understanding of mutually understood interests” (Francis 1990, p 270; Reisner 1986).

The intimate connection that exists between businesses and state and federal regulators is reinforced by self-interested growth coalitions seeking increased tax revenues. By

accepting the burdens of industrial development as the inevitable consequence of larger tax bases, local coalitions across the globe are “racing to the bottom” of environmental, health, safety, and labor standards (UN-HABITAT 2004, p 2). Just as the Corridor parishes of Louisiana outbid one another with ever larger tax breaks in order to woo ever-dirtier industries, Louisiana as a state must also compete globally for these industries. Thus, Louisiana finds itself not only in competition with Texas, New Jersey, and Alaska for petrochemical growth, but also with Nigeria, Mexico, and other developing nations that have been ecologically ravaged by petroleum and gas outfits.

### *CONCLUSION*

This paper adds to the available literature on the petrochemical industrial complex by supporting Rigamer (1971) and Burby’s (2000) qualitative observations regarding heavy industry’s displacement of other land uses from the lower Mississippi River’s elevated natural levees. The case study of Norco presented in this paper corroborates these observations with quantitative data collected by the author.

## METHODOLOGY

### *CASE STUDY RESEARCH*

My thesis contains a primary analytical component: the Norco case study. In order to conduct this case study, I have referred to Robert Yin's (2003) *Case Study Research: Design and Methods*. My initial research began as an "exploratory" study of St. Charles Parish—I researched the parish in order to answer the question, "What spatial phenomena can be observed by studying the petrochemical industrial complex of St. Charles Parish?" (Yin 2003, p. 6). Through this exploratory process, I observed the "levee monopolization" phenomenon discussed previously in the Introduction section of this paper, and began to tailor my research design to answer questions regarding this process. I settled upon six questions that I wished to answer through my case study research:

1. What is the land use composition of Norco?
2. What are the flood hazard characteristics of this community?
3. How much of the total land within Norco is owned by industrial concerns?
4. What are the flood hazard characteristics of the land that is owned by these concerns?
5. What are the flood hazard characteristics of non-industrial land within Norco?
6. Do industrial land uses consume more of the best-drained real estate in Norco than other land uses?

### *THE GEOGRAPHIC INFORMATION SYSTEM DATABASE*

In order to document, quantify, and illustrate the answers to my research questions, I have created a comprehensive Geographic Information System (GIS) database for St. Charles Parish that includes the following components:

1. A record of all residential properties owned by the Shell family of companies (Shell Oil, Shell Chemical, and Motiva Enterprises LLC; which I will heretofore collectively refer to as “Shell”) that were purchased between 1980 and 2003.
2. A geographic layer of all residential properties owned by Shell.
3. A comprehensive land use dataset of Norco.
4. A geographic inventory of all industrial facilities in the parish.
5. A Digital Flood Insurance Rate Map (DFIRM) flood-hazard dataset for St. Charles Parish produced by the Federal Emergency Management Agency (FEMA).

#### *The Shell Residential Property Database and Archive*

Shell began purchasing residential properties in and around the Diamond neighborhood of Norco, Louisiana in the late 1960s. The last recorded purchase was in 2008. The buyouts occurred almost exclusively in the subdivided plantation tracts of New Diamond and Good Hope. All of the records for these transactions are archived at the St. Charles Parish Courthouse in Luling, Louisiana. I have accessed these documents both by way of the physical archive and through the digital archive available online through the St. Charles Parish Clerk of Courts website: <http://www.stcharlesparish-la.gov/index.aspx?page=58>.

I have created a personal archive that contains all records of purchase between Shell and residential landowners between the years of 1970 and 2003. Because there is a fee associated with photocopying these records at the courthouse and exporting them from the digital archive, I took “screen captures” of these records from the digital archive and pasted

these images into Microsoft Word documents. The exact details of the court record database that I've constructed can be found in Appendix B.

### *The Norco Landuse Dataset*

In order to create a portrait of land use patterns in Norco and determine how land uses relate to flood zone designations, I have created a comprehensive, parcel-by-parcel land use dataset for the town. I acquired a GIS polygon layer of all parcels from the St. Charles Parish GIS department. I then populated this polygon layer with land use data that I've collected. For the specific contents of this dataset, please refer to Appendix C.

### *Federal Emergency Management Agency Digital Flood Insurance Rate Maps*

I have used the Federal Emergency Management Agency's Digital Flood Insurance Rate Map database (FEMA B 2008) to explore the relationship between land uses and flood vulnerability in the St. Charles Parish industrial corridor. The primary dataset used is the "Flood Hazard Area" GIS layer. Within St. Charles Parish, this dataset identifies the following categories of hazardous flood risk, as designated by FEMA's flood insurance study (FEMA 2008):

**Zone AE.** This flood insurance rate zone is considered susceptible to "100 year" flood events—each year, there is a 1% chance of flooding.

**Zone VE.** This zone is considered susceptible to 100 year flood events and is also considered susceptible to hurricane-force storm surges.

**.2 Percent Annual Flood Hazard.** This flood insurance rate zone is considered susceptible to “500 year” flood events—each year, there is a 1 in 500, or .2%, chance of flooding.



## ANALYSIS

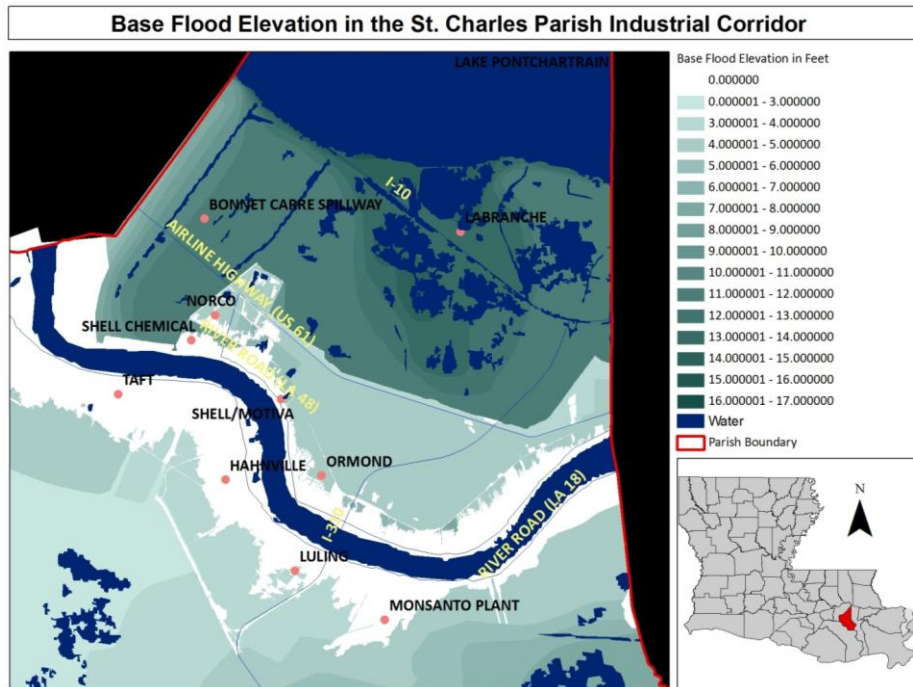


Figure 1: Base Flood Elevation in the St. Charles Parish Corridor

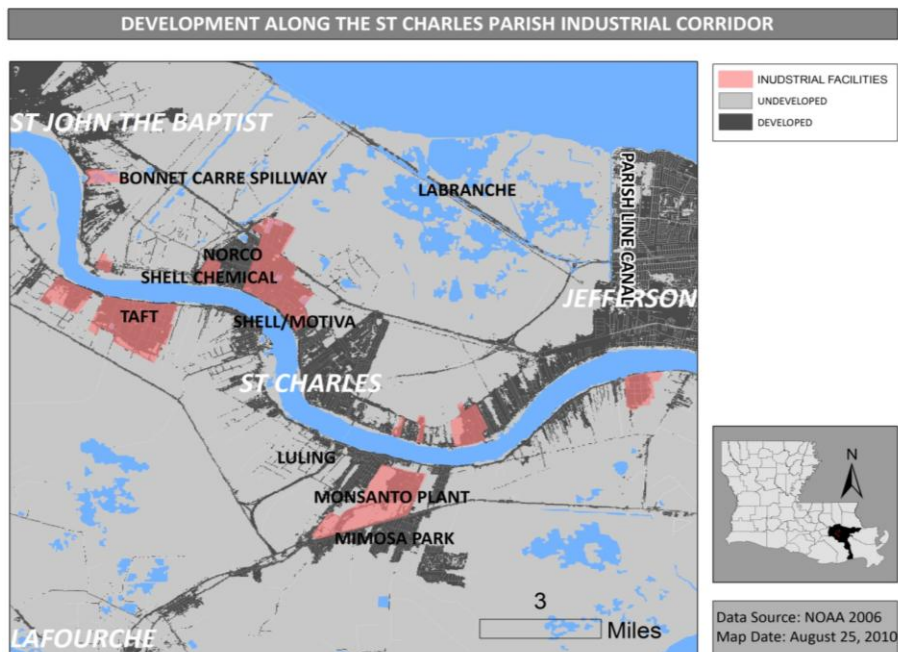


Figure 2: Development along the St. Charles Parish Industrial Corridor

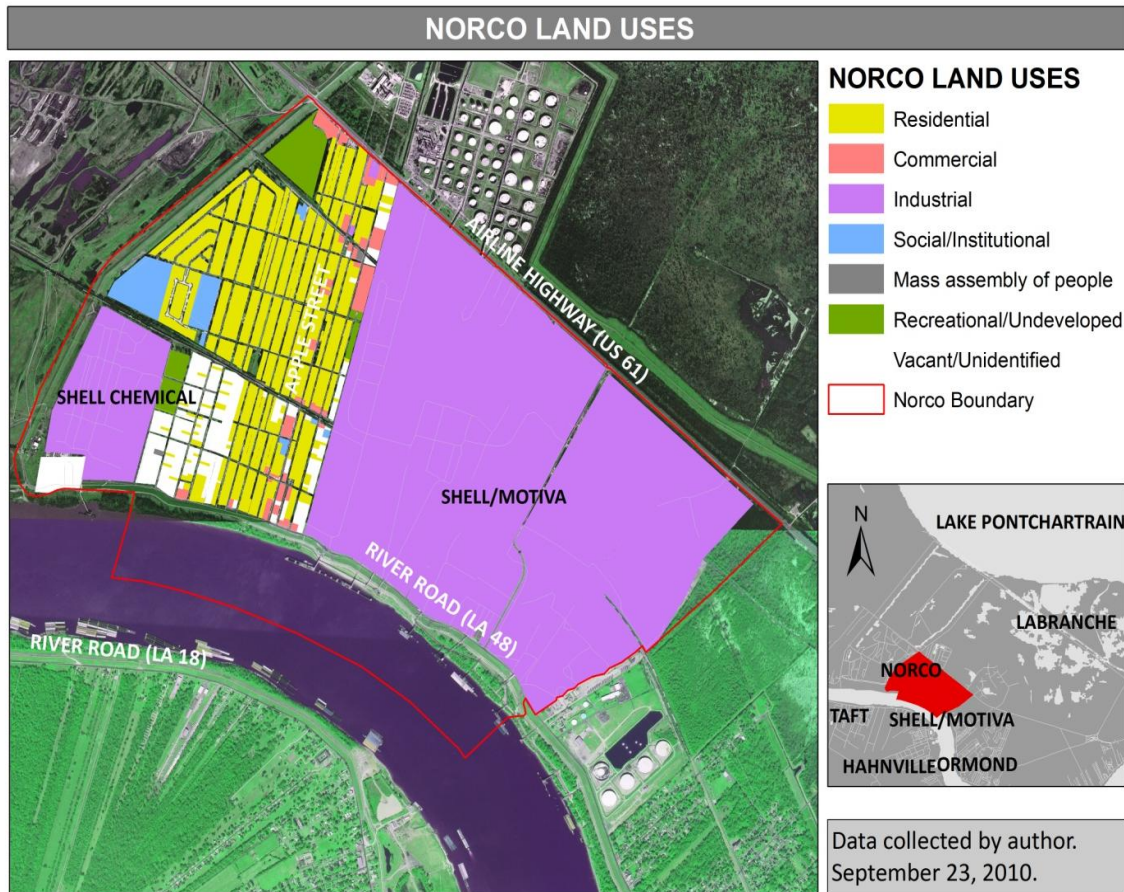
Discounting open water, St. Charles Parish's total acreage is 173,514.708. Roughly 9% of this land, 15,458.988 acres, constitutes St. Charles Parish's 500-year floodplain, which runs in a linear fashion along both banks of the Mississippi River. This land is the least vulnerable to flooding and storm surges in the parish, and is ideally suited to urban development. However, owing to the reasons described in literature review—river access to the Gulf of Mexico, compact land for intensive development, etc.—real estate within the 500-year floodplain is also desirable to petrochemical concerns.

Economic interests are still campaigning for industrial growth within the parish's 500-year floodplain. The Port of South Louisiana's website advertises parcels of land within the parish's industrial corridor that are "available" for industrial development, despite the fact that many of these parcels currently host residences.<sup>6</sup> Thus, urbanization and industrialization are occurring simultaneously within the same limited fringes of land. This section presents a case study on the St. Charles Parish town of Norco to illustrate the consequences of this developmental trend.

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<sup>6</sup> Port of South Louisiana website: <http://www.portsl.com/gis/stcharlesparish.htm>

## NORCO CASE STUDY



**Figure 3: Norco Land Uses**

### *History of Development in Norco*

Previous to the colonial occupation of the Mississippi Delta, the St. Charles Parish corridor landscape resembled much of the rest of the unsettled wilderness that surrounded it. The Mississippi River, unrestricted by the flood control infrastructure of today, spread wide and flat across the parish during spring floods and deposited sediment along its banks, creating broad natural levees that slope at a gentle grade towards the low-lying backswamps. These early floodplains and cypress swamps were the game grounds of Choctaw, Chickasaw, and other nomadic native American tribes that migrated according to the river's flood regime. Very

little of the landscape was altered by the efforts of these original settlers (Kidder 2000; Morris 2000). Most noteworthy are the Rangia clamshell mounds that they deposited in the shallow marshlands of the lake to create elevated areas; and the well-trodden game trails and portages that would later assist colonizers in navigating through those treacherous wilds (Kidder 2000).

In 1719, the Scotsman John Law and his “Company of the West,” acting under the French flag, populated this distant frontier of the “Orleans territory” with twenty-one German families. Additional Germans soon followed, affording the region its present-day distinction as Lake Pontchartrain’s “German Coast” (Yoes 2005, p 28). Propertied settlers brought in slaves to work the burgeoning sugar cane fields along the river. As these slaves earned their freedom, they settled into close-knit villages along the river’s levee, continuing to work their former captors’ land as sharecroppers (Doyle 2004).

Beginning in the early 1900s, petrochemical concerns began to actively gather plantation properties in St. Charles Parish for industrial development. Royal Dutch Shell initiated this trend in 1916 when it purchased the 366-acre Good Hope plantation tract. Over time, the tract grew into a massive oil refinery that now extends two and half miles down the river and spreads from the Mississippi River Road for over a mile towards Lake Pontchartrain (Doyle 2004). As the facility expanded, it bought out and ultimately devoured what was once the small port town Good Hope (USGS 1952, 1967, & 1992).

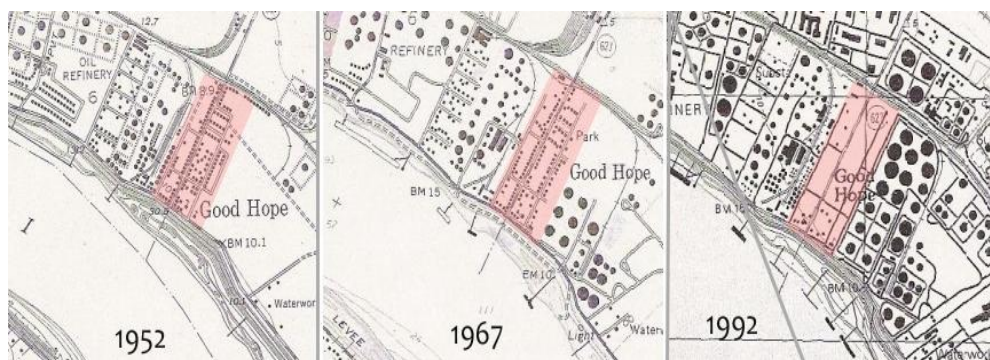


Figure 4: The extown of Good Hope in St. Charles Parish. *These images were taken from historic US Geological Survey topographic maps. By 1992, the Good Hope refinery bought out all the residential parcels and industry consumed the surrounding vacant land. Today, the site of the former subdivision is completely developed with industrial facilities (USGS 1952, 1967, & 1992).*

The town that grew up around this facility on its western edge assumed the acronymic name of NORCO—New Orleans Refining Company. It was once a large plantation tract belonging to Jean Francois Trepagnier. The tract’s orientation was typical of others in the region: it fronted narrowly on the Mississippi River and led northeast to the cypress swamps of Lake Pontchartrain. The plantation’s slave quarters were located near the river on the fringes of the tract. After gaining their freedom, many slaves remained in these quarters, which were situated in an area that came to be known as Belltown, and continued to work their former masters’ land as sharecroppers. In 1929, Shell Oil purchased the portion of the Trepagnier estate nearest the river, relocating Belltown residents to what is today called “Diamond,” immediately downriver of the newly purchased land (Yoes 2005; Lerner 2005).<sup>7</sup>

Shell also acquired the New Orleans Refining Company—Norco’s namesake—during this period. This 2,100-acre facility consumes the entire eastern edge of town and extends

<sup>7</sup> I have been unable to determine the exact details of this relocation process through my research, but St. Charles Parish court records show that the descendants of these former slaves possess a clear title to their ancestral land in Diamond.

downriver for a little over a mile. The southeast corner of the facility was once the small port town of Good Hope, but Shell's buyout efforts have erased it from existence.

Shell did not begin development of their chemical facility on the Trepagnier site until the early 1950s, and soon following its construction, industrial disamenities began to burden the Diamond community. Many residents sold their properties to Shell at extremely low prices in order to escape perceived health and environmental threats. Beginning in the late 1990s and continuing into the early 2000s, following much pressure by Diamond residents and their allies, Shell entered into a negotiated buyout process, purchasing properties from "fence line" residents in Diamond and elsewhere in Norco at fair market value (Lerner 2005; St. Charles Parish Courthouse Records).

These fence line purchases occurred primarily in two areas of town: in the Diamond neighborhood, which is identified as the "New Diamond Subdivision" in the court records of these property transactions; and along the eastern edge of Norco between Goodhope Street and the Shell/Motiva fence line.

Thanos (2000) identifies some of the central actors and policies that have led to the typed of growth present in Norco. In 1936, state legislators implemented the Industrial Property Tax Exemption Program (IPTeP). This program saves industry in the state approximately \$1 billion in tax exemptions. This tax exemption has greatly benefited Shell in the acquisition of properties to expand their Norco facilities.



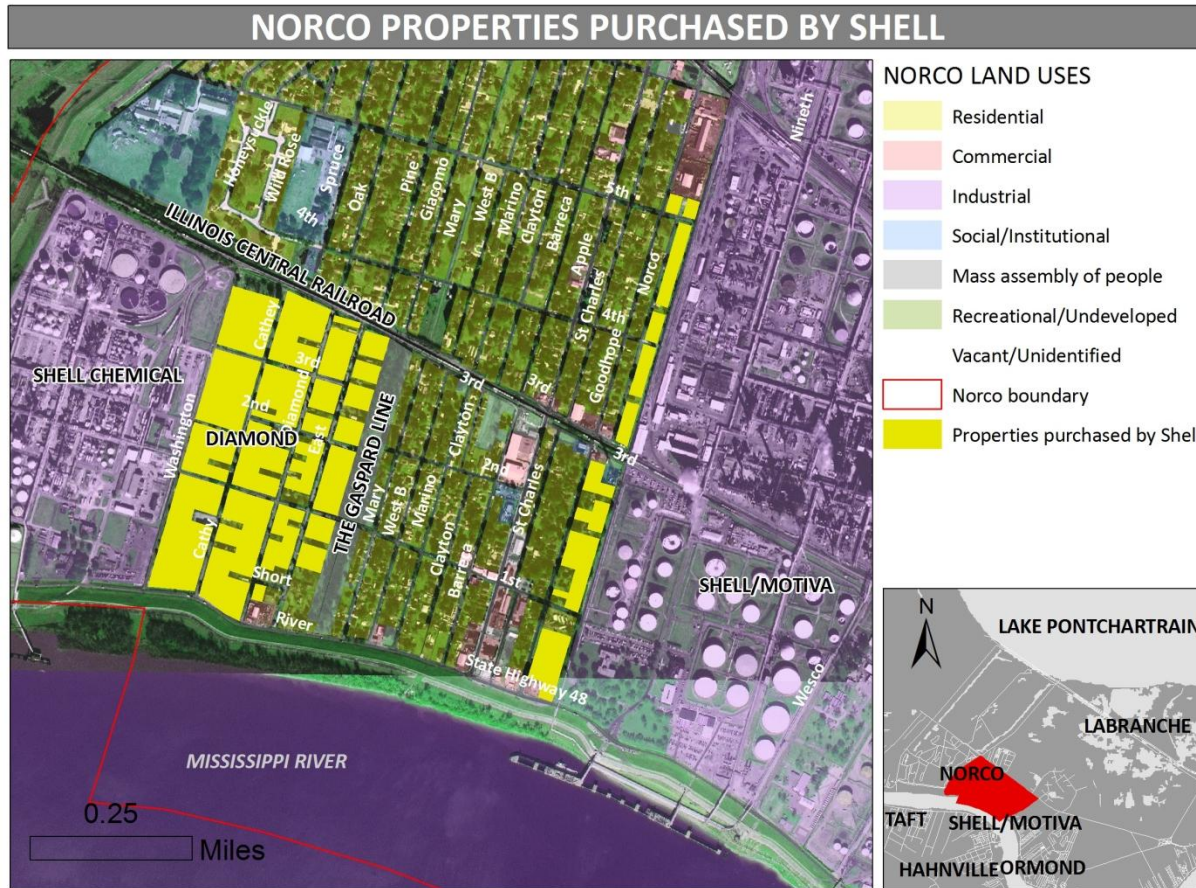


Figure 5: Norco Properties Purchased by Shell

### Spatial Calculations

In order to determine how Shell has impacted the urban fabric and land use composition of Norco, I have created a GIS land use dataset for the town as well as a dataset of all properties purchased by Shell. I have conducted calculations on the acreage of individual land uses within the town and illustrated how these interface with the Federal Emergency Management Agency’s flood zone designations (FEMA 2008). For the purpose of this analysis, I have defined Norco’s boundary based upon U.S. Census Bureau TIGER Line data (USCB 2009).

### Land Uses

The town's net acreage is 2,165.3. After subtracting the 220.2-acre portion of the Mississippi River that is included in the boundary definition, 1935.3 acres of land remain. Of that, all but approximately 39.45 acres are either developed or have recently been cleared of structures by Shell. 28 acres of this undeveloped land is a privately held parcel of property in the northwest corner of the town containing a pond and its surrounding wetlands. The area is known in the community as "Clayton's Pond."<sup>8</sup> The remaining 11.5 acres belong to a linear strip of wooded land that separates the Diamond community from its neighboring subdivision to the east. This strip, referred to by many residents as the "Gaspard Line," belongs to a quartet of barriers that physically separates Diamond from the rest of Norco—the remaining barriers being Shell Chemical to the west, the Illinois Central Railroad to the north, and the Mississippi River to the south.

Of the developed land, industrial uses account for more than half, occupying 1119.6 acres. Residential parcels cover approximately 277 acres. Shopping, retail, and trade amounts to 26.9 acres. All of the educational facilities in Norco—two grade schools and an adult learning center—total 31 acres. Two parcels of public recreational land exist within the town's boundaries, totaling 12 acres.

I have identified 92.59 acres as "vacant/unidentified." Of this, approximately 57.2 acres are lots in the community that have been purchased and cleared by Shell. When the lots that Shell converted from residences to recreational lands are factored in, the acreage jumps to 69.8.

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<sup>8</sup> Though Norco is heavily developed within its boundaries, the Bonnet Carre Spillway and the LaBranche wetlands are vast tracts of undeveloped recreational lands immediately adjacent to the town's boundaries.

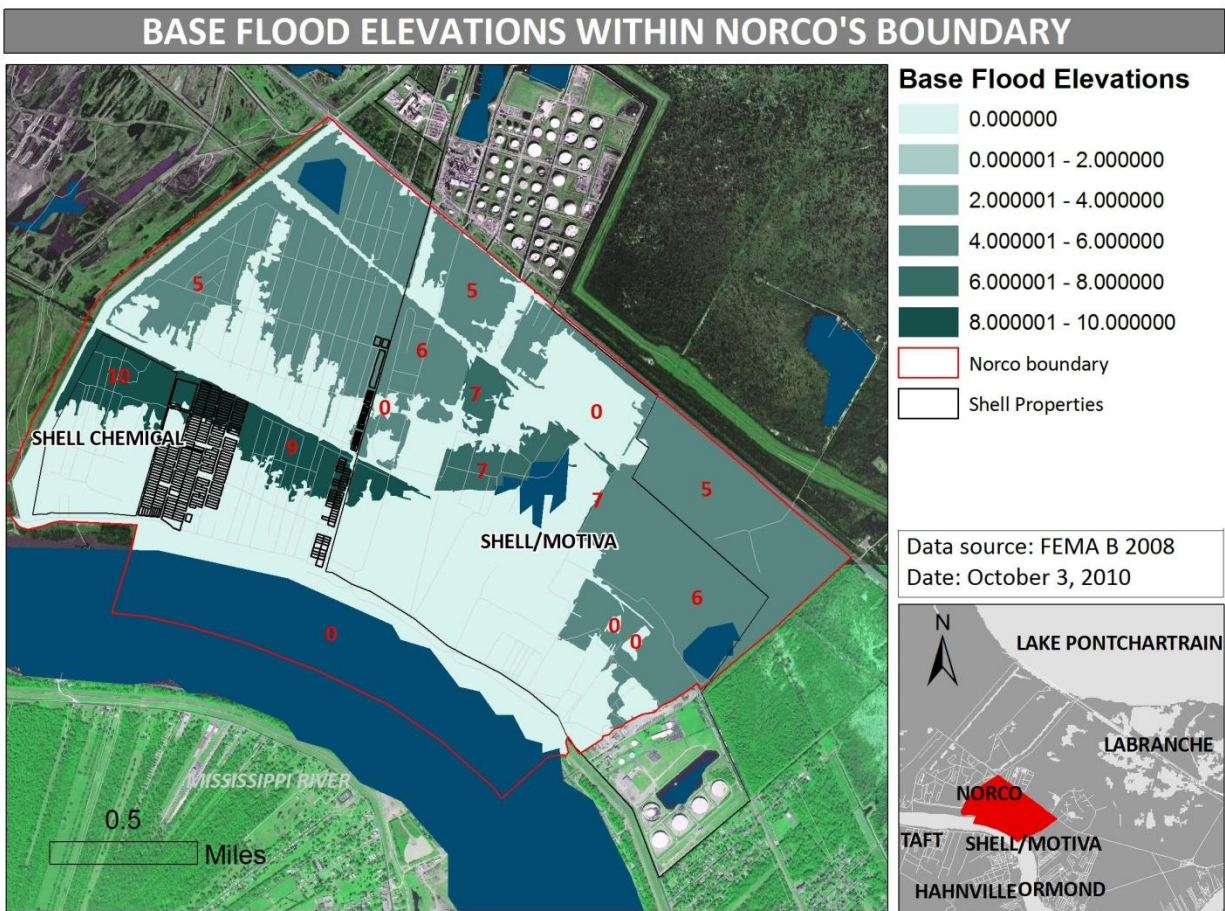


358 acres of land remain. Nearly all of this is covered by various infrastructures: flood control levees, drainage ditches, roadways, port facilities, a large electrical transformer, and a fire station.

**Table 1: Acreage of Parcels by Land Use Type Within Norco, Louisiana's 500-Year Floodplain**

| LAND USE TYPE   | TOTAL<br>ACREAGE | TOTAL % | 500 YR<br>FLOODPLAIN | 500 YR FP % |
|---|------------------|---------|----------------------|-------------|
| Industrial  | 1119.6           | 51.706  | 558.589              | 73.163      |
| Infrastructure  | 358              | 16.534  | 6.816                | 0.893       |
| Residential   | 277              | 12.793  | 104.196              | 13.647      |
| Undeveloped/Mississippi River                               | 259.65           | 11.463  | 7.365                | 0.965       |
| Vacant  | 81.14            | 4.277   | 57.733               | 7.562       |
| Social/Institutional  | 31               | 1.432   | 18.867               | 2.471       |
| Commercial  | 26.9             | 1.242   | 9.631                | 1.261       |
| Recreational  | 12               | 0.554   | 0.286                | 0.037       |
| Total   | 2165.3           | 100.000 | 763.483              | 100.000     |
| Data source: FEMA B 2008, land use data collected by author |                  |         |                      |             |

## Elevation



**Figure 6: Base Flood Elevations within Norco's Boundary**

FEMA's "static Base Flood Elevation" (BFE) measurement determines how high water would rise above the ground during a "base" flood event. The base flood is considered a 100-year flood, or a flood with a 1% chance of occurring in any given year. A BFE of "0" means that the land is not susceptible to flooding. Within St. Charles Parish, the "0" designation is approximately analogous to the 500 year flood plain, though the geographic contours of these designations show subtle differences within the FEMA dataset (FEMA B 2008). Industrial parcels of land within Norco account for approximately 73% of the 500-year flood plain (table x) and

69% of land with no base flood elevation (ie, a BFE designation of 0). All non-industrial land use parcels combined account for only 17.4% of land with no base flood elevation.

The table below summarizes the following attributes:

**BFE ACREAGE.** The acreage covered within Norco by each BFE designation.

**BFE AC %.** The percentage of overall land coverage that each BFE designation consumes.

**HEAVY INDUSTRIAL.** The amount of acreage covered by heavy industrial uses within each BFE designation.

**BUYOUT PARCELS.** The amount of acreage covered by residential properties that have been purchased by Shell within each BFE designation.

**TOT IND PARCELS.** The aggregated acreage of parcels owned by heavy industrial concerns, including Shell's "buy out" properties.

**TOT IND %.** The percentage of land owned by industrial interests within each BFE designation.

**NON-INDUSTRIAL PARCELS.** The aggregated acreage of all non-industrial land use parcels in Norco within each BFE designation.

**NON-IND %.** The percentage of aggregated acreage of all non-industrial land use parcels in Norco within each BFE designation.

#### BASE FLOOD ELEVATION (BFE) FOR INDUSTRIAL AND NON-INDUSTRIAL PARCELS IN NORCO, LOUISIANA

| BFE | BFE ACREAGE | BFE AC % | HEAVY INDUSTRIAL | BUYOUT PARCELS | TOT IND PARCELS | TOT IND % | NON-INDUSTRIAL PARCELS | NON-IND % |
|-----|-------------|----------|------------------|----------------|-----------------|-----------|------------------------|-----------|
| 0   | 907.241     | 47.733   | 578.701          | 48.628         | 627.329         | 69.147    | 157.423                | 17.352    |
| 5   | 512.656     | 26.972   | 84.573           | 3.615          | 88.188          | 17.202    | 205.934                | 40.170    |
| 6   | 255.590     | 13.447   | 251.611          | 0.000          | 251.611         | 98.443    | 0.000                  | 0.000     |
| 7   | 63.968      | 3.366    | 63.968           | 0.000          | 63.968          | 100.000   | 0.000                  | 0.000     |
| 9   | 78.224      | 4.116    | 11.707           | 17.720         | 29.427          | 37.618    | 33.934                 | 43.380    |
| 10  | 49.386      | 2.598    | 41.057           | 0.000          | 41.057          | 83.136    | 0.000                  | 0.000     |
| 11  | 14.047      | 0.739    | 0.000            | 0.000          | 0.000           | 0.000     | 0.000                  | 0.000     |
| 12  | 19.556      | 1.029    | 0.000            | 0.000          | 0.000           | 0.000     | 0.000                  | 0.000     |

Data source: FEMA B 2008, land use data collected by author

#### Data Interpretation

Analyzing this data, it is evident that the Shell Chemical facility and the Shell/Motiva refinery complex consume an overwhelming majority of the most flood resistant property in Norco. This levee monopolization recently increased through Shell's buyout efforts, but the last

of the homeowners in the buyout areas have settled their transactions with Shell in 2008 (St. Charles Parish courthouse records). No developable land remains in Norco for non-industrial expansion, and barring future buyouts, both industrial levee monopolization and non-industrial development in the town have reached their ceiling.

## CONCLUSION

The data collected and analyzed for the purpose of this thesis suggest that the “strip industrialization” observed by Rigamer (1971, p32) along the Mississippi River in St. Charles Parish, Louisiana has inhibited communities from developing in a way better suited to flood hazards. The Shell/Motiva and Shell Chemical facilities have overwhelmingly influenced the development of Norco and have dynamically changed the town’s landscape through its buyout efforts. It also perches upon a vast majority of the town’s highest land, which steered subsequent development into lower elevations until the town was maximally developed. Following this, Shell gained additional properties through their buyout of the only community that predated its own residence in the town.

### *Future Research*

A crucial question that remains unanswered within this research is: did residents whose properties were purchased by Shell relocate to other parts of the parish, and if so, what are the flood hazard conditions of their new residences? Is the petrochemical industrial complex actively and continually reworking the developed landscape of the parish in a way that leaves residents more susceptible to flood hazards? Nor has this research touched upon the more tucked away infrastructures of the complex—the waste injection wells, pipelines, and canals that hide elsewhere throughout the parish.

The constant feedback between petro-industrial and urban growth is far too complex to describe in a single case study. The wetlands of LaBranche and Lac Des Allemandes warrant further investigation. They have been exploited by oil interests historically, and are still used as sites for waste disposal. The diminished integrity of these wetlands has compromised their ability to protect the parish from hurricane force winds and storm surges.

The interaction between the petrochemical industrial complex and other infrastructures within the parish, such as flood control and highway infrastructure, should also be critically analyzed. The construction of Interstate 10 through the LaBranche wetlands has invited salt-water to intrude into the wetlands, thus destroying their vegetated root systems and causing land loss. This process is occurring even as industrial levee monopolization incentives growth within these wetlands. Combined with the aforementioned industrial waste disposal and resource mining already occurring in this habitat, the vital wetlands of LaBranche are rapidly deteriorating.

Economic interests are still campaigning for industrial growth within the parish's 500-year floodplain. The Port of South Louisiana's website advertises parcels of land within the parish's industrial corridor that are "available" for industrial development, despite the fact that many of these parcels currently host residences.<sup>9</sup>

At the time of this writing, in the summer of 2010, the Deepwater Horizon oil disaster has resulted in an unprecedented level of media attention focusing on Louisiana's oil and gas industry. Most of this coverage highlights the health, economic, and environmental consequences of the oil stream that has poisoned the Gulf of Mexico. What have been less

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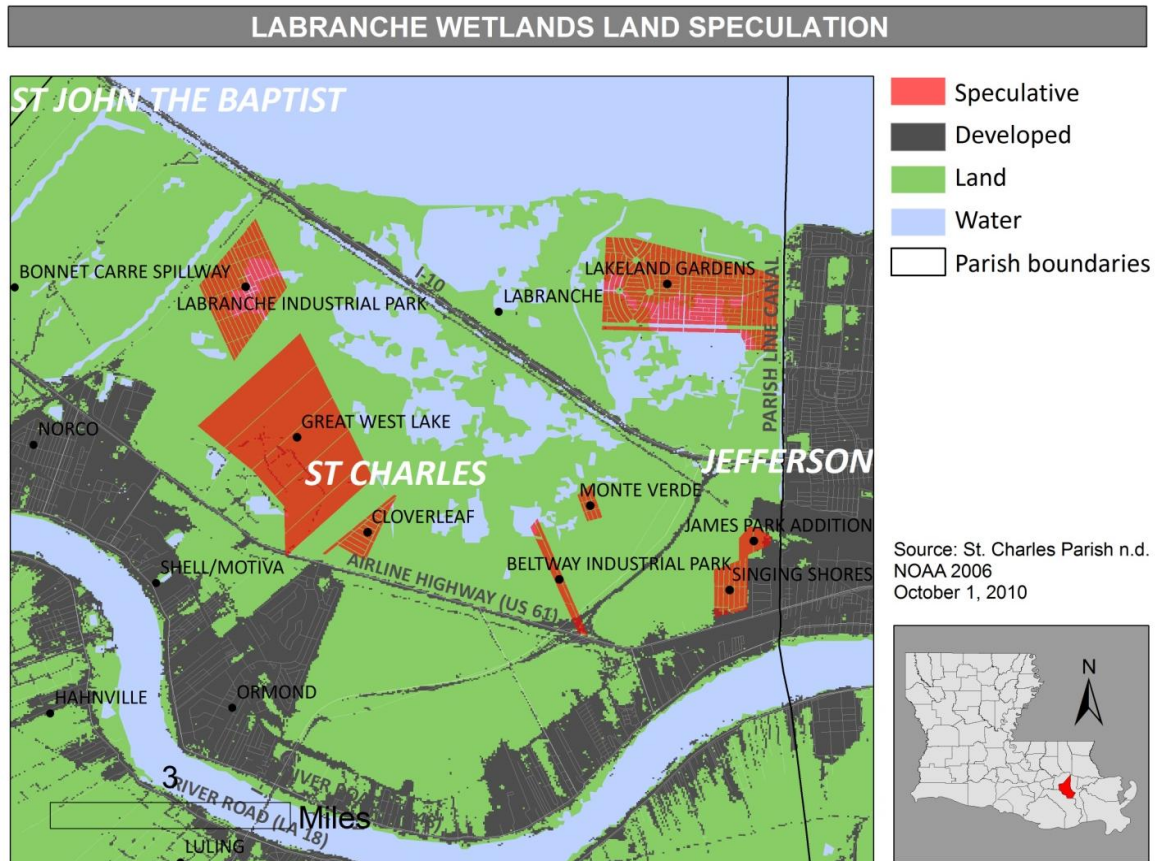
<sup>9</sup> Port of South Louisiana website: <http://www.portsl.com/gis/stcharlesparish.htm>

explicitly discussed in this massive and ever-expanding body of media coverage are the potential impacts on the urban environment of the Gulf South. For now, these details must be inferred from the bleak picture painted by the media cloud.

On Louisiana's Gulf Coast, along the barrier island of Grand Isle, fortunes depend heavily on commercial and recreational fishing. Should popular predictions come to bear, and the dispersed plumes of oil coat and subsequently destroy nearby coastal marshlands, then generations of sea life will be denied their breeding grounds (White, 2010). The much-celebrated tarpons and speckled trout of the region will be caught in diminishing numbers. The annual Tarpon Fishing Rodeo, a pillar of the island's economy, will for years be sparsely attended; or, as it has been this summer, cancelled altogether (The Times Picayune, 2010). One can imagine the slowly deteriorating wharfs and seasonal fishing camps; the unsettled tenements of business owners and their employers as their enterprises fail and they themselves are forced to leave. So too can one imagine such a fate in the estuaries of lower St. Bernard Parish, or Terrebonne, or even in the popular New Orleans seafood haven of Bucktown. In this dire but all too realistic scenario, urban blight would spread across the Louisiana Coast, tax bases would shrink, public services would dwindle, and vibrant and unique cultures would fall further into obscurity. To research these impacts shall be the responsibility of future scholars.

## APPENDICES

### APPENDIX A: LABRANCHE WETLAND HISTORICAL ANALYSIS



**Figure 7: LaBranche Wetlands Land Speculation**

In the 1970s, as demand rose for residential development associated with ongoing industrial growth, private real estate developers began to purchase tracts of land deep in the LaBranche wetlands. Many investors in the area believed that the Army Corps of Engineers planned to extend the East Jefferson Hurricane Protection levee through St. Charles Parish



(Charpentier 2007). This levee runs the length of the lake up to the Jefferson Parish line whereupon it terminates.

Wetland preservation policies forced the Army Corps to reroute the St. Charles Parish portion of the levee, which now runs roughly parallel to Airline highway and less than a quarter of a mile to its north (CEMVN 2008). The parcels for these unrealized developments are immortalized in a dataset produced by the St. Charles Parish GIS department (St. Charles Parish n.d.). Using this dataset, I have calculated the minimum acreage that these developments would have consumed in the LaBranche Wetlands.

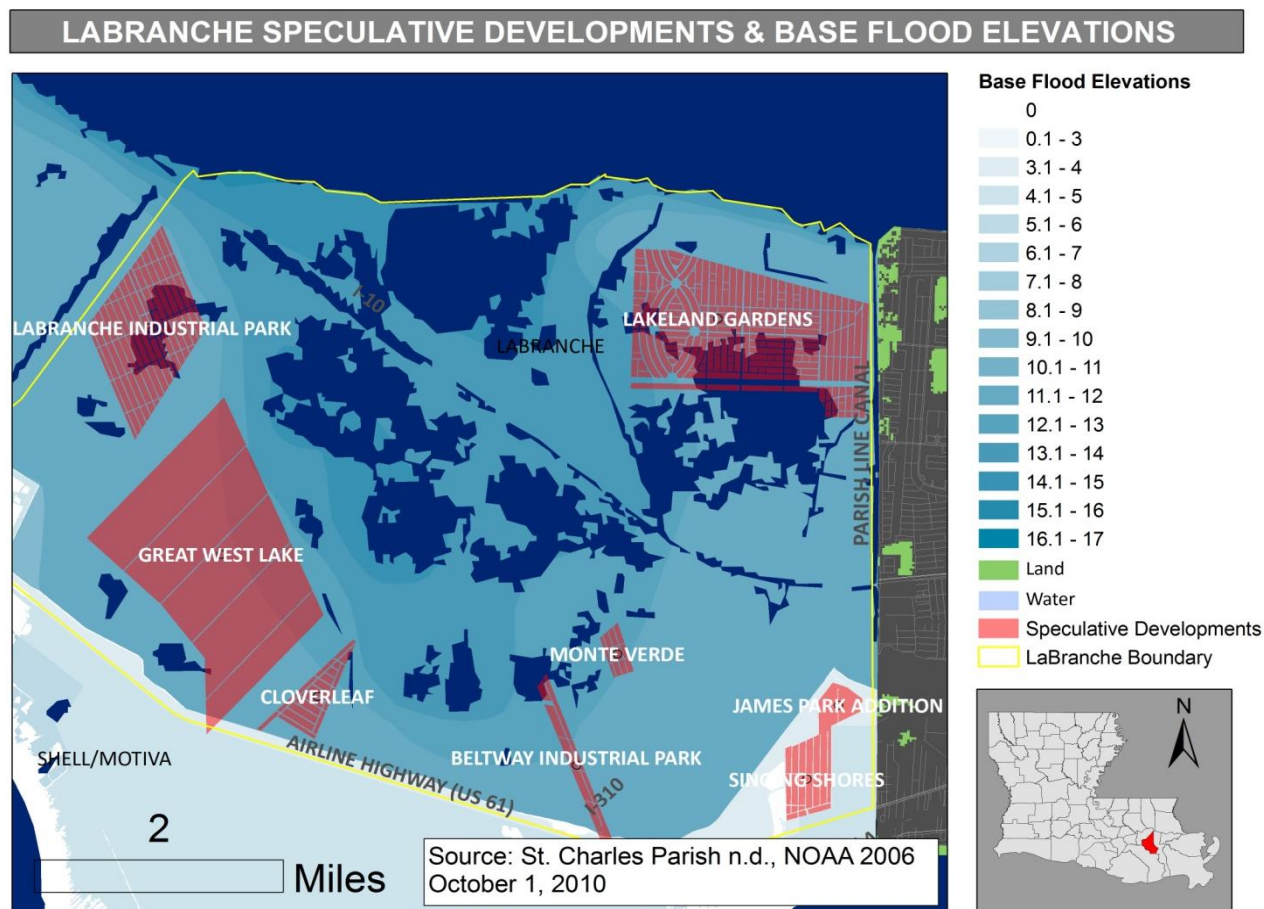


Figure 8: LaBranche Speculative Developments & Base Flood Elevations

In full, these subdivisions as planned would have consumed at least 1485.9 acres—7.10%—of the LaBranche Wetlands. These calculations do not include infrastructure such as roadways and drainage ditches. The mean base flood elevation of these parcels is 10.178. As Figure [///10] illustrates, these developments were slated for some of the deepest areas in the parish. Situated near the shores of Lake Pontchartrain, they would also have the least natural defense against hurricane force winds and storm surges.

**Table 2: Acreage of Speculative Developments in LaBranche**

| SUB_NAME                  | ACREAGE   | % OF LABRANCHE | Average BFE |
|---------------------------|-----------|----------------|-------------|
| Great West Lake           | 1485.8892 | 7.10%          | 12.22       |
| Lakeland Gardens          | 892.4343  | 4.26%          | 12.12       |
| LaBranche Industrial Park | 424.8219  | 2.03%          | 12.00       |
| Singing Shores            | 117.1092  | 0.56%          | 4.00        |
| Cloverleaf                | 93.0371   | 0.44%          | 12.19       |
| Beltway Industrial Park   | 80.7592   | 0.39%          | 12.01       |
| James Park Addition       | 57.2305   | 0.27%          | 4.00        |
| Monte Verde               | 33.8191   | 0.16%          | 12.88       |
| Total                     | 3185.1005 | 15.21%         | M=10.178    |

Data source: FEMA B 2008, acreage data collected by author

Additional qualitative research is required in order to establish a direct causal relationship between industrial development on the St. Charles Parish east bank and the real estate speculation discussed above. However, the limited research conducted for the purpose of this thesis suggests that such difficult, vulnerable residential developments would not be economically feasible unless all other options were exhausted.

## *APPENDIX B: THE SHELL RESIDENTIAL PROPERTY PURCHASES DATABASE*

I have created a personal archive that contains all records of purchase between Shell and residential landowners between the years of 1970 and 2003. These records are saved in a chronological sequence, and are identified inside of the Word documents with an “item number.” The item number always sits above the record that it identifies. Each Word document contains 29 records and is saved using the following naming convention:

SPC\_COC\_ITEM\_SHEET\_[number of first record]\_TO\_[number of last record]\_[sequential letter used to identify the document’s sequence in the archive]\_V[version number]

EXAMPLE: SCP\_COC\_ITEM\_SHEET\_1\_TO\_29\_A\_V1

Based on these records, I have created a Microsoft Excel spreadsheet with the following data fields:

**DATE.** The date of the property transaction.

**VENDOR.** The original property owner.

**VENDEE.** The purchaser of the property. This field will read as “Shell Chemical Co,” “Shell Oil Co,” or “Motiva and Shell [Chemical/Oil] Co,” if it is listed as a joint purchase between Motiva Enterprises and Shell.

**TYPE.** The type of transaction. This field will typically read “sale,” but may occasionally read “quit claim” if the original owner possessed no formal title to the land.

**SUBDIVISION.** The name of the subdivided plantation tract to which the property belongs. This field will typically read “New Diamond,” or “Good Hope (Diamond).” The “(Diamond)” caption is included to distinguish this subdivision from the nearby town of Good Hope, where Shell has also purchased ample residential properties.

**TRACT.** When a large tract of land is subdivided, the property owner, developer, or land surveyor will draft a plat map to identify the individual parcels contained within. Such was the case for the New Diamond and Good Hope subdivisions. Each of these plats identifies large block-sized “tracts” of land as well as the individual “parcels.” As these areas have undergone much change since their original subdivision, the tract and lot numbering is not always consistent. The plats are archived at the St. Charles Parish Court House, but are not available through the digital archive.

**PARCEL.** See “TRACT” description.

**ENTRY NUMBER.** The entry number of each record in the St. Charles Parish public records archive.

**BOOK/PAGE.** The original records, or photocopies of them, are physically stored in a series of volumes at the St. Charles Parish courthouse. These volumes are numbered. The “book” number identified the volume that a record is stored in, while the “page” number identified which page it is stored on.

**PRICE PAID.** Identifies the price that the vendee paid the vendor in each transaction.

**NO\_OF\_LOTS.** Identified the number of lots sold in each transaction.

**DIMENSIONS.** Identifies the physical dimensions of the lots sold. If separate lots are sold in the same transaction that are physically contiguous, then the measurement for each is combined. For example, if two separate lots are sold, each measuring 50 feet wide x 193 feet in length that run parallel lengthwise, then the dimension will read “100 x 193.” If the lots are not physically continuous, then each lot is entered as a separate record.

**SQ\_FT.** The square footage of the lot(s) sold. This value is not typically present in the original document; it is identified by multiplying the length of the parcel by its width.

**TOT\_PRCH\_SQFT.** If a single purchase contains multiple records in the spreadsheet (ie, if multiple lots sold in a single transaction are physically discontinuous), then the total square footage of the purchase is identified here.

**TOT\_NO\_ENTRS.** The total number of entries in the spreadsheet for a single purchase.

**FNCLN\_BUYOUT.** If a property was purchased through Shell’s “Fenceline Buyout Opportunity Program,” then this field is marked “Y.”

**ITEM.** The item number of the record in the Microsoft Word record archive.

**ADDRESS.** The property records only occasionally provide a physical street address, but this field is populated where available.

**NOTES.** Any additional observation, problems, and concerns related to a record entry.

### *APPENDIX C: THE NORCO LAND USE DATASET*

The Norco land use dataset is located on the DVD-rom included with this thesis. Using various resources, such as the online Google Maps application, local telephone directories, online business directories, and field surveys, I have populated this dataset with the two following fields:

**ACT\_CODE.** The Land Based Classification Standards (LCBS) Activity Code is an industry standard system of land use designation among planners. Each numeric code corresponds to a specific land use. The basic outline of this system is as follows:

**1000.** Residential activities.

**2000.** Shopping, business, or trade activities.

**3000.** Industrial, manufacturing, and waste-related activities.

**4000.** Social, institutional, or infrastructure-related activities.

**5000.** Travel or movement activities.

**6000.** Mass assembly of people.

**7000.** Leisure activities.

**8000.** Natural resources-related activities.

**9000.** No human activity or unclassifiable activity.

**BIZ\_NAME.** If a business or institution name applies to the parcel, it is included in this field.

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## **VITA**

Darin Acosta received his bachelor's degree in Urban Planning from the University of New Orleans in 2007. He began the graduate program in Urban and Regional Planning at UNO in 2008. He has spent much of his life documenting the natural and urban environments of the New Orleans region through various mediums, including essays, photography, documentary film making, and short fiction.