

Jefferson Parish Adaptation Strategy

APRIL 2019

Project Team

Led by the Louisiana Office of Community Development (OCD) and the Foundation for Louisiana (FFL), the multidisciplinary Louisiana's Strategic Adaptations for Future Environments (LA SAFE) team developed strategies in concert with an extensive community engagement campaign to provide an integrated approach in the development of an adaptation strategy for coastal Louisiana.

Funder

U.S. Department of Housing and Urban Development (HUD)



Partners

Louisiana Office of Community Development
Disaster Recovery Unit, Lead Partner

Foundation for Louisiana, Partner



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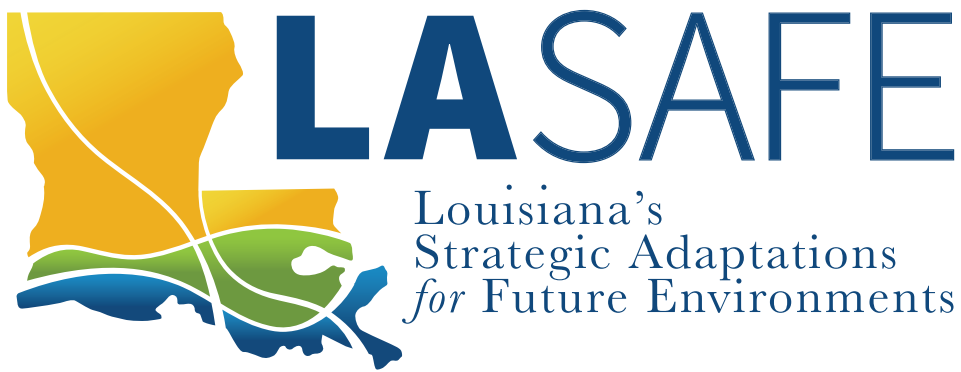
Other Partners

Franklin Associates, JCW, NOVAC, Coastal Communities Consulting, Greater New Orleans, Inc., Coalition to Restore Coastal Louisiana, Restore or Retreat, Restore the Mississippi River Delta, National Wildlife Federation, Environmental Defense Fund, Lake Pontchartrain Basin Foundation, Gulf Restoration Network, Bayou Interfaith Shared Community Organizing, Lower 9th Ward Center for Sustainable Engagement & Development, Zion Travelers Cooperative Center

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LA SAFE MISSION

Working together for community resilience, economic prosperity, and a better quality of life for everyone in Louisiana.

LA SAFE GOALS

1. To generate parish-wide, community-driven adaptation strategies focused on opportunities for residents and stakeholders to proactively adapt and prepare for anticipated environmental changes over the next 10, 25, and 50 years.
2. To implement a catalytic project in each of the six parishes that demonstrates adaptive development practices that conform to current and future flood risks. Furthermore, LA SAFE is intended to identify and support development of resilience-building projects and practices that can serve as models for the entire region.
3. To create a statewide adaptation model that enhances long-term sustainability and resilience for all Louisiana parishes.

LA SAFE is a comprehensive strategy for community **adaptation** and **resilience**, concepts that may have different meanings to different people. For the purposes of this strategy, the following definitions will be used.

Adaptation

the process of modifying behavior to suit changing environmental conditions.

Resilience

the capacity of individuals, communities, and systems to survive, adapt, and grow no matter what kinds of chronic stresses and acute shocks they experience.

Executive Summary

The document that follows provides an overview of the LA SAFE program developed in six Louisiana parishes facing increased flood risk associated with environmental changes. It then describes the process and products of the LA SAFE effort in Jefferson Parish specifically. In addition to a vision for the parish's future—and the goals, strategies, and actions identified to achieve that vision—these chapters also provide information that describes past, present, and likely future conditions in the parish, as well as an in-depth look at the activities and outputs of the community engagement process that has driven the development and prioritization of recommended adaptation strategies. Additional information on the background, research, analysis, planning process, and stakeholder engagement involved in the LA SAFE process can be found in the following chapters as well as in the **LA SAFE Regional Adaptation Strategy**.

The Jefferson Parish Adaptation Strategy comprises—

Chapter 1: LA SAFE Program

Provides an overview of the scope of work and adaptation planning objectives designed to support LA SAFE's mission to work together for community resilience, economic prosperity, and a better quality of life for everyone in Louisiana. This chapter includes an in-depth look at the community engagement process that took place over the course of five rounds of meetings conducted in the Jefferson communities of Westwego, Metairie, Marrero, Gretna, and Lafitte, which is a census-designated place south of the Town of Jean Lafitte. The resident input collected during this process identified shared concerns and hopes for the future, generated ideas for adaptation strategies, and helped determine priorities to guide planning and investment. Inclusive resident engagement has been and continues to be the driving force of LA SAFE.

Chapter 2: Hazards and Vulnerabilities

Provides detailed description of hazards such as land loss, subsidence, heavy precipitation, and storm surge that contribute to growing flood risk in Jefferson Parish. Drawing upon Louisiana's Coastal Protection and Restoration Authority (CPRA) storm surge modeling and FEMA's floodplain data, this chapter defines characteristics of low-, moderate-, and high-risk flood zones as well as the impacts of socioeconomic vulnerabilities that amplify risk, such as poverty, aging, rising insurance costs, geographical shifts in population, and a shortage of affordable housing in the parish.

Chapter 3: Existing Conditions

Describes key features of Jefferson Parish's natural environment and the ways in which topographical features and natural assets have affected early settlement patterns and the subsequent development of housing stock, transportation infrastructure, and economic activity. This chapter also describes the heritage and major cultural traditions and assets found in the parish. A summary of the implications of growing flood risk for the parish's assets in these categories—natural environment, housing, transportation, economy, and culture—as well as opportunities for preservation, growth, and investment lays the groundwork for the vision and strategies detailed in the next chapter.

Chapter 4: Vision and Strategies

Presents the vision for high-, moderate-, and low-risk zones and strategies for adaptation developed for Jefferson Parish by residents and community leaders working closely with planning and design experts throughout the LA SAFE engagement process. The strategies address five adaptation goals:

- Manage flooding and subsidence
- Direct growth to low-risk areas
- Improve mobility throughout the parish and region
- Strengthen and diversify local economies
- Protect and promote historic and cultural assets

The strategies presented in this chapter include best practices for stormwater management, inclusive development and revitalization of key corridors in low-risk zones, expansion of transportation choices and implementation of Complete Streets, provision of support for local fisheries; provision of education and job training programs, expansion of access to waterways, and enhancement of community assets for recreational and educational use. Each strategy is supported by actions and steps needed for implementation. Case studies are provided to document demonstrated success of key strategies.

Chapter 5: Achieving the Vision

Describes the six catalytic adaptation projects chosen by residents as priorities to be considered for LA SAFE funding. This chapter also describes the process for developing and evaluating the project proposals. Each project has been designed to demonstrate implementation of adaptation concepts that address the LA SAFE goals established by parish residents, build resilience for the parish, and deliver multiple benefits to the community. The six proposed projects include—

- Gretna Resilience District Kickstart
- Re-Green Elmwood
- Louisiana Wetlands Education Center
- Fat City Green Block
- Mixed-Use Housing Development in Westwego
- Airline and Roosevelt Linear Parks

Funded Project Descriptions

Louisiana Wetlands Education Center

The Louisiana Wetlands Education Center is a public services/education project located on the west bank of Jefferson Parish in the Town of Jean Lafitte. LA SAFE has emphasized the value of educating our coastal population about current and future environmental conditions and the effects of flood risk. The Louisiana Wetlands Education Center will be an educational asset serving students and families in the region, with programming for all ages, including a research outpost and meeting location for agencies and institutions. The center will promote preservation, conservation, and adaptation related to wetland ecosystems, using its location in the Jean Lafitte area as an outdoor classroom. Future phases would include an expanded fishing village to teach visitors about coastal community traditions, a treetop ropes course, water taxis to Grand Isle, kayak and canoe rentals, and overnight cabins.

Gretna Resilience District Kickstart

The Gretna Resilience District Kickstart is an ambitious Resilient Infrastructure and Community Nonstructural Mitigation/Flood Risk Reduction project. Two major components of the district, Gretna City Park and the 25th St. Canal, are of interest to the LA SAFE team for potential investment. Improvements to the park include greater stormwater retention, enhanced entryways, pathways and signage, additional seating and pavilions, and the installation of a tiered dock that will connect visitors to the water. The canal improvements include green infrastructure features to increase storage capacity and improve conveyance of stormwater in an area with a high concentration of repetitively flooded homes and businesses. In addition, the canal enhancements include the creation of recreational amenities for biking, walking, and interactive community spaces.

All images in this strategy are credited to the LA SAFE team, unless otherwise noted.



1 LA SAFE Program



Parish Waterways

The parish's many waterways, such as Bayou Barataria pictured above, offer both recreational opportunity and provide a livelihood for parish residents.

Background and Mission

In efforts to plan for a vibrant and sustainable future for our state, addressing growing flood risk will be a primary concern for Louisiana communities. Climate scientists agree that warming temperatures are likely to result in more frequent flooding that occurs with increased intensity. These impacts will be compounded by the effects of human activities that accelerate erosion and subsidence along the coast.

Over the years, Louisiana residents have responded to flood risk in various ways: first, by settling on higher ground along the rivers and bayous, then by building levees, and eventually by restoring wetlands. During the next 50 years, Louisiana is projected to lose more land along its coast than it can rebuild, even if restoration efforts are completed as currently planned.¹ As delta land continues to subside and erode, sea level rise is expected to accelerate. With less wetland buffer, the state's coastal regions face increased storm surge and flood risk that will impact families and communities in ways large and small, acute and chronic.

Louisiana communities must develop and implement risk reduction strategies that include mitigation, adaptation, and structural measures. Increasing flood risk is already causing socioeconomic and demographic repercussions. Due to the combined effects of man-made and natural land loss as well as sea level rise, **people are moving from flood-prone areas to higher ground seeking safety. In lower-risk areas to which people are moving, tax bases are growing, but the infrastructure is overburdened.** Communities in areas most at risk are losing population and facing declining median household incomes. These trends are likely to continue as risk increases.

Fifty years from now, high-ground, low-risk areas will be even more scarce. How parishes and municipalities develop this land will influence the region's population capacity, cost of living, economic opportunities, and quality of life. Some of the high-risk areas are where much of the region's economic activity takes place. Planning for the future of these areas where our working coast is located is as important as planning for low-risk areas where populations are expected to grow.

The challenge is greater than coastal restoration. CPRA's projections indicate that land is being lost faster than it can be built.² This understanding means that, just as people have done throughout human history, Louisianans must plan to adapt to the changing landscape and environmental conditions.



Street Flooding

Street flooding in Gretna following Hurricane Isaac.
Photo Credit: FEMA/Patsy Lynch



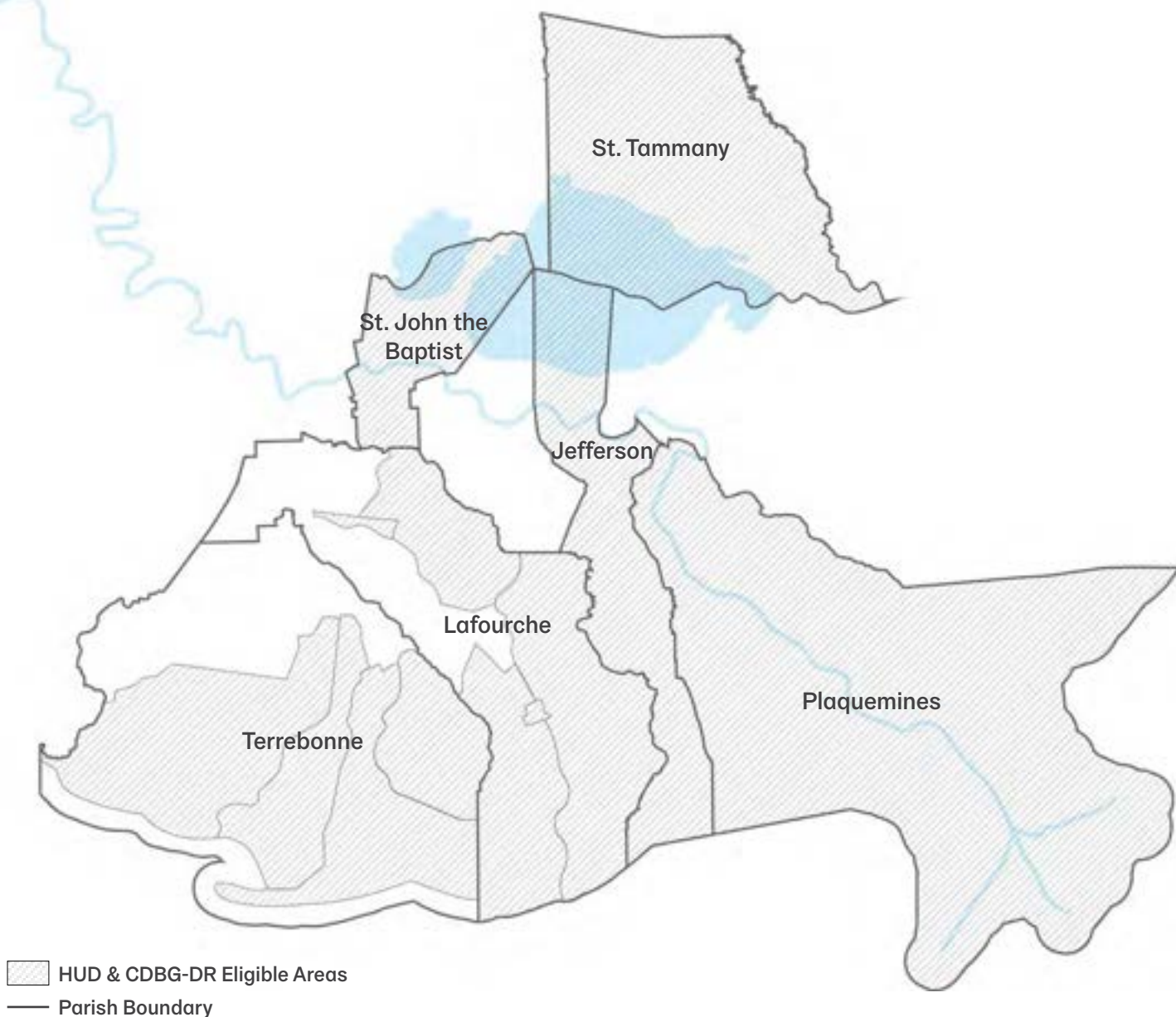
Home Damage

In Jean Lafitte, residents clear a home of debris that was flooded after Hurricane Isaac.
Photo Credit: FEMA/Patsy Lynch



Street Flooding

Cars pass through a flooded street in Metairie. Street flooding can occur during heavy thunderstorms when there is more rainfall in a short period of time than the drainage system can accommodate.



An Opportunity for New Solutions

To help address these complex issues in a holistic manner, the National Disaster Resilience Competition (NDRC), sponsored by the U.S. Department of Housing and Urban Development (HUD) and the Rockefeller Foundation, awarded funding for LA SAFE—Louisiana’s Strategic Adaptations for Future Environments. The LA SAFE program supported an inclusive public process to identify adaptation strategies and is providing funding for at least one catalytic project in each parish.

The LA SAFE planning process focused on six parishes heavily impacted by Hurricane Isaac in 2012: **Jefferson, Lafourche, Plaquemines, St. John the Baptist, St. Tammany, and Terrebonne**—as well as the region as a whole. Four of the LA SAFE parishes—Jefferson, Plaquemines, St. John the Baptist, and St. Tammany—are eligible to receive investments anywhere in the parish because they meet HUD’s Community Development Block Grant–Disaster Recovery (CDBG-DR) requirements. In Lafourche and Terrebonne Parishes, only certain census tracts meet those requirements. To receive funding, a locale must meet threshold requirements in the three categories of most impacted,

distressed, and unmet recovery needs as a result of a “Qualifying Disaster,” in this case, Hurricane Isaac.

While ongoing efforts such as the 2017 Coastal Master Plan and the Morganza to the Gulf levee system strive to reduce risk to populations from storm surge flooding via large restoration and protection projects, LA SAFE recognizes that the environmental challenges facing the region cannot be solved by engineering alone. Through policies, programs, and projects, LA SAFE offers a set of community-driven strategies designed to provide a holistic approach to reducing long-term risk and increasing Louisiana’s ability to prepare for and recover from disasters and other disruptions.

The adaptation strategies in LA SAFE’s regional and parish plans integrate stormwater management, housing and development, transportation, education, economy, and jobs, and culture and recreation to provide community benefits that improve quality of life while mitigating flood risk.

Through intensive public engagement and technical review processes, the Louisiana Office of Community Development (OCD) has identified at least one catalytic LA SAFE project to receive funding in each parish.

LA SAFE seeks a balance between natural forces and smart growth, where communities learn to adapt to risk by building with nature and living with water.

Community-Driven Planning

Community engagement is central to the LA SAFE planning process. **LA SAFE engaged 386 residents and community leaders in Jefferson Parish over the course of five rounds of meetings.** Meetings were held in Westwego, Metairie, Marrero, Gretna, and Lafitte, which is a census-designated place south of the Town of Jean Lafitte.

The LA SAFE team worked with these stakeholders to document and evaluate existing conditions in the parish, analyze risk, identify shared goals, and develop a vision for the future. The goals that residents set evolved into policies, programs, and six catalytic projects that address community needs stemming from environmental degradation and increasing flood risk. Specifically, residents established goals and values during the Round 1 meetings, identified areas of opportunity in Round 2 meetings, developed a vision in Round 3 meetings, identified potential projects in Round 4 meetings, and ranked project preferences in Round 5 meetings.

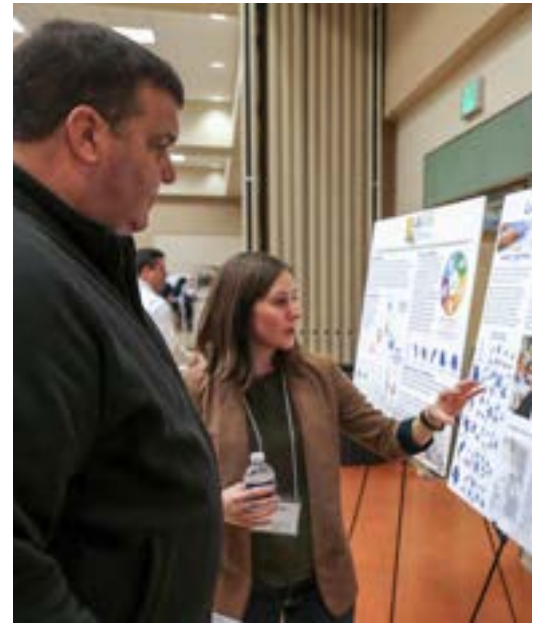
This collaboration was informed from start to finish by the best available data about future environmental conditions, best planning practices, and quality design expertise. The team also worked closely with residents to ensure that the strategies in the plan are closely aligned with the parish's culture and values.

The LA SAFE strategy that follows makes specific recommendations about how Jefferson Parish might adapt to future conditions. Some of these recommendations come from existing parish plans, some from local stakeholders, and some from the expertise of the team's planners and designers. All have been vetted and prioritized by the parish's residents and community leaders. The recommendations that rose to the top draw from multiple disciplines and provide benefits across categories and risk areas.



Synthesizing Perspectives

Early in the meeting process, LA SAFE presented this framework for decision-making, which seeks the common ground among Community Vision, Current & Future Environmental Conditions, and Best Planning Practices.



Engaging the Community

Left: At Meeting 3, residents identify parish priorities.

Right: A resident at Meeting 5 evaluates an engagement process board.



LEAD the Coast

Participants of Foundation for Louisiana's (FFL) LEAD (Leadership, Education, Advocacy, and Development) the Coast program served as table hosts and facilitators during the LA SAFE meetings. As coastal residents themselves, these table hosts had a personal understanding of the issues that impact their fellow community members. The LEAD the Coast Program provided them with additional coastal education and facilitation training. These table hosts helped to connect the LA SAFE project team with issues on the ground throughout the engagement process.



Photo Credit: Foundation for Louisiana



Parish Meetings

At Meeting 1, residents describe the changes they are experiencing.



What Does Change Mean to You?

The first activity, pictured above, asked residents to describe changes and challenges they've seen over the past 50 years. This activity included a map that depicts current and future land loss as well as population shifts that occurred between 2000 and 2010.



Adaptation Goals

The second activity focused on what residents value about Jefferson Parish and what they see as future goals.

Round 1 Meetings

In the first round of meetings, residents identified challenges, values, and goals that set the course for the rest of the engagement process. To accomplish this, residents participated in two group activities that asked them to describe the changes they have seen, what they value about their community, and what they would like their community to look like in the future.

In the first activity, “What Does Change Mean to You?” Jefferson Parish residents reviewed a map of future flood risk in the parish and described how they have been affected by changes to the environment, economy, and population over the past 50 years.

In the second activity, “Adaptation Goals,” residents shared their goals and values in categories designated “Community & Culture,” “Economy & Jobs,” and “Environment & Sustainability.” Residents were asked to consider these three categories in the context of the present strengths of the parish and future opportunities. They were asked what they want to preserve in their community and what the future of those things should look like.

Meeting Location Preference

To ensure that the subsequent engagement meetings were held in locations that would be accessible and convenient to the greatest number of people, residents were asked to suggest towns and potential meeting venues. These are shown to the right, on the Activity 1 map, with the size of the red circles corresponding to the number of nominations each town received. The Round 2 meeting locations were based on this resident input.



Activity Location Discussion

Residents suggest where Round 2 meetings should be held.



Activity 1 Map

Residents voted on potential Round 2 meeting sites.

Sources: CPRA Land Loss Modeling Data 2017 for a Medium Scenario; For all basemap data see References

“Population growth means more and more houses, and we need better roads and drainage.”

—Jefferson Parish Resident, Round 1 Meeting

Round 1 Meeting Outcomes


In the first activity, residents described a parish struggling with increased costs, population shifts, and business loss. Residents also described declining home values, poor development, flooding, and continued land loss. Resident comments were compiled and categorized as challenges.

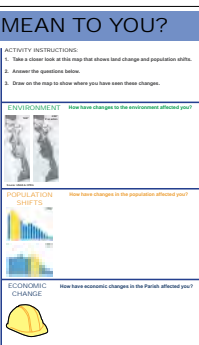
Responses from the second activity described what residents value in the parish and their goals for the future of their community. These were organized as strengths and opportunities, respectively. Residents emphasized traditions and culture, followed by community closeness, natural resources, safety, growth and adaptation, and the seafood industry.

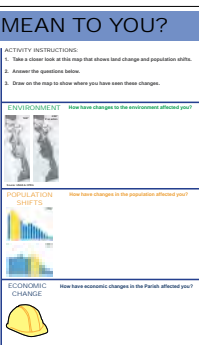
Among the opportunities most discussed were the development of new communities, economic diversification, protection and restoration, and the stabilization of the fishing industry.

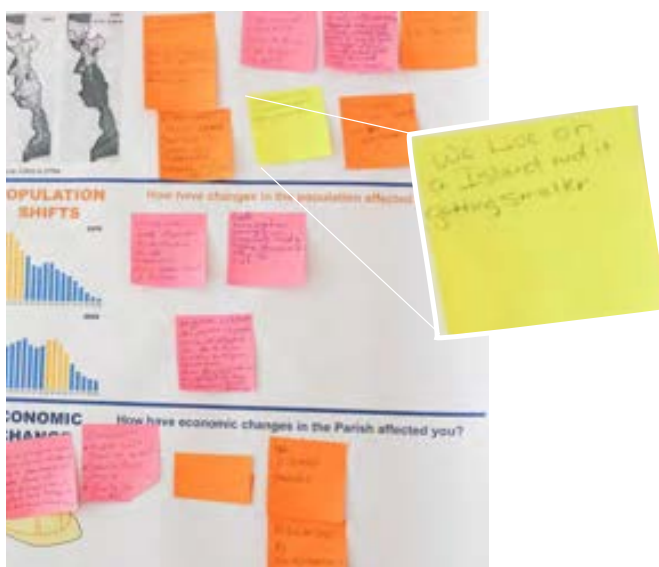
WHAT DOES CHANGE MEAN TO YOU?

ACTIVITY INSTRUCTIONS:
 1. Take a close look at the map that shows land change and population shifts.
 2. Answer the questions below.
 3. Draw on the map to show where you have seen these changes.

ENVIRONMENT How have changes in the environment affected you?


POPULATION SHIFTS How have changes in the population affected you?


ECONOMIC CHANGE How have economic changes in the Parish affected you?




Activity 1: “What Does Change Mean to You?”

Residents described changes and challenges that they’ve witnessed in the past decades on sticky notes.



Activity 2: “Adaptation Goals”

Residents described what they value in the parish and what their future goals are.

At Meeting 1, **56 residents** wrote **293 responses** to the activity prompts that LA SAFE organized into challenges, strengths, and opportunities. Resident comments were grouped and evaluated by frequency. The list below summarizes the most-discussed topics at the meeting in order of frequency of mention.

Challenges

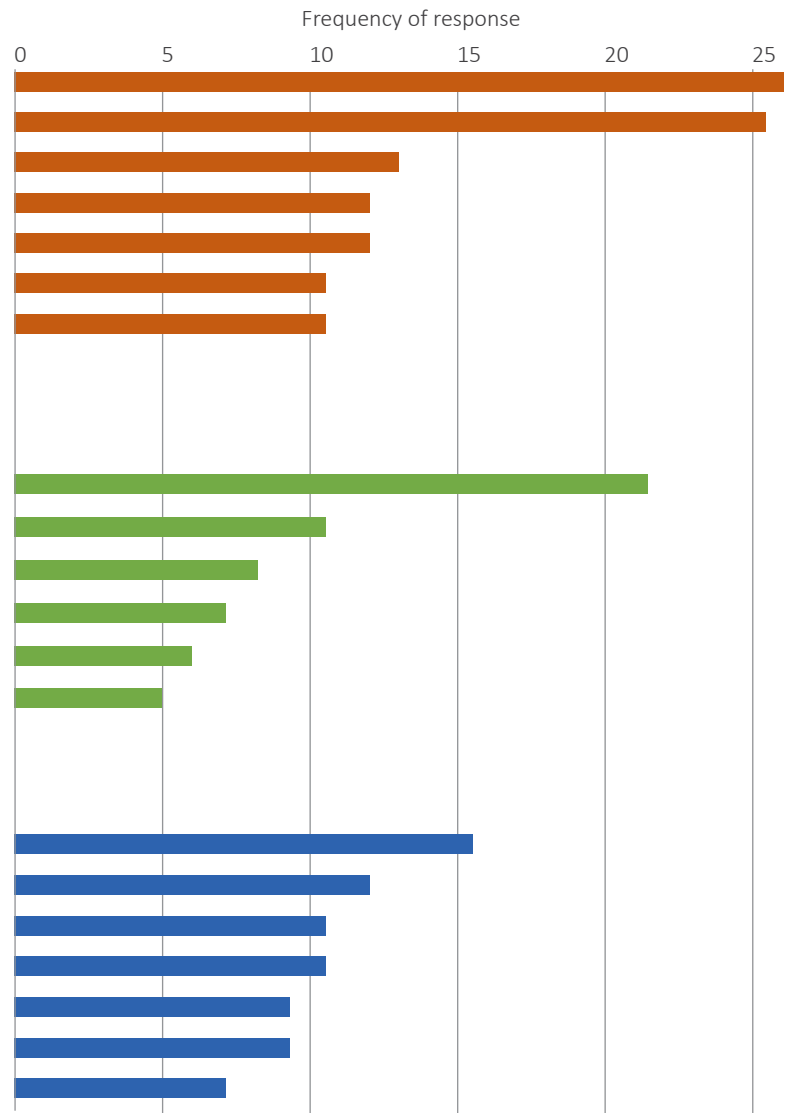
1. Increasing costs and population loss
2. Loss of businesses
3. Population loss/movement
4. Declining home values and tax base
5. Poor development and infrastructure
6. Flooding
7. Continued land loss

Strengths

1. Traditions and culture
2. Community closeness
3. Natural resources
4. Safety
5. Growth and adaptation
6. Seafood industry

Opportunities

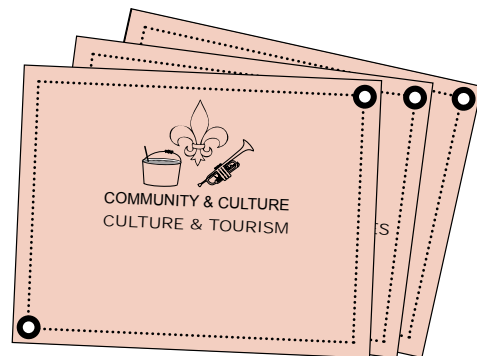
1. Develop new communities
2. Diversify and develop economy
3. Protection and restoration
4. Stabilize and support fishing industry
5. Improve transportation
6. Create public water and green space
7. Recreation and youth programs



Round 2 Meetings

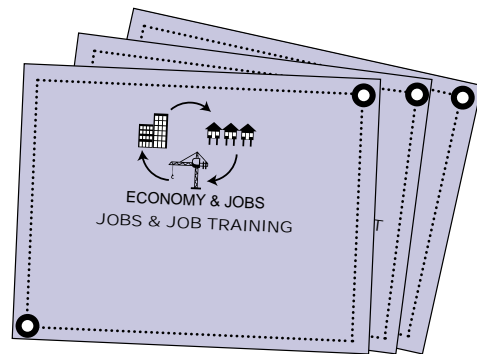
The second round of LA SAFE meetings in Jefferson Parish were held in Metairie, Marrero, and Lafitte. Each of these meetings was inclusive of nearby areas and focused on the unique issues particular to these communities.

Residents used question cards and maps to describe short-, medium-, and long-term goals for their communities. The question cards reflected the nine major topics that emerged from Meeting 1 across all six parishes. Residents sat in small groups around an elevation map of their community that highlighted future high-ground areas. The top of their table sheet showed land loss and flood risk over time, from 50 years past to 50 years into the future. With these future conditions in mind, residents chose one topic in each of the three categories (see right) that they deemed the most relevant to the future of their community. They were then asked to indicate areas or locations on their map where current issues exist and to propose solutions in the 10-, 25-, and 50-year time frames.



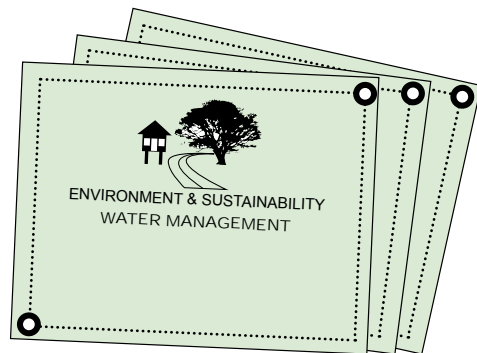
Community & Culture

Culture & Tourism
Youth & Education
Access to Services & Amenities



Economy & Jobs

Jobs & Job Training
Local Economic Development
Property Value & Cost of Living



Environment & Sustainability

Water Management
Transportation
Parks & Public Spaces

Table Sheet

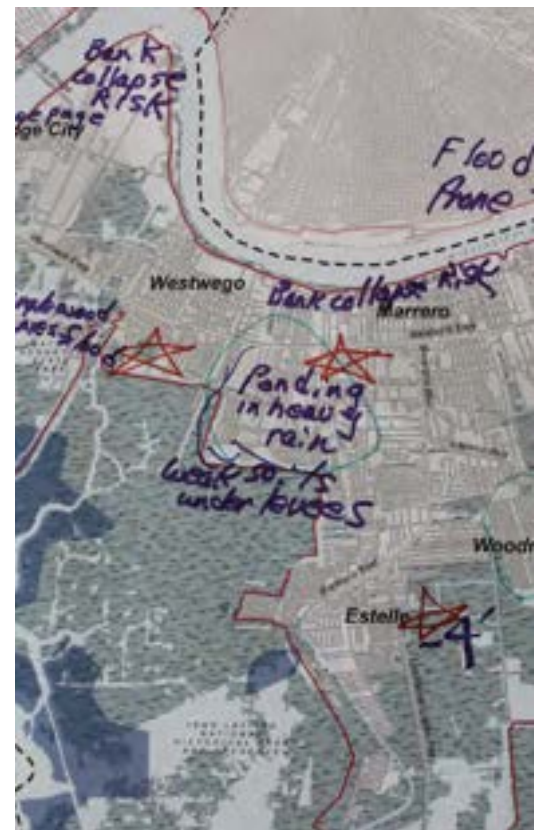
Table sheet from the Marrero meeting.





“Over on the levees, there is a lot of possibility for new trails and bike trails.”

—Jefferson Parish Resident, Round 2 Meeting in Metairie



Round 2

Top: Residents at Round 2 discussing one of the questions.

Left: Meeting participants mark areas of frequent flooding and community assets on a map.

Right: A table sheet on which notes related to Economy & Jobs are written in blue, and Community & Culture are in orange.

Round 2 Meetings Outcomes

The summaries below describe the most prevalent discussions at each of the three meetings in Round 2. In addition to documenting the group conversations, the LA SAFE team collected the notes and comments that residents had written on the maps. The map on the right provides a summary of the compiled comments.



Metairie

In Metairie, residents most commonly expressed interest in denser, walkable, mixed-use development with diverse housing options for both the aging as well as younger residents. They stated that the parish does not have a strong cultural center and the amenities needed to attract and retain younger workers. Some participants recommended establishing cultural districts; others recommended bus tours. Many residents emphasized the need to attract younger people to the area with amenities such as university satellites and a more vibrant urban fabric to compete with New Orleans. In this way, Jefferson Parish could offer a similar lifestyle with a lower cost of living. Residents emphasized transportation as a major area for improvement, suggesting HOV lanes, carpooling incentives, improved public transit, and a regional light rail.



Marrero

At the Marrero meeting, residents focused most on stormwater management issues, transportation, local economic development, and youth and education. Residents pointed out that there are rifts among these sectors and recommended better coordination among them in the future. The residents said that the school system lacks higher education pathways and could benefit from more connection to job training, local business, and industry.

Residents also expressed the need for more education about the region's environment and coastal issues. Residents pointed out that most stormwater management issues are related to construction practices. Many residents cited too much pavement and not enough stormwater retention areas as the main issues. Residents also expressed the desire to alleviate traffic and create an elevated evacuation route for the region.



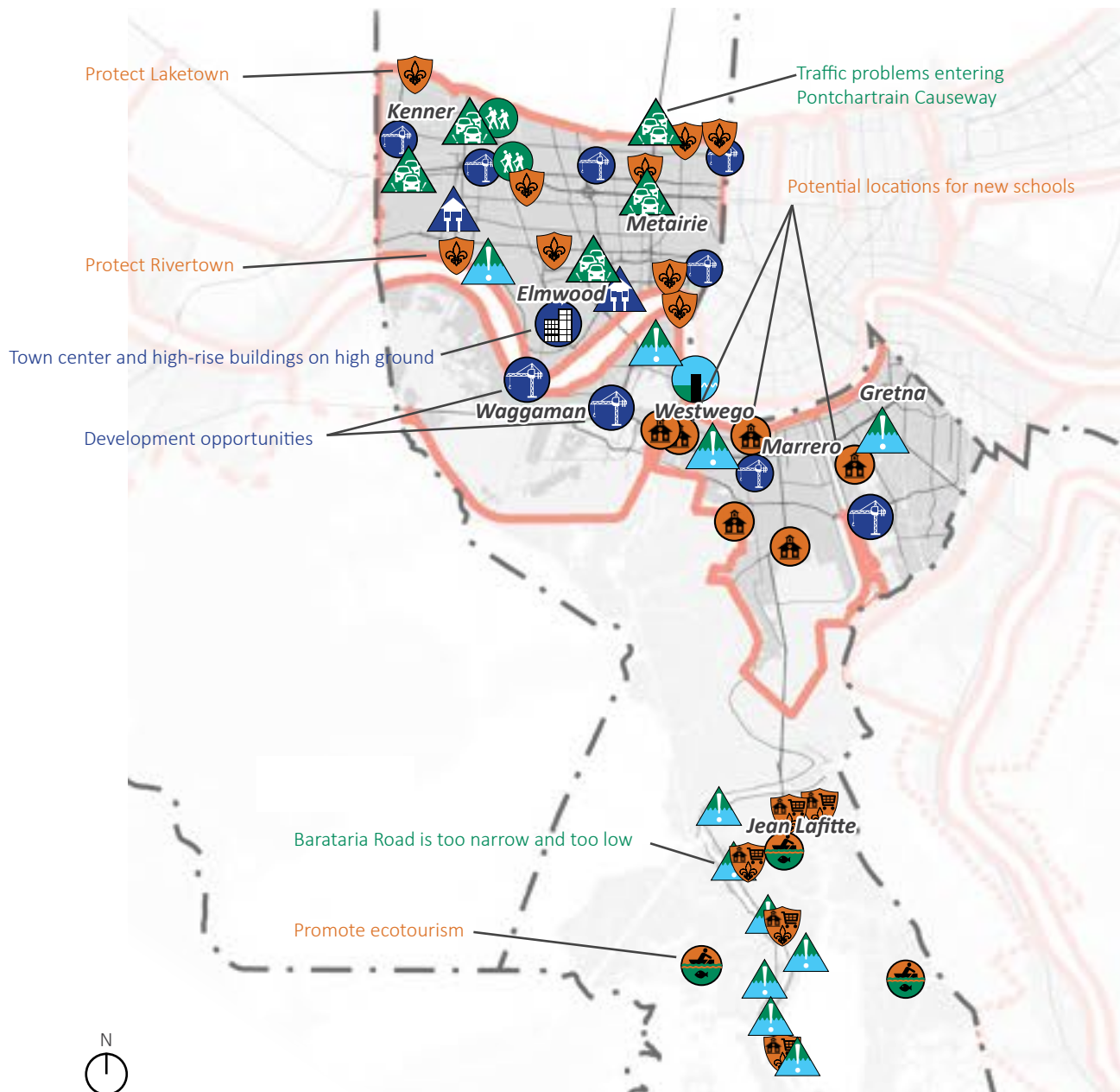
Lafitte

Lafitte residents' primary concern was the preservation of the water economy and the stabilization of home values and cost of living. Residents pointed out that flood insurance and wind insurance, if structures are elevated, are factors that compel some residents to move away and decrease the community's quality of life. To combat this, participants recommended raising the entire community, adding floodwalls, rewriting insurance policies to reduce premiums, and supporting programs to elevate or protect homes prior to disasters, rather than waiting for the aftermath. Economic and cultural issues centered on fishing, recreation, and ecotourism. Residents suggested strategies including swamp tours, a curriculum focused on environmental education, a commercial fishing village, aquaculture development, environmentally oriented attractions for visitors, and water management and restoration jobs.

Maps of Meeting 2 Locations

Jefferson Parish Meeting 2 maps show elevation, wetlands, and future land loss to illustrate future areas of high ground.

Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; For all basemap data see References



CROWD-SOURCED LAND USE MAP

This map compiles all the drawings and notes that residents placed on their activity maps. This indicates the types of interventions they envision across the parish. The colors of the icons correlate to the types of interventions suggested.





Sources: For all basemap data see References

Legend




ECONOMY & JOBS

-  General Economic Investment
-  Industry/Economic Investment
-  Housing & Development
-  Job Centers
-  Seafood Industry




ENVIRONMENT & SUSTAINABILITY

-  Parks & Nature Trails
-  Bike Trail
-  Multimodal Transportation
-  Traffic Problem



COMMUNITY & CULTURE

-  Cultural Assets
-  Schools & Educational Assets
-  Groceries & Amenities
-  Recreational Fishing & Ecotourism

FLOOD RISK REDUCTION

-  Flood Protection
-  Rainwater Retention Area/Nature Preserve
-  Flooding Problem

TYPE OF ICON

-  Asset/area to be protected
-  Potential new/improved asset

Round 3 Meetings

During Round 3, residents completed three activities. The first consisted of a set of polling questions about the strategies LA SAFE should pursue in the parish. Residents responded using clickers, and the results were captured and displayed in real time. For the second activity, residents rated their level of agreement with vision statements for three typological risk levels in the parish. In the third activity, residents rated to program, policy, and project strategies that were based on resident input provided during previous meetings.

Round 3 Meeting Outcomes

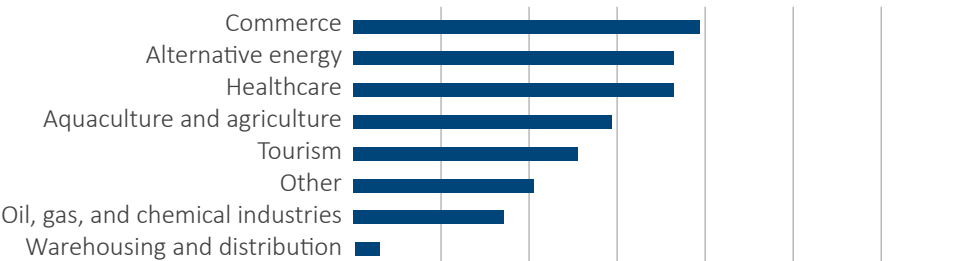
When residents were asked what they believed to be the most important issue for the future of Jefferson Parish, the majority said education, followed by healthy and safe environments. Commerce, alternative energy, and healthcare were the top job opportunities Jefferson Parish residents would like to see expanded. When asked about stormwater management, more than 35% of residents believe investing in and incentivizing green infrastructure—such as rain gardens, green roofs, bioswales—as the best strategy.



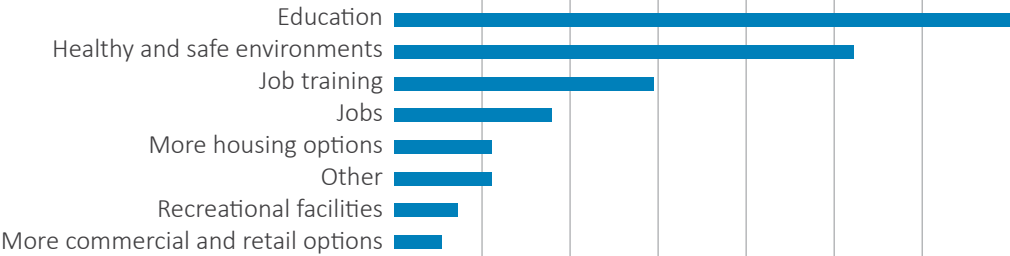
The Round 3 meeting was held at Mel Ott Recreation Center.

Activity 1 Responses

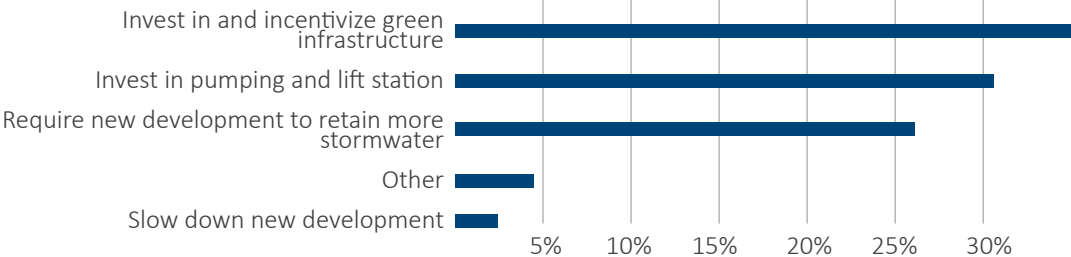
Q6: Which types of job opportunities would you like to see expanded in your parish?



Q7: Which of the following is most important in envisioning a future Jefferson Parish?



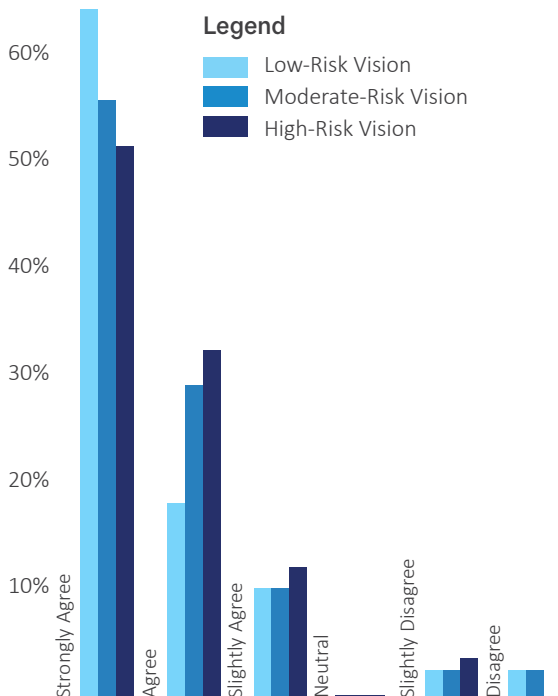
Q8: To improve stormwater management, Jefferson Parish should do which of the following?



In the second activity, the LA SAFE team presented a vision for the parish based on resident input received at previous meetings and future flood risk data. The vision that the team presented was organized into five planning categories and three risk levels: high-risk, moderate-risk, and low-risk. Residents evaluated the vision for each risk level using their clickers. More than 90% strongly agreed, agreed, or slightly agreed with the vision for each risk level. These vision drawings and the text displayed at the meeting are shown on the right.

More than **90%** of Meeting 3 participants agreed with the visions presented at each risk level.

Activity 2 Responses



Visions Presented at Round 3

The images below are the PowerPoint slides and description summaries of the visions that residents responded to using their clickers.

Low-Risk Vision



What we expect over 50 years:
Minimal flood risk
Economic growth
Population increase

Vision

A future with denser residential and mixed-use development, increased transportation options, economic development, improved stormwater management, and more community amenities.

Moderate-Risk Vision



What we expect over 50 years:
Land loss in surrounding areas | Moderate local flood risk
Not much change in population

Vision

A future with consolidated and elevated services and amenities, elevated housing, enhanced stormwater management, and waterways optimized for transportation and support of industry.

High-Risk Vision



What we expect over 50 years:
Land loss | High flood risk | Decline in population

Vision

A future with elevated homes, safe evacuation routes, an expanded recreational and ecotourism industry, and infrastructure to support the seafood industry and seasonal workers.



Meeting 3 Activity
Residents choose strategies they like and dislike.

Activity 3 focused on the range of projects, programs, and policies that LA SAFE could implement. Each table group evaluated 16 – 20 strategies within three of the five planning categories. Residents discussed the strategies shown and used green and red stickers to identify strategies they liked and disliked.


The list to the right shows the highest-rated strategies from each planning category organized within subcategories. Strategies within each subcategory are listed by popularity. Strategies that received high scores are represented by darker colors and are listed below each subcategory. Less popular strategies are represented in the lighter color and are not individually listed.

The results from this activity illustrate the strategies that most interested the Jefferson Parish meeting participants. After the meeting, the LA SAFE team used these results to begin forming projects, programs, and policies that honor resident preferences.

Top Strategies from Activity Three
The following categories emerged as a result of resident feedback from Meetings 1 and 2 and were introduced as an organizational framework in Meeting 3.




STORMWATER MANAGEMENT

- 

Improved Water Management Policies and Programs

 - Improved parish drainage system
 - Cross-parish stormwater management strategy
 - Culvert/ditch maintenance
 - Debris removal from inland waterways

- 


Green Development

 - Drainage requirements for new developments
 - Pervious paving
 - Community gardens and planting programs

Green Streets




HOUSING AND DEVELOPMENT

- 


Denser Development

 - Increased affordable housing options
 - Senior/elderly specific housing
 - High-density, mixed-use zoning along target corridors

- 

Home Elevation

 - Homeowner tax credit for elevating homes

- 

Town Square Development

 - Walkable, commercial town center
 - Recreational town square

- 

Remove Blight

 - Program to restore abandoned property to natural condition



Alternative Development



TRANSPORTATION

Biking and Walking Paths

- Complete Streets
- Hike and bike nature trails
- Paved bike paths connecting community and recreation
- Wetland walking trail
- Increase walkability and sustainable streetscape
- Green levees

Alternative Transit

- Commuter and regional rail
- Shuttle service for seniors and/or specific programs
- Improve public transportation across parish lines
- Emergency boats for disasters

Upgrade Transportation Infrastructure

- Improved evacuation routes



EDUCATION, ECONOMY, AND JOBS

Support Commercial Fishing

- Expand boat harbors
- Certify, label, and promote authentic Louisiana seafood
- Commercial fishing
- Local financial assistance and loans for fishers

Create Jobs

- Job opportunities in renewable energy
- Business incubator to help residents start new businesses
- Support growth in creative industries and information

Improve Education

- Add environmental/coastal management to K – 12 curriculum

Increase Tourism

Job Training

- Coastal restoration construction jobs and training
- Job training programs



CULTURE AND RECREATION

Youth Activities

- Support culturally focused camps and after-school programs
- Summer camp restoration programs
- Playgrounds that teach about living with water
- Hands-on environmental curriculum and field trips

Community Spaces

Water-Based Recreation

- Public boat docks
- Recreation destinations with access to water

"I like business incubators and satellite education facilities."

—Jefferson Parish Resident, Round 3 Meeting

"I like job opportunities in renewable energy—connect this with hands-on environmental curriculum and field trips."

—Jefferson Parish Resident, Round 3 Meeting

Round 4 Meetings

The purpose of the Round 4 meetings was to introduce and collect input on draft project proposals that were developed based on previous community input. Responses to these materials would then be used to refine the multitude of recommendations from the Round 3 meeting into six final project proposals that would be presented and evaluated in Round 5.

For the Round 4 meetings, the LA SAFE team engaged parish officials and stakeholders at two roundtable discussions followed by community open houses at the same venues. The meetings were held in Gretna on Oct. 17, 2017 and in Metairie on Oct. 18. These events provided opportunities for the LA SAFE team to receive feedback on the vision statements and possible adaptation strategies from parish staff, residents, and other stakeholders.

Roundtable Discussions

At the roundtable discussions, the LA SAFE team met with parish government officials and staff, as well as representatives of the Jefferson Parish Economic Development Commission (JEDCO) and Second Harvest Food Bank. Attendees reviewed and responded to the LA SAFE vision for Jefferson Parish as well as draft project and program concepts. They discussed the concepts and shared their perspective on implementation feasibility, maintenance, and alignment with ongoing parish efforts. The discussions helped the LA SAFE team understand existing parish strategies and challenges and how LA SAFE strategies can support and complement work already being done.



Roundtable Discussion

Parish officials discuss ideas with the LA SAFE team at the roundtable discussion in Gretna, top, and Metairie, bottom.

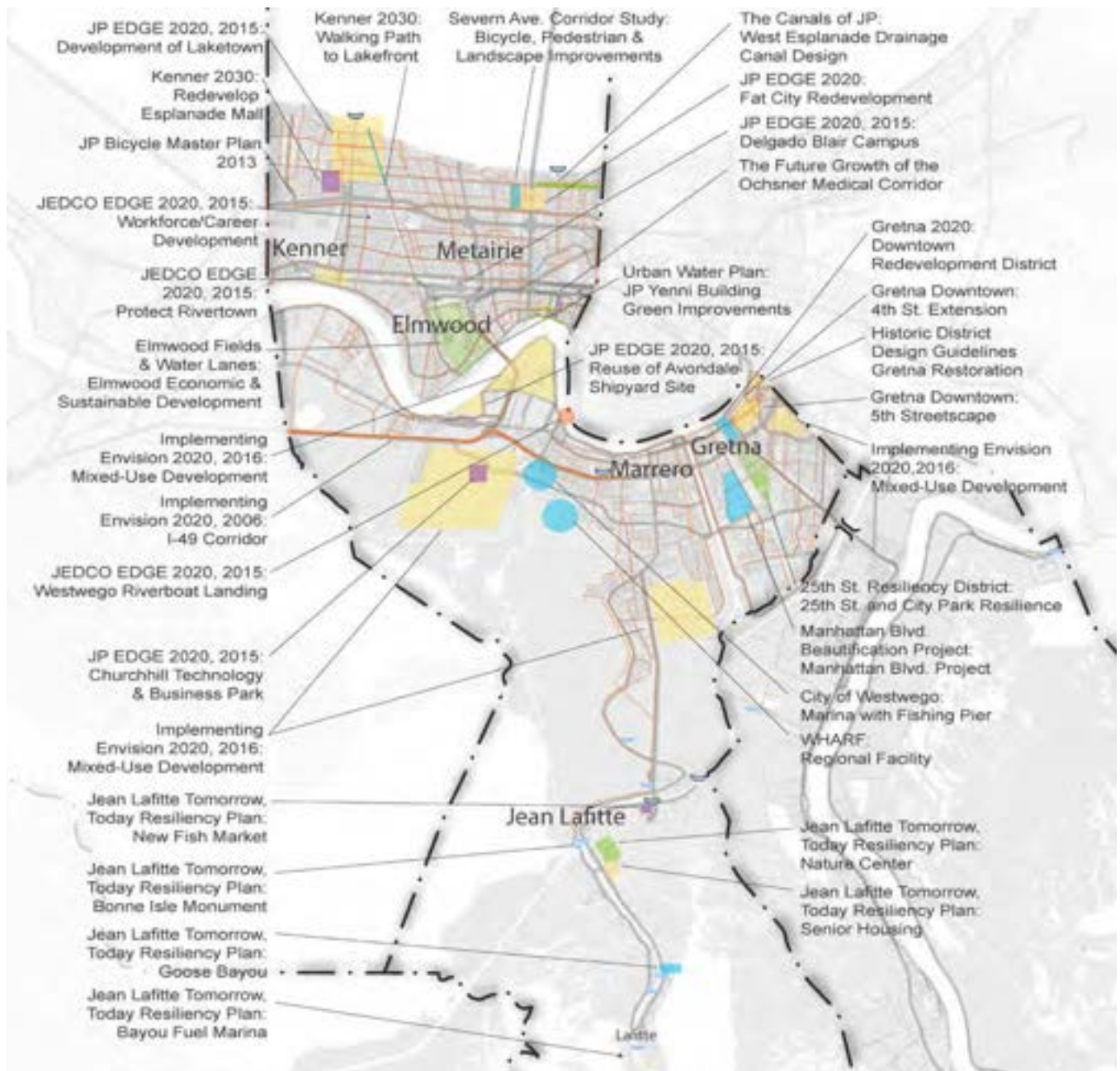


Potential Projects

LA SAFE team member discusses project concepts with Jean Lafitte Mayor Tim Kerner.

“There are ways to do stormwater management. We are looking at ways to do permeable pavement.”

—Jefferson Parish Official, Round 4 Meeting



EXISTING EFFORTS MAP

The LA SAFE team researched and compiled recommended projects from all recent Jefferson Parish plans. The map also shows planned transportation improvements that connect to Plaquemines Parish. This exercise revealed the existing efforts already underway. LA SAFE can leverage existing projects, avoid duplication, and narrow down the most effective interventions.

Sources: For all basemap data see References

Legend

- Economy, Education, Jobs
- Stormwater Management, Green Space
- Transportation
- Culture, Recreation
- Housing, Development
- New Transit Route
- Roadway Improvement
- Bike Path
- Bridge
- Boat Launch
- Public Boat Launch

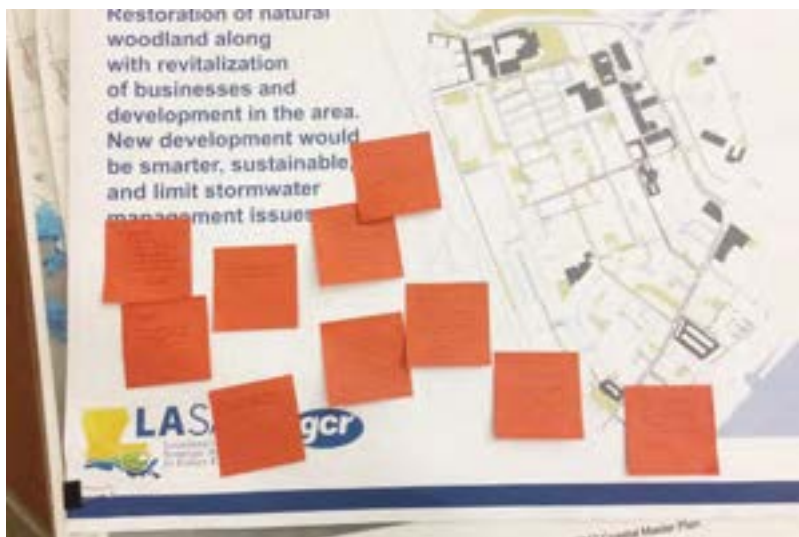
Roundtable Discussion

Gretna City Council members discuss project ideas with LA SAFE team members at the Gretna roundtable discussion.



Resident Feedback

Residents asked questions about the potential projects and gave feedback on sticky notes.



Project Boards

At the Round 4 meetings, mapped flood risk projections and six project concept ideas were displayed on boards.





Existing Efforts Map

A resident discusses the planning efforts already underway with an LA SAFE team member.



Potential Projects

LA SAFE team member explains a project concept with a parish resident.

Public Open Houses

Following the roundtable discussions, the meeting rooms were opened to the public to discuss the same content with residents. Information boards around the room summarized LA SAFE background information, the LA SAFE vision for Jefferson Parish, an existing efforts map, and draft project concepts. LA SAFE team members discussed the material one-on-one with residents and answered questions. Residents left comments and notes on the draft project boards.

Round 4 Meeting Outcomes

The parish roundtable meetings focused on stormwater management, subsidence, and resilient development. One major concern discussed among representatives at the stakeholder meeting was current and future development. They suggested incentives for new development to include pervious paving, water retention, and minimal concrete. Compared to pumping systems, stakeholders believed rain gardens and retention ponds to be a more effective long-term solution. Repurposing old development and incentivizing green development were cited as more cost prohibitive but safer for the future of the parish.

At the open houses, residents were most concerned about jobs, businesses, and transportation. Some residents suggested investing more in the fishing industry, local businesses, and ports to generate more taxable income for Jefferson Parish. Residents would also like to connect more bike lanes from New Orleans and New Orleans City Park to Metairie.

“Environmental conscience is really important. We face an infinite number of hurdles to realize opportunities we are talking about.”

—Jefferson Parish Official, Round 4 Meeting

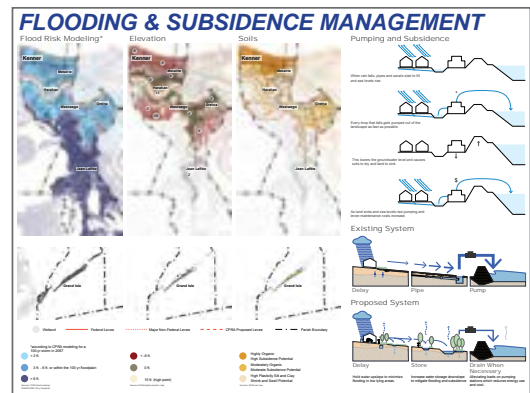
Round 5 Meetings

In the final round of Jefferson Parish meetings, residents gathered on Dec. 7, 2017 at the Mel Ott Recreation Center to evaluate the culmination of planning work that took place during the year. Information boards around the room and a video loop summarized the results from previous meetings, presented flooding and land loss information, and proposed a future vision for the parish that included physical interventions and policy recommendations. An additional meeting for Vietnamese- and Khmer-speaking residents was held on Dec. 20. Residents who speak these languages and live in Lafourche, Plaquemines, and Terrebonne Parishes were also invited.

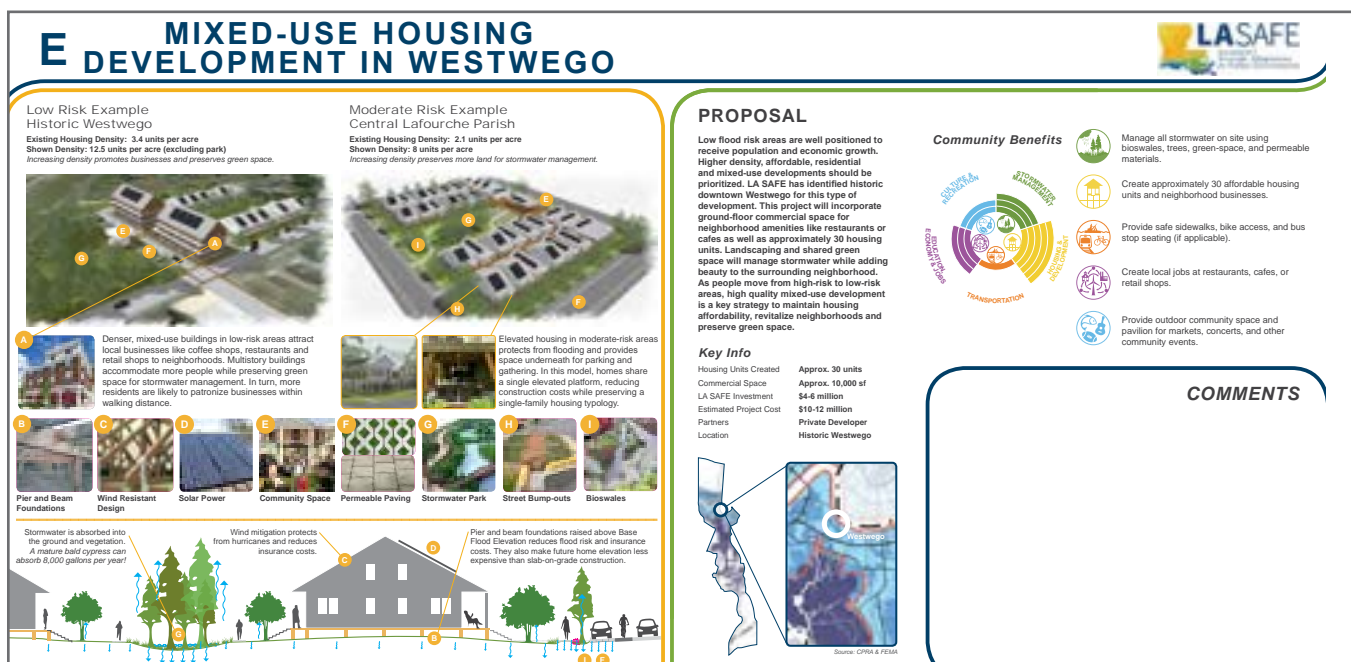
The central purpose of the meeting was for residents to evaluate and rank six catalytic projects that were collected in response to resident input collected during the previous four rounds of meetings. Each project is designed to provide multiple community benefits and support long-term sustainability. The project boards provided detailed descriptions, concept drawings, and example images along with information on estimated cost, location, area, and potential partners to give residents an idea of what implementation of each project would entail. Jefferson Parish residents commented on each project and participated in a poll to rank their preferences.



The Round 5 meeting was held at the Mel Ott Recreation Center.



The flooding and subsidence board shown at the meeting. This board was one of 12 informational boards that communicated the process and goals of LA SAFE.

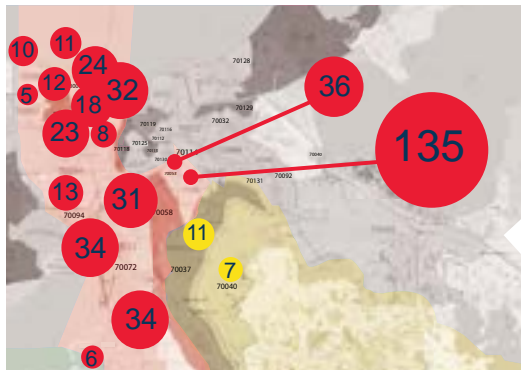


One of the six project boards shown at the meeting. All six projects are described in detail in Chapter 5.

Polling Process

At the meeting, residents were given six tokens: two gold tokens worth two points each, two green tokens worth one point each, and two blue tokens worth no points. Residents were instructed to place one token in each of six tubes that represented the six projects. At the end of the night, paper covers were removed from the tubes, revealing their contents. The color composition of each tube indicated the relative popularity of each of the projects, with gold being most popular and blue least popular. After the reveal, all points were counted. A board at the polling station explained how the public preference polling contributes to the larger selection criteria.

Knowing that some geographic bias was inevitable, LA SAFE also promoted an online version of the poll for three weeks following the meeting. In all, 396 Jefferson Parish residents from around the parish cast their preferences.



Participation Across the Parish

The map shows the geographic distribution of meeting attendees and online poll participants. The circle size and number correspond to number of participants from each zip code.

Resident Participation by Zip Code

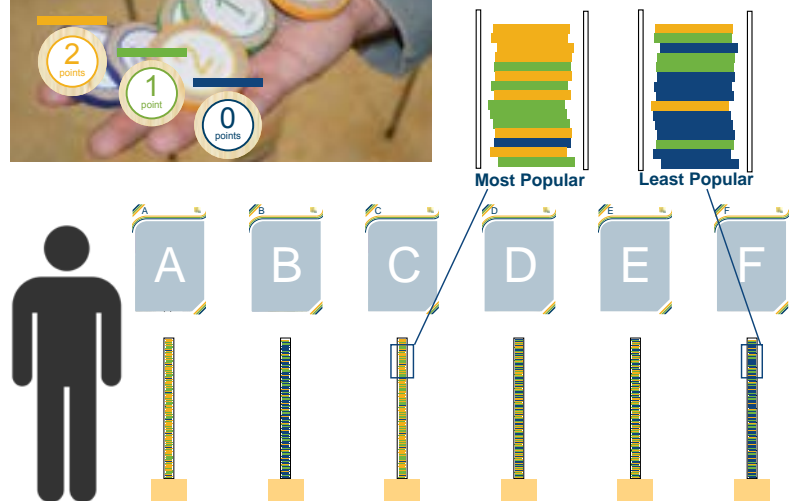
70053—135 responses	70123—23 responses
70056—36 responses	70001—18 responses
70067—34 responses	70094—13 responses
70072—34 responses	70003—12 responses
70005—32 responses	70006—11 responses
70058—31 responses	others—33 responses
70002—24 responses	



Residents evaluate one of the six catalytic projects.



Preference tokens at the meeting.



Residents cast their preferences at the Gretna meeting.

Round 5 Meeting Outcomes

Below is a summary of each of the six catalytic projects meeting participants were invited to review.

See the full project proposals in Chapter 5.



A: GRETNA RESILIENCE DISTRICT KICKSTART

This project will kick-start two major components of the Gretna Resilience District: Gretna City Park and the 25th St. Canal. Blending green infrastructure and stormwater management with functional amenities, the park and canal will provide quality of life enhancements and reduce flood risk in an area with a high concentration of severe repetitive loss properties.



B: RE-GREEN ELMWOOD

Re-Green Elmwood is a model for sustainable mixed-use design, introducing natural elements, landscaping, permeable paving, and other green infrastructure that will reduce flooding and enhance and promote Elmwood's future economic and residential potential.



C: LOUISIANA WETLANDS EDUCATION CENTER

A destination for students, families, researchers, and ecotourists, this education center will have activities and exhibits that showcase wetland ecosystems, preservation and adaptation strategies, and traditional arts and crafts of the people who live in the wetland areas. The building will model best practices for construction techniques in high-risk areas.



D: FAT CITY GREEN BLOCK

The Green Block strategy includes the redevelopment of part of a block in Fat City and proposes a phased introduction of public amenities and recreational green space designed to manage stormwater and reintroduce natural elements into dense hardscape. The stormwater management retrofits can be duplicated in parks or vacant property across the parish, expanding access to recreation and walkability, while reducing flood risk.



E: MIXED-USE HOUSING DEVELOPMENT IN WESTWEGO

This mixed-use housing prototype in Westwego will incorporate ground floor commercial space for neighborhood amenities like restaurants or cafes as well as approximately 30 housing units. This prototype will model land use and building design strategies that can be replicated in other high-ground areas and serve as a neighborhood revitalization example in a formerly industrial area.



F: AIRLINE AND ROOSEVELT LINEAR PARKS

The Airline and Roosevelt Linear Parks introduces a linear community space adjacent to Airline Hwy. between the Soniat Canal and Roosevelt Blvd. The park will provide stormwater management features, offer recreational opportunities, and support complementary community revitalization efforts for an underserved area of Jefferson Parish.

Poll Results

The poll results from the meeting, shown below, directly impacted the catalytic project selection process, weighted at 20% in the overall selection score. Jefferson Parish residents most preferred the Gretna Resilience District Kickstart project, followed by the Louisiana Wetlands Education Center.



“Meets multiple demands, and will be a great kick start for a rejuvenation of this area.”



“Permeable paving—this would be a great area for implementation.”



“Great project for the community and for the state. Promotes environmental awareness and issues. Great educational benefits.”






“I like [the] creation of community space within this town center.”



“Well-thought-out—especially community green space opportunities.”

Legend

-  Online poll
-  Vietnamese- and Khmer-speaking meeting
-  English-speaking meeting



“This project would be of big assistance in revitalizing neighborhoods so it will have an ancillary effect.”

—Jefferson resident comments on the catalytic projects



2 Hazards and Vulnerabilities



Barrier Islands and Wetlands

Barrier islands and wetlands, such as Grand Isle and the Barataria wetlands, provide a natural defense against storm surge.



RESIDENT OBSERVATIONS

Resident observations from Round 2 of community meetings, held in Metairie, Marrero, and Lafitte in Jefferson Parish.

Sources: For all basemap data see References

Due to its geographic location, Jefferson Parish is susceptible to the impacts of tropical storms and relative sea level rise. Effects of these two significant hazards include storm surge, heavy precipitation, land loss, sea level rise, and subsidence—all of which are connected and have a collective impact that increases flood risk and coastal erosion in Jefferson Parish.

Asset

Things such as buildings and infrastructure, natural features, cultural artifacts and traditions, knowledge, social bonds, systems, and networks—whether tangible or intangible—that are deemed to be of value to an individual, organization, or community.

Risk

Exposure to the possibility of experiencing negative consequences that may arise when hazards interact with vulnerable people, property, areas, or environments.




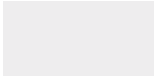

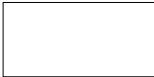

Hazard

Any substance, phenomenon, or situation that has the potential to cause disruption or damage to people, their property, their services, and/or their environment.

Vulnerability

Constraints of an economic, social, physical, or geographic nature that increase exposure to risk and/or reduce the ability to prepare for and cope with the impacts of disasters and disruptions.

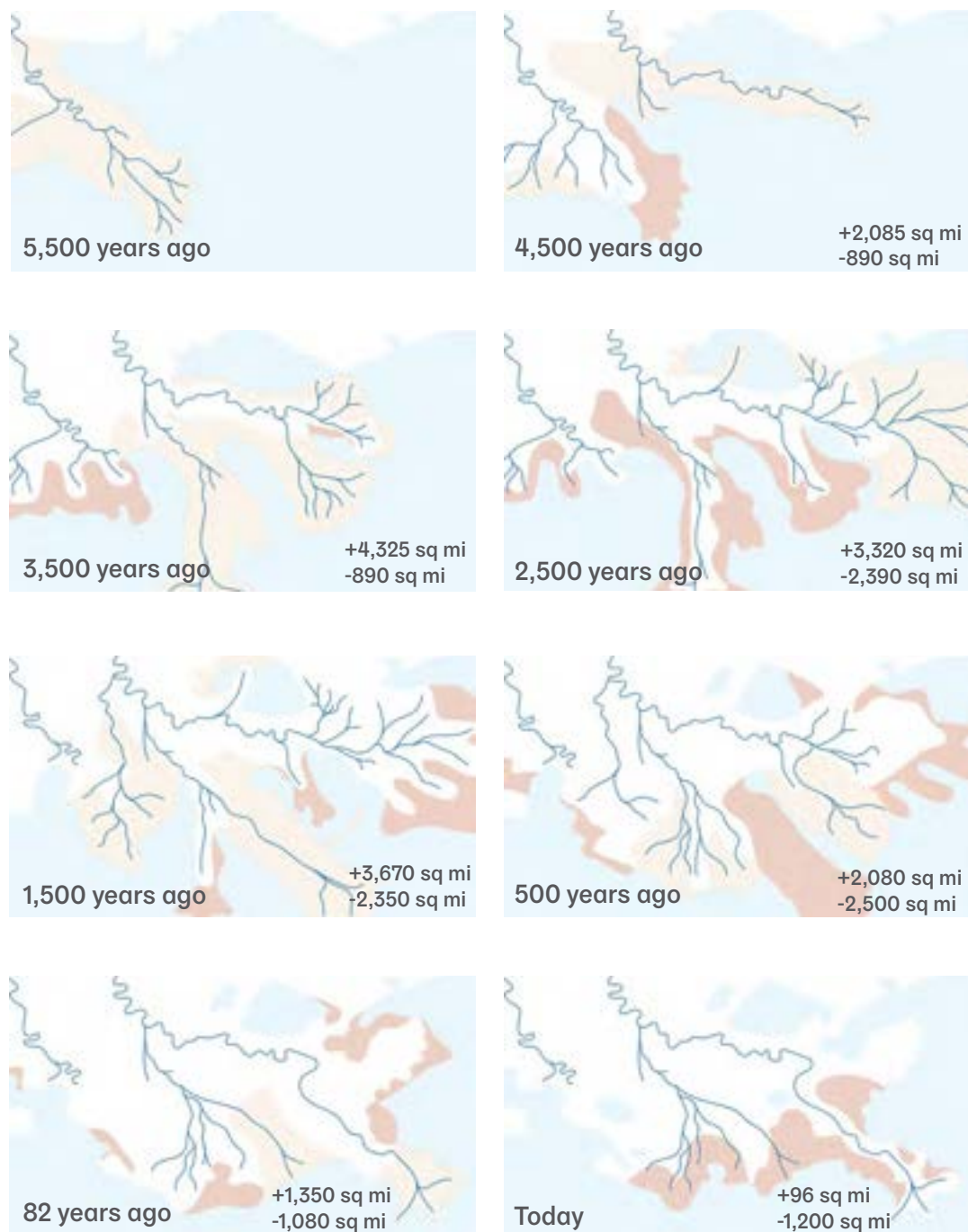
Legend

	Federal Levee (HSDRSS)		Land
	Non-Federal Levee		Wetlands
	CPRA Proposed Levee		Water
	Parish Boundary		



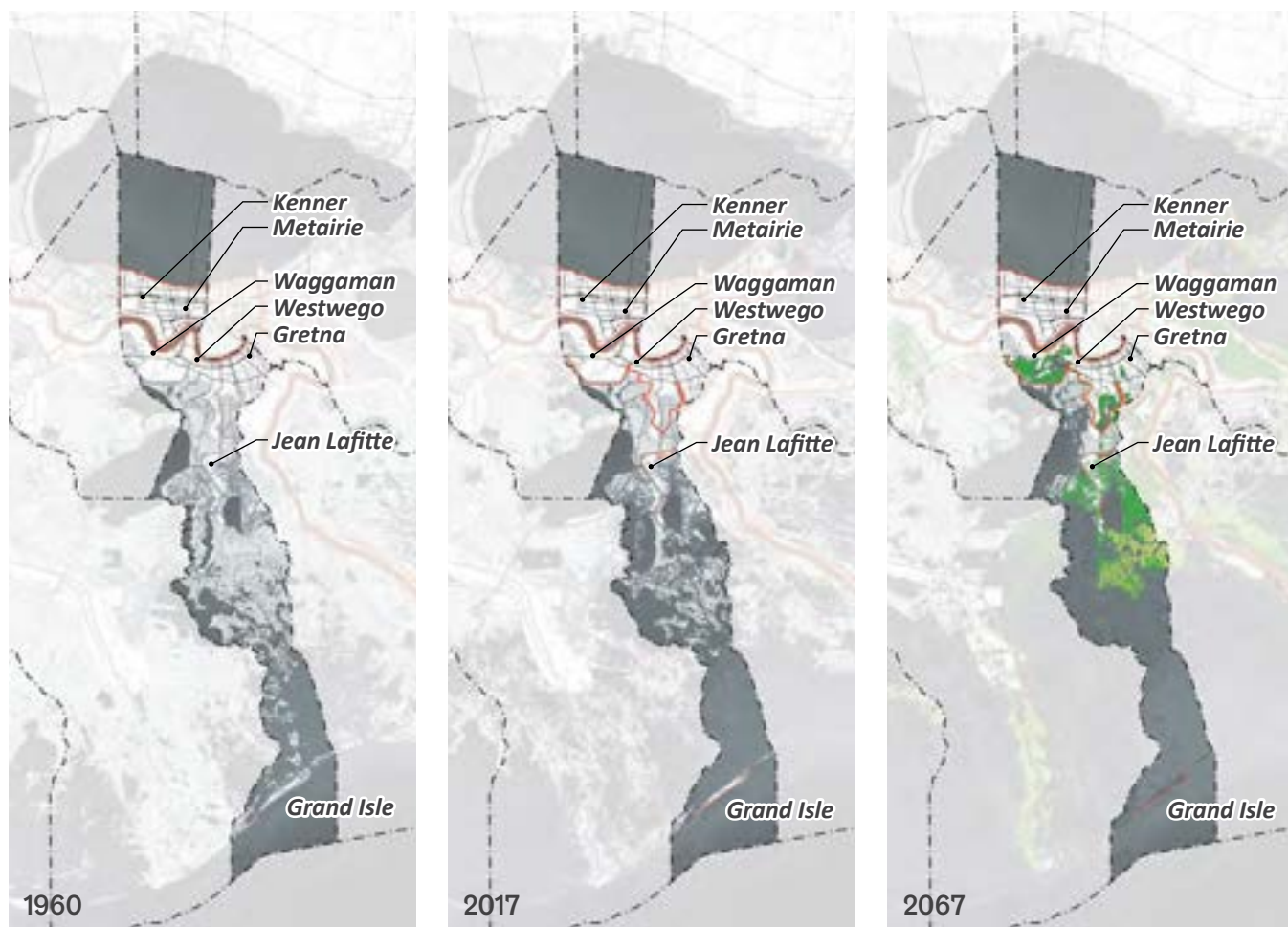
Land Loss

Jefferson Parish’s entire landmass was built over thousands of years by sediment from the Mississippi River and connecting distributaries. Annual flooding from the Mississippi River and its distributary Bayou Barataria brought sediment that was then deposited throughout the area as they overflowed their banks and discharged into marshes and estuaries. This sediment input build natural levees along the river and bayou’s banks and countered the effects of coastal erosion. However, when levees were constructed along the lower Mississippi River Basin to mitigate river flooding, they choked off the sediment supply to the parish and stopped the natural land-building process.



DELTA EVOLUTION

Sources: Adapted from *The Times-Picayune* | nola.com graphic from historic data based on Frazier, 1967, and *The Delta Cycle and Land Change Area in Louisiana Coastal Plain, 2014*; Adapted from *Changing Course*, Baird Team graphic



LAND LOSS MAPS

Land change along the Louisiana coast from 50 years ago to today and CPRA's predicted land loss, gained, and maintained under the Medium Environmental Scenario over the next 50 years as an outcome of implementing 2017 Coastal Master Plan projects.

Sources: CPRA Land Loss Modeling Data 2017 for a Medium Scenario; For all basemap data see References

Legend

- Land Lost/Open Water
- Land Maintained
- Land Gained
- Wetlands
- Land
- Federal Levee (HSDRSS)
- Non-Federal Levee
- CPRA Proposed Levee
- Parish Boundary

In addition to building levees that have contained the sediment supply from the Mississippi River, other human activities have also contributed to subsidence and erosion. Man-made causes of subsidence and erosion include oil and gas extraction, groundwater pumping, and marsh channelization. Extraction and pumping remove fluids and gases from the ground, leaving empty space into which the surrounding soil falls, causing subsidence.^{3,4} The creation of navigation channels and canals through marshes has accelerated erosion rates by increasing the area of marsh exposed to wave action and saltwater.

The land in Jefferson Parish is becoming increasingly fragile due to the lack of new sediment deposits, erosion, subsidence, and the effects of sea level rise, which further erodes land and wetlands, especially in the southern part of the parish.

From 2010 – 2016, Louisiana lost land at a rate equal to a football field every 100 minutes.⁵

Flood Risk

Flood risk is a product of the climate, geography, and socioeconomic profile of Jefferson Parish, and the threat is pervasive. As a coastal parish in a humid subtropical climate, Jefferson Parish is susceptible to tropical storms and the storm surge and precipitation they bring, all of which pose significant flood risk. Jefferson Parish also has high rates of annual precipitation and must manage stormwater to reduce flood risk. Sea level rise, increasing severity and frequency of weather, and subsidence continue to erode land, reshaping Jefferson Parish's coastline and increasing flood risk in areas previously considered safe from flooding associated with storm surge and precipitation. Poverty, limited access to jobs and training, and an aging population are socioeconomic vulnerabilities that exacerbate the magnitude of threat presented by these risks. Furthermore, though the hurricane protection system in Jefferson Parish provides risk reduction against storm surge, this system alters the natural hydrology of the area which can lower the water table and cause subsidence. As land sinks within the levee walls and the levees themselves form what is essentially a bowl in which precipitation quickly accumulates, forced drainage is required to reduce flood risk from rainfall within the levee system. Flood risks threaten the economies, infrastructure, populations, and the irreplaceable culture of Jefferson Parish.

Precipitation

Precipitation in Jefferson Parish primarily takes the form of rain, though hail has occurred occasionally with severe weather systems. The current precipitation rate for Jefferson Parish is approximately 63.5 inches per year.⁶ In the future, more intense downpours in shorter time periods are expected to occur more frequently. As a result, flood risk from precipitation is increasing because current stormwater management infrastructure and practices were not designed for these more intense precipitation patterns.

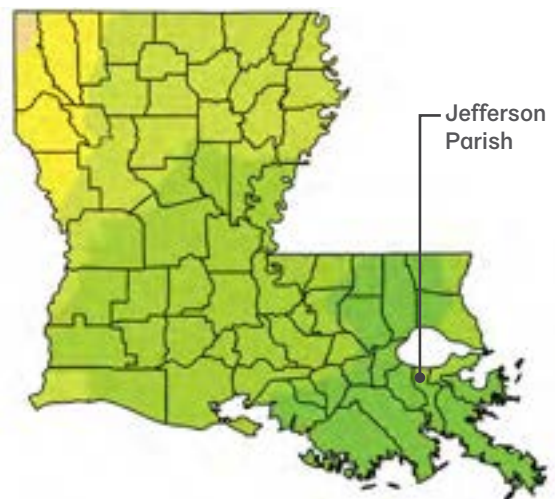
Storm Surge

Storm surge is an increase in water height caused by strong winds, often associated with a hurricane that produces vertical circulation below the water surface and elevates the water height. When a storm approaches land and encounters shallower water, the water piles up to a greater height. Combined with sea level rise, the impacts of storm surge are felt farther inland, affecting communities that were once protected by surrounding wetlands.



Flooding from Rainfall

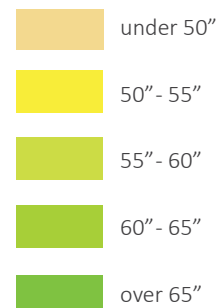
The Soniat Canal nearly reached its capacity during heavy rainfall.



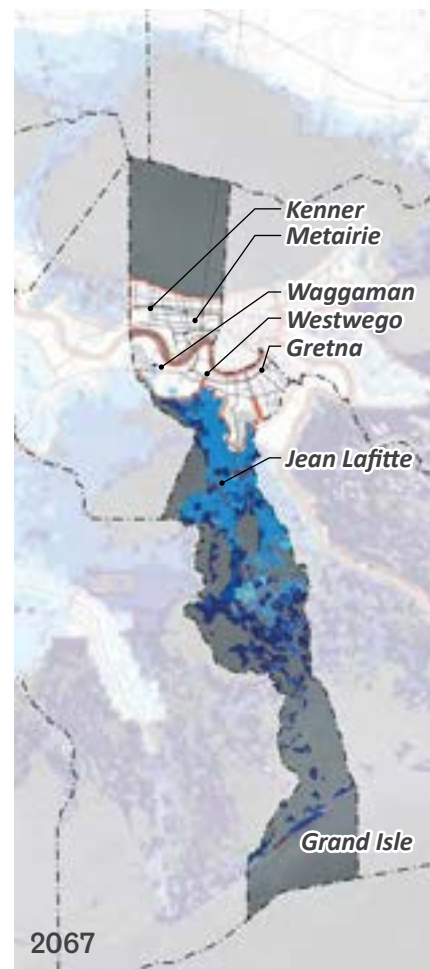
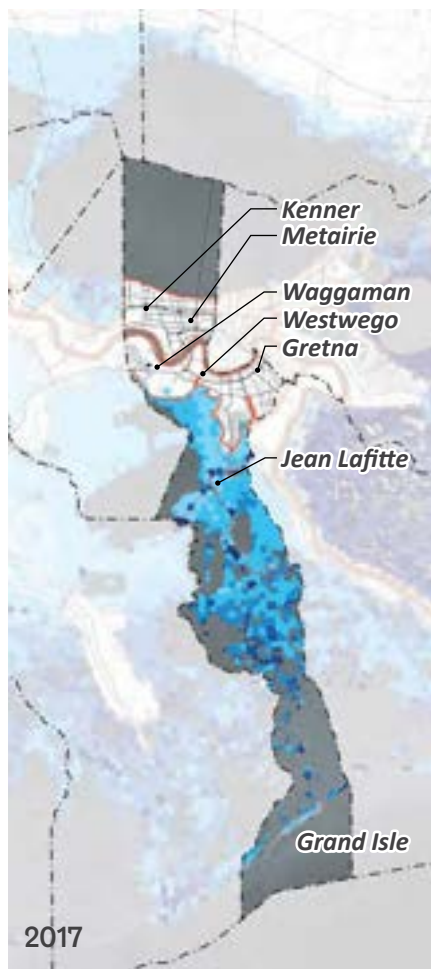
Louisiana Average Annual Rainfall Distribution

Adapted from: LSU Ag Center, "Precipitation Patterns over the Bayou State"

Annual Inches of Rainfall



The current precipitation rate for Jefferson Parish is approximately **63.5 inches** a year.



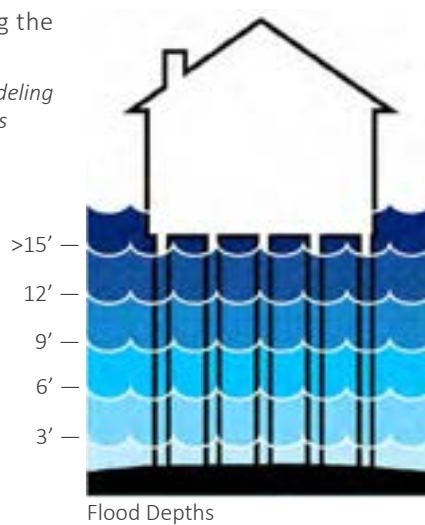
FLOOD RISK MAPS

Flood depths today, 25, and 50 years from now under the Medium Environmental Scenario as an outcome of implementing the 2017 Coastal Master Plan projects.

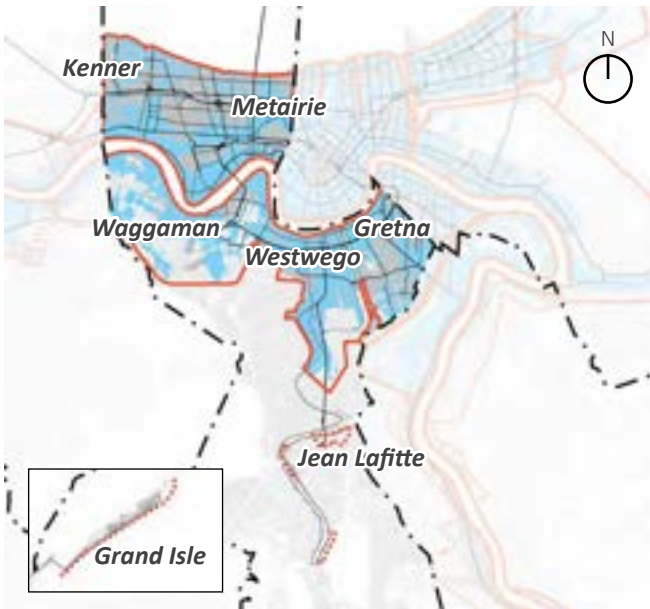
Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; For all basemap data see References

Legend

- Water
- Wetlands
- Land
- Federal Levee (HSDRSS)
- Non-Federal Levee
- CPRA Proposed Levee
- Parish Boundary



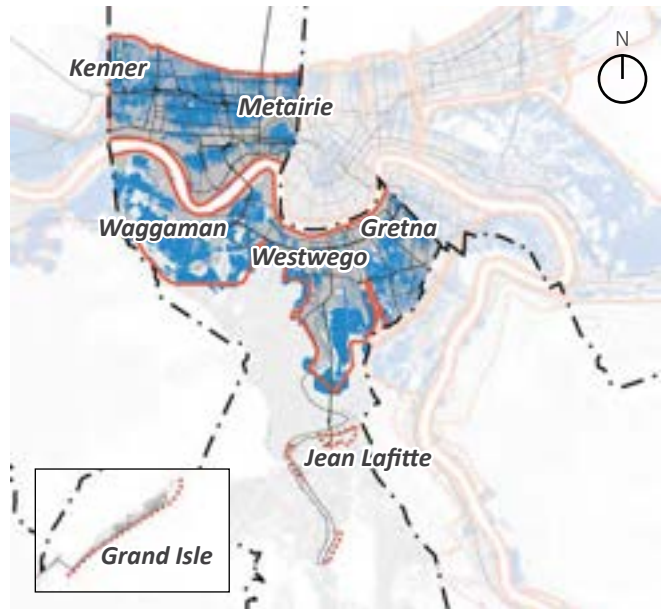
Jefferson Parish may experience up to \$500 million future economic damages due to storm surge-based flooding.⁷



Low Risk

Minimal storm surge flood risk projected and outside the current 100-year floodplain

Areas that currently have development opportunities to receive populations and economic activity from more flood-prone areas.



Moderate Risk

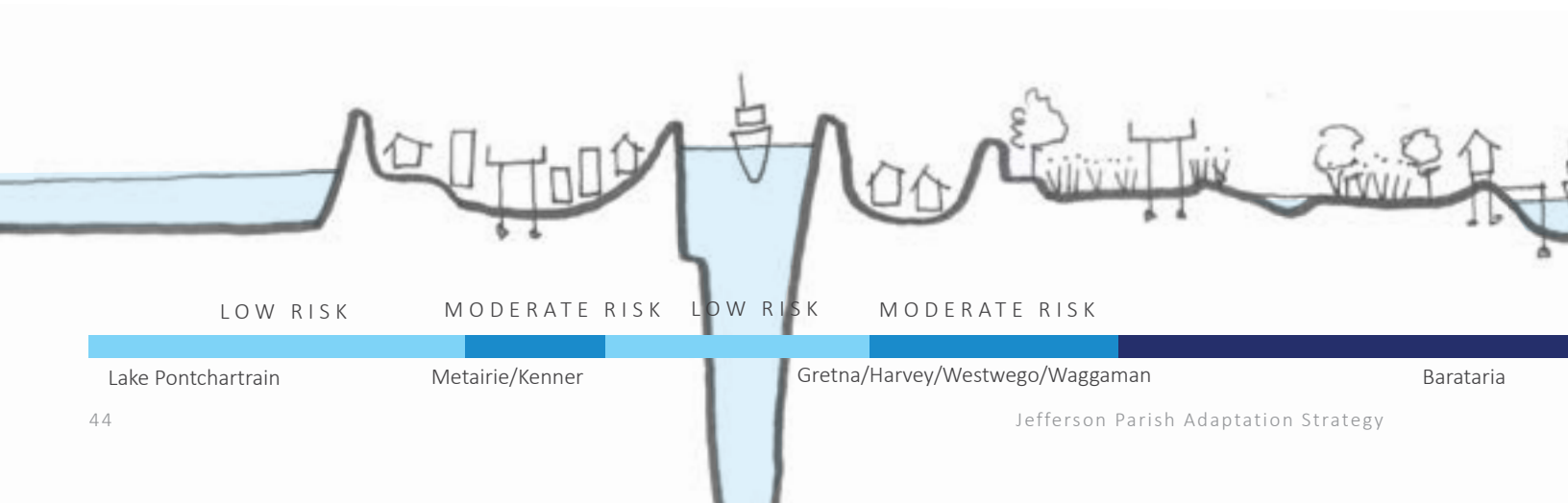
>0 – 6' projected storm surge flood depths or within the current 100-year floodplain

Areas conducive to maintaining current population levels and economic trends provided such communities orient future development and mitigation activities in alignment with future flood risk projections.

FLOOD RISK ZONES

Risk scenarios are based on CPRA's 50-year flood depth projections under a Medium Environmental scenario and FEMA's effective DFIRM floodplain data.

Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2018; For all basemap data see References












High Risk
 >6' projected storm surge flood depths

Areas that can expect to experience population decline and economic losses, up to and including full community-scale resettlement, as environmental conditions deteriorate and repetitive severe flood events take place.

Legend

-  Land
-  Wetlands
-  Water
-  Federal Levee (HSDRSS)
-  Non-Federal Levee
-  CPRA Proposed Levee
-  Parish Boundary

LA SAFE seeks to mitigate the threat of growing flood risk by encouraging smarter development patterns in lower-risk areas.





COMBINED FLOOD RISK ZONES

Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2018; For all basemap data see References

CPRA + NFIP FIRM

STORM SURGE



The map shows 2067 flood risk from storm surge for a medium scenario or a 100-year storm.

STORM SURGE

RAINFALL



Additionally, areas within levees and in a 100-year floodplain are shown as a moderate-risk zone, as these zones flood during heavy rainfall.

Legend

Low Risk

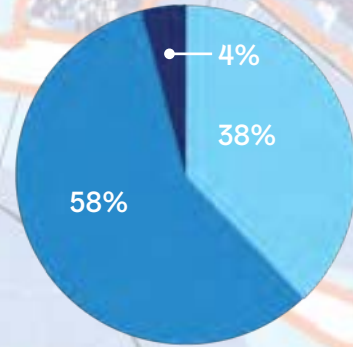
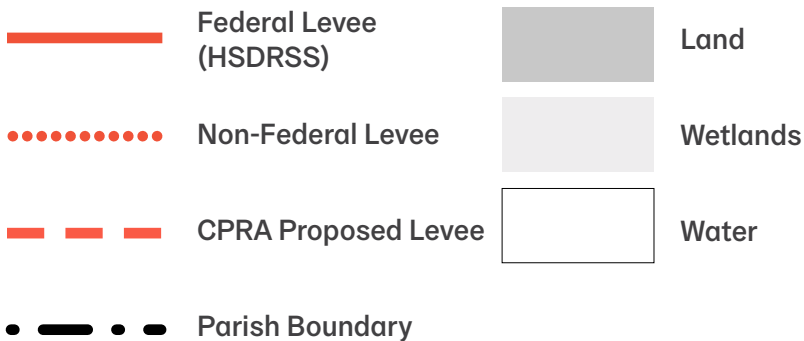
Minimal storm surge flood risk projected and outside the current 100-year floodplain

Moderate Risk

>0 – 6' projected storm surge flood depths or within the current 100-year floodplain

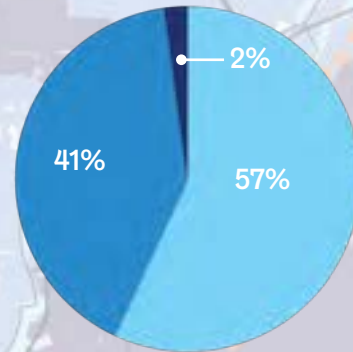
High Risk

>6' projected storm surge flood depths



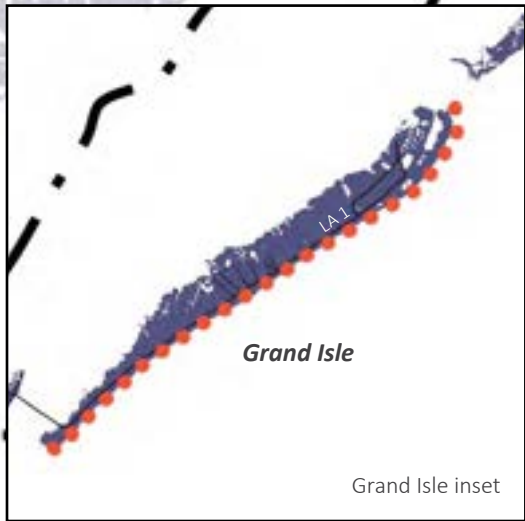
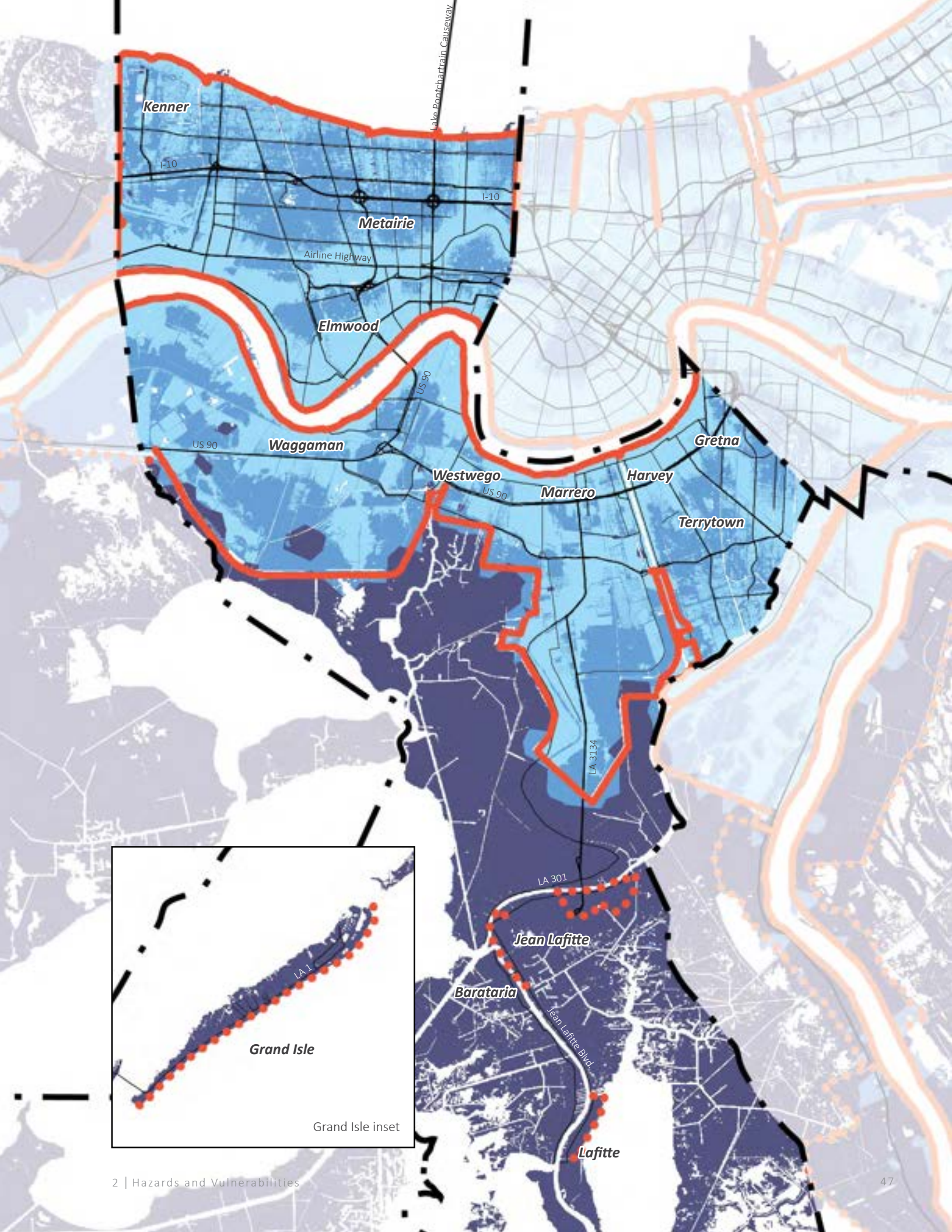
Urbanized Land Area per Risk Zone

Source: U.S. Census Bureau, Census 2010 Summary File 1



Population per Risk Zone

Source: U.S. Census Bureau, Census 2010 Summary File 1





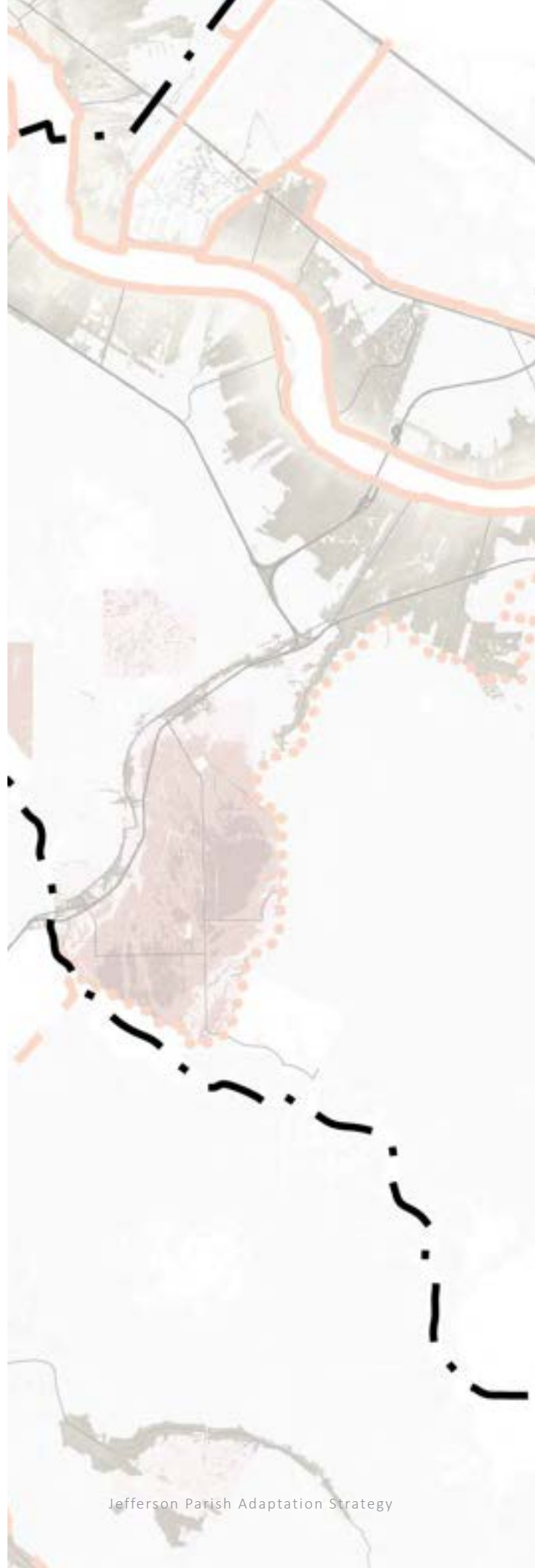
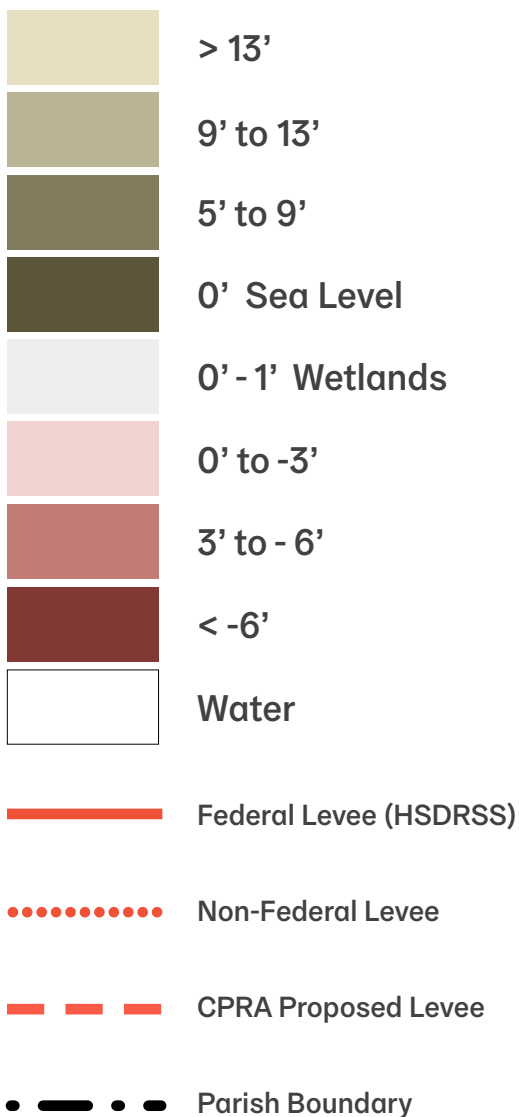
ELEVATION TODAY

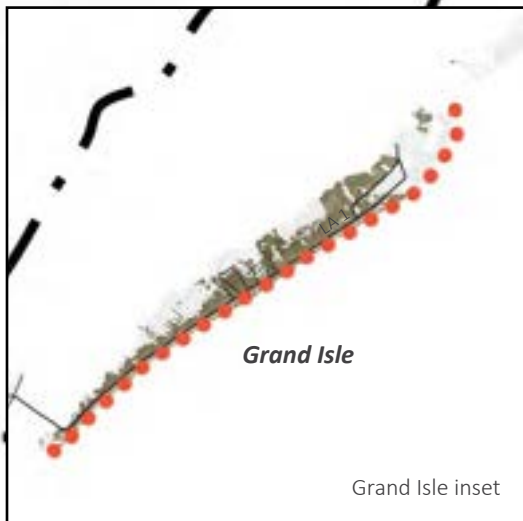
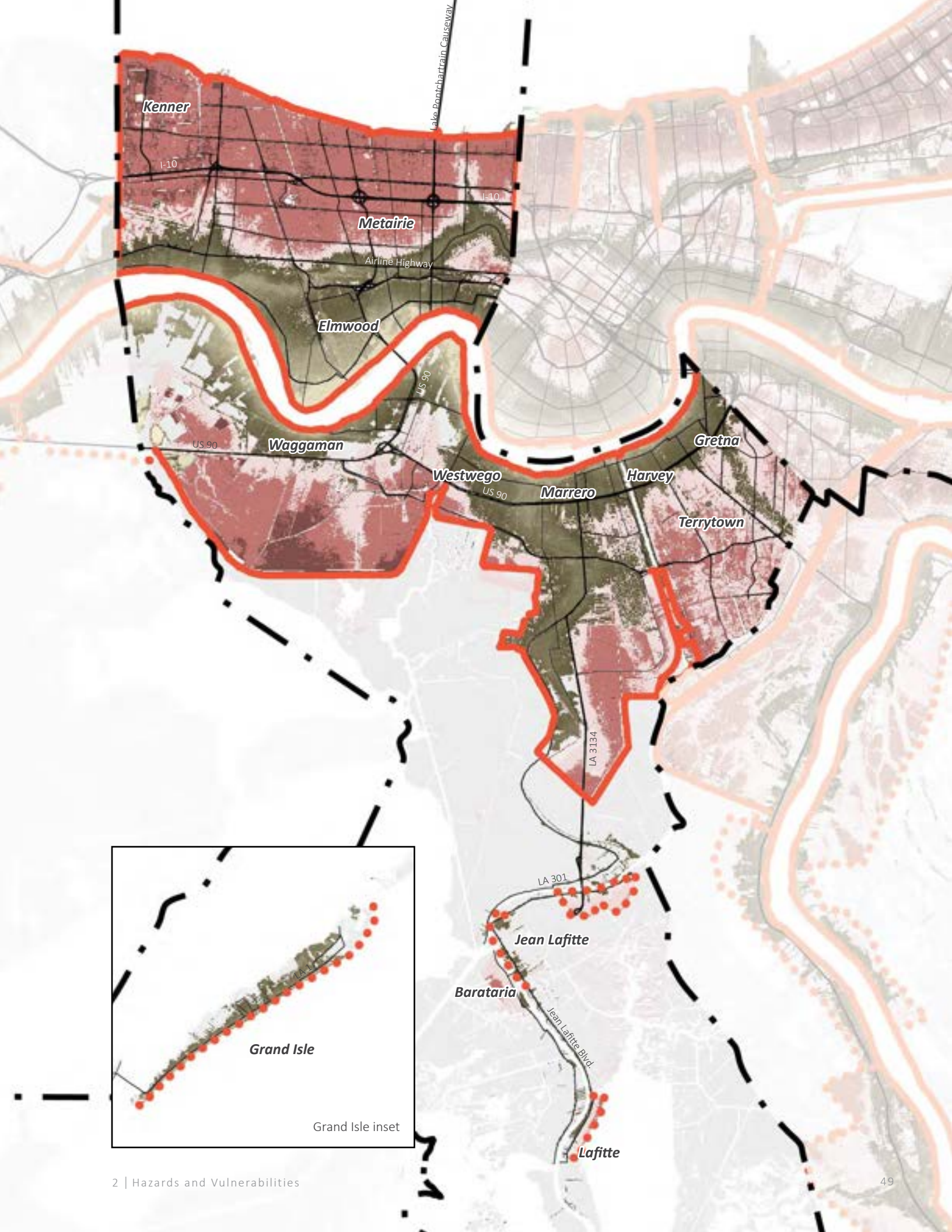
Source: NOAA Digital Elevation Map 2011; For all basemap data see References

Elevation

Of Jefferson Parish's total landmass, 66% is in a special flood hazard zone and thus environmentally sensitive for development.⁸ Several of the parish's communities are located near sea level, some even below. There is limited land available above sea level, with elevation rates higher toward the northern part of the parish. The low elevation of the southern part of the parish is a hazard that cannot be ignored. The higher land elevation in the northern part of the parish is an asset for future growth.

Legend





Subsidence

Coastal Subsidence

Like all of the Mississippi River Delta, Jefferson Parish is subject to subsidence, the settling of sediment that causes land to decrease in elevation—literally to sink. Rising sea levels compound the negative effects of subsidence. The combination of subsidence and sea level rise is referred to as “relative sea level rise,” and Jefferson Parish experiences significant rates of relative sea level rise. Long-term observations of the rate of relative sea level rise in Jefferson Parish range from 0.08 – 1.38 inches annually.^{9,10}

Along the Jefferson Parish coast, the combined effects of these processes—storm surge, sea level rise, saltwater intrusion, and subsidence—expose an ever-increasing area of the parish to erosion as water and wave action reach farther inland. As saltwater pushes farther inland, it increases salinity in brackish and freshwater marshes. Saltwater intrusion causes deterioration of the marsh habitat because many species of plants cannot survive increased salinity levels. When marshes are healthy, they provide a protective buffer during storm surge events. But as marsh habitats decline, the vegetation and root structures that prevent erosion disappears, causing the marsh to convert to open water and leaving areas behind the marshes more vulnerable to storm surge flooding.

“We lost three camps back there where the land just eroded, and the camps literally fell into the water.”

—Jefferson Parish Resident

Shallow Subsidence

Internal subsidence is the sinking of the ground that damages buildings, streets, and other infrastructure and makes the challenge of pumping stormwater out of the region more difficult. Subsidence is a result of dry soils, largely caused by current drainage practices that pump water out rather than maintaining a consistent water table.^{11,12}

LA SAFE encourages an integrated water management approach that uses both gray and green infrastructure. These facilities reduce flooding by alleviating loads on drainage systems and slowing subsidence by recharging groundwater.

The increased flood risk and infrastructure damage caused by subsidence across the region add millions of public dollars every year in preventable expenses.¹³ Subsidence also drastically raises the cost and frequency of repairs to levees, canals, and floodwalls that have been compromised by degradation or lowered elevations.

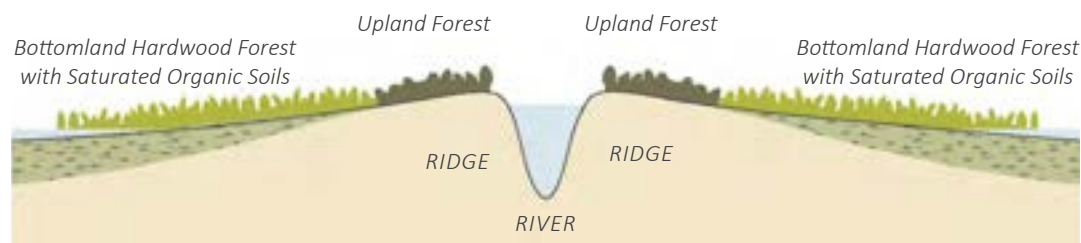
There is an opportunity to address our water risks by expanding water management roles to include subsidence control. Stormwater management best practices hold water in the landscape as long as possible, so that pumping is a last resort. Water storage in ponds, canals, rain gardens, and bioswales maintain higher groundwater levels, allowing organic soils to remain stable.

The graphic below indicates how development patterns over time can lead to land subsidence. Uncontrolled development in low-lying areas with organic soils necessitates pumping practices which, in turn, cause soils that need water to remain stable to dry out and sink.



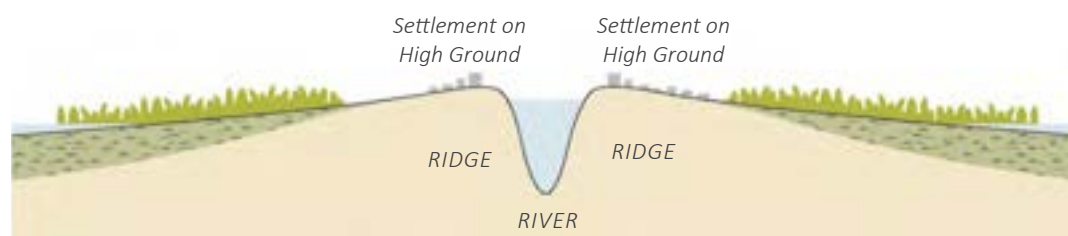
The Cost of Subsidence

Much of the low-lying land was built on former swampland which has subsided. Subsidence has caused damage to roadways and parking lots.



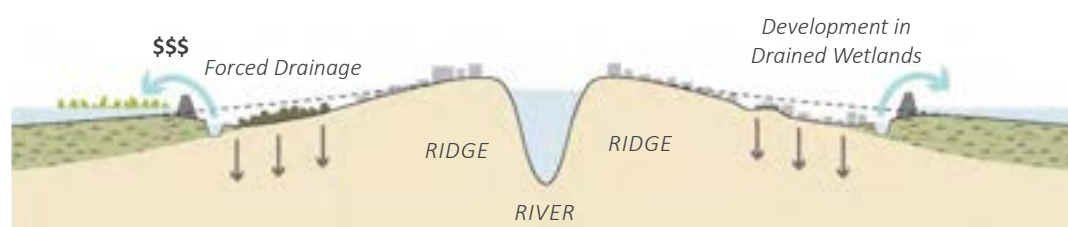
Pre-European Settlement—Natural Condition

Natural waterways form naturally high ridges.



Early Development

Early development was on the highest ground adjacent to natural bayous and waterways.



Current Condition—Drain and Pump

Modern technologies have allowed development in low-lying wetlands. Water is pumped out lowering the groundwater level and causing soils to shrink and land to sink.



SOIL SUBSIDENCE POTENTIAL




The map shows varying levels of organic soils and their relative subsidence potential. This information can guide land use decisions and help determine risk mitigation standards.

Source: Web Soil Survey produced by National Cooperative Soil Survey, USDA Natural Resources Conservation Service 2015 – 2016; For all basemap data see References

As organic soils are drained of water, their contents “oxidize,” or decompose and shrink. The areas with the highest percentage of organic material in their soils typically have the highest potential for subsidence. Water levels in these areas need to be maintained at higher levels to avoid subsidence-related damage to buildings and infrastructure.





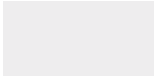


Structural protection worsens subsidence unless internal water detention is prioritized.

Legend

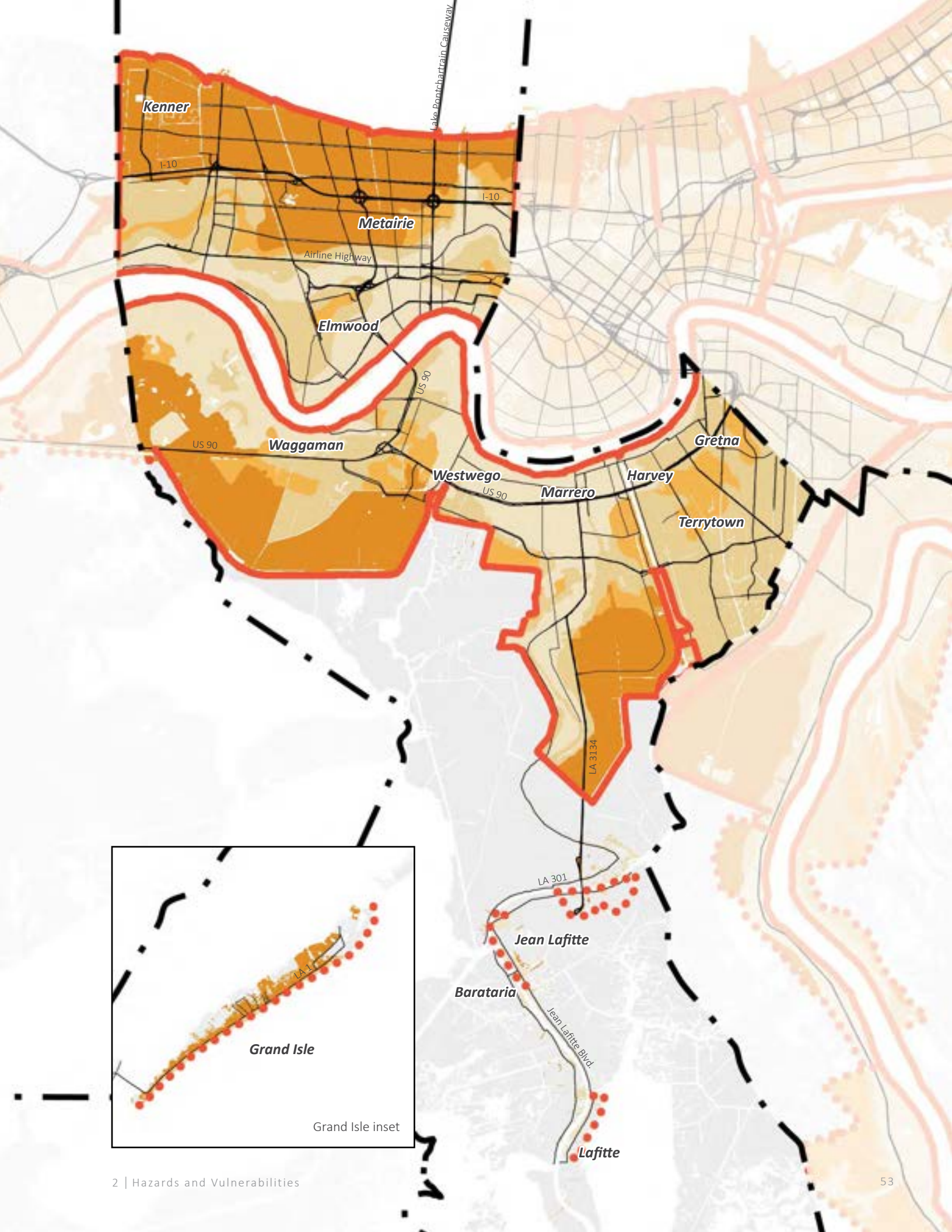
-  **Highly Organic Soils**
High Subsidence Potential
-  **High Plasticity Silt and Clay Soils**
Shrink and Swell Potential
-  **Low Plasticity Silt and Clay Soils**
Lower Shrink and Swell Potential

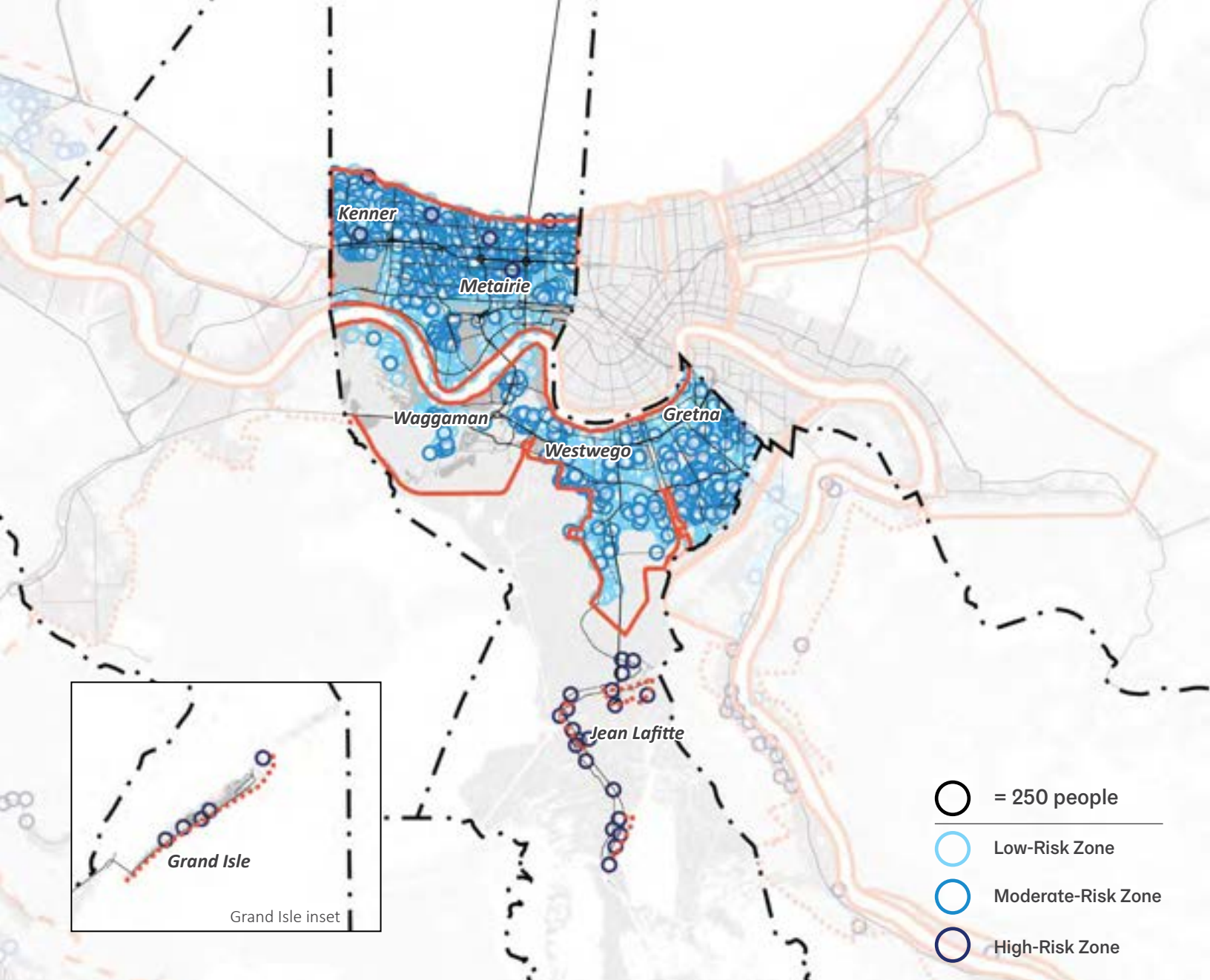


Delta soils are like a sponge. Organic soils are only stable when they are full of water. When they dry out, they shrink.

-  **Federal Levee (HSDRSS)**
-  **Non-Federal Levee**
-  **CPRA Proposed Levee**
-  **Land**
-  **Wetlands**
-  **Water**
-  **Parish Boundary**







POPULATION DENSITY PER RISK ZONE

The map shows population density in the three risk zones.

Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2010; Data prepared by ESRI, sourced from U.S. Census Bureau, Census 2010 Summary File 1; For all basemap data see References

“I fear losing neighbors due to economic challenges.”

—Jefferson Parish Resident

Social Vulnerability

Vulnerability is more than just exposure to hazards such as storm surge, heavy precipitation and subsidence. Vulnerability is caused conditions including poverty, racial or cultural marginalization, geographic isolation, illness, disability, or a variety of other afflictions that may impede a person or community's ability to prepare for or cope with a shock or stress. For example, while a storm surge may be the physical cause of damage and harm to a community, a range of economic, cultural, social, and political factors also affect the degree to which an individual or community is negatively impacted by that event. Understanding vulnerability means understanding the amount of damage an event can potentially inflict, as well as understanding the resources and strategies available to the affected population for recovery, preparation, mitigation, and adaptation. In order to effectively plan for and adapt to risks, the types and magnitude of vulnerability must be understood and taken into account.

Income and Poverty

Poverty is a key factor that increases vulnerability to environmental hazards and stresses.^{14,15} Lower-income households have fewer resources to dedicate to preparing for and recovering from an adverse event. Their economic livelihoods are also more likely to be disrupted by an environmental shock or stress, as their jobs may offer little protection against employment disruptions. People living in poverty are also more likely to live in high-risk areas with greater degrees of exposure to those risks. They are less likely to be insured against disasters or other adverse events, and they have fewer resources available with which to protect or replace their assets. Often individuals in poverty also do not have adequate access to information about adaptation options. The lack of access to resources presents additional challenges for these families who are often unable to move to new locations, secure new jobs, or to adapt to change in high-risk areas.

Estimates from the U.S. Census Bureau's 2015 American Community Survey show approximately 16.8% of the population in Jefferson Parish living below the poverty line.¹⁶ This rate is lower than the state of Louisiana (19.8%)¹⁷ and lower than that of the Gulf Coast region¹⁸ (17.6%),¹⁹ but higher than the United States (15.5%).²⁰ The percentage of individuals below poverty in Jefferson Parish has risen 3.1% since the 2000 census.²¹ According to the U.S. Department of Housing and Urban Development, 38.5% of Jefferson Parish households were characterized as "low-moderate income" in 2015.²²



Implications for Risk

Individuals and families with lower incomes and little or no savings are more vulnerable to any number of flood or disaster-related impacts, including healthcare- or injury-related costs, direct property damage, damages to their vehicles, interruptions to transportation infrastructure or transit services, effects on employers, and interruptions to schools or childcare. Any of these can be "the last straw" that pushes a vulnerable household into economic crisis.

Homeownership and Cost of Housing

In 2015, 61.9% of non-vacant housing units in Jefferson Parish were owner-occupied and 38.1% were renter-occupied,²³ compared to 63.9% owner occupancy and 36.1% renter occupancy in 2000.²⁴ In 2015, the median gross rent in Jefferson Parish was \$900, compared to \$788 statewide in Louisiana.²⁵

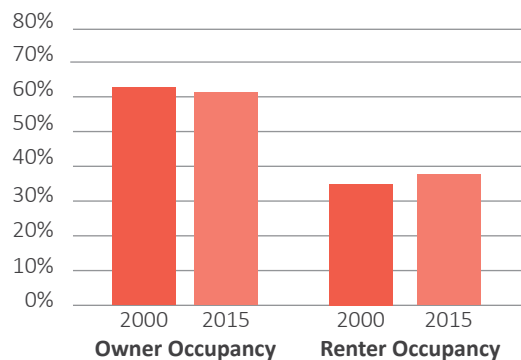
Rents are higher than the state average and approximately 54% of renters in Jefferson Parish were rent-burdened in 2015 spending 30% or more of their household income on rent. Approximately 30% of renters in Jefferson Parish were severely rent burdened in 2015, spending more than 50% of their income on rent. This was an increase from 2000, when 39% and 19% of renters were rent burdened or severely rent burdened, respectively.^{26,27} As homeownership is decreasing in Jefferson Parish, those who are renting are increasingly cost-burdened. Whether they own or rent, cost-burdened households have fewer resources to dedicate to preparations and adaptation measures that would make them more resilient to future hazards.

Insurance Affordability

Adequate insurance coverage is a critical hedge against the potential cost of disasters, and anyone that owns property in a hazard-prone area should invest in both a home- or property-owner's policy as well as flood insurance. In the wake of a disaster, property that is underinsured or lacks appropriate coverage places greater burdens on the owner's own financial reserves and on public sector disaster recovery efforts.

However, both homeowner's policies and flood insurance have become more expensive and therefore increasingly difficult for households and businesses to afford. Over the past decade, the cost of homeowner's insurance has risen 50% nationwide. Within Louisiana, rates increased 67% from 2004 – 2015,²⁸ and in the coastal zone, the increase was even higher at 85%. Between 2005 and 2015, homeowner's insurance premiums in Jefferson Parish increased 74%, rising from an average premium of \$1,309 in 2005 to \$2,282 in 2015.²⁹ This represents approximately 4.8% of household income of Jefferson Parish residents.³⁰

Rising premiums mean households have fewer resources to devote to efforts to reduce risk or to cover other expenses, resulting in increased vulnerability.



Non-Vacant Housing Occupancy

Sources: U.S. Census Bureau, 2000 Census; U.S. Census Bureau, 2010 – 2015 American Community Survey 5-Year Estimates

“My neighbor left, he lived next to me but his house was flat on the ground. He was a fisherman, a good fisherman, but his insurance was \$10,000 a year.”

—Jefferson Parish Resident

“Cost of homeowner's insurance increased greatly.”

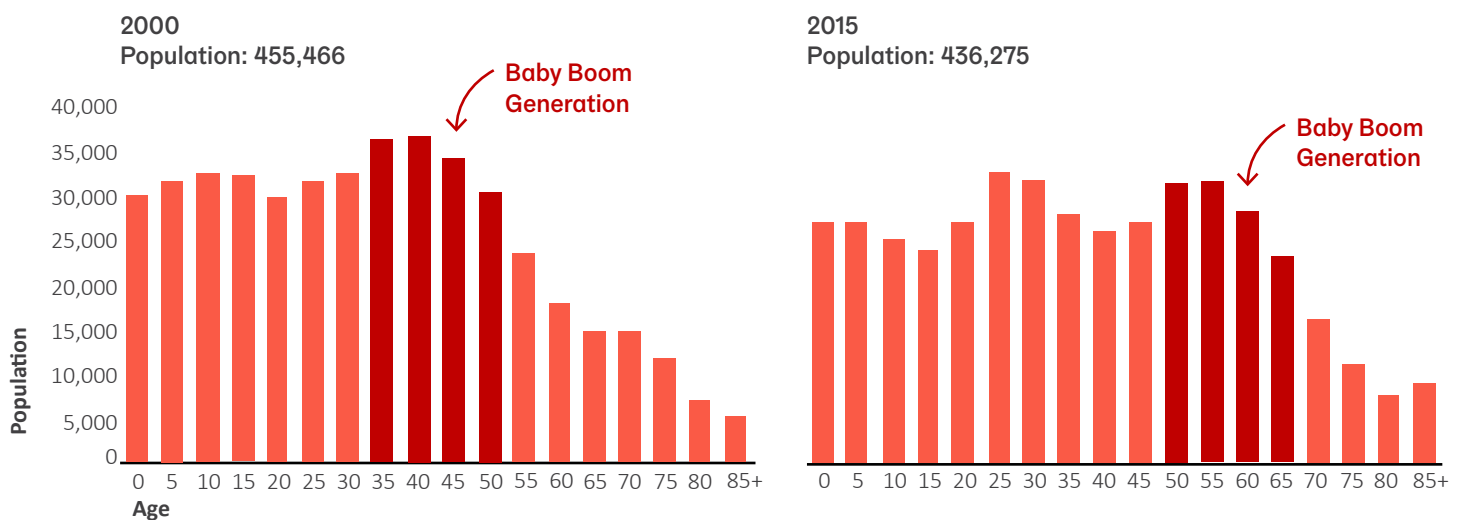
—Jefferson Parish Resident

In 2017, the cost of National Flood Insurance Program (NFIP) policies rose an average of 6%.³¹ Increases can be much higher but are capped at 18% for any individual policy.³² Recent efforts to reduce flood insurance costs have resulted in updated flood maps for Jefferson Parish. These new flood maps are anticipated to lower flood insurance premiums by up to \$600 and may affect as many as 80,000 policy holders.³³ As of 2017, Jefferson Parish had 92,214 flood insurance policies with an average premium of \$831.³⁴ While these increases are intended to bring premiums up to actuarial rates that reflect true flood risk, one unintended consequence is that some policyholders are dropping their coverage, and fewer homeowners are purchasing new policies. Nationally, there has been a 10% decrease in the number of policies since 2012 when legislative changes were made to the NFIP.³⁵ As of 2013, the parish had 6,895 repetitive loss and 1,917 severe repetitive loss properties, 2,888 of which were not insured.³⁶ The rising costs of flood insurance, combined with diminishing property values in high-risk areas, drains residents' net worth and makes relocation financially impossible for many.

Aging Population

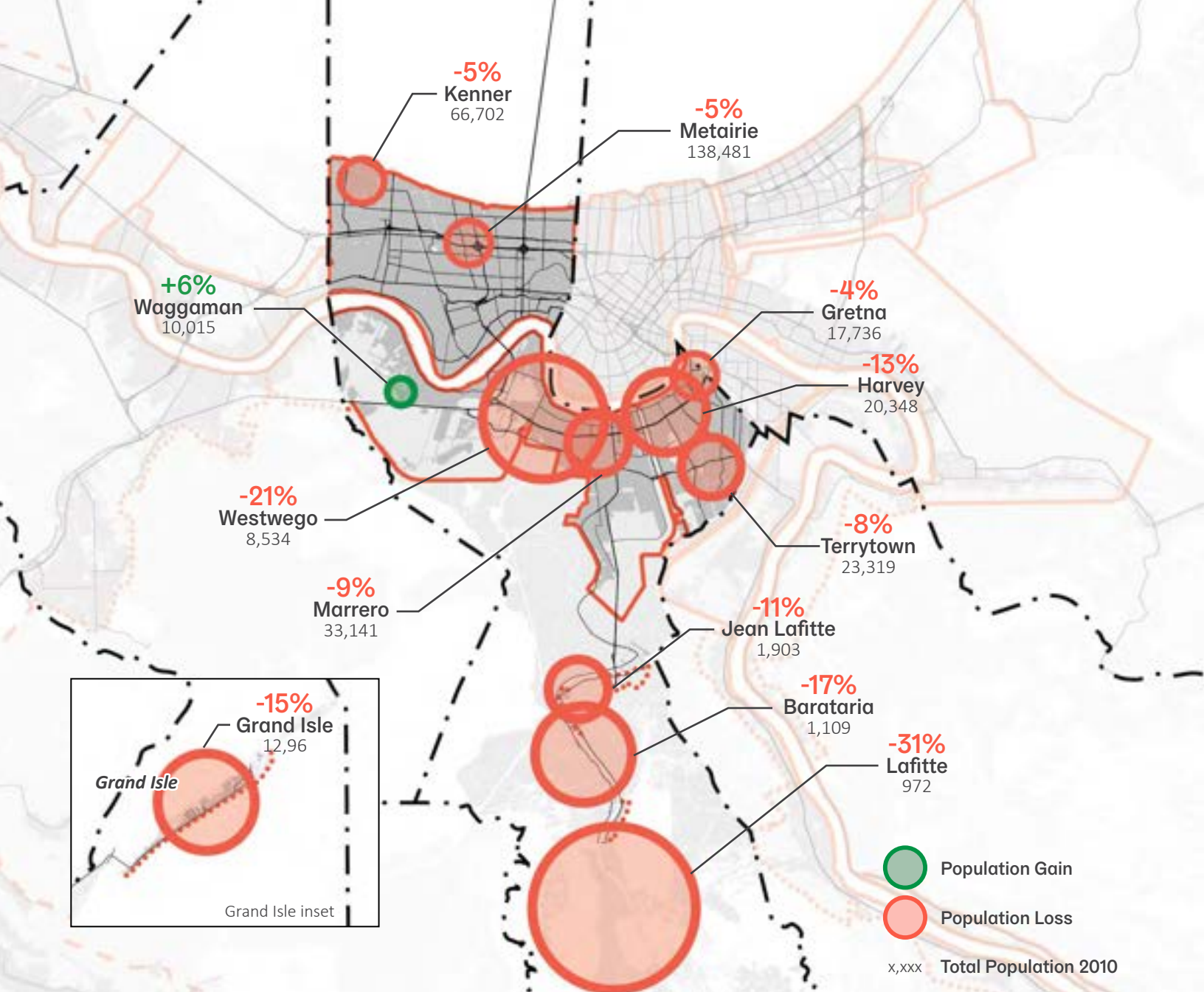
The physical, economic, and social vulnerabilities associated with aging—especially when layered with poverty, lack of insurance, and other factors—pose additional challenges for many older adults attempting to prepare for and recover from disasters, including floods.

Since 1980, the median age of Jefferson's residents has increased by 11 years.^{37,38} An aging population has unique needs that must be considered when assessing vulnerability. Older residents are more likely to have mobility issues that make evacuation in the event of a storm more difficult for them. Older residents are also more likely to be on fixed incomes, which can make rising insurance costs and recovery efforts a significant financial burden.



Population by Age, 2000 – 2015

Sources: U.S. Census Bureau, 2000 Census; U.S. Census Bureau, 2011 – 2015 American Community Survey 5-Year Estimates



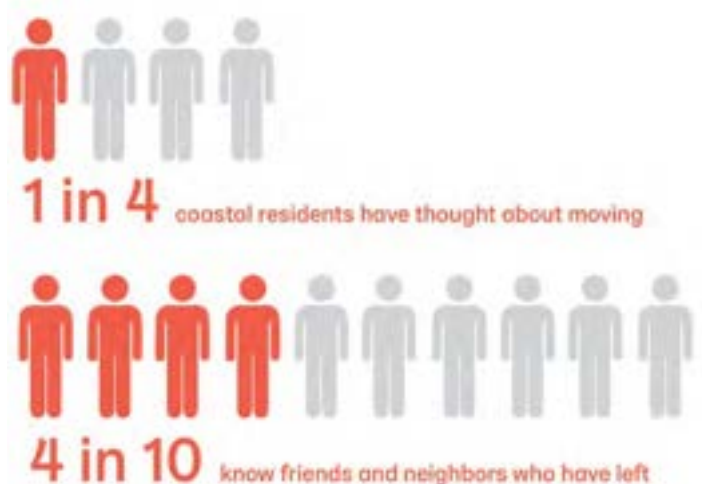
POPULATION CHANGES 2000 – 2010

Between 2000 and 2010, lower parts of the parish saw declining population while the northern part of the parish saw a population increase.

Sources: Data prepared by ESRI, sourced from U.S. Census Bureau, Census 2000 Summary File 1 and Census 2010 Summary File 1; For all basemap data see References

Legend

- Land
- Wetlands
- Water
- Federal Levee (HSDRSS)
- Non-Federal Levee
- CPRA Proposed Levee
- Parish Boundary



Source: Survey by National Association of Realtors and Center for Planning Excellence, 2013

Population Movement

In 2013, the National Association of Realtors and the Center for Planning Excellence conducted a survey of Louisiana's Coastal Management Zone and found that 25% of coastal residents have thought about moving from their current home, and 40% know friends or neighbors who moved due to persistent challenges associated with living in the coastal areas, including the cost of flood insurance and potential flood damage.³⁹

Jefferson Parish is no exception to this trend. Between 2000 and 2010, the overall parish population decreased 5%.^{40,41} In the lower part of the parish in the communities of Lafitte, Barataria, Westwego, and Grand Isle, populations decreased 31%, 24%, 21%, and 16% respectively.^{42,43} According to local stakeholders, many residents, weary of repeated storm flooding and fewer employment opportunities, simply moved up the bayou to lower risk areas. The communities of Elmwood and Waggaman in Jefferson Parish experienced population increases of 10% and 6%, respectively.^{44,45} Overall, the most southern communities are experiencing the most population decreases, while communities located in northern parts of the parish, where elevations are higher, are experiencing lower population decreases. According to stakeholders, people are moving to the Northshore area in St. Tammany Parish, where elevations are higher. Higher elevations are less susceptible to flood surge risk and relocating to these areas is a way to reduce exposure to risk. However, population shifts such as these create challenges for the communities that are losing population, as well as those that are gaining. Population loss makes it more difficult to fund infrastructure and sustain key services such as medical facilities, schools, and emergency services. In receiving communities, rapid population growth may overwhelm the current capacity of infrastructure and services.

“Ingalls Shipbuilding closed. It caused somewhat of a job loss. A lot of people went to Mississippi because that is where they have another shipyard.”

—Jefferson Parish Resident



Implications for Risk

It makes sense that individuals, families, and businesses are choosing to relocate in response to the perception or reality of increasing risk in a given location. However, these shifts in population and economic activity can result in economic and social hardships for those who are relocating as well as the communities that they left behind and those to which they move. The goal of this LA SAFE plan is to consider these movements in a strategic framework that can mitigate rising risks where possible, allowing people to remain in place—or leverage the push and pull forces that lead to population relocation so as to maximize the positive impacts of relocation for all parties.



Bayou Barataria

Water is a driver of both income and recreation for Jefferson Parish as well as habitat for wildlife.

3 Existing Conditions



Natural Environment

Natural Assets

Jefferson Parish is located in the heart of the southern Gulf Coast and is composed of coastal lands woven with bayous, lakes, waterways, and wetlands. Over 85% of the parish is water and wetlands, with freshwater marshes in the northern areas and along Lake Pontchartrain, brackish marshes farther south, and saltwater marshes near the coast.⁴⁶ A network of lakes, bayous, bays, and canals traverse the parish. Most development is found on the high ground along the banks of the Mississippi River and Bayou Barataria. Barrier islands located in Jefferson Parish provide the first line of defense from oncoming hurricanes. The extensive bayous, wetlands, marshes, and barrier islands of Jefferson Parish provide recreational, agriculture/aquaculture, and economic opportunities. However, the low topography and watery landscape of the parish also leave it heavily exposed to floods of all types.

Over 85% of the parish is water and wetlands, with freshwater marshes in the northern areas, brackish marshes farther south, and saltwater marshes near the coast.



Access to Natural Systems

The Jean Lafitte National Historical Park and Preserve in Barataria provides access to the parish's remaining wetlands.



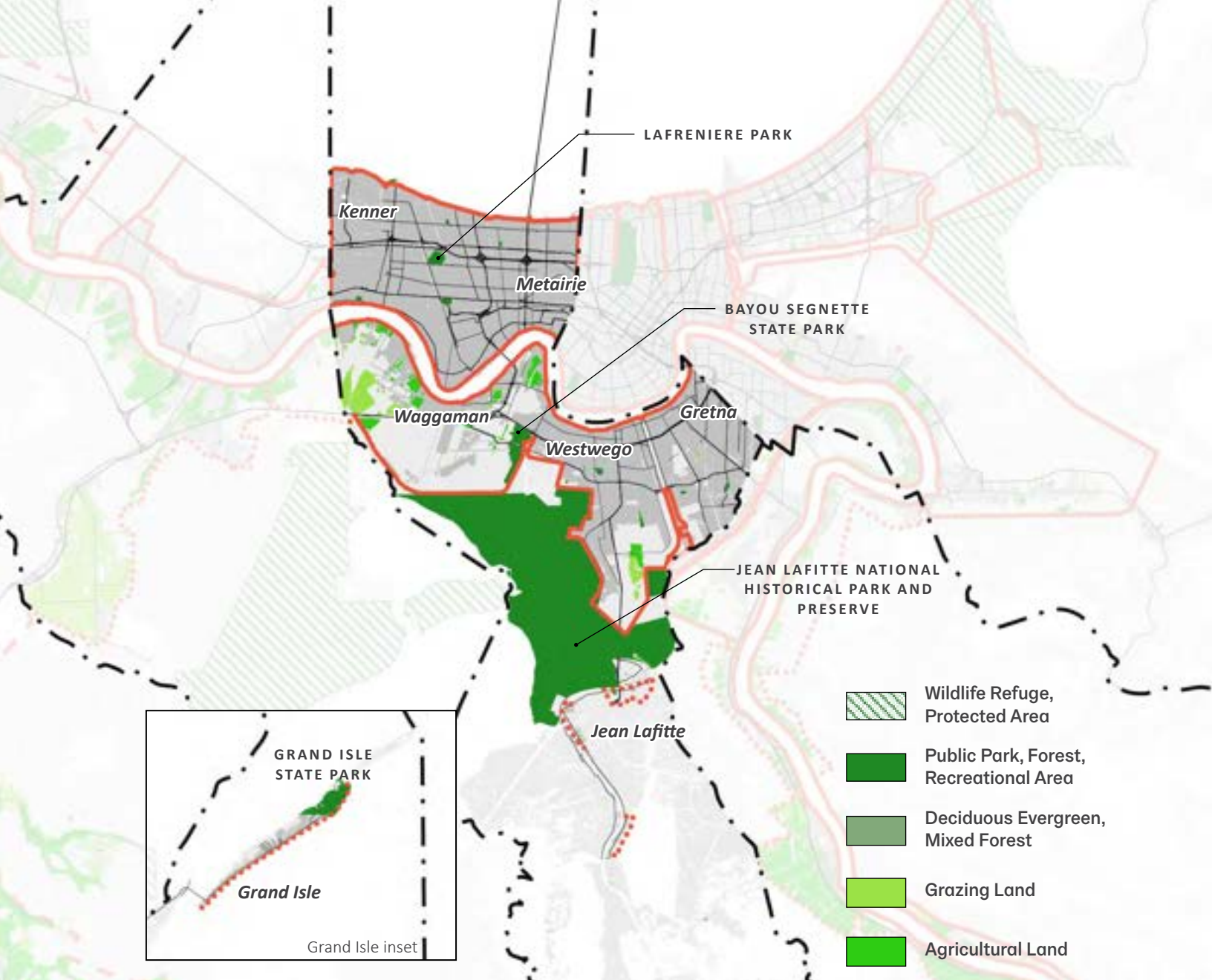
Natural Habitat

The parish's wetlands provide natural habitat for wildlife.



Recreational Amenity

Grand Isle offers beach access and fishing opportunities.



NATURAL ASSETS TODAY

Coastal Louisiana comprises many waterways, parks, forests, and farmland.

Sources: U.S. Census Bureau TIGER/Line 2016; U.S. Fish and Wildlife Service 2001; Louisiana Department of Wildlife and Fisheries 2006; National Land Cover Database created by Multi-Resolution Land Characteristics Consortium 2011; For all basemap data see References

Legend

- Land
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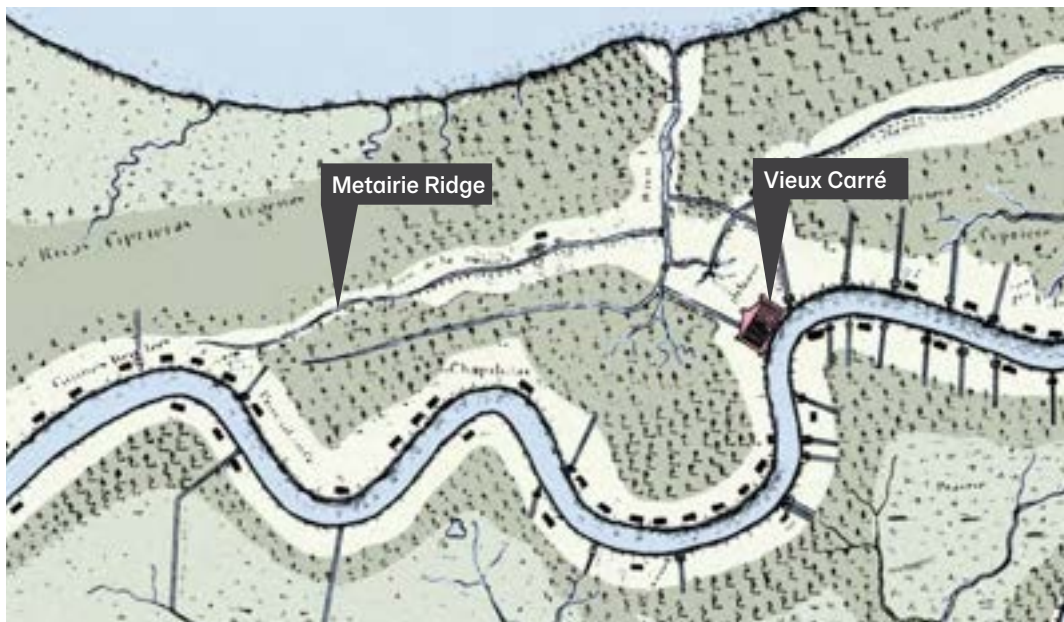
Housing and Development

In a planning context, “development” refers to the way in which residential and commercial structures, transportation facilities, stormwater management infrastructure, and public amenities and services are designed, located, expanded, and spatially organized and networked. Planning and zoning are tools communities can use to help ensure that development results in low-risk, affordable housing stock, efficient transportation systems, access to jobs and services, and economic sustainability while preserving natural and cultural assets and supporting a high quality of life.

Historical Settlement and Development Patterns

The natural landscape has heavily influenced past and current development patterns in Jefferson Parish. The upper and lower parts of the parish developed appropriately for their environmental contexts.

In the upper part, more than 2,500 years ago, the Mississippi River deposited sediment that created a natural ridge. This ridge—and the surrounding area—was once known as Tchoupitoulas. In the 1700s, the ridge and area were renamed Metairie. The Acolapissa, an American Indian tribe, used the ridge as a road; European settlers, who received French and Spanish land grants starting in the late 17th century, did as well. In 1825, Jefferson Parish was established, and for more than a century, the area was mostly rural, with dairy farms, plantations, and large tracts of undeveloped land. In the 1910s, streetcar lines were installed on the old ridge, now known as Metairie Road, which gave way for development on the east bank, north of the Mississippi River. After World War II, the cypress swamp and marshes between Lake Pontchartrain and the Metairie Ridge were drained for development. From the 1950s until the 1970s, many people moved to this area to find larger properties, lower housing costs, and lower taxes.



WPA Soil and Foundation Survey

Drawn in 1803 and traced by the Works Progress Administration, the map indicates the higher ground along the Mississippi River and ridge along Metairie Bayou.

Map Credit, Original: Plan Del Local De las tierras que Rodean la Ciudad de Nueva Orleans, created by Carlos Laveau Trudeau, 1803; The Historic New Orleans Collection; Traced by WPA, 1936; Colorized by Waggonner & Ball

On the west bank, which is south of the Mississippi River, Gretna was established in 1836. It had a service station on the Mississippi River for the Missouri Pacific Railroad, the Texas and Pacific Railway, and the Southern Pacific Railroad. A ferry was the only means to cross the Mississippi River to New Orleans until 1958 when the Crescent City Connection at last bridged the west bank communities directly to New Orleans. A second span opened in 1988.

The southern part of the parish was home to American Indians including members of what is now known as the United Houma Nation. By the 18th century, the area was bustling with activity including fishing, hunting, agriculture, and pastoral farming, and French settlers established the Barataria Bay as a harbor for ships in the Gulf of Mexico. French and Spanish settlers were joined by Filipino, Chinese, and Croatian immigrants, respectively arriving as early as the late 1700s, around the mid-1800s, and mostly in the early 1900s. During the 1700s to the mid-1800s, numerous plantations developed in this area, many producing sugar and rice. Some families who lived in the region trapped mink, muskrats, and alligators for fur and skins and harvested moss to fill mattresses and furniture cushions. From the late 19th through early 20th centuries, residents in bayou communities harvested oysters, crabs, shrimp, and fish from the estuaries. Rich in cypress and oak trees, this region was logged for ship building. Many canals were dug to connect the area with the Mississippi River to transport lumber, which was a major industry until the sawmill closed in 1929.



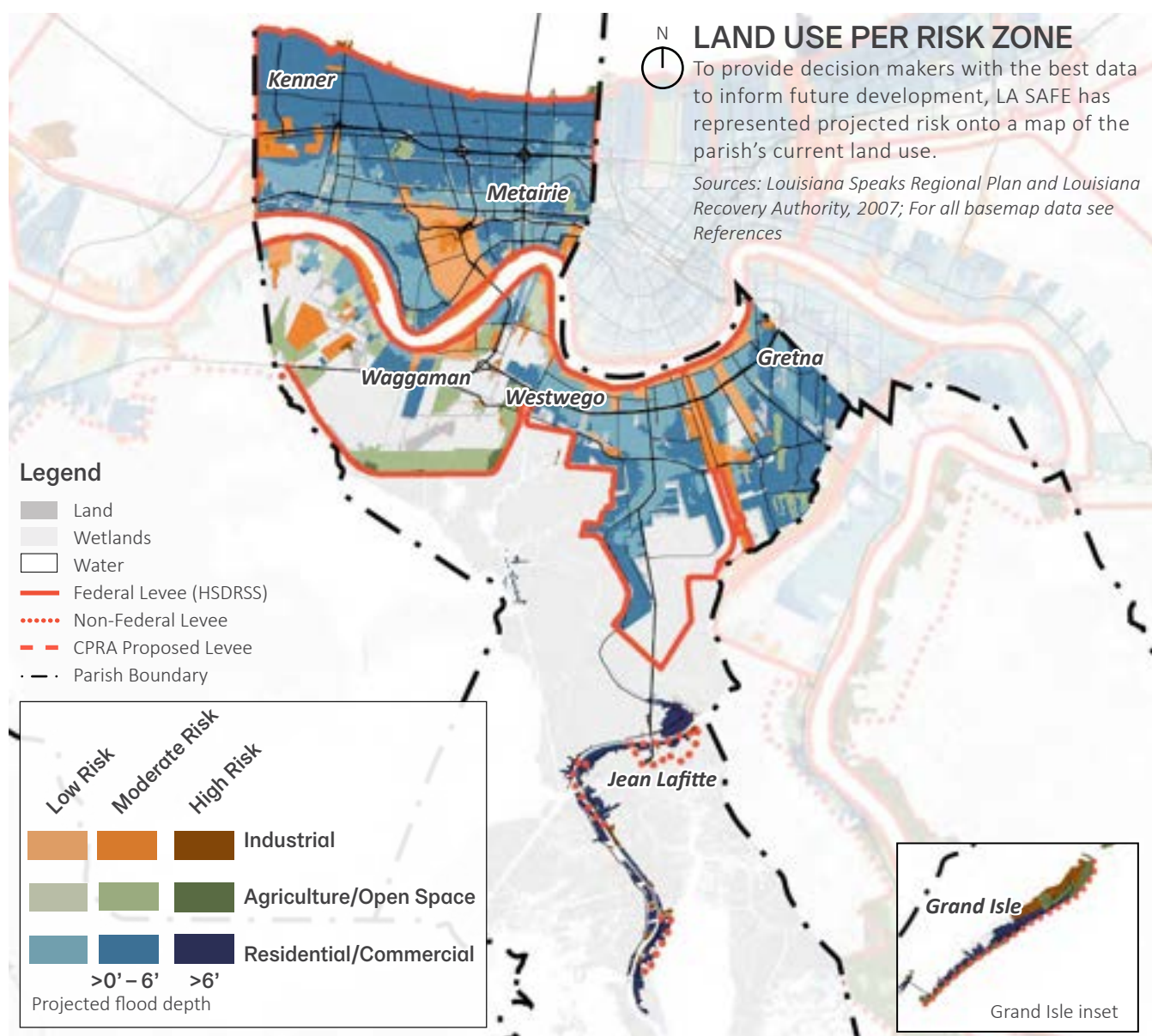
Bayou Communities

Jean Lafitte along Bayou Barataria.

Photo Credit: Town of Jean Lafitte

Current Development Patterns

The east bank of Jefferson Parish is a suburb of New Orleans. It is densely populated with primarily single-family residential and commercial development. The Lake Pontchartrain Causeway—the bridge connecting the Northshore area to the Greater New Orleans Area—becomes North Causeway Blvd. and intersects in Jefferson Parish with I-10, US 61, and US 90. The Louis Armstrong New Orleans International Airport is also located in Jefferson Parish, serving the Louisiana, Mississippi, and Alabama Gulf Coast area for domestic and international flights. The location and proximity of these intermodal assets provides a desirable environment for continued commercial and industrial development. This area is also protected from hurricanes by a system of levees and canals.



Present-day infrastructure investments are concentrated inside the hurricane protection system of the west bank area. The area outside these levees consist of the Jean Lafitte National Historical Park and Preserve and undesignated swamp and marsh areas that are environmentally constrained for development due to significant risk from tidal flooding and storm surge, subsidence, and erosion. Jefferson Parish's area is composed of 56% water and 44% land,⁴⁷ although land area continues to be converted into water area—most severely in the southern part of the parish. In those areas already experiencing the impacts of land loss, residents and businesses have been voluntarily migrating north to reduce their economic losses from repeated flooding. As a result, populations in communities such as Jean Lafitte, Barataria, and Grand Isle are shrinking, while populations are growing in places within the hurricane protection system, such as Waggaman and Elmwood, that have higher ground and lower flood risk.

Another factor driving the loss of lower bayou populations is the location of public assets and amenities. Maintenance of public assets and services in higher-risk areas is increasingly more challenging as flood risks continue to increase, while the pool of those receiving services shrinks.

Most housing units in Jefferson Parish have been built on slab. If a base flood elevation was required, fill was imported from borrow pits to achieve a desired elevation while still building on slab. Although it may protect individual structures, the use of fill accelerates the rate of runoff into surrounding areas and causes scour around the area that was filled, potentially compromising its stability and eroding surrounding land, ultimately increasing flood risk for the surrounding area. Increased flood risk in the southern portions of the parish has also given rise to a secondary housing market. Flood-prone areas that may no longer be desirable as permanent residences are transitioning to tourist and recreational areas with camps and vacation homes—a trend that has been well-observed in Grand Isle and Jean Lafitte. These population shifts reinforce historic growth patterns in the parish, where residents are inherently attracted to investing in areas of higher ground. However, availability of higher ground is a major constraint for development.



Implications for Risk

Development decisions made today about where to locate buildings, roads, homes, and businesses will affect the parish well into the future. Envision Jefferson 2020, also known as the Jefferson Parish Comprehensive Plan, calls for future development that generally follows historical development patterns and anticipates that an additional 11,049 acres of land are necessary to accommodate the residential, mixed-use, commercial, and industrial growth expected by 2020.⁴⁸ Fortunately, the future land use map indicates that ample developable land is available and focused inside the hurricane protection system of Jefferson Parish. The 2017 Coastal Master Plan anticipates that up to an additional 41% of the parish land will be lost over the next 50 years if no actions are taken to slow down the rate of land loss.⁴⁹ This loss will primarily impact the areas outside the hurricane protection system. In order to accommodate additional projected population growth and movement, Jefferson Parish will need to concentrate assets and encourage greater density in future development.

Transportation

Local and regional transportation systems support commerce; connect people to activities, jobs, and services; and serve as an evacuation network in case of emergency. Jefferson Parish's transportation infrastructure includes an international airport, bus routes, highways, interstates, and a growing network of bicycle infrastructure and canals for water-based transportation.

The Louis Armstrong New Orleans International Airport has a 10,104-foot and a 7,001-foot runway for cargo and passenger flights that moved more than 12 million passengers in 2017. There are two terminals, east and west, and Concourses A through D with major airlines serving the airport for domestic and international flights. The airport is currently undergoing expansion to build a new terminal and three concourses with opening dates set for 2019.

Jefferson Transit (JeT) provides the urbanized area of the parish with a bus system, which includes routes to New Orleans and the Louis Armstrong New Orleans International Airport. JeT operates six routes in both the east bank and west bank areas of Jefferson Parish. Connecting service to Regional Transit Authority (RTA) bus lines for New Orleans transit are available in Kenner and Gretna.

The highway system—I-10, US 61, and US 90—provides regional connectivity to adjacent communities and New Orleans as well as multiple evacuation routes in the east bank area; US 90, LA 23, and LA 45 provide connectivity for the west bank area to the region. At the parish level, there is a growing emphasis on bike facilities as well as Complete Streets implementation in urbanized areas, both of which accommodate multiple modes of travel, encourage active lifestyles, attract new residents, and improve quality of life.



Pedestrians and Bicycles

Jefferson Parish has a growing network of pedestrian and bicycle infrastructure.

Photo Credit: City of Gretna

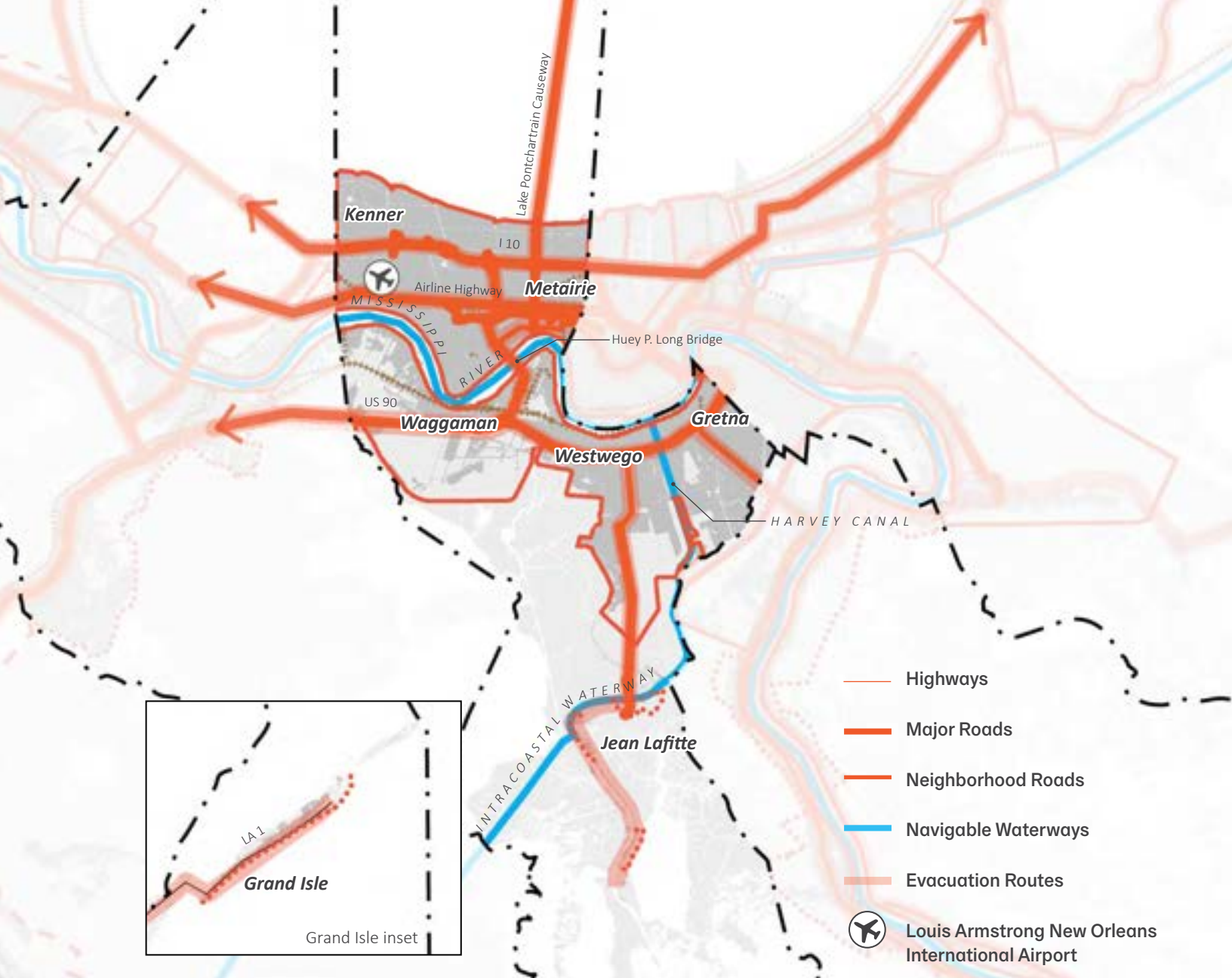


Huey P. Long Bridge

The Huey P. Long Bridge connects vehicular and railroad traffic across the Mississippi River.

Implications for Risk

Transportation infrastructure may be impacted by floods in two main ways: short-term submersion and long-term damage from water, scour, or salt. Short- or long-term loss of transportation infrastructure can have serious impacts on everything from evacuation and repopulation, disaster recovery and logistics, and economic health—both sector-specific and broad-based. Mitigation, such as elevation, flood-proofing, and relocation, can dramatically reduce vulnerabilities of transportation infrastructure. In many cases, properly designed transportation infrastructure can double as mitigation in itself, providing retention and detention facilities, drainage, or spillway capacity. Roads can also exacerbate flood conditions by cutting off natural drainage channels, causing water to pool.



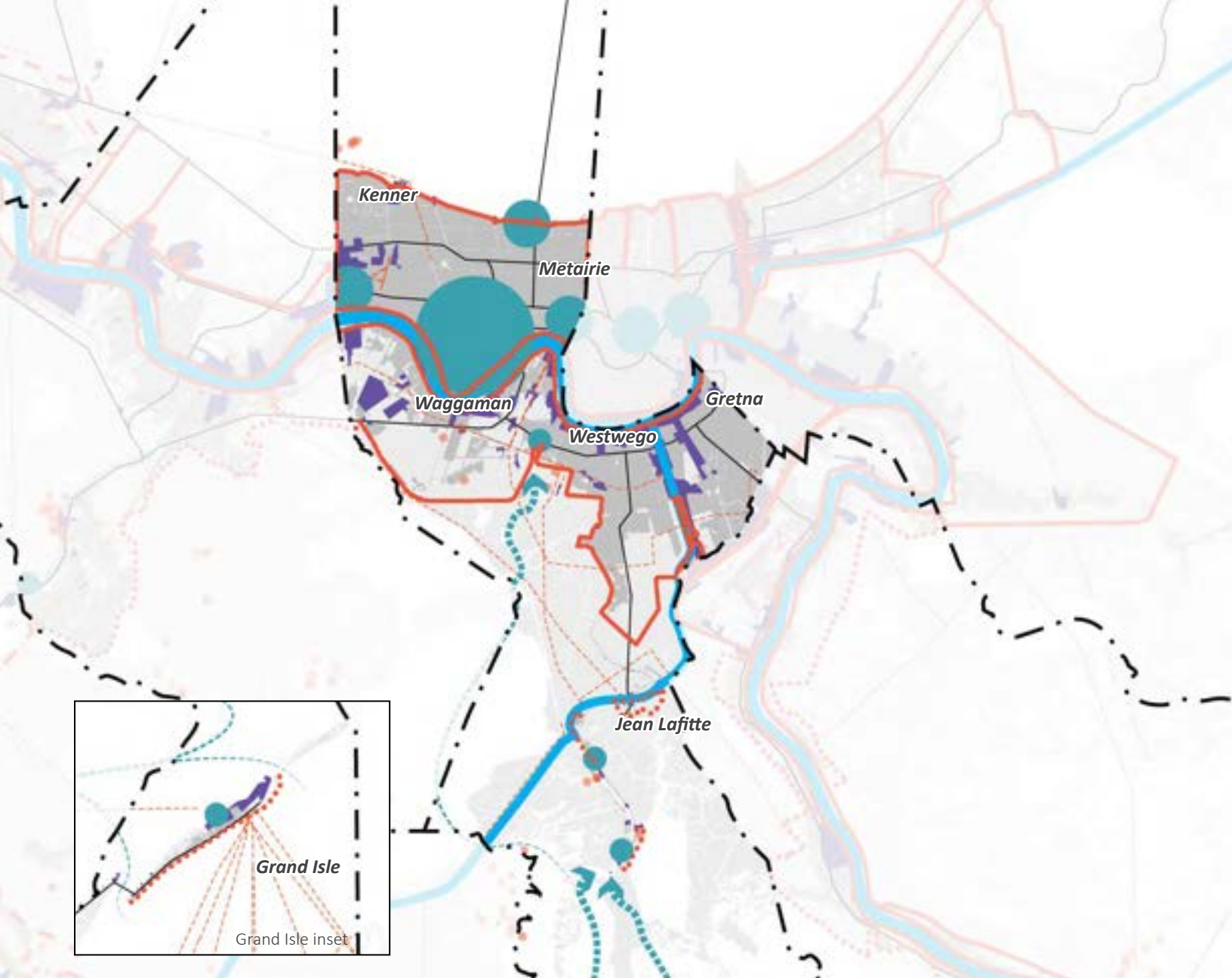
TRANSPORTATION INFRASTRUCTURE

The map shows the parish's major transportation infrastructure, including roadways, navigation canals, and the airport. Evacuation routes are highlighted.

Sources: Research and Innovative Technology Administration's Bureau of Transportation Statistics (RITA/BTS) and National Transportation Atlas Databases (NTAD) 2006; OpenStreetMap 2017; For all basemap data see References

Legend

- Land
- Wetlands
- Water
- Federal Levee (HSDRSS)
- Non-Federal Levee
- CPRA Proposed Levee
- Parish Boundary



ECONOMIC DRIVERS

The landscape of southeastern coastal Louisiana provides a number of economic drivers—such as oil and gas, navigation, and seafood industries.

Sources: RITA/BTS and NTAD 2006; USGS National Wetlands Research Center 1999; Louisiana Department of Natural Resources, Office of Conservation 2007; U.S. Department of the Interior, Minerals Management Service 2006; Louisiana Speaks Regional Plan and Louisiana Recovery Authority 2007; For all basemap data see References

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- Industrial Areas
- Offshore Oil & Gas Platforms
- Active Oil & Gas Well
- Pipelines

- Seafood Processing Center
- Seafood Distribution Center
- Navigational Waterways

Economy

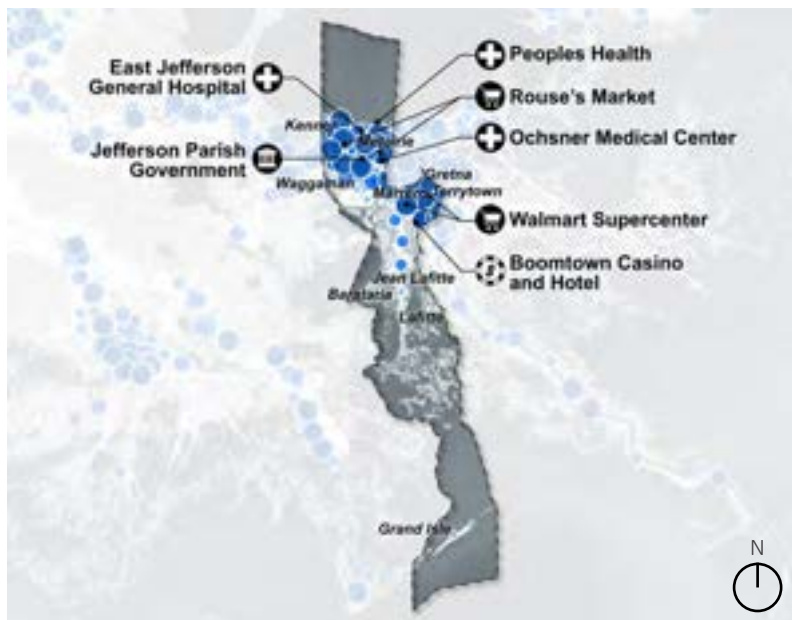
Prior to the tremendous growth of the oil and gas industry that occurred from the 1920s through the 1970s, Jefferson Parish's economy relied heavily on agriculture and the seafood industry. Jefferson Parish residents farmed on plantations; harvested, processed, and distributed seafood; traded fur; cultivated sugarcane; and logged forests. The parish's strategic location on the Gulf of Mexico to the south and Lake Pontchartrain to the north, with the Mississippi River running through, has provided the foundation for a solid transportation network. Today, major highways and railways, as well as the Louis Armstrong New Orleans International Airport, provide easy access for the transport of people, goods, and cargo to and from Jefferson Parish and the greater metropolitan region. The three major employment sectors in Jefferson Parish that provide services outside the parish are business services, distribution and electronic commerce, and water transportation. Major industries primarily serving within the parish include healthcare, real estate, construction, and development.

Jefferson Parish stakeholders identified renewable energy production, ecotourism, and the seafood industry as areas that offer potential growth and diversification opportunities. The LA SAFE process included outreach to these industries, and the LA SAFE plans take the current and future needs of these industries into careful consideration. Common concerns that emerged include workforce development, career readiness and awareness, land use policy, and flood risk. LA SAFE strategies presented in the regional and parish plans reflect the need to sustain core employers while also diversifying economic assets.



Implications for Risk

The facilities and infrastructure that support these industries are exposed to flood hazards the same as any other component of the built environment. When such facilities or assets are damaged or shut down by hazard events, they have ripple effects on the surrounding community. These effects may take the form of hazardous material releases (airborne or waterborne), supply-chain interruptions, or economic disruptions that drag on household economies and resiliency. Over the longer term, significant impacts to key business sectors can also drive down tax revenues and thus undermine the fiscal stability of the parish, generate lawsuits and insurance claims that can adversely affect business confidence, and diminish the parish's ability to retain and attract employers.



JOB CENTERS

The majority of the parish's job centers are located on high ground. While the economy is largely based on oil and gas, growing employment sectors include medical, transport, and retail.

Sources: U.S. Census Bureau, Center for Economic Studies, 2014; Infogroup published under U.S. Department of Labor guidance

Legend

Job per Census Block Group

- 0 - 50
- 50 - 100
- 100 - 200
- 200 - 500
- 500 - 1000

- Water
- Wetlands
- Parish Boundary

Economic Opportunities

Meeting participants recognized that Jefferson Parish must continue to diversify its economy to reduce its heavy dependence on finite natural resources and to decrease economic disruption from natural disasters. In addition to building on existing industries, Jefferson Parish can capitalize on its strategic location and become the “gateway to the region.”

Water transportation, logistics, and distribution form one industry cluster that remains strong and could grow in the coming decades, benefiting current and future employees of Bollinger Shipyards, Acme Truck Line, Republic National Distributing Co., and other businesses. Plans for redeveloping the former 206-acre Avondale shipyard into an intermodal terminal are underway. The parish’s geographic location and infrastructure offer a multimodal hub unlike any other in the Gulf South. Assets include the Mississippi River, interstate highways, several Class-1 railroads, the Harvey Canal, and the Louis Armstrong New Orleans International Airport.

“Number one is going to be the shipping, and wherever we work at, everything grows from that. That is priority; the rest we can deal with it. But if we don’t have an economy or jobs, nothing matters.”

—Jefferson Parish Resident



Avondale Shipyard

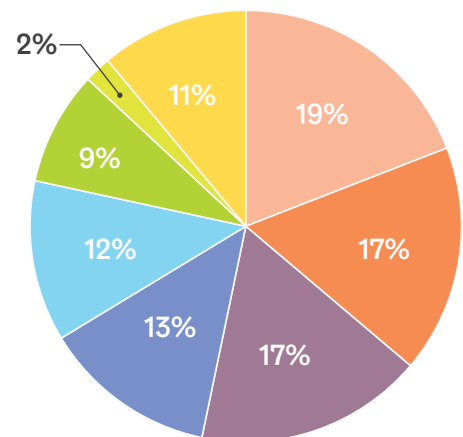
Founded in 1938, and closed in 2014, the shipyard provides a strategic location for an economic redevelopment opportunity such as the proposed intermodal terminal across the Mississippi River from the Elmwood industrial area.
Photo Credit: Google Maps

Another promising cluster includes the coastal, water, and environmental industries. JEDCO—along with many parish residents and stakeholders—recognize that Louisiana is poised to be a forerunner in coastal restoration and water management. Local construction companies, engineering firms, and other businesses will likely expand within the parish and region. Their expertise can serve not only Jefferson Parish but also other states and nations that face the challenges of stormwater planning, coastal restoration, and smart-growth development. Creating and enhancing alternative energy businesses must be considered as well.

Currently, the healthcare industry is the parish’s largest employer, drawing talented workers and offering competitive average wages. Jefferson Parish leaders have concentrated on developing top-quality services at local and regional levels, and growth is already evident. West Jefferson Medical Center and East Jefferson General Hospital expanded to offer improved access to care in their communities, and Ochsner Health System has begun a \$360 million expansion to its Jefferson Highway campuses.

Information technology products and systems already have a strong presence in Jefferson Parish with businesses such as Panavision, Geocent, and 365 Connect. To further expand the industry’s impact in the parish as well as its international reach, parish leaders can continue to attract companies that complement existing sectors such as healthcare, water transportation, and engineering.

Throughout the world, Louisiana’s food culture—especially centered on the Greater New Orleans Area—is well-renowned. Within Jefferson Parish, there are several companies that provide commercial fishing, seafood processing, and food manufacturing, which include Zatarain’s, Boscoli Foods, Inc., and MMI Culinary Services. Offering facility tours, tasting events, or other special activities could boost business for both the food and tourism industries.



Resident Feedback

During the Round 3 meetings, attendees were asked what types of job opportunities they would like to see expanded in the parish.

- Marine Engineering
- Alternative Energy
- Healthcare
- Aquaculture/Agriculture
- Tourism
- Oil and Gas/Chemical Industry
- Warehousing/Distribution
- Other



The Gretna Farmers' Market is open every Saturday morning.
Photo Credit: City of Gretna



Blessing of the Fleet in Jean Lafitte.
Photo Credit: Town of Jean Lafitte



Living along a waterway creates a unique way of life that includes recreational boating and fishing, as shown above in Barataria.



The Jefferson Linear Park offers access to water along Lake Pontchartrain in the more urban and suburban upper part of the parish.



Lafreniere Park provides a multi-use trail and pavilions in the more urban west bank of the parish.

Parish Assets

During the community engagement process, residents identified the landscape's natural resources and an important cultural influence. Residents also identified education, business opportunities, expanding infrastructure, and access to water as important cultural strengths.

Heritage and Culture

Jefferson Parish residents value their heritage and culture and appreciate the traditions that developed over time as generations built their lives and families amidst the local landscape and waterways. The people have a diverse culture. In the upper part of the parish—characterized by urban and suburban development, with major economic hubs located within the levee system—the culture is heavily influenced by the Greater New Orleans region. As this area is slated for growth because of its levee protection and low flood risk, the cultural identity can be further defined over time. In the lower part, the traditions and culture of fishers and trappers are dominant. A strong historical association with the privateer Jean Lafitte is still evident in the communities of Westwego, Bucktown, Barataria, and Jean Lafitte.

Despite disasters and other disruptions, Jefferson Parish communities seek to prioritize historic and cultural resources, embrace the local ways of living with water, celebrate the social and cultural character of different neighborhoods, and cultivate a special sense of place. Hospitality, fun-loving natures, culinary traditions, and an emotional connection to the land are alive and well along Bayou Barataria today. Cajun food and music along with festivals, parades, and cultural events, such as the Blessing of the Fleet and International Grand Isle Tarpon Rodeo, have a unique and endearing character, drawing tourists from around the state, nation, and globe. This powerful cultural presence is a valuable asset that helps drive the economy and sustain a strong sense of place.

**“Louisiana is a part of me. The culture is one thing
that you don’t want to give up. The way of life.”**

—Jefferson Parish Resident



4 Vision and Strategies



50-Year Vision

Gateway to the Region

Because of its major cross-parish connections and the New Orleans International Airport's location in Kenner, Jefferson Parish is the gateway to the region and an important economic engine. It is Louisiana's second-most populous parish and where Ochsner Health System, one of the state's largest employers, is headquartered. Within the perimeter levees, LA SAFE envisions a renovated urban water system with blue and green corridors, multimodal transportation, a diversified economy with sustainable industries, and higher-density, mixed-use development on higher ground. Outside the levee system, the challenge of rising water is turned into an opportunity for new cultural and ecological destinations with support for the fishing industry, ecotourism, consolidated services around community hubs, and improved connectivity.

Renovated Urban Water System

Inside the levee protection system, low-lying areas with highly organic soils, previously marshland, are most susceptible to drainage-induced subsidence and flooding.

- Engineered landscapes and blue/green corridors delay and store stormwater while providing amenities with multiple benefits to the community.
- Groundwater and subsidence are managed and measured. Reduced pumping and raised water levels limit subsidence.
- Holding water upslope, as close to the source as possible, reduces runoff in low-lying areas.
- Splitting drainage at ridges optimizes flow and decreases pumping demands in low-lying areas.
- Stormwater management is incorporated in new development and redevelopment projects, especially where organic soils have the highest potential of land subsidence.
- Smart retrofits use permeable materials to replace impervious surfaces.
- Open canals are maintained and linear park zones along water edges allow controlled flooding while providing recreational and educational opportunities.
- Miles of new waterfronts and park amenities enhance the character of the public realm and spur economic development.
- Redevelopment of historic corridors with multimodal transit links people and assets across parishes.

Smart Growth

Incorporating lessons learned, the west bank of Jefferson Parish directs growth on higher ground and utilizes natural systems for stormwater management.

- Environmental assets and natural buffers in floodplains are preserved and protected.
- New development in the 100-year floodplain is limited and existing critical infrastructure is elevated, and fortified.
- Sustainable industries diversify the economy and provide opportunities for riverside redevelopment.
- Denser, mixed-use development patterns on higher ground promote public health through walkable, bikeable neighborhoods.

Cultural and Ecological Destination

Outside the levee protection system, the communities of Crown Point, Jean Lafitte/Barataria, Lafitte, and Grand Isle turn challenges into new opportunities.







- The existing truncated bayou system is restored to enable flows and reconnect across the levee.
- Cultural and environmental assets are preserved.
- Services and amenities are consolidated around community hubs along the bayou's higher ground.
- Connectivity of services is maintained up and down the bayou and across to Grand Isle.
- Wind and flood insurance policies are addressed to retain residents and attract new investment.
- The fishing industry is supported and new opportunities in ecotourism and aquaculture promoted.



50-YEAR JEFFERSON PARISH VISION

The Jefferson Parish vision includes designing new growth corridors and urban centers, protecting public assets, establishing resilient neighborhoods, enhancing economic engines, and adapting to rising waters.

Legend

-  Existing Transportation Routes
-  CPRA Proposed Levee
-  Pump Station/Control Structure
-  High Ground
-  Low Ground (High Flood Risk)
-  Salt/Brackish Water

Toolkit of Interventions



Ecological Restoration and Limited Floodplain Development



Hardscape Retrofits and Build Sustainable Industries



Street-Level Water Management and Enhanced Canal Experience



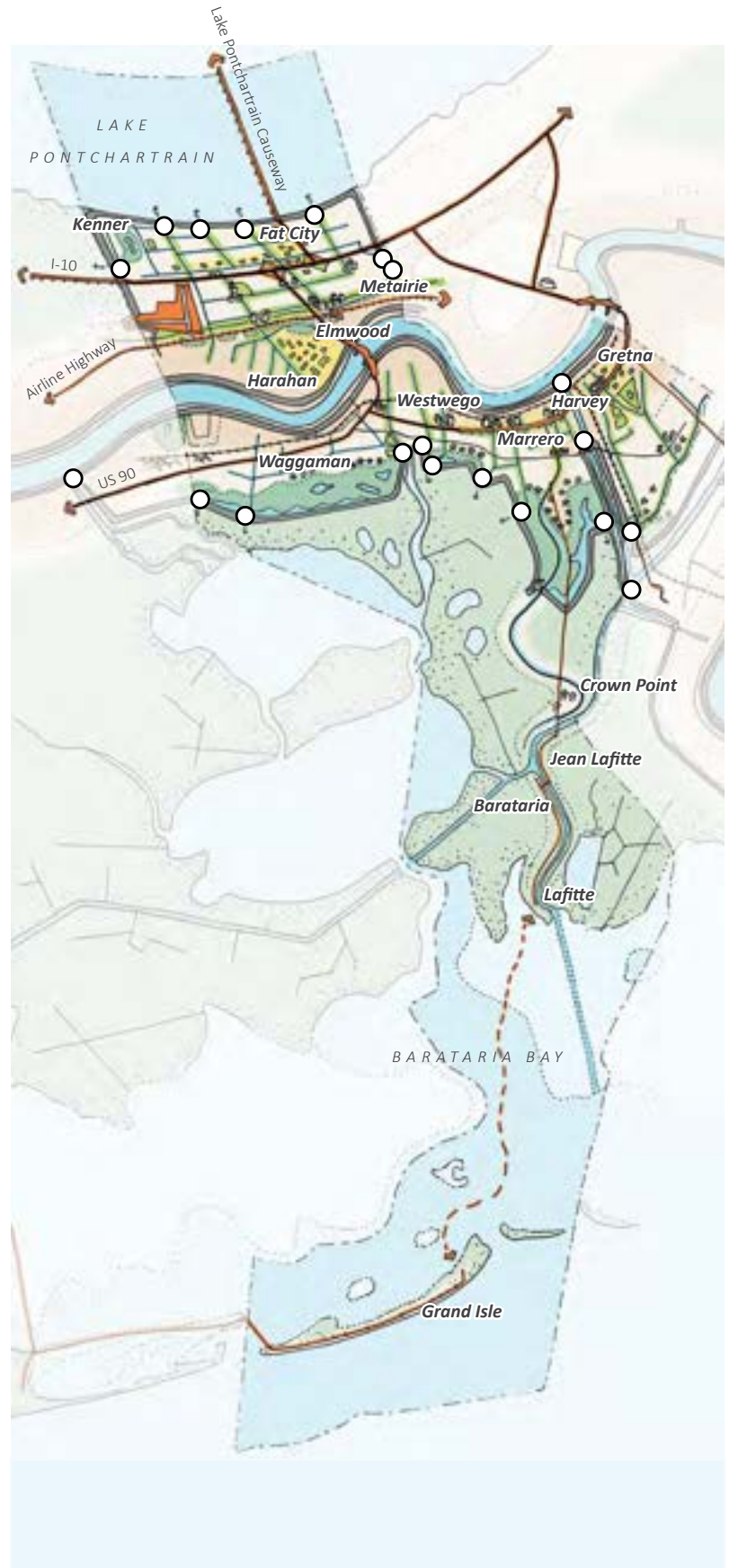
Integrate Green Infrastructure into New Development



Water Transportation Connection to Grand Isle



Restored Bayou Connection



Low Risk

Minimal storm surge flood risk projected and outside the current 100-year floodplain

Design New Growth Corridors and Urban Centers

Low-risk areas have development opportunities to receive populations and economic activity from more flood-prone environments.



Photo Credit: City of Gretna

Moderate Risk

>0 – 6' projected storm surge flood depths or within the current 100-year floodplain

Protect Assets and Establish Resilient Neighborhoods

Areas conducive to maintaining current population levels and economic trends, provided such communities orient future development and mitigation activities in alignment with future flood risk projections.



High Risk

>6' projected storm surge flood depths

Enhance Economic Engines and Adapt to Rising Waters

Areas that can expect to experience population decline and economic losses, up to and including full community-scale resettlement, as environmental conditions deteriorate and repetitive severe flood events take place.



50-Year Vision by Risk Level

Dealing with flood hazards and managing risk have always been part of life in Jefferson Parish, and a great deal of work has been done in recent years to help the parish and the region continue to thrive amidst a changing environment and risk profile. The 2017 Coastal Master Plan, along with Jefferson Parish's Hazard Mitigation Plan, Comprehensive Plan, and Storm-water Management Program, are guiding investments in structural and nonstructural projects designed to address land loss and coastal erosion, which is essential to the future of Louisiana's coastal communities.

LA SAFE has created an opportunity to build upon these plans and ongoing investments by putting community members and stakeholders at the forefront of the planning process. The LA SAFE team worked with them to develop a shared vision for the future of their parish and region; set priorities to inform a holistic approach to achieving resilience; and vet local, parish-wide, and regional solutions. This process enabled residents and local stakeholders to take on greater ownership of the strategies needed for their communities to successfully mitigate flood risk and adapt to future hazards. The following recommendations are the result of that community-driven process.

LA SAFE promotes new growth corridors and urban centers in low-risk areas, protects assets and establishes resilient neighborhoods in areas of moderate risk, and enhances economic engines and adapts to rising waters in high-risk areas.



LOW-RISK ZONE

Risk scenarios are based on CPRA's 50-year flood depth projections under a Medium Environmental scenario and FEMA's effective DFIRM floodplain data.


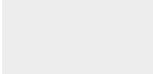





Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2018; For all basemap data see References

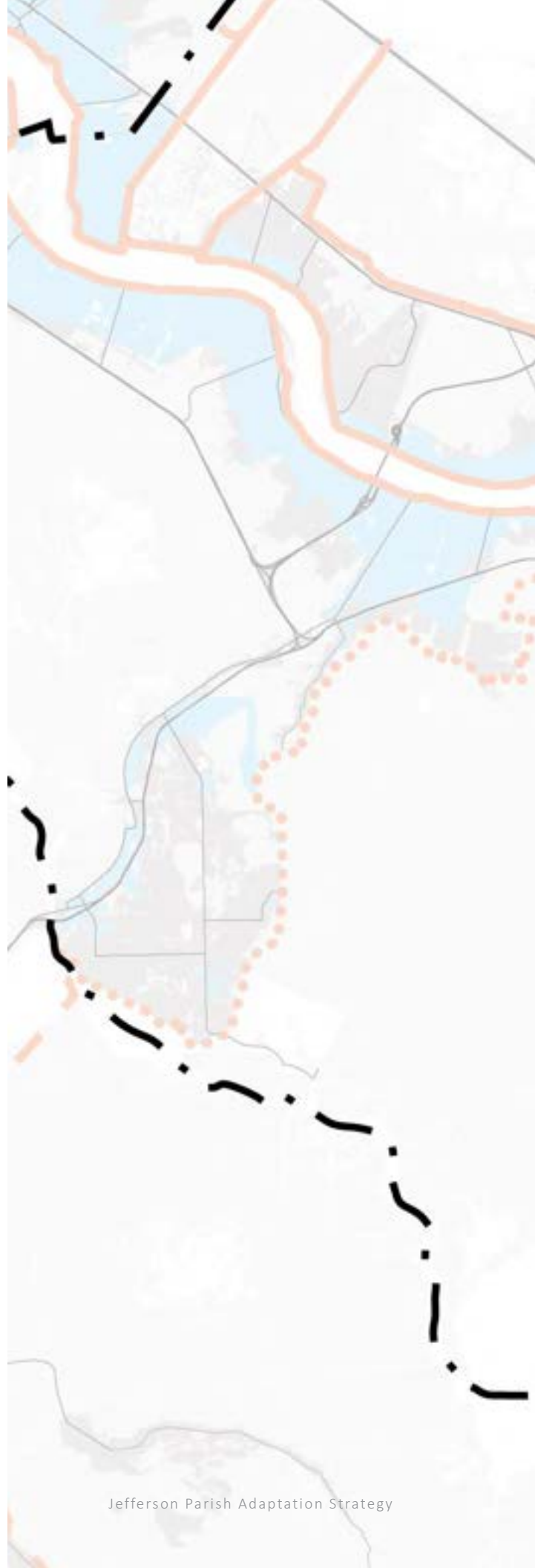
Low Risk

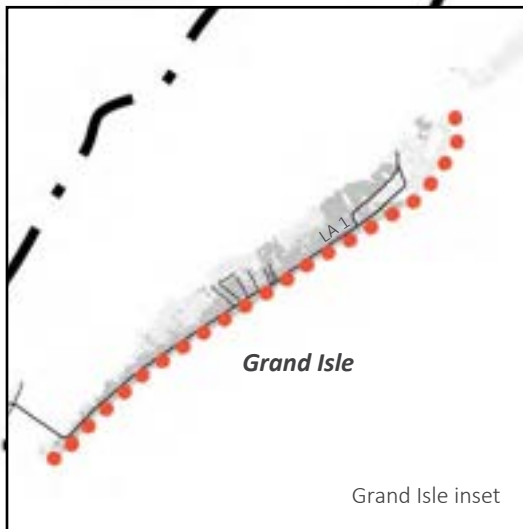
Minimal storm surge flood risk projected and outside the current 100-year floodplain

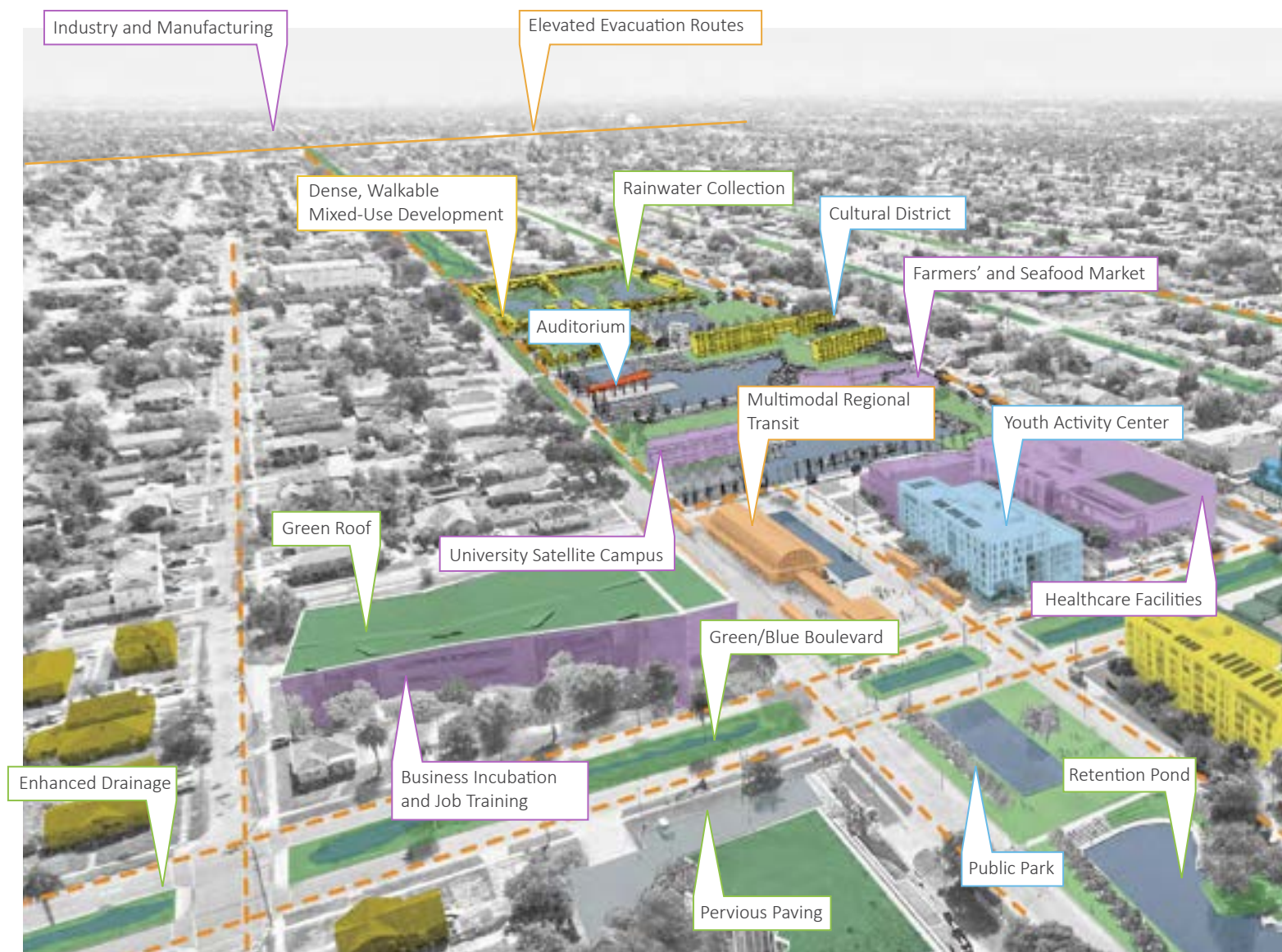
Current characteristics of these areas include urban-type, single-family residential and commercial development with infill opportunities, some public transportation options, and traditional stormwater management facilities. Primarily located on and along the natural ridges, the area is growing geographically on the west bank within the levee system, converting undeveloped land into subdivisions. Currently, there is minimal flood risk from storm surge in this area, although heavy downpours have been flooding streets.

Legend

-  Land
-  Wetlands
-  Water
-  Federal Levee (HSDRSS)
-  Non-Federal Levee
-  CPRA Proposed Levee
-  Parish Boundary







Perspective View of 50-Year Vision



50-Year Vision for Low-Risk Areas: Design New Growth Corridors and Urban Centers

Lower-risk areas are projected to have economic growth, population increases, and minimal flood risk. The low-risk area vision is characterized by—

- Internal stormwater management and retrofits as well as subsidence management
- Diversified economy with sustainable industries
- Enhanced experiential and performance qualities of canals
- Increased transportation options
- Dense, walkable, mixed-use housing

Legend



Water Management



Education, Economy, and Jobs



Housing and Development



Culture and Recreation



Transportation

When surveyed at Meeting 3, a total of 66% of Jefferson Parish participants strongly agreed with this vision, and the next 25% agreed or slightly agreed. Less than 10% of participants disagreed or slightly or strongly disagreed.



MODERATE-RISK ZONE

Risk scenarios are based on CPRA's 50-year flood depth projections under a Medium Environmental scenario and FEMA's effective DFIRM floodplain data.


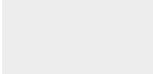





Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2018; For all basemap data see References

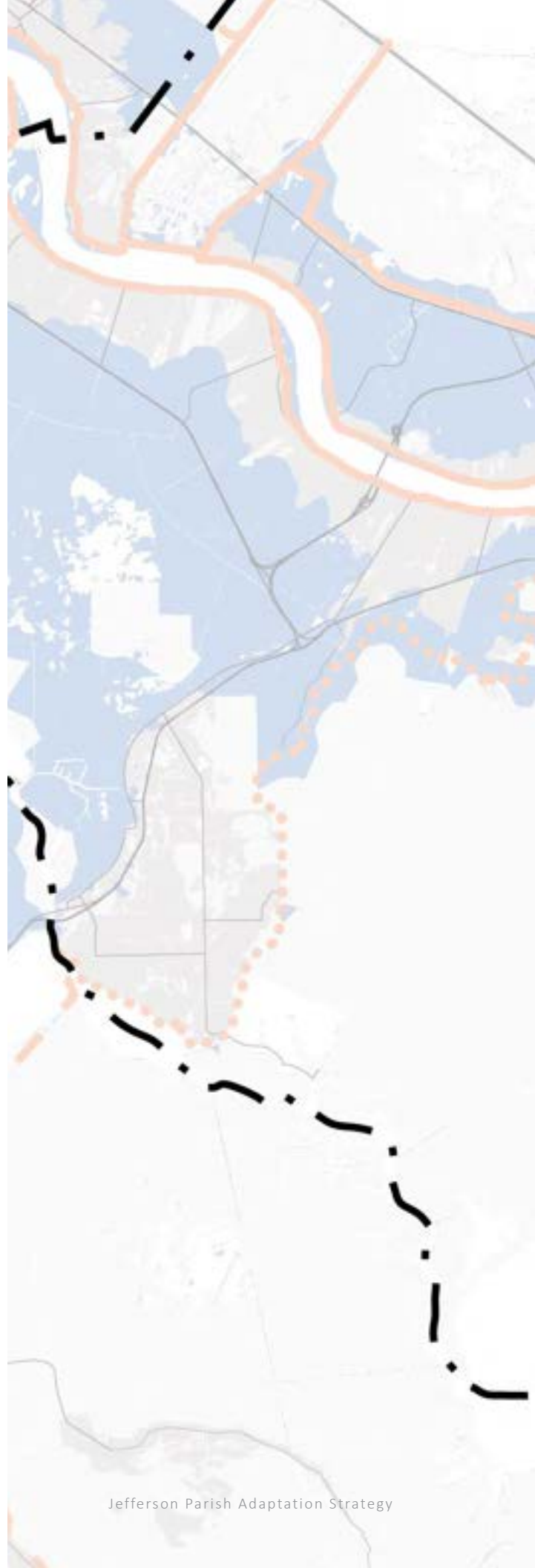
Moderate Risk

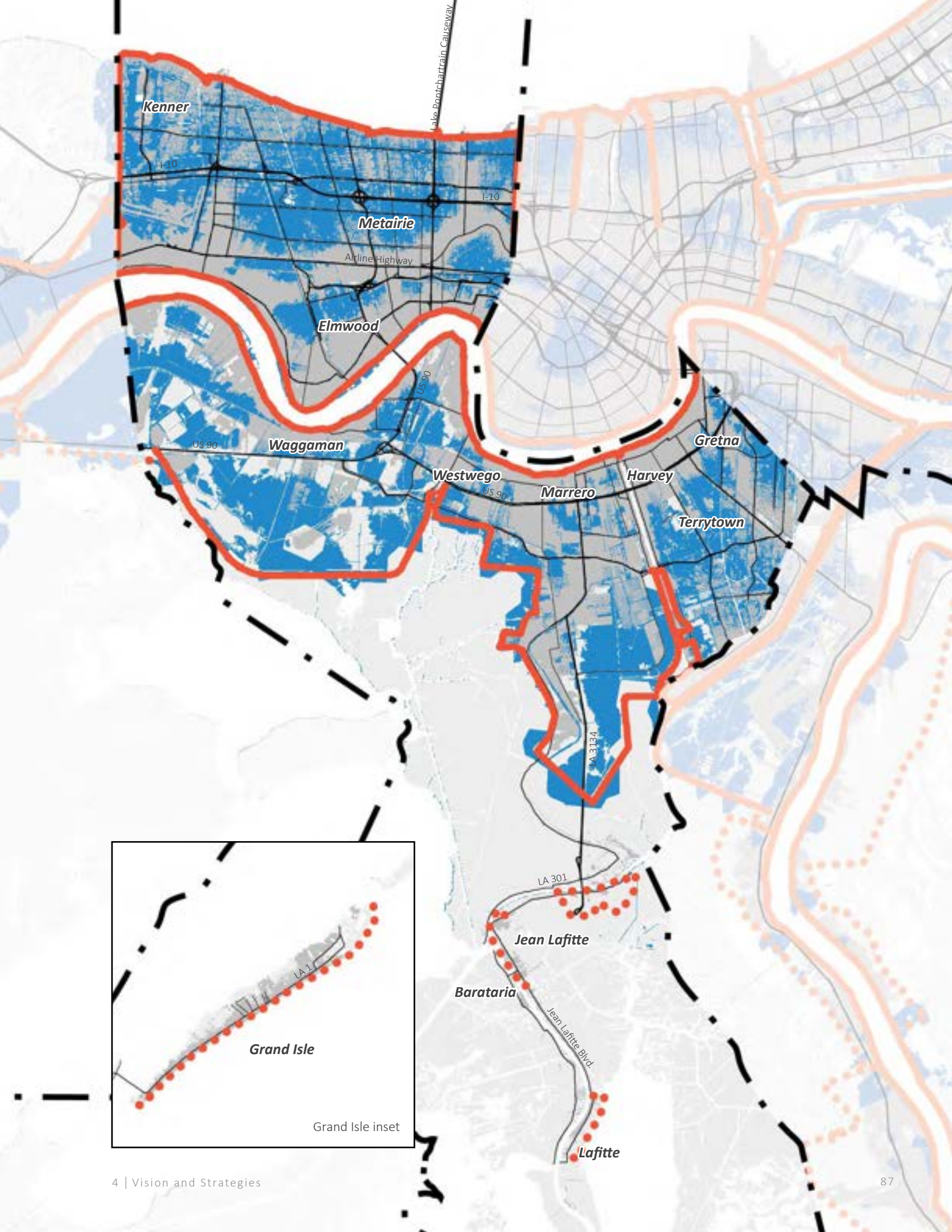
>0 – 6' projected storm surge flood depths
or within the current 100-year floodplain

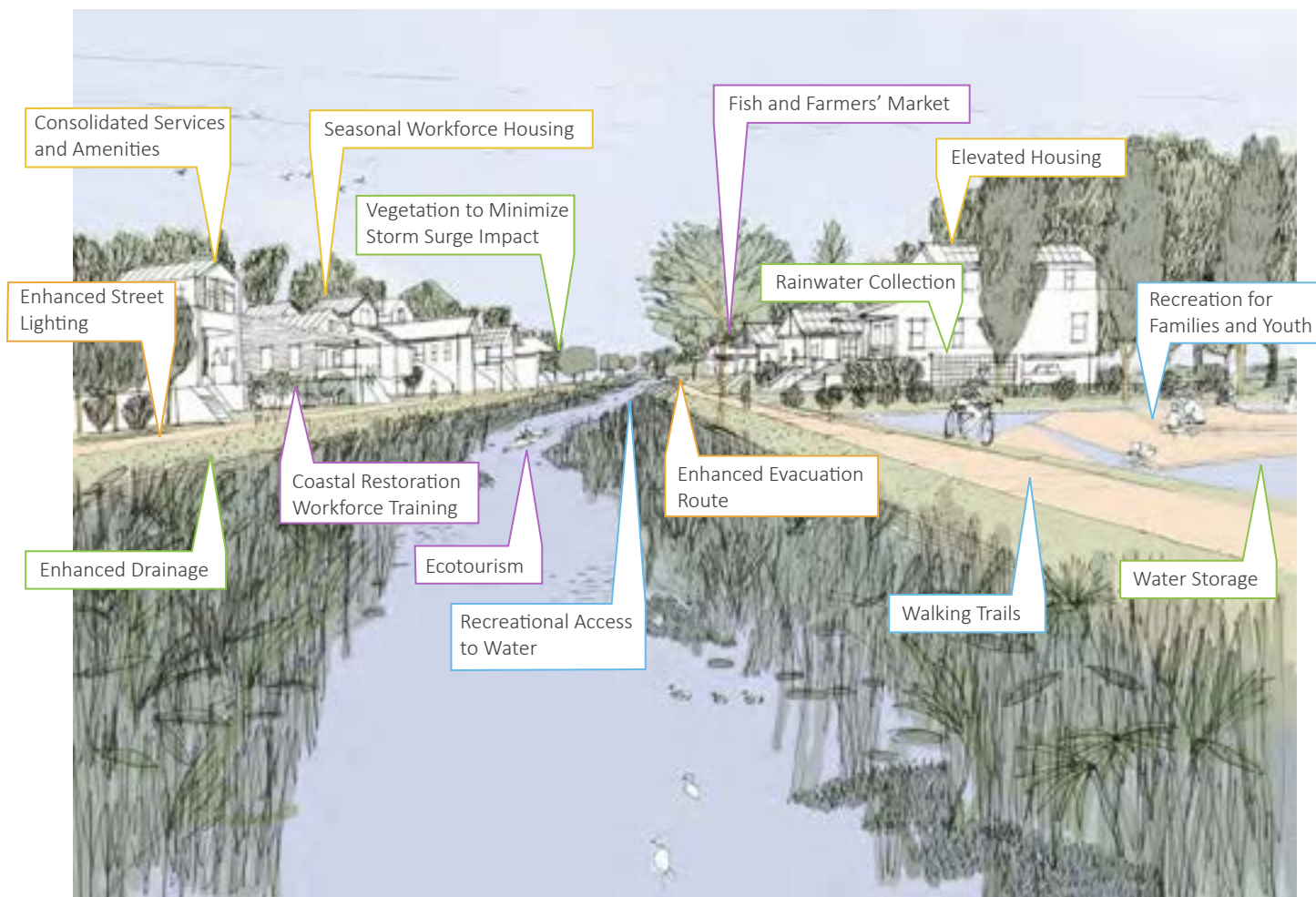
The moderate-risk areas are characterized by dense urban development on the east bank and undeveloped and developing area in the west bank in Jefferson Parish. Because the moderate risk areas are within the levee system, increases in population are expected.

Legend

-  Land
-  Wetlands
-  Water
-  Federal Levee (HSDRSS)
-  Non-Federal Levee
-  CPRA Proposed Levee
-  Parish Boundary







**Perspective View of 50-Year Vision
Along Improved Canal**

Legend



Water Management



Education, Economy, and Jobs



Housing and Development



Culture and Recreation



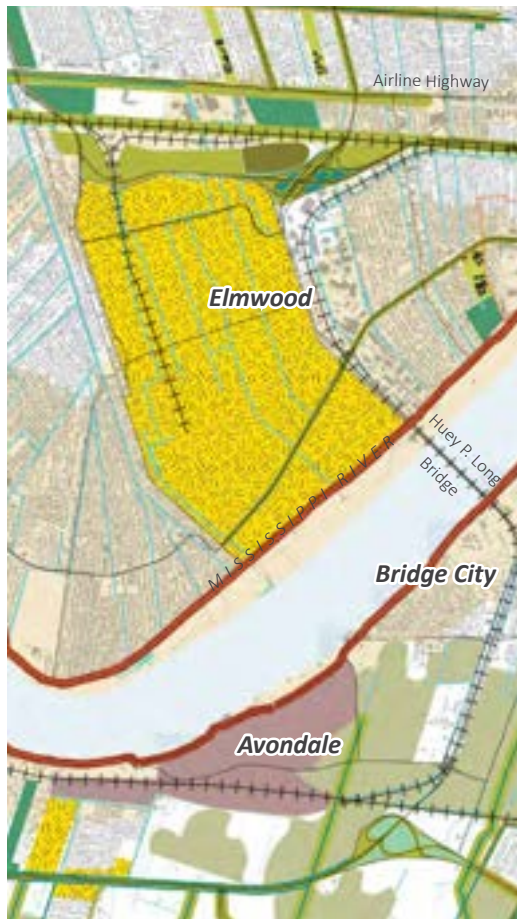
Transportation

50-Year Vision for Moderate-Risk Areas: Protect Assets and Establish Resilient Neighborhoods

Moderate-risk areas are projected to have land loss in surrounding areas, moderate local flood risk, and minimal change in population. The moderate-risk area vision is characterized by—

- Internal stormwater management and retrofits as well as subsidence management
- Diversified economy with sustainable industries
- Enhanced experiential and performance qualities of canals
- Increased transportation options
- Dense, walkable, mixed-use housing

When surveyed, a total of 54% of Jefferson Parish participants strongly agreed with this vision, and the next 36% agreed or slightly agreed. Less than 10% of participants disagreed or slightly or strongly disagreed.



Plan View of 50-Year Vision Elmwood and Avondale

The 50-year vision includes reestablishing Avondale as an industrial zone and revitalizing Elmwood into a mixed-use district.



Plan View of 50-Year Vision Harvey Canal

The 50-year vision for urban waterways includes mixed-use development, recreation space, and green infrastructure retrofits.



Plan View of 50-Year Vision Westwego

The 50-year vision for development on higher ground close to the river. The vision includes blue/green corridors and expanded pedestrian networks.

Legend

- Stormwater storage
- Retrofits with pervious paving and green infrastructure
- Complete green streets
- Urban Waterway Development
- Pedestrian Connection
- Drainage Infrastructure
- Pump Station
- Levee
- Revitalize Historic District
- Existing park
- Existing school
- Existing civic institution
- Existing healthcare facility

Sources: For all basemap data see References



Perspective View of 50-Year Vision for Urban Waterway Development



HIGH-RISK ZONE

Risk scenarios are based on CPRA's 50-year flood depth projections under a Medium Environmental scenario and FEMA's effective DFIRM floodplain data.

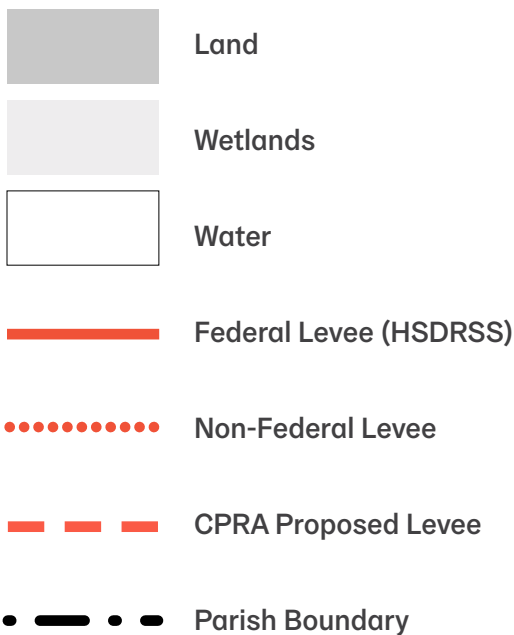
Sources: CPRA Flood Risk Medium Scenario Modeling Data 2017; FEMA Effective DFIRM 100-year floodplain data for Jefferson Parish 2018; For all basemap data see References

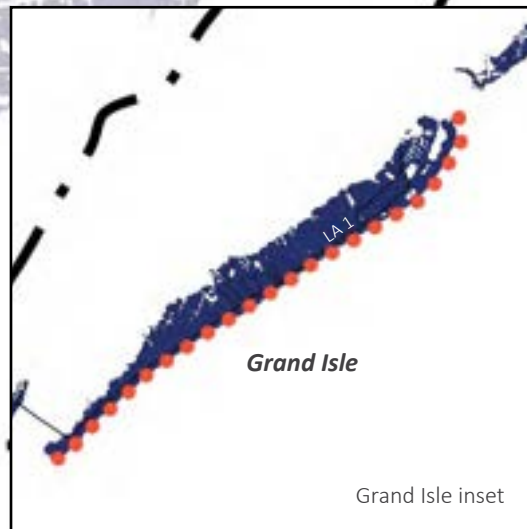
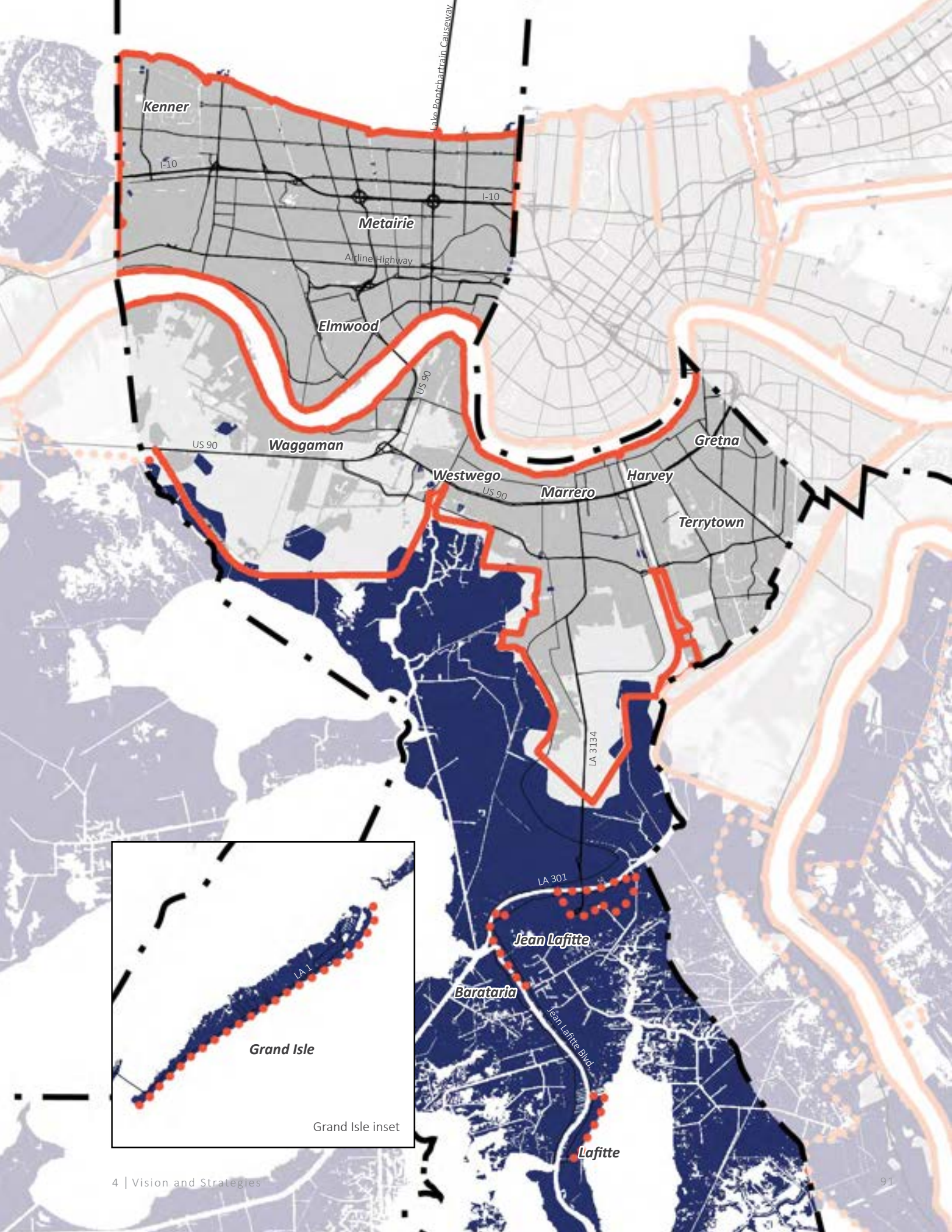
High Risk

>6' projected storm surge flood depths

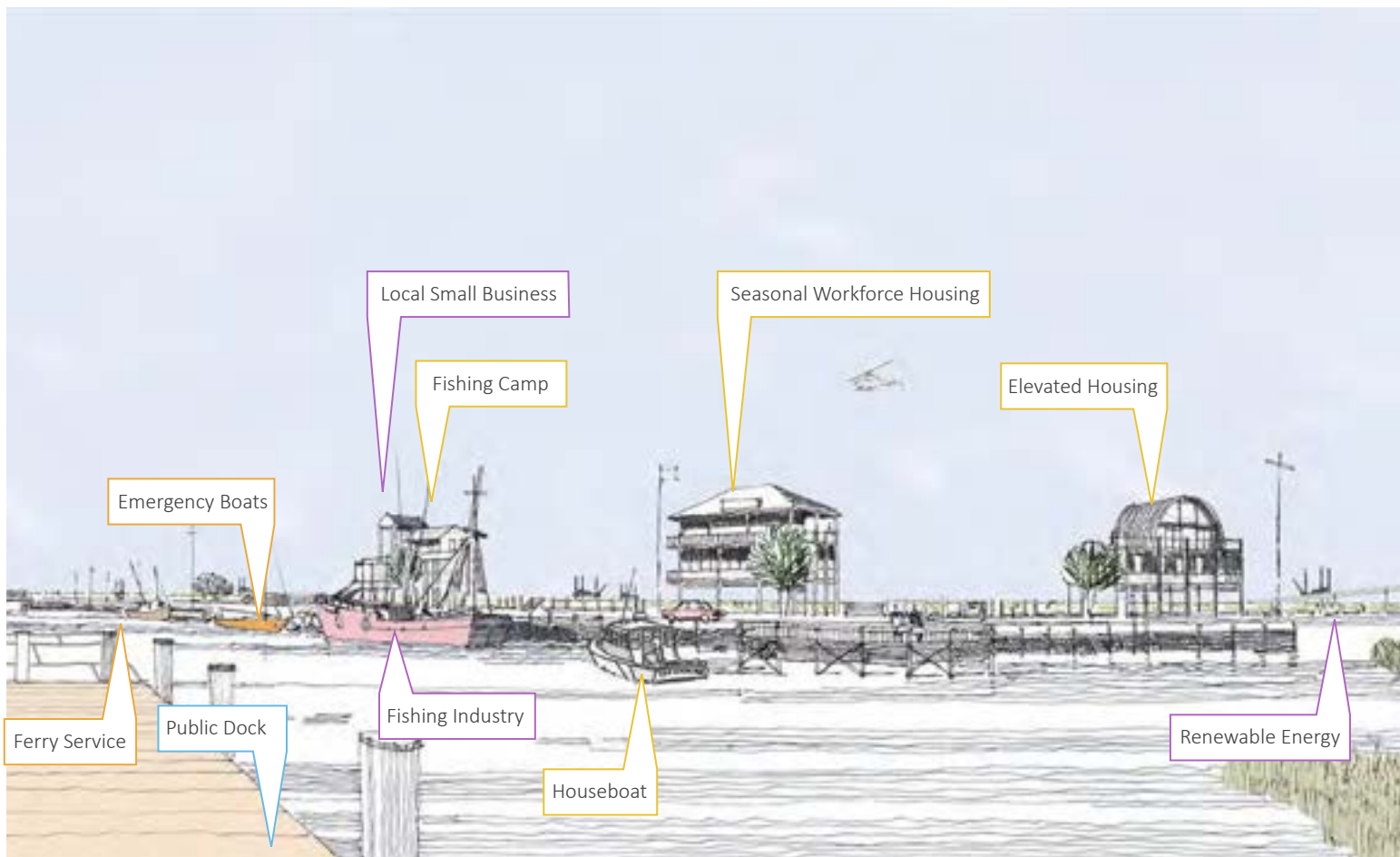
Most of these areas currently experience a high level of flood risk. As seas continue to rise and the Louisiana coastline continues to be negatively impacted, these areas will experience unsustainable levels of flood risk. Land loss and coastal erosion are evident, and parish and state investments toward infrastructure improvements have significantly slowed. In many areas new or substantially improved homes are required to elevate 12 feet, or higher due to FEMA, state, or local regulations. These residents are primarily working in the oil and gas and seafood industries or ancillary support industries. Many homes have transitioned to seasonal fishing camps, and fewer people live there permanently. The tourism economy is predominant.

Legend





Grand Isle inset



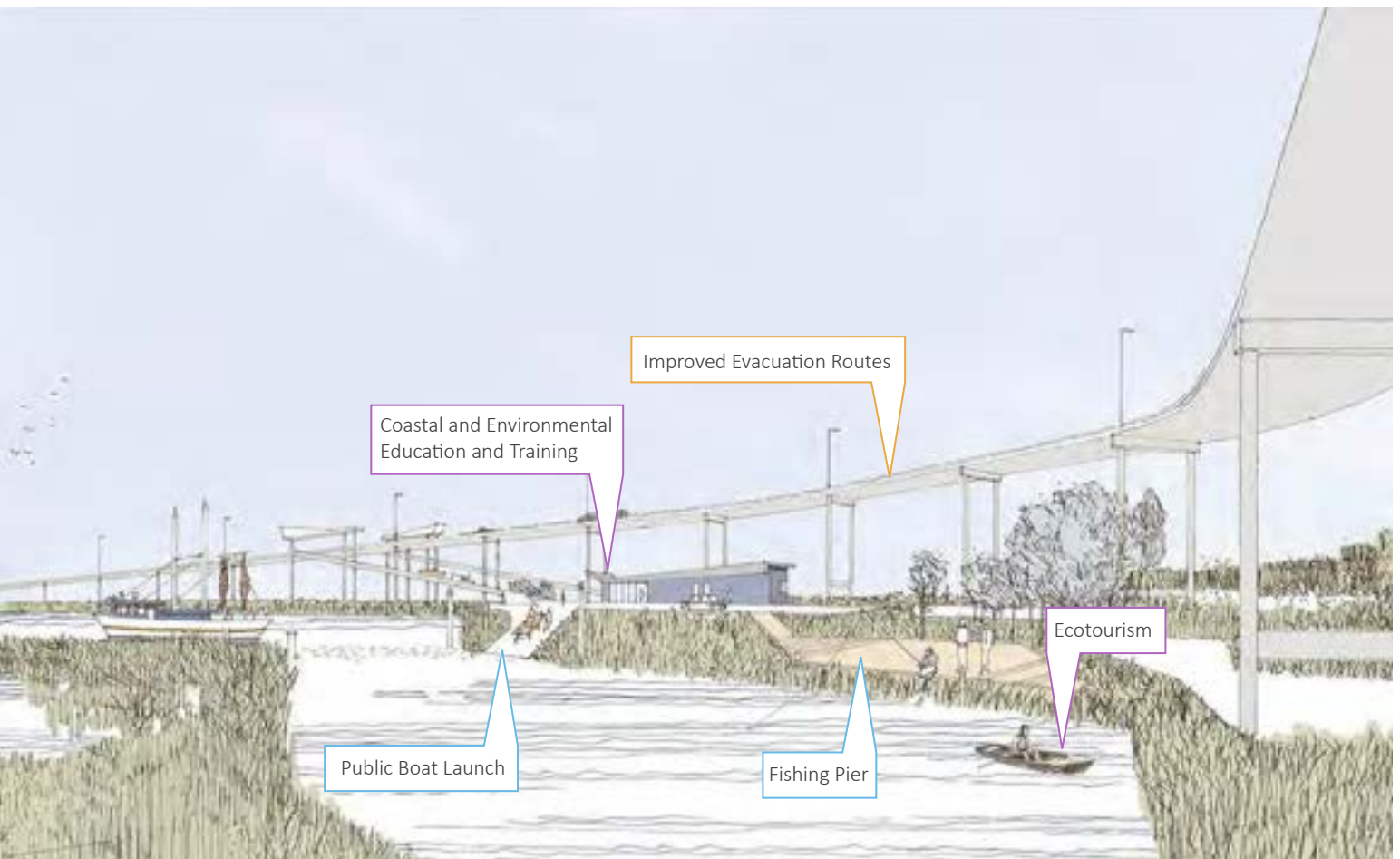
Perspective View of 50-Year Vision

The high-risk vision presents a future with seasonal workforce housing, a bus system, improved evacuation routes, and a coastal and environmental education and training center.

50-Year Vision for High-Risk Areas: Enhance Economic Engines and Adapt to Rising Waters

High-risk areas are projected to have land loss, high flood risk, and a decline in population. The high-risk area vision is characterized by—

- Expanded recreation and ecotourism industries and improved access to nature
- Elevated evacuation routes
- Improved infrastructure to support the seafood industry and coastal workers
- Promotion of new industries such as aquaculture, coastal restoration, renewable energy, and workforce development in these sectors
- No permanent primary residences outside the levee system



Legend



Water
Management



Education, Economy,
and Jobs



Housing and
Development



Culture and
Recreation



Transportation

When surveyed, a total of 51% of Jefferson Parish participants strongly agreed with this vision, and the next 43% agreed or slightly agreed. Less than 8% of participants slightly or strongly disagreed.

Adaptation Goals and Strategies

This section includes background on each goal followed by a description of the strategy and specific actions needed to implement the strategy. Through the LA SAFE engagement process, parish residents, leaders, and stakeholders provided input to create these goals.



Goal 1: Manage Flooding and Subsidence

Implement water management strategies that are based on natural systems and address all scales, which include regional, parish, and community programs as well as initiatives targeted to individual property owners.

Strategy 1: Retain and detain stormwater

Strategy 2: Reduce impervious surfaces

Strategy 3: Reduce the impact of storm surge

Strategy 4: Review and update stormwater policies and programs to adhere to the recommendations found in the above three strategies



Goal 2: Direct Growth to Low-Risk Areas

Create safe, inclusive, and vibrant communities with amenities that attract and retain residents of all ages.

Strategy 1: Encourage dense, sustainable, mixed-use development on higher ground

Strategy 2: Create and maintain a diverse and resilient housing stock for people at all income levels



Goal 3: Improve Mobility Throughout the Parish and Region

Support a resilient transportation system that includes multiple modes and promotes the creation of walkable communities.

Strategy 1: Expand and diversify transportation options

Strategy 2: Adopt and implement a Complete Streets program



Goal 4: Strengthen and Diversify Local Economies

Integrate risk and adaptation practices into all levels of government and educational systems. Build a robust economy that diversifies the parish's economic base, supports residents' entrepreneurial spirit, and trains and retrains parish workers in emerging industries.

Strategy 1: Retain existing business and develop new business opportunities throughout the parish

Strategy 2: Improve career ladders and links to workforce development



Goal 5: Retain Local Culture and Enhance Recreation Opportunities

Retain the parish's culture and values as growth and development occurs. Leverage the parish's historic assets to improve the local economy. Incorporate diverse recreation opportunities while mitigating flood risks to promote a healthy environment that allows residents to experience the parish's natural beauty.

Strategy 1: Retain local culture and enhance recreation opportunities

Strategy 2: Protect and promote cultural assets



In Jefferson Parish, like other parishes and communities across the state and nation, stormwater management best practices need to complement and support resilient development and redevelopment. Many green infrastructure site-design practices can reduce the cost of infrastructure while maintaining or even increasing the value of the property.

GOAL 1

Manage Flooding and Subsidence

Strategy 1

Retain and detain stormwater

- Action A: Promote the use of shared detention areas to adjacent property owners.
- Action B: Minimize water conveyance across ridges; hold water in the basins.
- Action C: Expand capacity of existing drainage canals.
- Action D: Limit water table drawdown; raise water table where possible in subsidence-prone areas.
- Action E: Establish a groundwater management unit of the parish to monitor water tables and provide standards limiting impacts of subsidence.
- Action F: Increase multipurpose canals on the west bank.

Strategy 2

Reduce impervious surfaces

- Action A: Continue and expand incorporating green infrastructure into development designs and drainage updates.
- Action B: Incorporate green streets infrastructure and water management into road design.
- Action C: Discourage elevated fill and incentivize pier-and-beam foundations for structures.

Strategy 3

Reduce the impact of storm surge

- Action A: Sufficiently elevate structures in moderate- and high-risk areas.
- Action B: Conserve and restore wetlands.

Strategy 4

Review and update stormwater policies and programs to adhere to the recommendations found in the above three strategies

- Action A: Continue to conduct an audit of all parish plans, regulations, policies, and practices relevant to stormwater regulation and amend development codes to achieve consistency with stormwater management best practices.
- Action B: Implement and enforce stormwater management program.
- Action C: Continue to develop and update stormwater utilities that create fee-based services to help pay for green infrastructure flood risk reduction projects.
- Action D: Provide incentives for private developers to handle stormwater on site.

A photograph of a wetland park. In the foreground, there is a body of water with a small wooden boardwalk or bridge crossing it. The background is filled with dense, green trees and foliage. The sky is visible in the upper left corner.

Wetland Park

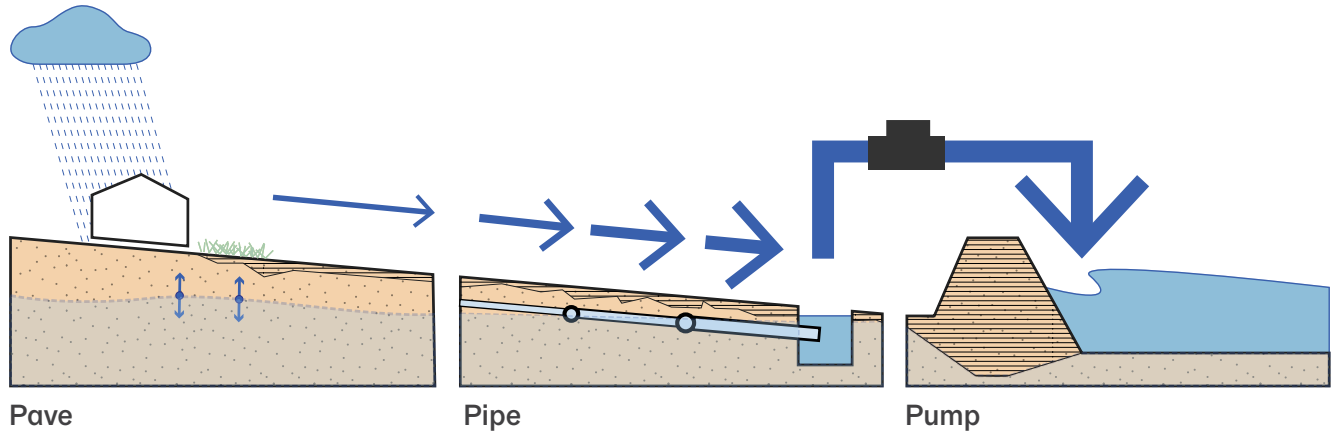
Wetland parks divert and temporarily store water during heavy rain events, provide for natural habitat recovery, and offer a public space for education and recreation.

Strategy 1: Retain and detain stormwater

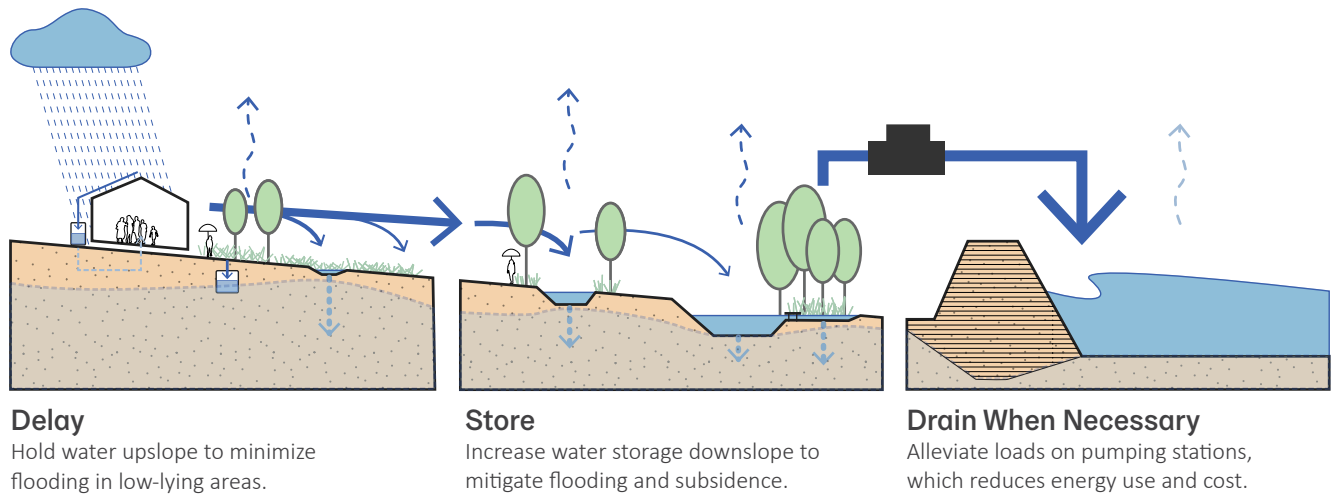
Jefferson Parish has an opportunity to manage stormwater by enforcing existing stormwater management ordinances; promoting shared detention ponds; increasing retention areas throughout the parish; reducing stormwater runoff; and enhancing the existing drainage systems to residents and businesses.

To ease demand on Jefferson Parish's pump system during storm events and reduce subsidence within the levee system, the parish should identify additional areas to retain water, including increasing the number of canals along the west bank and splitting drainage at the ridge on the east bank to make use of natural gravity to convey stormwater. This measure will serve to reduce economic damage from flooding, decrease downstream erosion, decrease subsidence, and improve the quality of water flowing into adjacent bayous and Lake Pontchartrain. Parish-wide, shared retention areas strategically located would have the most impact and should be located near development to receive runoff routed from development sites. Potential retention areas include wetlands, acquired properties, or undeveloped land throughout the parish to which stormwater is intentionally directed from developed areas. Similarly, existing detention requirements could be leveraged with other or smaller property owners to locally manage stormwater.

Existing System



Proposed System: Delay and Store Runoff



Retain

the holding of stormwater permanently in basins, ponds, and cisterns. Retention basins allow stormwater to infiltrate the ground and for the collected stormwater to be repurposed for other uses such as irrigation.

Detain

the holding of stormwater temporarily in a swale, detention basin, or other features. Detention reduces peak discharge by allowing the slower and more controlled release of runoff and does not allow for the permanent pooling of water.



Water Storage

A two-acre retention pond was incorporated into Atlanta's Historic Fourth Ward Park, a redeveloped brownfield along the Atlanta BeltLine.

Photo Credit: Jamie/Wikimedia Commons/CC BY-SA 2.0

Action A: Promote the use of shared detention areas to adjacent property owners.

When a site larger than one acre is developed, the applicable stormwater detention volume could be increased to allow adjacent development to channel stormwater runoff into this closed system. The parish should work with developers and adjacent property owners to identify opportunities to leverage detention areas to serve larger developed areas. In addition, commonly held detention areas need to be inspected regularly to ensure that channels into the detention and retention areas are clear of debris and pollutants.

Steps needed:

- Allow shared detention areas in development codes.
- Identify potential sites for shared detention areas, including new development sites near existing development sites or near sites currently being planned for development.
- Identify a fee structure, including any incentives for installation of green infrastructure.
- Work with the development community and Louisiana Home Builders Association to educate them on the benefits of shared detention areas and promote their use.
- Update the Storm Drainage Design Manual to include guidelines for shared detention areas.
- Enforce maintenance standards and responsibilities to ensure proper functioning of detention areas.

Action B: Minimize water conveyance across ridges; hold water in the basins.

To reduce costs of pumping water over ridges and the associated impacts to the water table, the parish should split drainage at the ridge and build on their current regulations to increase incentives to retain stormwater in place.

Steps needed:

- Reevaluate current canal management to reduce necessity to pump across the ridge.
- Split drainage facilities at the ridge and utilize gravity to draw water away from the ridge.
- Enforce stormwater management requirements to minimize the volume of runoff discharged from developed sites.
- Review stormwater fee structure to ensure that incentives result in desired stormwater retention.
- Implement and enforce noncompliance fees.
- Apply fees toward building and maintaining green infrastructure that benefits the same community where the fee is collected.
- Create water credits to encourage developers to exceed stormwater management requirements.
- Establish a stormwater management authority to manage fees and water credits and a stormwater advisory committee to review stormwater management projects and advise on fee allocations.



Split at the Ridge

Today, stormwater is collected and conveyed across the width of the east bank and discharged into Lake Pontchartrain. This means that all of this runoff is pumped through the Metairie Ridge and aggregated with runoff from the lowlands. The split-at-the-ridge retrofit proposes to instead divert runoff from areas riverside of the ridge into the Mississippi River using new and expanded pump stations in Harahan and Monticello Canal.

Image Credit: Greater New Orleans Urban Water Plan, Waggonner & Ball

Legend

- Ridge
- Low-lying land
- Wetlands
- Water storage
- Small-scale strategies to slow water
- Split-at-the-ridge
- Parish boundary

Action C: Expand capacity of existing drainage canals.

Current drainage facilities should be reengineered and new canals designed to increase their capacity and function to hold additional stormwater. To increase capacity, the canals could be terraced to create an artificial floodplain designed to contain, retain, and drain. The terraced part could be designed to detain stormwater when needed and slow draining stormwater, which would further reduce erosion of the canals and better manage stormwater influx at the receiving end of the canal. When the terraces are not needed to manage stormwater, they allow for recreational activities and green spaces in an urbanized area.

Steps needed:

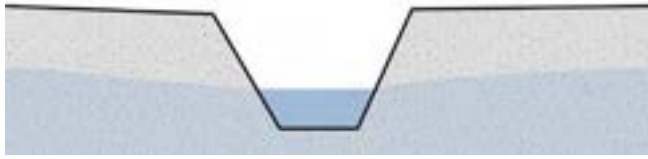
- Identify canals suitable for expansion and enhancement.
- Work with neighborhoods and residents to design public properties along canals.
- Work with the Department of Public Works as well as the Department of Parks and Recreation to increase stormwater management capacity along the canals and identify opportunities for multipurpose function and multipurpose benefits.
- Ensure that development along the canals is appropriate for the redesign and their contribution to runoff into the area.

Increased Storage

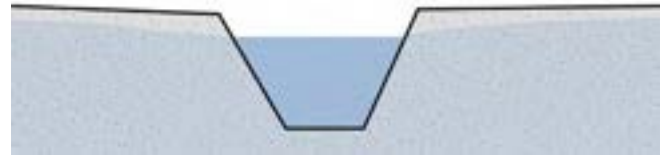
The Veterans Canal is envisioned as a terraced artificial floodplain that can be both a recreational amenity during dry times and additional water storage when needed.

Image Credit: Greater New Orleans Urban Water Plan, Waggonner & Ball





Jefferson Parish’s canals are typically shallow—which leads to subsidence—or can be stagnant or choked with invasive aquatic vegetation.



Passive systems like a weir hold back water a higher level until it spills over, which delays the need for pumping as well as creates flow.



Raise Water Levels

Water levels are critical to the long-term sustainability because they determine whether areas with organic soils stay stable or continue sinking. Maintaining higher water levels in surface canals will improve the stability of surrounding soils.

Action D: Limit water table drawdown; raise water table where possible in subsidence-prone areas.

To reduce the demand on forced drainage during storm events, the parish should continue to identify strategically located undeveloped areas that can serve as retention areas for stormwater. The retention areas will decrease the amount of water that will need to be pumped out to reduce flooding and can maintain and possibly raise the water table at the area. When not needed for retaining stormwater, the retention areas could also be sites for publicly accessible culture- and nature-based education and recreation. For example, the proposed Airline and Roosevelt Linear Parks transform a section of an existing canal into a multifunctional site that manages stormwater quantity and quality as well as provides recreational benefits.

Steps needed:

- Map high flood risk areas (on a parcel level), undeveloped and natural areas, and local hydrology and drainage patterns.
- Identify focus areas where undeveloped and natural areas can be used by developed areas to temporarily store runoff.
- Ensure that the stormwater management area remains undeveloped and continues its retention function.
- Update the Storm Drainage Design Manual to ensure that stormwater quality and quantity are appropriate for the receiving ecosystem.

Action E: Establish a groundwater management unit of the parish to monitor water tables and provide standards for limiting impacts of subsidence.

Monitoring water tables and activities that draw down the water tables will allow the parish to create standards limiting impacts and raising the water table where possible in subsidence-prone soils.

Steps needed:

- Expand both in scope and geography green infrastructure practices to mitigate flooding, combat subsidence, and comply with MS4 requirements.
- Install a groundwater monitoring network and employ real-time controls to manage surface water levels for subsidence control.
- Monitor and record stormwater and groundwater quantity and quality, as well as land subsidence, to ensure objectives are being met.
- Establish close collaboration with other local and state entities that manage groundwater within the perimeter defense system.

Action F: Increase multipurpose canals on the west bank.

As new development continues to focus on the west bank, additional stormwater management facilities will be required to manage stormwater runoff. To reduce economic damage from rain events, Jefferson Parish should consider placing additional canals with the potential to retain and slow down stormwater and provide recreational amenities to the public.

Steps needed:

- Identify target areas for development and determine needed stormwater management.
- Work with developers to incorporate public green spaces along potential new canals.
- Work with all departments to identify other purposes and benefits of new canals, such as recreational benefits, green spaces, public spaces, and natural habitats.
- As the number of canals increases, discuss issues relating to public safety and identify improvements needed to maintain safety of residents around open canals.
- Allow new canals to be easily adaptable to changing water management needs.



Strategy 2: Reduce impervious surfaces

Sea level rise, subsidence, and greater frequency and severity of rain events are already increasing Jefferson Parish's stormwater management burden. Flood risk can be reduced by decreasing the amount of stormwater runoff entering the drainage system. Stormwater management best practices for limiting runoff include decreasing impervious surfaces by incorporating green infrastructure into development designs.

Pervious Paving

Pervious pavers allow stormwater to be absorbed where it falls, reducing runoff into the drainage system.

Action A: Continue and expand incorporating green infrastructure into development designs and drainage updates.

To reduce the demand on the drainage system, the parish should consider requiring the incorporation of green infrastructure into all development as a means to handle stormwater runoff and control erosion and water table drawdowns.

Steps needed:

- Include a list of best practices to reduce impervious hard surfaces in the Stormwater Pollution Prevention Plan for all phases of development.
- Update ordinances to require property owners, including those below one acre, to manage stormwater on site and reduce runoff from their property.
- Update ordinances to reduce parking requirements; establish a maximum impervious surface for developments.
- Provide incentives/rewards for voluntary reduction of impervious surfaces.
- Encourage the use of pervious material where practicable.
- Update ordinances to increase erosion controls during and after site development.
- Require integration of green infrastructure techniques into site design.
- Develop a stormwater impact fee to incentivize the use of green infrastructure.
- Work with neighborhood associations and other stakeholders to promote use of green infrastructure.

Green Infrastructure

Stormwater management is integrated into the landscape design. A rain garden captures stormwater runoff.



Action B: Incorporate green streets infrastructure and water management into road design.

Green streets improve water quality and help reduce runoff into the stormwater system through integration of stormwater treatment techniques that use natural filtration processes and landscaping into street design. Jefferson Parish should review its right-of-way, drainage patterns, and green infrastructure opportunities and incorporate green street concepts into the parish's roadway conceptual planning, design, engineering, and development process.

Steps needed:

- Review right-of-way, drainage patterns, and green infrastructure opportunities.
- Incorporate green street concepts into the parish's roadway conceptual planning, design, engineering, and development process.
- Incorporate green street infrastructure into right-of-way acquisition and roadway design decisions.
- Coordinate across departments to leverage ongoing capital improvements to include green infrastructure that will improve water quality, improve drainage, and control erosion.
- Prepare operation and maintenance plans.

Green Streets

Stormwater is directed into curbside bioswales through curb cuts to reduce street flooding and infiltrate soils.



Action C: Discourage elevated fill and incentivize pier-and-beam foundations for structures.

Reducing the amount of fill used to meet elevation requirements will reduce flood risk. Any slope of fill increases runoff velocity, which can lead to soil erosion, scouring, stormwater quality impairments, and alterations in local hydrology and the hydrology of borrow pits. To prevent future unintended consequences from the use of fill, the parish should work with homebuilders and realtor associations to identify and implement development best practices and incentivize use of the least amount of fill or no fill to meet elevation requirements. This strategy will build on the programs the Jefferson Parish Department of Floodplain Management is implementing to lessen the risk of flooding.

Steps needed:

- Work with the Louisiana Home Builders Association, Louisiana Realtors, and other stakeholders to identify barriers and opportunities to discourage elevating homes on fill.
- Work with state agencies and local departments to document benefits and trade-offs of limiting the fill option.
- Work with the Louisiana Assessors' Association to discuss how elevations are assessed and potential differences among types of elevations.
- Implement development code changes identified in the parish's review of local code of ordinances to discourage slab-on-grade and fill and further encourage pier-and-beam construction that properly accommodates water flow during flood events.
- Provide property owners with clear and current information regarding best practices and options for elevating homes and businesses. FEMA, the LSU AgCenter, and the American Society of Civil Engineers have many publications available that provide useful technical information.
- Combine wind fortification and weatherization programs with home elevations to address multiple risk factors.
- Require elevation via pier-and-beam construction in order to be eligible to receive parish and state resources for elevation.

Elevated Structures

Structures elevated with pier-and-beam construction allow the water to flow underneath without harming the structure or neighboring structures.



Photo Credit: Google Maps Street View

Wetlands as Natural Defense

Jefferson Parish's wetlands, such as the LaBranche Wetlands pictured here, can provide recreational and educational benefits as well as protect communities against the impacts of storm surge.

Strategy 3: Reduce the impact of storm surge

Considering a future with increasing flood risk, it is important to employ what is known as a “multiple lines of defense” approach. Decreasing direct economic damage to existing structures can be achieved through elevation. Addressing land loss and erosion, flood risk, and habitat loss through restoration of wetlands is a major opportunity for Jefferson Parish to also provide recreational and educational benefits.

Action A: Sufficiently elevate structures in moderate- and high-risk areas.

Storm surge can cause significant economic damage to infrastructure and residential and commercial structures. As these structures are built and redeveloped, they should be elevated to a height that ensures minimal damage from storm surge.

Steps needed:

- Review state flood risk disclosure requirements and update requirements that flood risk is disclosed during property transactions and that these requirements are enforced.
- Develop a publicly available database of flooded and mitigated properties.
- Periodically update to show updated flood risk that takes into account parish-level flood-risk mitigation measures that have been taken and other features not reflected in the FEMA maps.

Beechgrove and Claiborne Homes: Westwego, LA

Located in Westwego in Jefferson Parish, the community consists of single-family, affordable rental housing. Each home is elevated, providing covered parking and storage below the home.

Photo Credit: Google Maps Street View



Action B: Conserve and restore wetlands.

Natural habitats such as wetlands and forests have been shown to attenuate storm surge. In addition to the levee protection system, the parish can further reduce storm surge impacts by restoring and creating marshlands inside the levee. This will serve to advance implementation of the Multiple Lines of Defense Strategy⁵⁰ the state has incorporated into its coastal protection and restoration effort. Undeveloped areas below Waggaman and Avondale and east of Estelle should be considered for conservation to manage stormwater, provide habitat, manage the water table, and thus reduce subsidence inside the levee system.

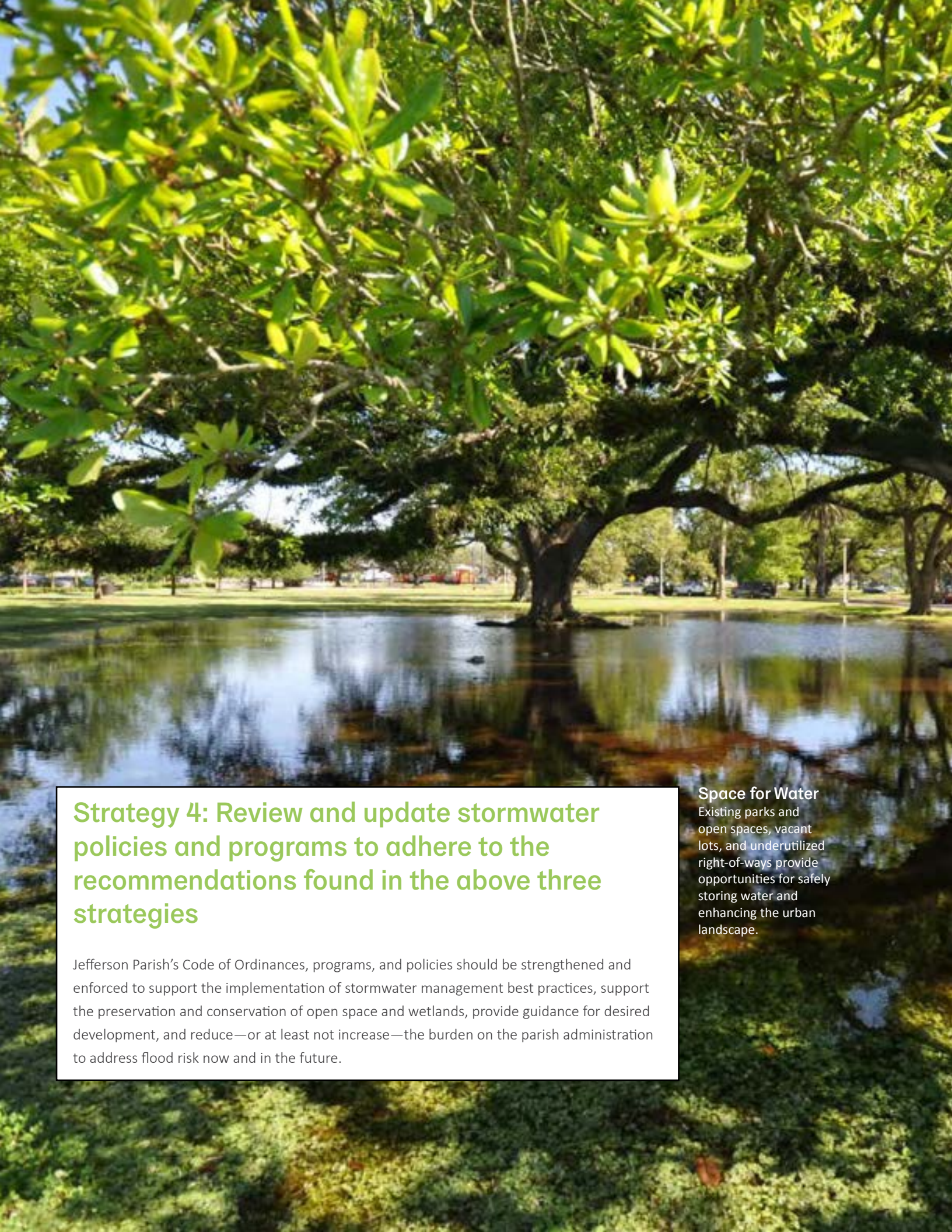
Steps needed:

- Continue coordinating with U.S. Army Corps of Engineers and CPRA to leverage ongoing protection and restoration efforts.
- Identify target areas and prioritize restoration projects that will provide the most benefit to ecosystems and communities over the long term.
- Identify additional implementation programs with USACE and CPRA to expand on existing work.

Jean Lafitte National Historical Park and Preserve

Wetlands and swamps provide the first line of defense against storm surge from nearby lakes and the Gulf of Mexico.





Strategy 4: Review and update stormwater policies and programs to adhere to the recommendations found in the above three strategies

Jefferson Parish's Code of Ordinances, programs, and policies should be strengthened and enforced to support the implementation of stormwater management best practices, support the preservation and conservation of open space and wetlands, provide guidance for desired development, and reduce—or at least not increase—the burden on the parish administration to address flood risk now and in the future.

Space for Water

Existing parks and open spaces, vacant lots, and underutilized right-of-ways provide opportunities for safely storing water and enhancing the urban landscape.

Action A: Continue to conduct an audit of all parish plans, regulations, policies, and practices relevant to stormwater regulation and amend development codes to achieve consistency with stormwater management best practices.

To ensure all aspects of the Code of Ordinances are consistently supportive of stormwater management best practices, Jefferson Parish should continue their audit of the entire code to remove barriers to, and encourage use of, stormwater management best practices.

Steps needed:

- Meet with parish departments to identify how stormwater management relates to their work and mission, including any needs or barriers staff have observed, how the code is implemented “on the ground,” and any unintended consequences.
- Review results of the code audit with parish departments and the development community.
- Develop code amendments using best practices to address conflicts and needed updates, as identified in the code audit.
- Develop a mechanism to ensure that agencies and departments collaborate on implementing the revised codes and provide input/sign-off in the permitting process.
- Prepare and adopt amendments to city codes, as needed.
- Develop a monitoring system to gauge effectiveness of the stormwater management program.

“Minimize concrete on new subdivisions and developments.”

—Jefferson Parish Resident

“I like high-density, mixed-use zoning along target corridors.”

—Jefferson Parish Resident

“We need policies to encourage resilient, elevated housing development.”

—Jefferson Parish Resident

Action B: Implement and enforce stormwater management program.

To address watershed-related flood risk throughout the parish, develop or update the parish stormwater management plan and partner with regional organizations and other parishes to prepare a regional stormwater management plan to serve as a guiding document for water management decisions. The plans should address floodplain management within the watershed, provide short- and long-term goals for managing water quantity and quality, and provide guidance on how to protect the watershed and its inhabitants.

Steps needed:

- Develop or update a comprehensive parish stormwater management plan.
- Work with regional planning associations to develop a watershed-based stormwater management plan with accompanying policies that apply across jurisdictional lines, especially those upstream of the parish.
- Assess current and planned programs and projects to ensure consistency with the 2017 Coastal Master Plan.
- Develop strategies to consider current and future flood risk in prioritizing allocation of resources.



East Bank of Jefferson Parish

The Greater New Orleans Urban Water Plan is a comprehensive stormwater management plan for the New Orleans region, including the east bank of Jefferson Parish, which could be used in developing a parish-wide stormwater management plan.

See full reports here: <http://livingwithwater.com/>

Image Credit: Greater New Orleans Urban Water Plan, Waggonner & Ball

Action C: Continue to develop and update stormwater utilities that create fee-based services to help pay for green infrastructure flood risk reduction projects.

The impacts of population growth—more development, fewer pervious surfaces, and more polluted runoff—are causing stormwater management programs to become increasingly expensive. To offset these costs and leverage infrastructure projects, local jurisdictions can develop a stormwater fee that supports stormwater management projects and practices that reduce flood risk. As capital improvements are made, the stormwater fee can also provide funding for incorporating green infrastructure features into other projects.

Steps needed:

- Require that all publicly funded capital projects capture and store at least 1.25 inches of rainfall in the first hour of a rain event.
- Encourage the use of captured stormwater for graywater use and establish safety guidelines for use of graywater.
- Continue to design new and retrofitted recreation areas with ample drainage and storage space, and use those recreation areas as a secondary tier of defense against neighborhood flooding.
- Develop a five-year benchmark for “Greened Acres” and offer competitive grant programs for the development of green infrastructure projects on private property.

Policy Example: City of New Orleans Comprehensive Zoning Ordinance (CZO)

The Greater New Orleans Foundation Headquarters, built to comply with the new CZO, features a courtyard with multiple water management systems including rain gardens, underground cisterns, permeable paving, native plantings, and a permeable asphalt parking lot.

Photo Credit: Waggonner & Ball, Photo by Alise O’Brien



Action D: Provide incentives for private developers to handle stormwater on site.

Handling stormwater on site reduces the amount of runoff entering the drainage system. The parish should develop incentive programs to encourage property owners to implement site-level features such as rain barrels, rain gardens, and bioswales as well as to replace impervious surfaces like concrete with gravel, permeable pavers, or other pervious materials. Incentives in the form of tax credits, stormwater fee discounts, and rebates can be used to offset the costs of implementation and reward measures taken to increase the amount of stormwater that can be handled on site.

Steps needed:

- Incentivize investment in stormwater management best practices on private property through grant and low-interest loan programs, tax rebates, and stormwater fees.
- Provide outreach, education, and technical assistance to the public, planners, contractors, and local governments on best practices for stormwater management, green infrastructure, and the current status of local stormwater management systems.
- Use the Re-Green Elmwood proposed LA SAFE implementation project as a prototype for reducing pervious surfaces.

City of Philadelphia Stormwater Management Incentives Program

“The City of Philadelphia, through the Philadelphia Water Department (PWD) and Philadelphia Industrial Development Corporation (PIDC), has created the Stormwater Management Incentives Program (SMIP) and the Greened Acre Retrofit Program (GARP) to reduce the price for qualified non-residential PWD customers and contractors to design and install stormwater best management practices. These practices reduce stormwater pollution to the City’s sewer and surrounding waterways and enhance water quality in the region’s watersheds.”

City of Philadelphia Stormwater Grants

The PWD grant helps to fund stormwater runoff management systems, such as the stormwater planter installed at Navy Yards, at right.

Photo Credit: Google Maps Street View



BALANCING WATER Climate Resilience Mitigation

Flood Mitigation Assistance - Fiscal Year 2017



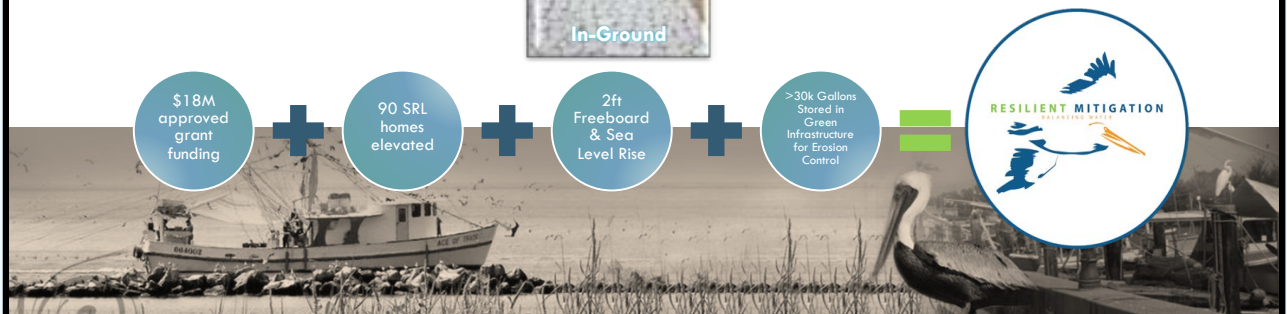
Education

- ✓ Homeowners
- ✓ Contractors
- ✓ Engineers
- ✓ Internal Departments



Background

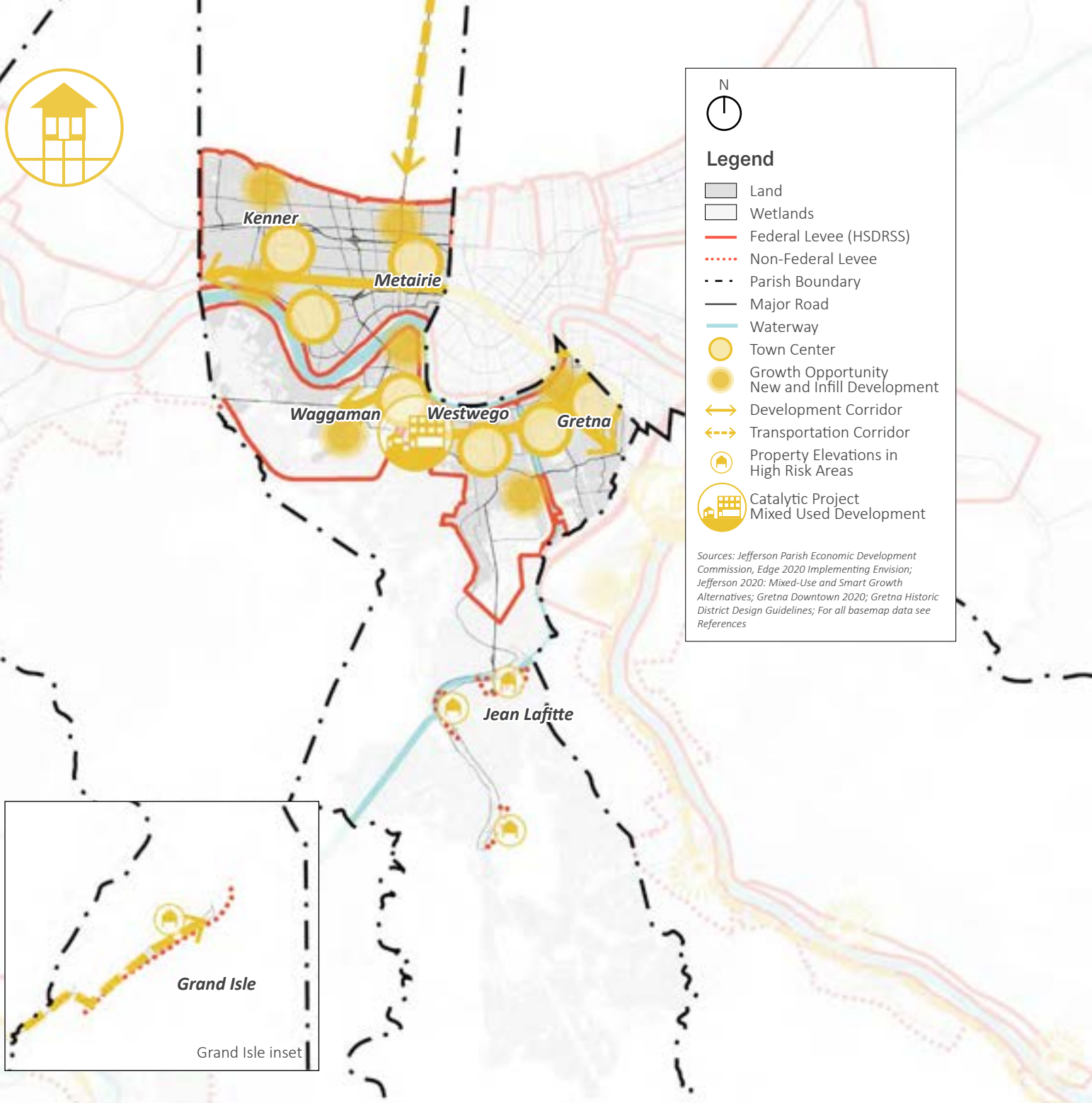
- ✓ HM Plan Updated 2015
 - Identified Subsidence as a Natural Hazard
- ✓ Greater New Orleans Urban Water Plan completed 2015
 - Provided techniques to mitigate subsidence through water management projects
- ✓ National Disaster Resilience Competition
 - Balancing water strategy initiated for public infrastructure, local policies, and coastal restoration
- ✓ FEMA's Climate Resilience Mitigation Action Memo
 - Floodwater Storage memo released by FEMA



Above: Jefferson Parish is implementing the Balancing Water Program.
Image Credit: Jefferson Parish, Department of Floodplain Management & Hazard Mitigation

Case Study: Jefferson Parish, LA

Jefferson Parish, through FEMA's Flood Mitigation Assistance Program, is elevating residential structures that have flooded using pier-and-beam foundations rather than fill. This nationally-competitive grant program provides funds annually for flood hazard mitigation projects and plan development, prioritizing repetitive and severe repetitive loss properties. In addition to elevating structures, this program also funds soil stabilization, erosion control, and hydrological restoration projects, which can be implemented using green infrastructure. Using these funds, Jefferson Parish is elevating numerous flooded properties and also installing green infrastructure features that assist with stormwater quality, erosion control, and aquifer storage. In addition, Jefferson Parish is reaching out to and educating residents on the importance of managing stormwater on site through its Balancing Water Program.



To be competitive economically, quality of life and quality of place are increasingly important. This is particularly true as the parish works to educate, attract, and retain a young and diverse labor force. Careful planning along with strategic investments can serve to reinforce a desirable development pattern, fully leverage the area's assets, and create a more memorable and livable place. Areas that would have to manage future growth and development were flagged, and in some cases, have already begun taking steps to accommodate increased populations and shifting development policies to incorporate green strategies that would support sustainability and resilience and assist with managing water.

GOAL 2

Direct Growth to Low-Risk Areas

Strategy 1

Encourage dense, sustainable, mixed-use development on higher ground

- Action A: Restrict development in high-risk areas to recreational, fishing, and coastal/water-based
- Action B: business support uses.
Prepare areas on higher ground for increased concentrations of development.
- Action C: Create a housing relocation fund.
- Action D: Repurpose unused properties and retrofit existing developments and amenities.

Strategy 2

Create and maintain a diverse and resilient housing stock for people at all income levels

- Action A: Expand affordable housing and senior housing.
- Action B: Create a more resilient housing stock throughout the parish.
- Action C: Increase housing choices.
- Action D: As growth occurs, maintain and enhance the parish's existing diverse communities.
- Action E: Expand access to legal help for low-income homeowners with title issues.

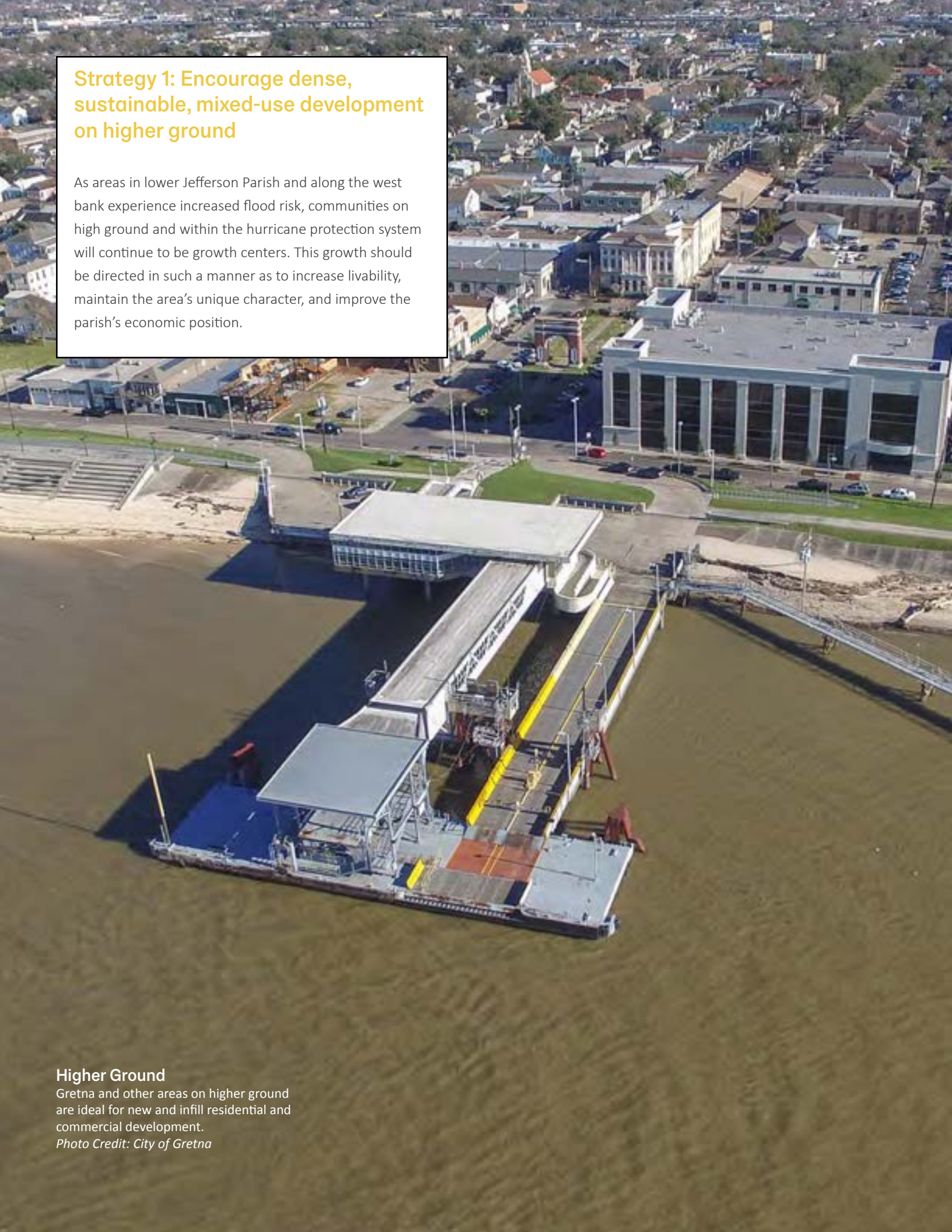
Strategy 1: Encourage dense, sustainable, mixed-use development on higher ground

As areas in lower Jefferson Parish and along the west bank experience increased flood risk, communities on high ground and within the hurricane protection system will continue to be growth centers. This growth should be directed in such a manner as to increase livability, maintain the area's unique character, and improve the parish's economic position.

Higher Ground

Gretna and other areas on higher ground are ideal for new and infill residential and commercial development.

Photo Credit: City of Gretna



Action A: Restrict development in high-risk areas to recreational, fishing, and coastal/water-based business and support uses.

To ensure that economic damage is limited and fewer recovery efforts are required, the areas that are currently at high flood risk and those areas that will be outside the hurricane protection system should only be developed to support recreational, fishing, and coastal/water-based uses.

Steps needed:

- Update ordinances to limit development and investment in high flood risk areas.
- Update ordinances to limit development and investment in areas outside of planned and existing structural protection systems.
- Promote activities that return high-risk areas to natural areas that can assist with storm surge reduction and water management.

“Hurricane Harvey brought a good example of what poor planning brings; Houston showed picture of 30 years ago and now—green space vs. concrete. Areas with concrete all flooded. Cities like Gretna are built out, houses on almost every lot. We have made mistakes. All cities have made mistakes in planning. The real challenge is how to change what we have done wrong.”

—Jefferson Parish Resident

Action B: Prepare areas of higher ground for increased concentrations of development.

To accommodate parish residents who wish to move away from areas of increased flood risk in lower Jefferson Parish and along the west bank and to maximize economic opportunities, areas on high ground and those areas located within the hurricane protection system should increase available housing stock and provide opportunities for commercial investments. Applying best practices for local water management, transportation, and site and building design, Jefferson Parish has an opportunity to provide a high quality of life reflective of the culture and traditions of its residents.

For historic downtown Westwego, LA SAFE proposes a mixed-use, 30-unit housing development with ground-floor commercial space for neighborhood amenities like restaurants or cafes. Landscaping and shared green space will manage stormwater while adding beauty to the surrounding neighborhood. Projects such as this can help to maintain housing affordability, revitalize neighborhoods, and preserve green space.

Steps needed:

- Update the development code for unincorporated areas of Jefferson Parish to allow for higher-density and mixed-use developments; incorporate requirements for minimum building elevation and on-site stormwater management.
- Conduct small area plans for high ground to evaluate zoning practices to ensure that growth can be accommodated and is appropriately placed.
- Consider and evaluate incentives for locating residential and commercial development on higher ground.
- Together with property owners, residents, and developers, create building design guidelines to ensure that building typology fits within the desired context and character of the community.
- Ensure that housing and commercial development coordinates with and integrates transportation and stormwater management practices.
- Require bonding of new commercial developments in high-risk areas to ensure demolition at the end of their useful life or upon long-term vacancy.
- Target Disaster Recovery and CDBGs funding to prepare for future disasters.
- Offer grants or low-interest financing to allow low-income households to benefit from the long term savings from wind-mitigation features and other retrofits.
- Pursue development and implementation of regional and state programs to assist homeowners with wind mitigation projects such as storm ties, hurricane shutters and wall bracing.

Action C: Create a housing relocation fund.

People who want or need to move to areas of higher ground often do not have the resources to relocate and purchase homes in new communities. Stressed with living in a high-risk area with degraded property values, they may have limited funds for moving, closing costs, and down payments. A housing relocation fund could be established for three to five years to assist people moving from the highest-risk areas or areas with repetitive losses to areas of higher ground and inside the hurricane protection system. One-time grants for moving costs, down payments, or closing costs would provide an incentive and the assistance needed to move away from high-risk areas.

Steps needed:

- Initiate funding programs through public funding and nonprofits to pay closing costs, partial down payments, moving costs, and other related expenses.
- Identify additional sources of funding or develop a partial repayment program to maintain this fund over the long term.
- Expand existing housing repair and maintenance programs to rehab and redevelop substandard housing, focusing on low-risk areas.
- Provide pre- and post-purchase housing education and counseling programs.

“[I’m] living with uncertainty of when the next inevitable flood will occur.”

—Jefferson Parish Resident



Hope Haven: Marrero, LA

Founded in 1925, several of the Hope Haven orphanage's campus buildings have been renovated and repurposed, housing and adult health care program, a culinary and hospitality training program for at-risk youth, a parish fire station, a community garden, and various other uses.

Photo Credit: Google Maps Street View

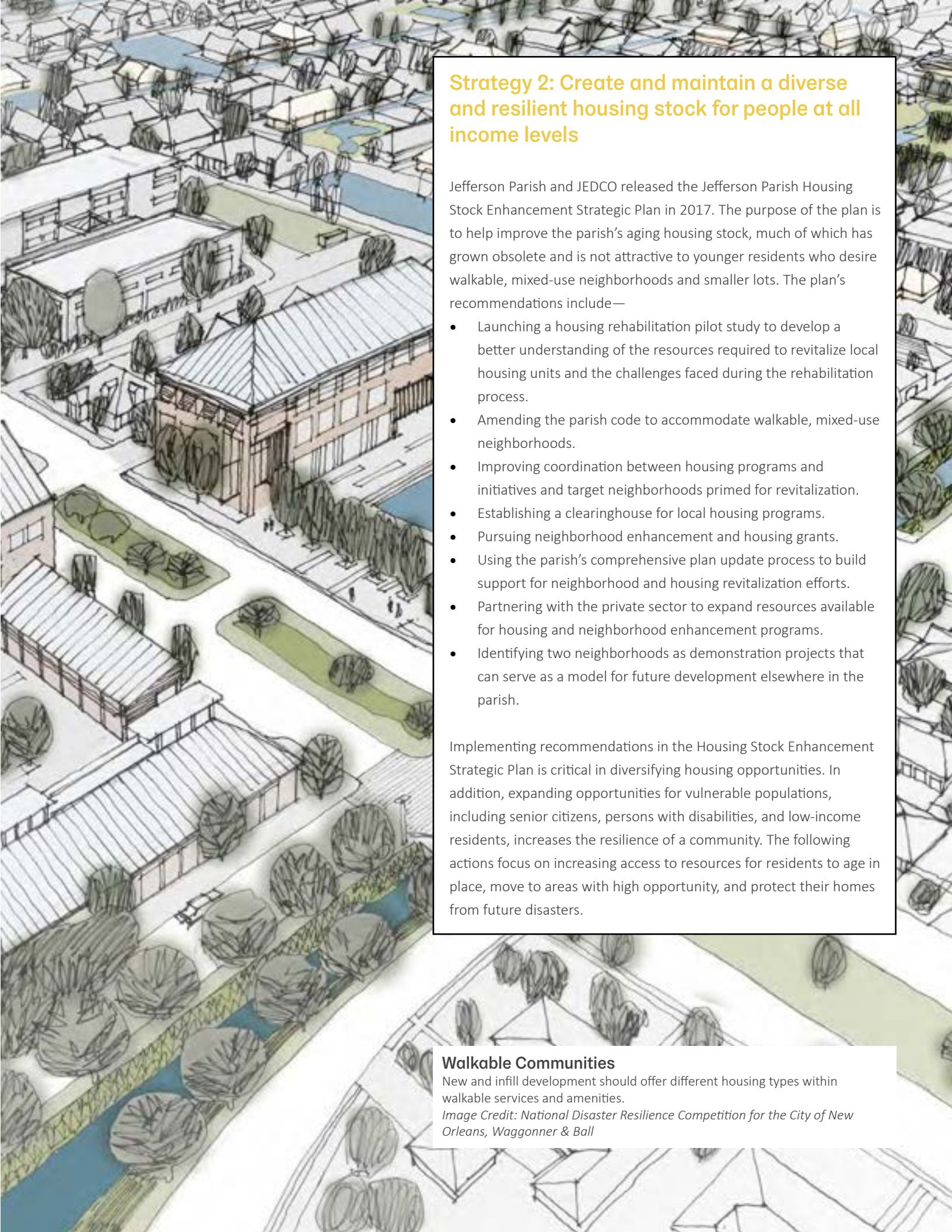
Action D: Repurpose unused properties and retrofit existing developments and amenities.

To encourage and concentrate development and redevelopment in existing communities, abandoned buildings should be repurposed to meet the needs of the community. Jefferson Parish and other entities should work with property owners, residents, and others to identify opportunities for redevelopment and develop policies or incentives that encourage adaptive reuse of existing buildings.

Jefferson Parish is home to a number of existing sites ready for improvements to more quickly achieve the stormwater management and green space improvement goals. Some of these local amenities are fixtures of the community and already provide critical services, including employment opportunities and areas of commerce. These existing amenities could be updated to include stormwater management and green design principles to transform into a multifunctional resource for the larger community.

Steps needed:

- Identify the commercial and public infrastructure needs of the community.
- Inventory abandoned and underutilized public and private buildings, such as schools, post offices, big box stores, commercial and industrial sites, and others.
- Work with property owners, residents, and others to identify opportunities for redevelopment.
- Develop policies or incentives that encourage adaptive reuse of existing buildings.



Strategy 2: Create and maintain a diverse and resilient housing stock for people at all income levels

Jefferson Parish and JEDCO released the Jefferson Parish Housing Stock Enhancement Strategic Plan in 2017. The purpose of the plan is to help improve the parish's aging housing stock, much of which has grown obsolete and is not attractive to younger residents who desire walkable, mixed-use neighborhoods and smaller lots. The plan's recommendations include—

- Launching a housing rehabilitation pilot study to develop a better understanding of the resources required to revitalize local housing units and the challenges faced during the rehabilitation process.
- Amending the parish code to accommodate walkable, mixed-use neighborhoods.
- Improving coordination between housing programs and initiatives and target neighborhoods primed for revitalization.
- Establishing a clearinghouse for local housing programs.
- Pursuing neighborhood enhancement and housing grants.
- Using the parish's comprehensive plan update process to build support for neighborhood and housing revitalization efforts.
- Partnering with the private sector to expand resources available for housing and neighborhood enhancement programs.
- Identifying two neighborhoods as demonstration projects that can serve as a model for future development elsewhere in the parish.

Implementing recommendations in the Housing Stock Enhancement Strategic Plan is critical in diversifying housing opportunities. In addition, expanding opportunities for vulnerable populations, including senior citizens, persons with disabilities, and low-income residents, increases the resilience of a community. The following actions focus on increasing access to resources for residents to age in place, move to areas with high opportunity, and protect their homes from future disasters.

Walkable Communities

New and infill development should offer different housing types within walkable services and amenities.

Image Credit: National Disaster Resilience Competition for the City of New Orleans, Waggonner & Ball

Action A: Expand affordable housing and senior housing.

Maintaining housing affordability is often a challenge in areas experiencing growth pressures. Establish appropriate strategies to identify additional sources of funding for the development of affordable housing, including new construction, renovation, and retrofitting. Strategies could include partnering with philanthropic organizations to leverage funds and create a low- or no-interest loan program for rehabilitation and repair and collaborating with local financial institutions to create financing tools for rehabilitation, repair, and replacement.

Steps needed:

- Expand access and scope of Owner-Occupied Housing Rehabilitation, Emergency Home Repair, and Replacement Housing Programs to assist elderly and low-income communities.
- Partner with philanthropic organizations to leverage funds and create a low- or no-interest loan program for rehabilitation and repair; collaborate with local financial institutions to create financing tools for rehabilitation, repair, and replacement.
- Identify local housing developers and nonprofits that have capacity to develop new housing and renovate or retrofit existing housing for elderly and low- to moderate-income residents.
- Convene working group of local developers, service providers, major employers, and local government to address barriers to the development of affordable and senior housing in the parish.
- Identify local government rules and regulations that prevent or deter affordable as well as senior housing development and take steps to amend such rules and regulations.
- Reallocate federal funds to finance the development of affordable housing and renovation or retrofits of existing homes.
- Support Low-Income Housing Tax Credit applications throughout the parish.
- Identify qualified developers and Community Housing Development Organizations (CHDOs) to apply for Low-Income Housing Tax Credits (LIHTC) to renovate or construct affordable housing units.
- Encourage formation of new CHDOs to apply for LIHTC.
- Encourage development of support services for senior housing.

Action B: Create a more resilient housing stock throughout the parish.

The parish's Department of Community Development is using green building standards for projects funded with CDGB-DR dollars, which could be incorporated into all residential renovation and new construction projects. Working with other local governments and housing authorities, Jefferson Parish can encourage these entities to incorporate green building standards, such as the Enterprise Green Building Standards, into all residential community development projects.

Jefferson Parish has the highest number of elevation projects in South Louisiana with nearly 8,000 active, completed, or planned projects as of 2015. In addition, the Jefferson Parish Floodplain Management and Hazard Mitigation Department is leading the way in expanding elevation and reconstruction projects to incorporate green infrastructure components in lieu of traditional soil stabilization measures or simply repaving a walkway or driveway. Additional elevation projects are possible, as Jefferson Parish includes the highest number of repetitive loss and severe repetitive loss properties in coastal Louisiana.

Steps needed:

- Integrate resilient design and construction practices into all housing development activities funded by HUD, parish government, local government, or housing authorities.
- Educate assessors and the real estate community on the value of resilient building practices. Create a toolkit and/or communications package to clearly articulate the value of green building practices. If the parish and the real estate sector appropriately value of resilient investments, market demand will follow.
- Develop parish-wide guidelines for building, site design, and development to educate and inform homeowners, builders, and the local government on how to best protect assets against future floods and reduce repetitive losses, similar to the Resilient Jean Lafitte, Louisiana Flood Preparedness Toolkit.
- Support continued work by the parish's Floodplain Management and Hazard Mitigation Department with residents to secure funding from FEMA.

Action C: Increase housing choices.

Throughout the community engagement process, many residents and leaders identified the need for a greater supply of housing types and affordability. Expanding housing options throughout the parish can better accommodate growth by appealing to a wider array of household types, income, and age levels. Considerations include offering not only varied price points for housing but also varied product types as well as desired community characteristics.

Steps needed:

- Create a work group of industry professionals and community representatives to identify desirable and marketable housing types.
- Prioritize implementation of the Housing Stock Enhancement Strategic Plan.
- Review ordinances and the development approval process to identify any barriers to development of desired housing types.
- Develop design standards to ensure quality and compatibility standards for various housing types to enhance neighborhood integrity.

Terrabella: Covington, LA

Located in Covington, LA, the Terrabella Village concept offers different housing types, lot sizes, and price ranges. Amenities and services are located in walking distance in the neighborhood.

Photo Credits: Google Maps Street View



Action D: As growth occurs, maintain and enhance the parish's existing diverse communities.

As people move away from lower Jefferson Parish, growth pressures may increase property values and taxes and ultimately threaten residents' abilities to maintain ownership of their homes and land, resulting in displacement of long-term, low-income residents. Programs and policies to protect the culture and affordability of these communities will enhance the overall quality and diversity of the parish.

Steps needed:

- Establish areas for middle-income housing on vacant land.
- Research and consider tax programs that can help retain long-time homeowners in at-risk neighborhoods.
- Protect senior homeowners who cannot afford rising property taxes in their neighborhoods and cannot afford the upkeep on their homes. Consider providing funding for existing senior home repair programs, with a priority for residents in at-risk neighborhoods.
- Create community and neighborhood development/improvement organizations to help maintain the quality and services for at-risk neighborhoods.

Action E: Expand access to legal help for low-income homeowners with title issues.

Unclear property ownership is a major barrier to receiving assistance after a disaster or accessing funding—grant-based or traditional loans—for maintaining or improving property.

Steps needed:

- Partner with organizations such as Louisiana Appleseed or Southeast Louisiana Legal Services to provide legal assistance to low-income households both before and after disasters to resolve title issues.
- Market programs to homeowners to raise awareness about available services.



Transportation is an essential element of any metropolitan area. The ability to get to work, school, and healthcare, among other amenities, is vital for every demographic throughout the parish, including youth and teenagers who are too young to drive or senior citizens who are no longer able to drive themselves. Residents should also be able to traverse the parish without excessive traffic congestion and walk or ride along aesthetically pleasing streets. Jefferson Parish has many opportunities to create safer, healthier streets that provide more transportation choices and better connections to jobs and essential services, particularly in low-income areas. A comprehensive look must be taken at Jefferson Parish's transportation system to ensure that residents' mobility is enjoyable and efficient, with multiple transportation and transit options.

GOAL 3

Improve Mobility Throughout the Parish and Region

Strategy 1


Expand and diversify transportation options

- Action A: Develop a reliable mass transit system in preparation for population growth and anticipated traffic congestion.
- Action B: Develop a comprehensive bikeway network that is continuous, easy to access, and well-marked.
- Action C: Plan for safe and efficient evacuation routes when planning and designing new roadways, as applicable.

Strategy 2

Adopt and implement a Complete Streets program

- Action A: Design and construct roadways and intersections to enable safe access for all users.
- Action B: Incorporate stormwater management into roadway design.
- Action C: Set appropriate design standards for rural and urban areas.
- Action D: Evaluate capital improvements and coordinate design.
- Action E: Establish a monitoring and evaluation process to measure progress and provide a focus on health equity.



Strategy 1: Expand and diversify transportation options

Jefferson Parish is likely to continue to grow and develop over the next 50 years. As more residents move in, the volume of cars on roads and highways would exponentially increase, while level of service would decrease. To prepare for this anticipated growth, parish officials should begin planning and thinking about daily population movement that doesn't exacerbate existing traffic congestion.

Multiple Modes of Transportation

Transportation options could include expanded bus networks, water transportation, and expanded pedestrian and bicyclist options.

Image Credit: National Disaster Resilience Competition for the City of New Orleans, Waggonner & Ball

Action A: Develop a reliable mass transit system in preparation for population growth and anticipated traffic congestion.

Jefferson Parish is presently serviced by the Jefferson Transit (JeT) public transit system. However, LA SAFE public meeting attendees stated that they do not find the system reliable or hours of operation to be convenient. Improving the bus system and rider experience could get more people out of cars and using transit, which would help ease the ongoing traffic congestion.

Steps needed:

- Conduct feasibility study and identify potential capital funding for commuter rail, connecting to nodes such as the Metairie Central Business District (CBD) and New Orleans.
- Improve bus system to make bus operations and schedule more reliable and accessible to elderly.
- Expand paratransit service operation hours beyond existing fixed-route hours to better accommodate riders with disabilities who depend on this service.
- Increase or amend bus operation hours to more accurately cater to residents' work schedules.
- Ensure that public transportation is available for youth who do not own cars and have no transportation for work. Presently, there is only transportation for senior citizens.
- Explore rideshare, water taxis, and other alternative services or modes as transportation options.

"[We need to] improve public transportation across parish lines because now it's just the station on the West Bank Expressway and we need one over by Laplace."

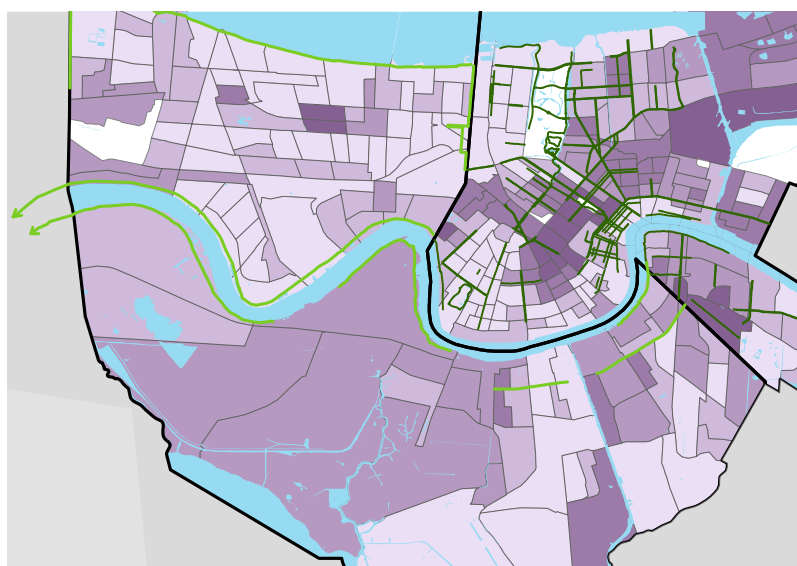
—Jefferson Parish Resident

Action B: Develop a comprehensive bikeway network that is continuous, easy to access, and well-marked.

Bicycle use is gaining momentum in Jefferson Parish; however, bike enthusiasts are facing challenges to biking on a regular basis due to safety concerns and a lack of bike lanes and amenities. Jefferson Parish's 44 miles of bicycle infrastructure concentrate along waterways. While the network connects to bikeways in New Orleans, it does not currently reach most inland, residential areas in the parish, including many lower-income neighborhoods. Jefferson Parish passed a Bicycle Master Plan in 2014 and is currently investing almost \$56 million in projects that include walking and biking amenities. Continuing to increase and improve bicycle infrastructure and educate drivers and cyclists alike can improve the bicycling experience for everyone on the road, while promoting health and well-being for parish residents.

Steps needed:

- Maintain and improve existing trails and on-street bikeways.
- Define specific requirements and performance measures for pedestrian and bicycle circulation in Unified Development Code.
- Install bicycle parking at popular public destinations.
- Update the parish's sign regulations to include signage for bicycle parking areas.
- Provide signage that is oriented for pedestrians and bicyclists to help identify bicycle paths, parking areas, and facilities.
- Amend zoning code to require bicycle parking and support facilities at privately developed commercial, trail, multifamily residential and institutional properties.
- Ensure the safety of bicyclists by educating drivers and bicyclists about road safety.
- Ensure that bike routes are extended to lower-income areas.



Bicycle Infrastructure

The map illustrates bicycle infrastructure relative to poverty rate in Jefferson Parish in 2016.

Image Credit: Smart Growth America, National Complete Streets Coalition: An Evaluation of New Orleans and Jefferson Parish

Legend

Bicycle Infrastructure

- Jefferson Parish
- New Orleans

Poverty Rate

- 0.0 – 8.8%
- 8.9 – 19.1%
- 19.2 – 30.6%
- 30.7 – 44.9%
- 45.0 – 89.0%

In New Orleans and Jefferson Parish, 36% of people live in high-poverty neighborhoods yet over 67% of crashes involving people biking or walking occur in these neighborhoods.

—An Evaluation of New Orleans and Jefferson Parish

Action C: Plan for safe and efficient evacuation routes when planning and designing new roadways, as applicable.

Jefferson Parish's transportation plan should push for major road improvements to include building roads on pilings to preserve existing hydrology and evacuation routes.

Steps needed:

- Use the 50-year projections in CPRA's Master Plan to identify key transportation and evacuation routes vulnerable to current or future flooding and prioritize their retrofit in the Louisiana Statewide Transportation Plan.
- Establish alternate evacuation routes. Existing routes, including I-59, I-10, and I-55, are choke points and do not allow residents to evacuate in a timely and efficient manner.
- Conduct assessment of extending Harvey Blvd. and Lapalco Blvd. to help ease traffic congestion.
- Coordinate with the Louisiana Department of Transportation and Development (DOTD) to identify potential infrastructure upgrades and new infrastructure projects.
- Require DOTD to model the impacts of new transportation projects on hydrological processes.
- Request that all DOTD projects include flood risk mitigation and cause minimal impact on surrounding areas.

Strategy 2: Adopt and implement a Complete Streets program

Complete Streets accommodate all users within the public right-of-way, including those who are walking, bicycling, driving, using public transportation, and those with disabilities. Implementing Complete Street design components creates an attractive environment that offers potential for green infrastructure elements for stormwater management, in addition to encouraging bicycle and pedestrian transit, which contribute to overall well-being. Evaluating Complete Streets programs with a focus on health equity identifies neighborhood residents facing the greatest health and safety risks and focuses on how Complete Streets can better serve these vulnerable communities.

Green Streets

Green street design incorporates stormwater treatment techniques and landscaping.



Action A: Design and construct roadways and intersections to enable safe access for all users.



Complete Streets Manual

See full report here:

<https://www.cpex.org/complete-streets-manual/>



Jefferson Parish Bicycle Master Plan

See full report here:

<http://www.jeffparish.net/modules/showdocument.aspx?documentid=11505>

Regardless of age, ability, or mode of transportation, streets must be safe for everyone. In many cases, this requires retrofitting existing streets to better accommodate users of modes other than cars. This changing approach to street design and construction must be guided by an overarching policy that defines priorities and outlines appropriate techniques to achieve them—for instance using traffic calming techniques to reduce speeds in areas of high pedestrian activity to improve safety; defining streetscape elements in a manner that provides federally compliant ADA access; and designing intersections to minimize conflicts among pedestrians, cyclists, vehicles, and transit to improve multimodal safety.

The Jefferson Parish Complete Streets Coalition has developed a Complete Streets resolution. This resolution calls for all parish departments involved with the built environment to take a comprehensive and integrated approach that considers and appropriately balances the needs of all users. Program goals of this resolution address safety, connectivity, multimodal accommodation, livability, equity, ecology, economic development, and sustainability and resilience.

Steps needed:

- Adopt and employ the Complete Streets resolution by the Jefferson Parish Complete Streets Coalition.
- Using models of existing Complete Streets manuals, customize a Complete Streets manual for Jefferson Parish that provides street crossing best practices and technical details relating to street design, as well as information regarding where and how to apply these techniques throughout the parish.
- Evaluate the parish's current guidance and manuals relating to street and intersection design for criteria to improve safety and comfort for pedestrians and bicyclists and ensure ADA accessibility; amend as necessary.
- Develop and implement a parish Planned Use Development (PUD) or Traditional Neighborhood Development (TND) ordinance or planning process. The principles of Planned Use and Traditional Neighborhoods include active centers, a walkable design, and transit options within a compact neighborhood scale, which align with Complete Streets principles.
- Continue to support, implement, and update the Jefferson Parish Bicycle Master Plan.

Action B: Incorporate stormwater management into roadway design.

Green streets are street right-of-ways that use stormwater management techniques that filter stormwater to reduce pollutants and decrease the quantity of water conveyed into the storm sewer system in lieu of conventional stormwater management. Incorporating stormwater management facilities throughout street right-of-ways should be part of an integrated strategy to deal with stormwater runoff throughout Jefferson Parish and to help reduce the burden on structural flood control devices.

Steps needed:

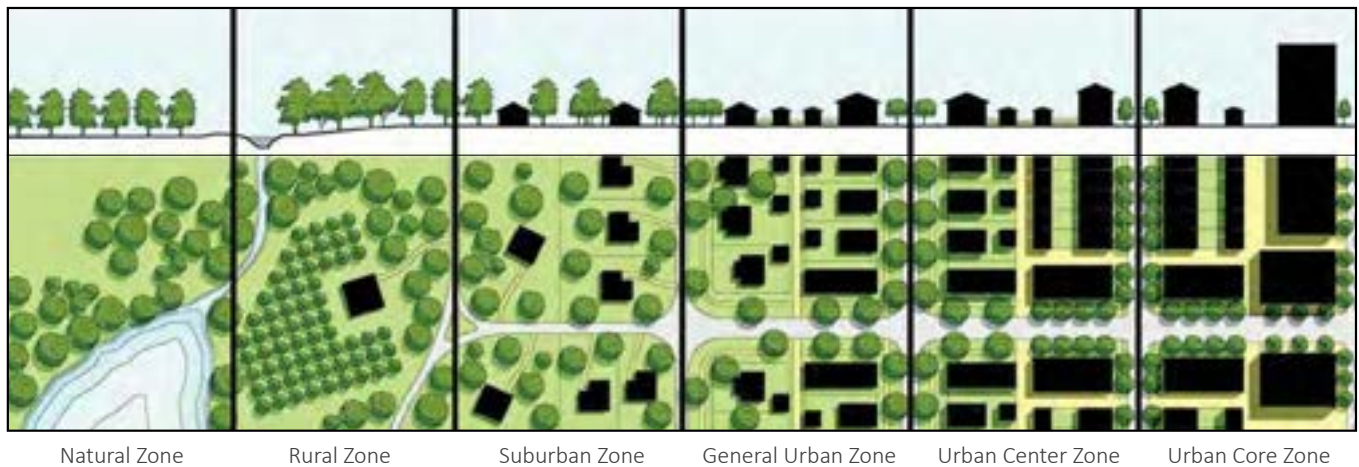
- Evaluate current guidance and manuals relating to paving and drainage for barriers to implementing green streets.
- Update codes to reflect goals for implementing green streets and stormwater management, including green infrastructure.
- Expand tree planting requirements in the development code to include minor arterials and local roads. Presently, the development code only requires tree planting on major corridors. Trees provide many benefits including reduction of heat island effects, promoting cleaner air, reducing stormwater buildup, and making a desirable space for pedestrians and cyclists.
- Expand tree preservation requirements to commercial and industrial districts.

Green Street Infrastructure

Pervious paving, subsurface storage, rain gardens, and water-loving plants reduce localized street flooding by providing pockets of space to which stormwater can flow. The water, filtered by this system, infiltrates the ground and is absorbed by plants.

Image Credit: Greater New Orleans Urban Water Plan, Waggonner & Ball





Context of South Louisiana

Development patterns vary depending on context.

Image Credit: Louisiana Speaks Pattern Book

Action C: Set appropriate design standards for rural and urban areas.

Jefferson Parish contains a variety of different types of places, from urban areas such as those found near Causeway Boulevard in Metairie, suburban areas such as Westwego and Gretna to more rural locations in the lower part of the parish. Respecting this varied character throughout the parish requires a tailored approach to designing roadways that is consistent with the character of a place while also addressing safety, connectivity, and convenience for everyone using the road. A palette of design standards that reflects the rich array of contexts will assist in developing street designs that better respond to and connect with the surrounding context. Design standards must also provide solutions to address differing priorities that must be addressed when there is limited right-of-way available.

Steps needed:

- Prepare corridor plans for areas targeted for Complete Streets to establish design priorities for capital projects.
- Create design standards for the range of street types identified in the area plan that are consistent with guidance provided in an adopted Complete Streets manual.

Action D: Evaluate capital improvements and coordinate design.

A number of subsurface utilities must be coordinated with one another as well as with above-ground amenities in order to avoid conflicts. The amount of right-of-way available can often determine how easy or complex this task will be. Coordination must occur at the early stages of a project, beginning with project selection, to ensure that needs can be met, design can be coordinated, and construction can take place efficiently. This level of coordination requires a clearly articulated process that defines roles and responsibilities of everyone involved in street design and construction.

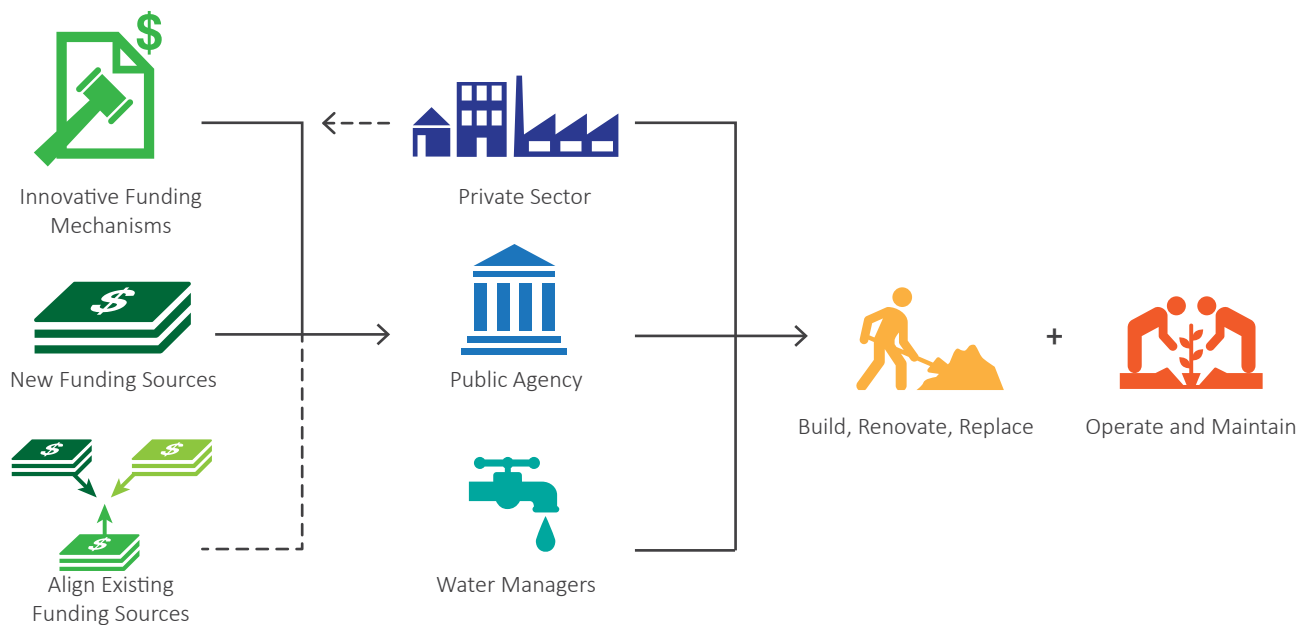
Steps needed:

- Create a coordinated capital improvement program for all department and utility projects to leverage infrastructure investments and minimize conflicting projects.
- Prioritize transportation projects that promote multimodal transportation, access to public and commercial facilities, and provide environmental and economic benefits.
- Outline a design process that requires all departments to work together to select projects, evaluate design alternatives, and coordinate throughout the construction and project delivery process.
- Coordinate with all utility providers during project selection, design, and construction of street projects.

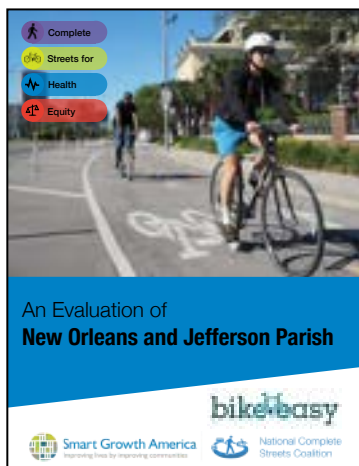
Financing Diagram

The diagram shows how various funding sources can be leveraged to execute new projects.

Image Credit: Edited from Greater New Orleans Urban Water Plan



Action E: Establish a monitoring and evaluation process to measure progress and provide a focus on health equity.



An Evaluation of New Orleans and Jefferson Parish

See full report here:

http://bikeeasy.org/files/Complete_Streets_for_Health_Equity_Report_NO_JP.pdf

As documented by the National Complete Streets Coalition, Complete Streets can benefit low-income neighborhoods and communities of color that have historically not had much investment in biking and walking facilities. Members of these communities experience disproportionate rates of chronic diseases, are at higher risk of being struck and killed by cars while walking, and are less likely to own a car. Jefferson Parish should implement policies that prioritize those most vulnerable to unsafe traffic conditions and health risks; the opportunities for benefits are enormous.

Steps needed:

- Implement recommendations in the National Complete Streets Coalition's Evaluation of New Orleans and Jefferson Parish.
- Develop performance measures to track progress and impacted neighborhoods.
- Use an equity lens when evaluating transportation planning processes and policies; new Complete Streets projects and investment; and new connections and transportation opportunities.

Case Study: City of Takoma Park, MD

Through private and public funds, the City of Takoma Park is transforming a heavily-used road with little runoff management into a street that has reduced the runoff of polluted water into the nearby creek system while promoting safe pedestrian, bicycle, and vehicular use. The one-mile section will feature stormwater curb extension, bioretention cells, and bioretention swales to address stormwater management needs. The retrofit also includes wider, ADA-compliant sidewalks.



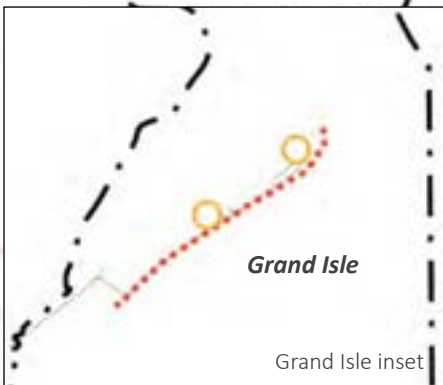
Grant Ave. bioretention cells, curb cuts, and ADA-compliant sidewalk upgrades.
Photo Credit: Google Maps Street View



Legend

- Land
- Wetlands
- Federal Levee (HSDRSS)
- Non-Federal Levee
- Parish Boundary
- Major Road
- Waterway
- Proposed Economic Project
- Economic Growth Center
- Economic Growth Corridor
- Higher Education Center

Sources: Jefferson Parish Economic Development Commission, Edge 2020; Kenner 2030 Strategic Plan for a Prosperous Future; The Future Growth of the Ochsner Medical Corridor; Technical Report JEDCO; ULI Ochsne; Jean Lafitte Tomorrow, Today Resiliency Plan; For all basemap data see References



GOAL 4 Strengthen and Diversify Local Economies

Strategy 1 Retain existing business and develop new business opportunities throughout the parish

Action A: Support the local seafood industry through marketing and technical support.

Action B: Support local business development and innovation.

Strategy 2 Improve career ladders and links to workforce development

Action A: Connect residents to job opportunities in growing industry clusters.

Action B: Integrate coastal history, culture, and future environmental challenges into school curricula and extracurricular activities.

The background image is a street-level view of the Ochsner Medical Center. A large, modern building with a light-colored facade and large blue letters spelling "Ochsner" is visible. In the foreground, there is a paved road with white lane markings. To the left of the road, there is a grassy area with trees and a sidewalk. A white delivery truck is parked on the street. The sky is clear and blue.

Strategy 1: Retain existing business and develop new business opportunities throughout the parish

The parish will recruit new employers and encourage long-term business investments that generate quality employment opportunities for residents and protect environmental quality. Increased diversity within the parish's economic base can also add stability and lessen volatility in the local economy.

Ochsner Medical Corridor

Ochsner Health Center plans to revitalize the Jefferson Highway corridor and create a hub for healthcare with the construction of the Ochsner Center for Innovation and a multi-use medical plaza.

Photo Credit: Google Maps Street View

Action A: Support the local seafood industry through marketing and technical support.

The seafood industry is a vital part of the regional and local culture as well as the economy. Striving to protect and create new opportunities within the industry, local business leaders, educators, and organizations can come together to support the industry and those it supports.

Steps needed:

- Expand brand and marketing strategy for Louisiana seafood by partnering with National Oceanic and Atmospheric Association (NOAA) Fisheries.
- Create accountability and certification standards for restaurants carrying Louisiana seafood.
- Increase opportunities for direct sales and distributions by expanding connections to small and mid-size producers with local outlets, including seafood and farmers' markets.
- Provide resources—such as insurance, marketing assistance and business plans—to help fishers expand into ecotourism during non-fishing seasons.
- Understand how changing environmental conditions and proposed coastal restoration projects will affect Louisiana fisheries and work with affected fisheries to provide alternative opportunities or support.
- Assist the fishing industry with technical assistance and flexible loan programs that help improve product quality, reputation, and distribution to local markets.
- Promote Louisiana's seafood industry with targeted advertising campaigns and events.
- Provide research and technical assistance for adopting sustainable fisheries and aquaculture practices in Louisiana.

"I think we need to promote our industries, local industries, but seafood is our major industry."

—Jefferson Parish Resident

"First, you have to support the commercial fishermen. We can't keep allowing the state to import seafood from everywhere else."

—Jefferson Parish Resident



Business Incubators and Makerspaces

Incubators can offer training programs for starting new businesses as well as offer space and amenities for small business owners.

Photo Credit: Lukas Boxberger/Wikimedia Commons/Share Alike 4.0 International

Action B: Support local business development and innovation.

A healthy and diverse local economy provides an important building block for a resilient community. Building on existing resources and infrastructure, there is an opportunity to foster local business growth and expansion.

Steps needed:

- Engage in a marketing campaign, informed by JEDCO, to promote existing resources, such as local small business incubators, coworking space, and flexible production and storage options throughout Jefferson Parish.
- Simplify and streamline business and development processes across the parish.
- Encourage and support the expansion of tourism in Jefferson Parish by investing in historical preservation efforts, introducing ecotourism, expanding access to natural resources, and developing a variety of lodging amenities.



Skilled Jobs

Skilled job training and education can prepare Jefferson Parish's residents for new and expanding industries.

Photo Credit: Coalition to Restore Coastal Louisiana

Strategy 2: Improve career ladders and links to workforce development

The parish's ability to attract and retain employers that offer good jobs depends heavily upon the availability of a ready workforce. Therefore, the parish should support a range of strategies to ensure that resident workers have opportunities to gain marketable skills and training needed for the jobs available now and in the future.



Industry, Job, and Education Corridor

Located in Jefferson Parish, Churchill Technology and Business Park is home to Jefferson Parish Economic Development Commission (JEDCO) headquarters, a conference center, and Patrick F. Taylor Science and Technology Academy. It is the future home of Delgado Community College's River City Campus and Advanced Manufacturing Center of Excellence.

Photo Credit: Google Maps Street View

Action A: Connect residents to job opportunities in growing industry clusters.

As a part of a larger strategy, economic development organizations at local, regional, and state levels are spearheading initiatives to connect industry leaders, educational institutions, and residents to undertake workforce development activities. Jefferson Parish should incentivize workforce development in green energy and healthcare, in particular.

Steps needed:

- Continue to connect local firms and businesses with the Coastal Protection and Restoration Authority (CPRA) to provide services to support the activities in the Coastal Master Plan and explore the potential for local hiring requirements.
- Create a comprehensive inventory of existing educational and workforce training opportunities, informed by the work of Greater New Orleans, Inc. (GNO Inc.), JEDCO, CPRA, University of New Orleans, and Delgado Community College in the burgeoning water, coastal, and environmental industries to identify existing needs and opportunities.
- Improve career ladders and links to workforce development in the healthcare industry through community-based training programs. The partnership among Ochsner Health System, Jefferson Parish Department of Community Development, Jefferson Community Action Programs (JEFFCAP), and JEDCO to provide a 16-week training course with wraparound services can act as a pilot program for similar efforts with other healthcare providers.
- Capitalize on JEDCO's industry database to identify workforce needs and tailor training programs for residents of Jefferson Parish with an emphasis on the healthcare, water, coastal, and environmental industries.



Educational Programs

Ripple Effect field trip to UNO's Coastal Education and Research Facility. Students studied blue crab behavior, explored the estuary in canoes, and recorded observations of organisms caught in dip nets.

Photo Credit: Ripple Effect Water Literacy Project

Action B: Integrate coastal history, culture, and future environmental challenges into school curricula and extracurricular activities.

Providing opportunities for students to learn about the region, specifically the history, culture, and future environmental challenges, creates awareness of coastal issues from a young age and has the potential to strengthen connections to the region and expose students to regional job opportunities in growing industries.

Steps needed:

- Collaborate with teachers and administrators to create curricula and field-based workshop opportunities to teach K – 12 students about coastal resources and risks that align with local and national education standards.
- Create physical locations or education hubs located in wetland and coastal areas, such as the conceptual Louisiana Wetlands Education Center, for K – 12 and post-secondary students to engage in educational and workforce development opportunities in coastal management and environmental sciences.
- Establish connections between high schools and companies in coastal management fields to create greater awareness about industry needs and post-secondary options and more direct pipelines for local hiring.
- Identify parish-level faculty liaison to convene educator and administrative working groups and oversee the coordination of efforts on integrating curricula with state partners and other parishes.



AJ & Sheron Fabre Market.

Photo Credit: Town of Jean Lafitte/Paul Christiansen



Jules Nunez Seafood Pavilion.

Photo Credit: Town of Jean Lafitte/Paul Christiansen



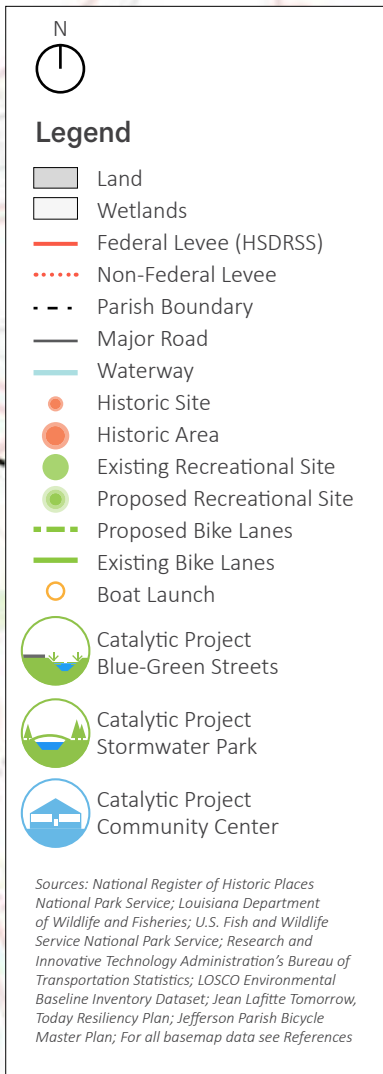
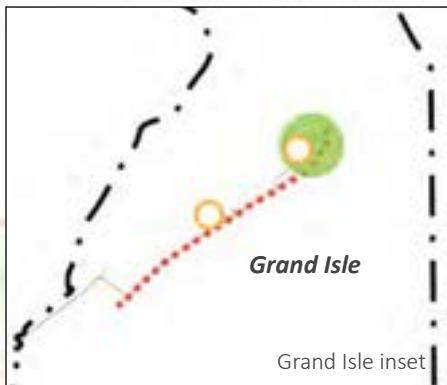
Gathering Place

In addition to vending space, the AJ & Sheron Fabre Market can also function as a community space for functions such as meetings or live music. *Photo Credits: Town of Jean Lafitte/Paul Christiansen*



Case Study: Jean Lafitte Fisheries Market

In 2017, the Town of Jean Lafitte opened a seafood pavilion and market to host special events and serve as a monthly vending outlet for local commercial fishers, artists, and craft retailers. The Jules Nunez Seafood Pavilion and AJ & Sheron Fabre Market is a large, covered venue featuring a 60-foot counter with beer and soda taps, ice machines and refrigerators, and a stage for live bands for special events. To underline and preserve the local identity, the venue is decorated with reproductions of signs from local retailers of a century ago, including the Bridge Side Inn, the Isadore Fisher General Store, and Victor Kerner's Grocery, which was run by Mayor Tim Kerner's great-grandfather. The attached deck is partially built over the waterway and seats up to 175 people. Two smaller pavilions provide space for up to eight commercial fishers to sell their catch directly.



A successful long-term plan must account for the values that Jefferson Parish residents hold dear. While every project should strive to avoid disrupting existing cultures and traditions, some projects will focus on preserving valuable cultural elements so that the way of life in Jefferson Parish can continue perpetually.

GOAL 5 Retain local culture and enhance recreation opportunities

Strategy 1 Ensure public and community assets provide recreational and educational opportunities

Action A: Retrofit underutilized urban areas as new recreational and cultural assets.

Action B: Protect vital fishing and maritime recreation and livelihood opportunities.

Action C: Design stormwater management facilities on vacant and abandoned lots and public lands as recreational assets.

Strategy 2 Protect and promote cultural assets

Action A: Preserve and support historic district restoration and cultural protection and preservation.

Action B: Provide educational signage at key locations to learn about the culture and natural assets of the area.



Strategy 1: Ensure public and community assets provide recreational and educational opportunities

There are a number of planned improvements and upgrades to public and private facilities that introduce new recreational and educational opportunities in Jefferson Parish. The parish can expand these existing efforts to continue to improve opportunities for play, exercise, and leisure.

Recreational Amenities

Amenities, such as boardwalks and pathways in Jean Lafitte Historical Park and Preserve, can provide educational and recreational opportunities.



Kenner Development and Recreation Opportunities

Kenner possess swaths of vacant land that can provide stormwater storage that doubles as recreational wetlands, waterways, and green spaces. Properties located adjacent to these features can become sites for waterfront civic, institutional, mixed-use, and residential developments.

Image Credit: Greater New Orleans Urban Water Plan, Waggonner & Ball

Action A: Retrofit underutilized urban areas as new recreational and cultural assets.

Expanding the parish's unique recreational assets will reinforce the character of Jefferson Parish and make it a more memorable and livable place, improving residents' quality of life and drawing visitors. There are opportunities throughout the parish to build upon existing assets or underutilized commercial areas to more efficiently deliver recreational resources to the parish's citizens and visitors.

Steps needed:

- Redevelop the aging Esplanade and Clearview Malls to act as community centers, complete with recreational areas, emergency shelter capacity, coworking spaces, green building design principles, and permanent housing solutions.
- Invest in broad real estate revitalization along Jefferson Highway, providing a new corridor for residents to live and work alongside the planned O-Town Development from Ochsner Hospital.
- Expand the JEDCO/JPCDC facade renewal program to revitalize key corridors.
- Expand redevelopment opportunities in low-risk areas like Elmwood to incorporate mixed-use elements and form partnerships with private sector entities that are committed to reducing risk and achieving the parish's goals.
- Adopt a shared-use partnership agreement between the parish and school district to share recreation facilities. Fund and build a recreation facility in an underserved neighborhood as a catalytic project.
- Prepare an implementation plan and build a network of recreational paths along drainage canals.
- Make improvements and updates to existing recreational facilities as recommended in the parish parks and recreation plan.

Action B: Protect vital fishing and maritime recreation and livelihood opportunities.

Amenities that support the fishing industry can provide multiple functions that also support recreational opportunities. Space for commercial fishers to dock their vessels for short periods for needed maintenance could also serve as a recreational amenity and boat launch for area residents. Cabins provide critical rest stops for working fishers and may also serve as lodging for tourists and visitors to the bayou. Fishing cabins could also be considered adjacent to the new Lafitte Fisherman's Seafood Pavilion and Market.

Steps needed:

- Install new fishing piers, dock facilities, jetties, and refueling stations for commercial and recreational fishers at the Westwego Marina and WHARF (Wetland Harbor Activity and Recreational Facility).
- Reconstruct covered boat berths and add dry boat storage facilities along Goose Bayou in Jean Lafitte.

Westwego Marina and WHARF

The Westwego Marina and WHARF provides a boat launch and docking area, and features an open-air market with vendor booths with seafood, fresh farm goods, prepared foods, and crafts.



Action C: Design stormwater management facilities on vacant and abandoned lots and public lands as recreational assets.

Reduce flooding by using vacant and abandoned lots as well as public lands such as right-of-ways for stormwater management and recreational facilities. Jefferson Parish should develop a program to turn this abandoned land into water features and landscaped areas with swales, water gardens, permeable paths and sidewalks, and other amenities. This enables properties to be recreational and open community assets while also holding floodwaters when needed.

Steps needed:

- Review existing Jefferson Parish regulations for neighborhood retention areas.
- Research best practices, using New Orleans and other cities that are creating multi-use retention facilities as sources.
- Update ordinances to require private properties that provide retention areas to design and build them as recreational or open space areas.
- Identify property and funding for potential multi-use facilities.
- Work with Jefferson Parish recreation districts to create multi-use retention areas.

Space for Water

The Mirabeau Water Garden, currently in design for the City of New Orleans, is a 25-acre empty lot that will become a model of sustainable water management in the region by reducing flooding and limiting subsidence in the neighborhood. The public park will also become a destination for recreation and environmental education.

Image Credit: Waggonner & Ball



Strategy 2: Protect and promote cultural assets



Lafreniere Park

Lafreniere Park provides a recreational amenity and showcases local flora and fauna within the suburban Metairie community.



Historical Sites

Jefferson Parish can expand on its historical sites, town centers, and parks to attract tourists and visitors.

Action A: Preserve and support historic district restoration and cultural protection and preservation.

An aggressive state, regional, and local cultural and historic marketing campaign will attract tourists and visitors to Jefferson Parish to experience the parish's many assets.

Steps needed:

- Support the Gretna Resilience District, a forward-thinking and sustainable plan for development in Gretna.
- Improve Historic 5th Street in the City of Gretna with the addition of sidewalks, bioswales, bike paths, and green space. Use apps, augmented reality, and other new technologies to help visitors discover Louisiana's culture and history, including fisheries and farmers' markets and other local assets.
- Participate in a state-sponsored "stay-cation" marketing campaign aimed at Louisiana residents to promote local tourism.
- Promote use of the state's Percent for Art program to include all capital expenditures from public funds, and allow the program to fund cultural assets such as space for music, festivals, or traditional cooking, in addition to visual arts.
- Co-locate cultural events and programs near existing transportation corridors and community centers to make them more accessible to a wider range of people.
- Facilitate use of tax credits and create incentives to restore historic properties.

Action B: Provide educational signage at key locations to learn about the culture and natural assets of the area.

Educational materials help raise awareness about assets throughout the parish and also support the ecotourism industry. Signs, maps, and brochures can convey important natural and cultural facts to visitors and engage them more deeply in the experience of the park.

Steps needed:

- Inventory the historic cemeteries, buildings, and neighborhoods and design educational plaques commemorating these important cultural centerpieces. These historic markers could contain education elements about the natural environment and about Louisiana’s changing coasts and sustainability challenges.
- Identify the key elements to feature on signage and brochures. Include facts about the natural environment and its habitats; species of birds and other wildlife and vegetation common in the area; the stormwater management function of the site; information about the pirogues and their uses and users; and other relevant information.
- Work with the Louisiana Department of Culture, Recreation, and Tourism and other stakeholders to develop the content and maps for trail and boat users.
- Place signage at key locations.
- Promote use of trails and key educational sites through geocaching and outdoor classroom activities.

Educational Signage

Educational signage at the Bucktown Lakefront Park informs visitors about marsh plants, wildlife, wetland loss, and wetland mitigation.





Case Study: Wally Pontiff Jr. Playground, Metairie, LA

Wally Pontiff Jr. Playground, located in the Old Metairie section of Jefferson Parish, is a high-performance landscape that maintains the appearance of a traditional suburban park. In addition to providing significant stormwater retention, it offers recreational opportunities for local residents including ball fields and a gymnasium. Pontiff Playground flooded after Hurricane Katrina and subsequent levee failures, damaging facilities and necessitating near total reconstruction.

The most striking strategy of the reconstruction of Pontiff Playground is a three-foot tall earthen berm, which was constructed around the perimeter of the park, creating a 40-acre stormwater retention area that is designed to retain water for up to a day before being siphoned into the 17th Street and Suburban Canals. The bermed area accommodates approximately 6.9 million cubic feet (52 million gallons) of stormwater. This is sufficient to drain six inches of standing water from a surrounding area totaling 180 acres, with the goal of mitigating a 10-year rain event (9.4 inches in a 24-hour period). During heavy rainfall, the playground can be intentionally flooded to help alleviate the burden on surrounding drainage systems. The berm, additional drainage modifications, and required pumps were financed by the Jefferson Parish Drainage Department for approximately \$6 million. Enhancing the pre-Katrina park infrastructure with a cost-effective and high-capacity integrated landscape water management system has reduced risk of flooding in Old Metairie, dual-purposed public land, and has created a popular destination that improves the quality of life for Jefferson Parish residents.



Airline and Roosevelt Linear Parks

Roosevelt Blvd. can be a Complete Street with a multi-use pathway, street trees, and a terraced canal for increased capacity and recreation.

5 Realizing the Vision



Planning to Action

Residents constantly think about the risks associated with living in St. John the Baptist Parish and how they can live harmoniously with the water around them. Throughout the LA SAFE initiative, residents and stakeholders discussed their needs and possible solutions for adapting to future changes to their environment and risk profiles. The top strategies for each adaptation goal are described in Chapter 4: Vision and Strategies.

Based on resident and stakeholder input, the Louisiana Office of Community Development identified six catalytic projects that implement numerous adaptation strategies. Ideas gathered from meeting participants in Rounds 1 through 4 contributed to each project's development. Residents and stakeholders reviewed the resulting six strategies and provided feedback on their preferences, which were factored into funding decisions. LA SAFE identified one or two projects in each parish to provide funding assistance.

Strategy Evaluation Criteria

Evaluation of catalytic projects eligible for LA SAFE funding is based on the following criteria—

1. Public Preference

The results of the preference polling at the fifth round of meetings paired with the responses from an online survey, which allowed residents to indicate their preferences if they were unable to attend a Round 5 meeting.

2. Leverage Funds

The level of matching funds from other sources available to implement the project.

3. LMI Benefit

Projects that predominantly benefit a low-to-moderate income population.

4. Public Benefit (Quantitative)

The level of benefit to the public that can be measured. For example, the number of units created in a housing proposal or the amount of water stored in a stormwater management proposal.






5. Public Benefit (Qualitative)

The degree to which the project addresses future flood risk in a unique way and/or improves quality of life for residents.

6. CRS Score

Awarded to projects that gain points in FEMA's Community Rating System (CRS), which lowers flood insurance rates.

The table on the opposite page summarizes the six catalytic projects considered for LA SAFE funding and how they address the parish's goals. Detailed descriptions of each of the six projects follow the table.

Pilot Projects	LA SAFE Goals				
	 Water Management	 Housing and Development	 Transportation	 Education, Economy, and Jobs	 Culture and Recreation
Gretna Resilience District Kickstart	Park and canal improvements to increase stormwater retention capacity and reduce flooding risk to streets, houses, schools, and businesses.	Improves housing stock and property values by reducing flood risk and enhancing the park, encouraging development and neighborhood revitalization.	Creates greater community connectivity, walkability, and bikeability.	Educational signage and programming about stormwater management will be included in City Park; support jobs to rent recreational equipment and manage facilities.	Provides spaces for many types of recreation; increases community connectivity and access to amenities. It will provide aesthetic enhancements and improve quality of life.
Re-Green Elmwood	Pervious paving, green space, vegetation, and underground detention components drain and filter stormwater and reduce flooding. The tree canopy and green spaces reduce heat island effect.	Increases demand for private redevelopment in Elmwood, including adjacent mixed-use renovation and old Kmart sites with 280 residential units.	Sidewalks and green space increase pedestrian walkability, safety and connectivity. Signalized intersections and traffic calming improve circulation and decrease delays.	Improvements will enhance neighboring businesses and promote new investment; signage will educate residents about the value of green infrastructure.	Reintroduction of natural green features such as bioswales and tree canopy will promote walkability and begin the transition to a mixed-use area with cultural and recreational amenities.
Louisiana Wetlands Education Center		Building designed to model development suitable to high-risk areas.	Master plan includes water taxis, tour boats, and trips to destinations like Grand Isle. Boardwalks and trail provide access to wetland ecosystems.	Provides educational opportunities for all ages, focusing on the ecology and culture of wetland areas. The center will provide jobs for science educators and local craftspeople to demonstrate traditional techniques.	Provides a recreational destination connected to nature, including boardwalks, trail, and outlook decks. Cultural programming includes traditional boat building, net making, duck carving, storytelling, and other interactive exhibits.
Fat City Green Block	Reduces risk of street flooding in Fat City, protecting local businesses and housing. Use green infrastructure to manage stormwater, mitigating additional subsidence.	Develops a public service hub, including a sheriff substation, library, and stormwater management park.	Creates safe, comfortable walking, bicycling, and public transportation corridors.	Supports Fat City neighborhood revitalization, increasing property values and tax revenue. Invest in stormwater management, making areas more attractive for commercial and retail development.	Expands access to green space in an urban neighborhood. Create a sense of place by investing in public service hub.
Mixed-Use Housing Development in Westwego	Manages all stormwater on site using bioswales, trees, green space, and permeable materials.	Creates approximately 30 affordable housing units and neighborhood businesses.	Provides safe sidewalks, bike access, and bus stop seating (if applicable).	Creates local jobs at restaurants, cafes, and retail shops.	Provides outdoor community space and pavilion for markets, concerts, and other community events.
Airline and Roosevelt Linear Parks	Incorporates green infrastructure components into recreational areas to alleviate street flooding and slow and detain runoff from Airline Hwy. Key elements include bioswales, rain gardens, and increased tree canopy.	Supports holistic community revitalization efforts in surrounding neighborhoods and for businesses along Airline Hwy.	Provides neighborhood access points to increase community connectivity and promote walkability.	Supports economic development revitalization efforts along Airline Hwy. by providing a community space; provides educational opportunities through signage at the park.	Creates a new public amenity that enhances quality of life in the surrounding areas and provides park space within a heavily developed area.

Gretna Resilience District Kickstart

A major challenge identified by stakeholders in Jefferson Parish is flooding in urbanized areas due to excess impervious surfaces, poor drainage, and overwhelmed stormwater management systems. At the same time, the numerous canals in the parish presents an asset around which many opportunities exist. Opportunities identified by residents include increased recreational assets, multifunctional infrastructure, education around water management, and access to these assets.

Land development patterns and stormwater management—especially in new development and redevelopment of urbanized areas—must be considered. The Gretna Resilience District Kickstart proposal begins the transformation of existing infrastructure to address flood risk and enhance quality of life by focusing on Gretna City Park and the 25th St. Canal. Improvements to Gretna City Park include increasing stormwater retention of the existing retention pond; enhancing the entryways, pathways, and signage for access; and providing recreation and education. Additional seating and pavilions and the installation of a tiered dock will connect visitors to the water. The canal improvements include green infrastructure features to increase capacity and conveyance of stormwater in an area with a high concentration of repetitively flooded homes and businesses. In addition, the canal improvements include the installation of recreational amenities for biking, walking, and interactive community spaces.



Precedent images of 25th St. Canal; *Photo Credit, Left: stari4ek/Flickr/CC by SA 2.0*



Precedent images of pathways and boardwalks.



Precedent images of park pavilions.



Precedent images of green streets.

Statistics

Project Area	Gretna City Park—approximately 78 acres Street and canal—approximately 4,800 linear feet
Location	Gretna Resilience District
LA SAFE Investment	Up to \$6 million
Estimated Project Cost	Gretna City Park—\$4.5 million 25th St. Canal—\$3.0 million Huey P. Long Ave.—\$1.4 million Total—\$11.5 million (with design and contractor fees)
Partners	FEMA (FMA, PDM); Jefferson Parish; City of Gretna; JPPSS; Tulane Regional Urban Design Center

Section Legend

- A** 6' – 0" Urban bioswale with trees and native plants
- B** 5' – 0" Pedestrian pathway
- C** Widened canal channel (typical water level 3' – 0", maximum water level 7' – 0")
- D** Gabion terrace walls as new canal edge
- E** Reconstruct existing roadway
- F** Street trees and native plants in stormwater management facilities
- G** 12' – 0" Bioretention cell



Image Credit: Google Earth

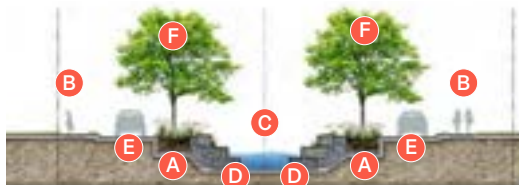


25th St. Canal Aerial View

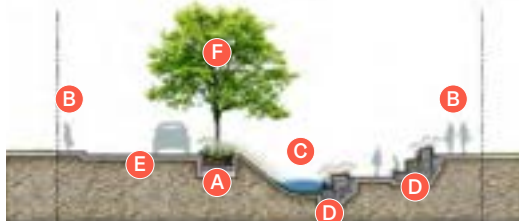
Improvements include reconstructed roadways, bioswales, pervious crosswalks, and street trees. Canal improvements include a widened channel with stabilized canal edges.



Section A



Section B



Section C



Section D



Re-Green Elmwood

Impervious surfaces, lack of green and open spaces, and poor stormwater management are challenges identified during parish-wide stakeholder meetings in Metairie and Gretna. Residents are aware of these issues, educated about the benefits of green infrastructure, and ready to implement these measures in their community to reduce flood risk and increase quality of life.

In areas with dense development, it will be important to manage stormwater closer to where it falls to not only reduce the burden on existing drainage infrastructure but also to increase the water quality at the receiving water bodies. In Jefferson Parish, the Elmwood area is seeing increases in population and development, and green spaces must either be preserved or reestablished. Once called Elmwood Park, the area is now a heavily paved commercial district that floods regularly and contributes to the flooding that occurs in riverside portions of Jefferson Parish. The Re-Green Elmwood proposal is a long-term strategy that peels back pavement where possible and transforms street edges, right-of-ways, and parking lots into interconnected networks of water storage spaces. The proposed catalytic project begins implementation of this strategy with a smart retrofit on both public and private land that adds value to retail and commercial developments while limiting flooding within the district and beyond.



Elmwood West Drive Perspective

The streetscape features tree-lined bioswales, enhanced pedestrian sidewalks, and pervious paving retrofits in parking lots.



Left: Bioswale and pedestrian pathway; Right: Pervious paving







Left: Pedestrian bridge through bioswale; Right: Parking lot bioswale; Photo Credit, Right: Center for Neighborhood Technology\Flickr\CC by SA 2.0

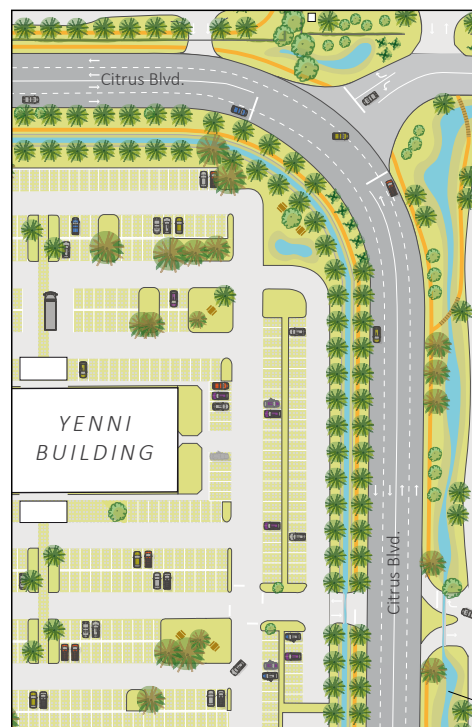
Statistics	
Project Area	46 acres
Location	Elmwood Business District
LA SAFE Investment	\$1.5 – \$6 million
Estimated Project Cost	Public parking retrofits—\$2.4 million Elmwood W. Green Street—\$1.0 million Private parking retrofits—\$4.6 million Traffic improvements—\$1.4 million
Partners	Jefferson Parish; tax incentive financing; private developer










Future Vision for Elmwood District

The future vision for Elmwood includes green streets, parking retrofits, and water storage.

-  Bioswale
-  Infiltration in parking lots
-  Temporary infiltration in parking lots
-  Water storage lots



Parking Retrofits

-  Tree-lined bioswale
-  Pervious parking
-  Gutter across roadway
-  Existing tree
-  New tree
-  Pedestrian bridge
-  Sidewalk

Louisiana Wetlands Education Center

For centuries in the swamps of lower Jefferson Parish, a unique culture developed, and now, this community is threatened by continued land loss, a changing seafood industry, and demographic shifts. The history, way of life, and skills of the people who brought seafood to New Orleans’ restaurants and beyond are vanishing along with the land and ecosystem they depend on. To preserve this culture and history, the Louisiana Wetlands Education Center will feature interactive exhibits, classrooms, and access to outdoor learning opportunities.

Specifically, the Wetlands Educational Center will serve students and families in the region, providing programming for all ages, including a research outpost and meeting location for agencies and institutions. The center will promote preservation, conservation, and adaptation related to wetland ecosystems and provide details about traditions and people of bayou communities, including the privateer Jean Lafitte.

The project includes a three-phase master plan. Under this proposal, LA SAFE will potentially fund Phase II of the master plan.

Master Plan

- Phase I**
Create a Multipurpose Resource Facility
- Phase II**
Construction of a Wetlands Education Center and Replica of a Fishing Village
- Phase III**
Expansion of Amenities and Cultural Activities at the Fishing Village

Phase II: Wetlands Education Center and Replica Fishing Village

- The **Wetlands Education Center** will include—
- Combination classroom and film theater with seating for approximately 80 students
 - Small meeting rooms for private research
 - Multiple restoration, preservation, and adaptation displays with emphasis on wetland ecosystems
 - Several interactive and static galleries and exhibits, including turtles, spiders, baby alligators, etc.
 - Large observation windows, an outdoor observation deck, and an observation tower
 - Gift shop and first aid station

The project also proposes an **extension of the existing elevated wooden walking trail** through the cypress swamp, including various **docks, observation platforms, and picnic areas.**

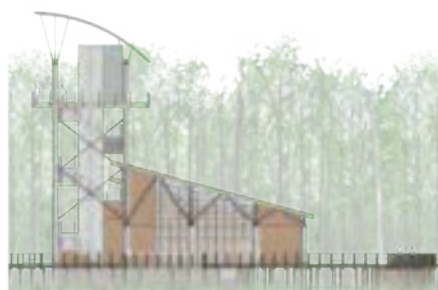
Additionally, the proposal includes the construction of a **replica fishing village**, including **rental cabins, outdoor classrooms, a tour boat, and water taxi dock.**

Statistics	
Location	Jean Lafitte
LA SAFE Investment	Up to \$6 million
Estimated Project Cost	Up to \$12.5 million
Partners	Town of Jean Lafitte



Phase II: Wetlands Education Center

Image Credit: WHLC Architecture



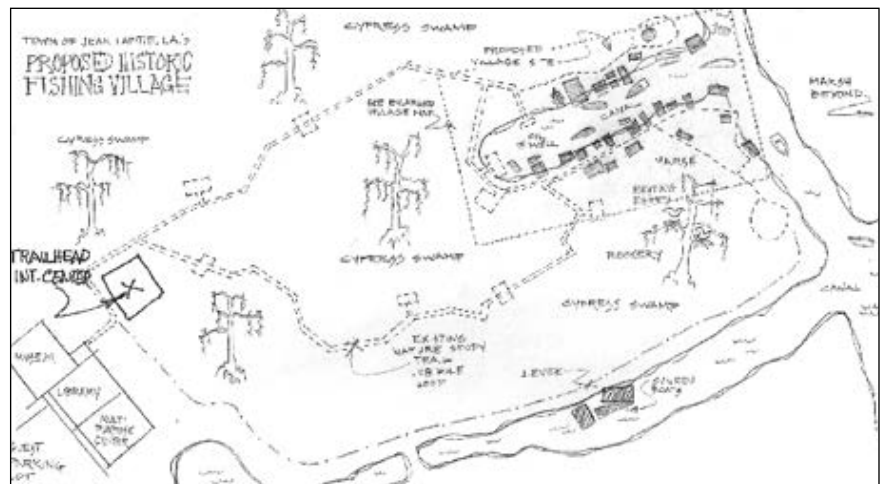
West Elevation

Image Credit: WHLC Architecture



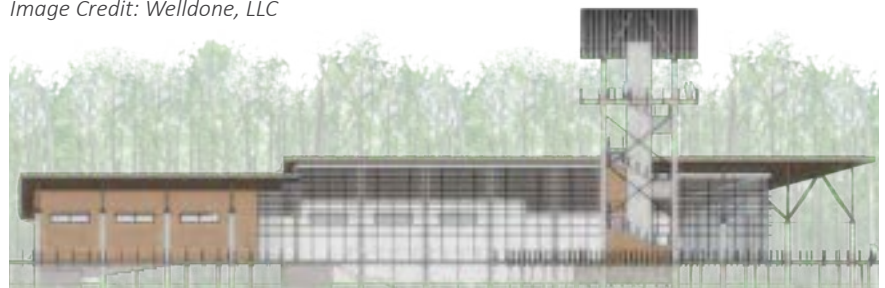
East Elevation

Image Credit: WHLC Architecture



Conceptual Plan

Image Credit: Welldone, LLC



North Elevation

Image Credit: WHLC Architecture

Fat City Green Block

The Fat City Green Block project would build on the neighborhood revitalization efforts in Fat City—a previously thriving neighborhood in Metairie. Most of the investment and activities in Fat City occurred during the 1970s and 1980s, but disinvestment has left the neighborhood with vacant shops, many bars, and few or no opportunities to walk, bike or take transit for daily needs. With about 45% of the total surface area being impervious, rain events have been causing street and neighborhood flooding. The revitalization efforts are addressing these issues.

As part of the long-term strategy, Fat City redevelopment will include public amenities, such as a library and a police station, as well as shops and restaurants. While these efforts provide economic opportunities, the installation of green infrastructure and reduction of impervious surfaces will assist with stormwater management needed to make these opportunities sustainable. Through LA SAFE, the Fat City Green Block project proposes to resurface parking lots with pervious pavers, cut curbs, and install bioswales and retention ponds to reduce flood risk and improve runoff water quality in the area.



Long-Term Vision

A long-term vision for Fat City includes repaving all surfaces with pervious pavers to help reduce flooding within the district and alleviate flooding in surrounding neighborhoods. Currently, approximately 45% of the total surface area in Fat City is impervious.
Image Underlay Credit: Google Earth

Statistics	
Project Area	Green Block—4 acres
Location	Fat City, Metairie
Estimated Project Cost	Development—\$3.7 million Pathways—\$1.9 million
Partners	Jefferson Parish; Jefferson Parish Sheriff’s Office; Jefferson Parish Library



Dry Condition

Bioswales and retention ponds are dry, providing visual relief throughout the district with native grasses, wildflowers, and other plantings.

- 1 Pedestrian sidewalks around block; promenade through center of block
- 2 Parking lot with pervious pavers
- 3 Open pavilion for stage or educational/recreational programs
- 4 Terraced lawn for seating or play area
- 5 Platform for performances or other educational/recreational programs



Rain Event

During a rain event, bioswales and retention ponds provide stormwater storage. Elevated businesses remain accessible via boardwalks.

- 6 Retail pavilions
- 7 Food truck parking and picnic area
- 8 Curb cuts and perimeter bioswales
- 9 Bioswales and retention ponds
- 10 Reflecting pool

Plan View

Planned development includes a library, police station with first floor retail, and additional retail buildings. LA SAFE proposes to add green infrastructure. Buildings should be elevated, allowing planted bioswales and retention ponds across the block to fill with water during a rain event. Boardwalks and pervious pavers allow complete accessibility as the ponds fill with water.

Mixed-Use Housing Development in Westwego

As people move to low-risk areas, quality residential and commercial space as well as supporting infrastructure must be available to accommodate these population changes. Providing a range of residential and commercial developments will help meet the housing and economic demands of different generations and household types. To facilitate healthy population growth, higher-density, affordable, residential, mixed-use, and low-impact developments should be prioritized in low-risk areas. Through the LA SAFE process, downtown Westwego was identified as an low-risk area in Jefferson Parish that could benefit from this type of development.

The Mixed-Use Housing Development in Westwego will incorporate ground-floor commercial space for neighborhood amenities like restaurants and/or cafes that can spur economic growth in the area. The development will include 30 housing units to maintain housing affordability. The low-impact development will include green spaces and green infrastructure that manage stormwater on site, be constructed of material suitable for the Louisiana climate, and be responsive to a storm-prone landscape. Construction design will feature wind-resistance, elevated foundations, and solar energy supported by a solar power cell on site.

Moderate-Risk Example


Central Lafourche Parish







Photo Credit: Karen Apricot\Flickr\CC by SA 2.0


Elevated housing in moderate-risk areas is protected from flooding and provides space underneath for parking and gathering. In the model above, homes share a single elevated platform, reducing construction costs while preserving a single-family housing typology.



Mixed-Use Buildings

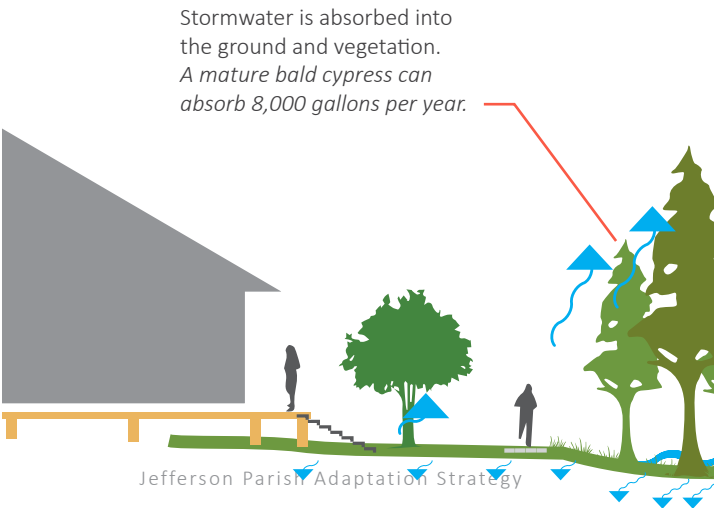


Pier-and-Beam Foundation;
Photo Credit: RBerteig\Flickr\CC by SA 2.0



Wind-Resistant
Photo Credit: B.Wikimedia Commons by SA 3.0

Statistics	
Project Area	Housing—Approximately 30 units Commercial Space—Approximately 10,000 sf
Location	Historic Westwego
LA SAFE Investment	Up to \$6 million
Estimated Project Cost	\$10 – 12 million
Partners	Private developer



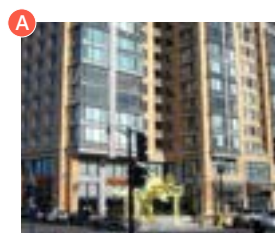
Low-Risk Example Historic Westwego



Existing Housing
Density—2.1 units per acre

Proposed Housing
Density—8 units per acre

**Increasing density
preserves more
land for stormwater
management.**



Mixed-Use Buildings
Photo Credit:
AgnosticPreachersKid\
Wikimedia Commons\CC by
SA 3.0

Denser, mixed-use buildings in low-risk areas attract local businesses like coffee shops, restaurants, and retail stores to neighborhoods. Multistory buildings accommodate more people while preserving green space for recreation and stormwater management. In turn, more residents are likely to patronize businesses within walking distance.



Design;
Will Bradley\
Wikimedia Commons\CC



Solar Power



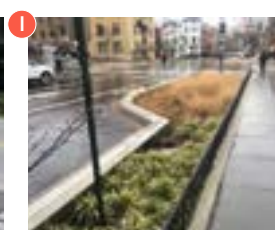
Community & Market Space



Permeable Paving;
Photo Credit: Lombroso\
Wikimedia Commons\CC
by SA 3.0



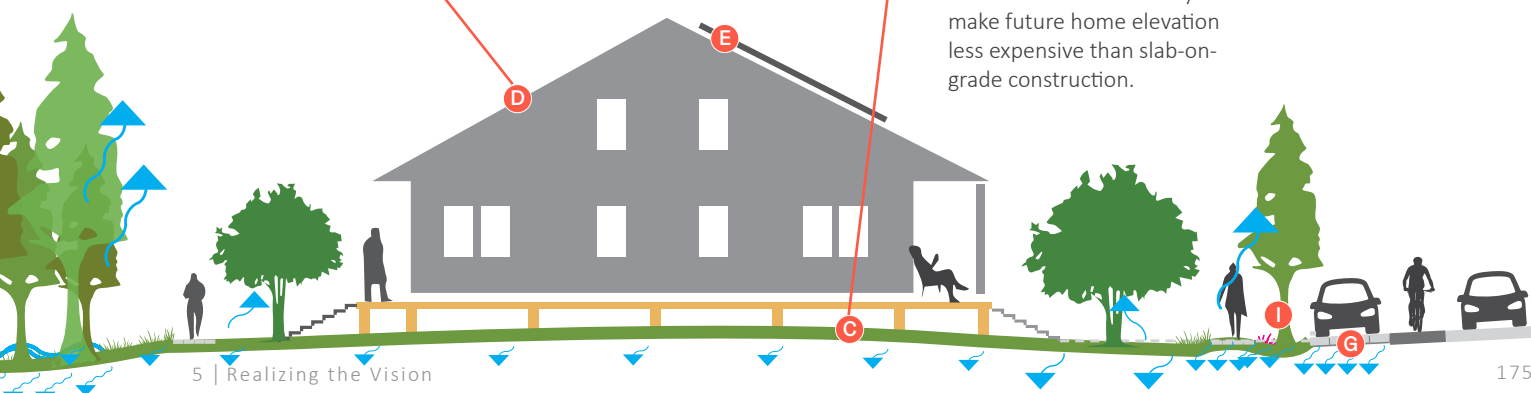
Street Bump-Outs; Photo
Credit: Philadelphia Water
Department Louis Cook\
Flickr\CC by SA 2.0



Complete Green Street;
Photo Credit: Eric Fischer\
Flickr\CC by SA 2.0

Wind mitigation protects
from hurricanes and reduces
insurance costs.

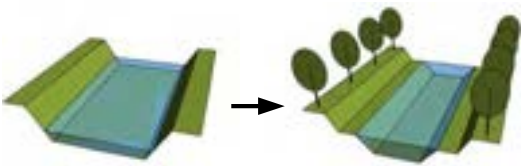
Pier-and-beam foundations
raised above Base Flood
Elevation reduces flood risk
and insurance costs. They also
make future home elevation
less expensive than slab-on-
grade construction.



Airline and Roosevelt Linear Parks

Effective stormwater management was identified as a major challenge facing Jefferson Parish residents. An overwhelmed stormwater conveyance system consisting of canals and pumps is increasingly causing flooding in areas that were previously deemed safe from flooding. Furthermore, the current infrastructure is only needed during certain weather events and provides no recreational opportunities during fair weather, despite proximity to neighborhoods. These canals present an opportunity to become more multifunctional, providing important stormwater management services and recreational benefits for residents.

The Airline and Roosevelt Linear Parks will reshape the canals with sloped, landscaped sides and improve the banks with boardwalks, shade trees, and bike lanes. These features will allow the park to take on more water as needed while also providing recreational benefits. The proposed project will demonstrate the feasibility of these types of improvements throughout the parish and spur further investment in similar amenities for underserved communities.



Airline Highway Canal Retrofit

Between Roosevelt Blvd. and the Soniat Canal, the existing canal along Airline Highway can be reshaped to have sloped, planted edges, a wider floodplain, and a higher water level on dry days.



Existing canal along Airline Highway.



Precedent image of the Westersingel Canal in Rotterdam. The lower path can safely flood during extreme rainfall.

Statistics	
Project Area	Airline Highway—8,000 linear feet Roosevelt Blvd.—3,500 linear feet
Location	Airline Drive between Soniat Canal and Roosevelt Blvd.
LA SAFE Investment	Up to \$6 million
Estimated Project Cost	Airline Highway—\$9.0 million Roosevelt Blvd.—\$3.9 million
Partners	Jefferson Parish



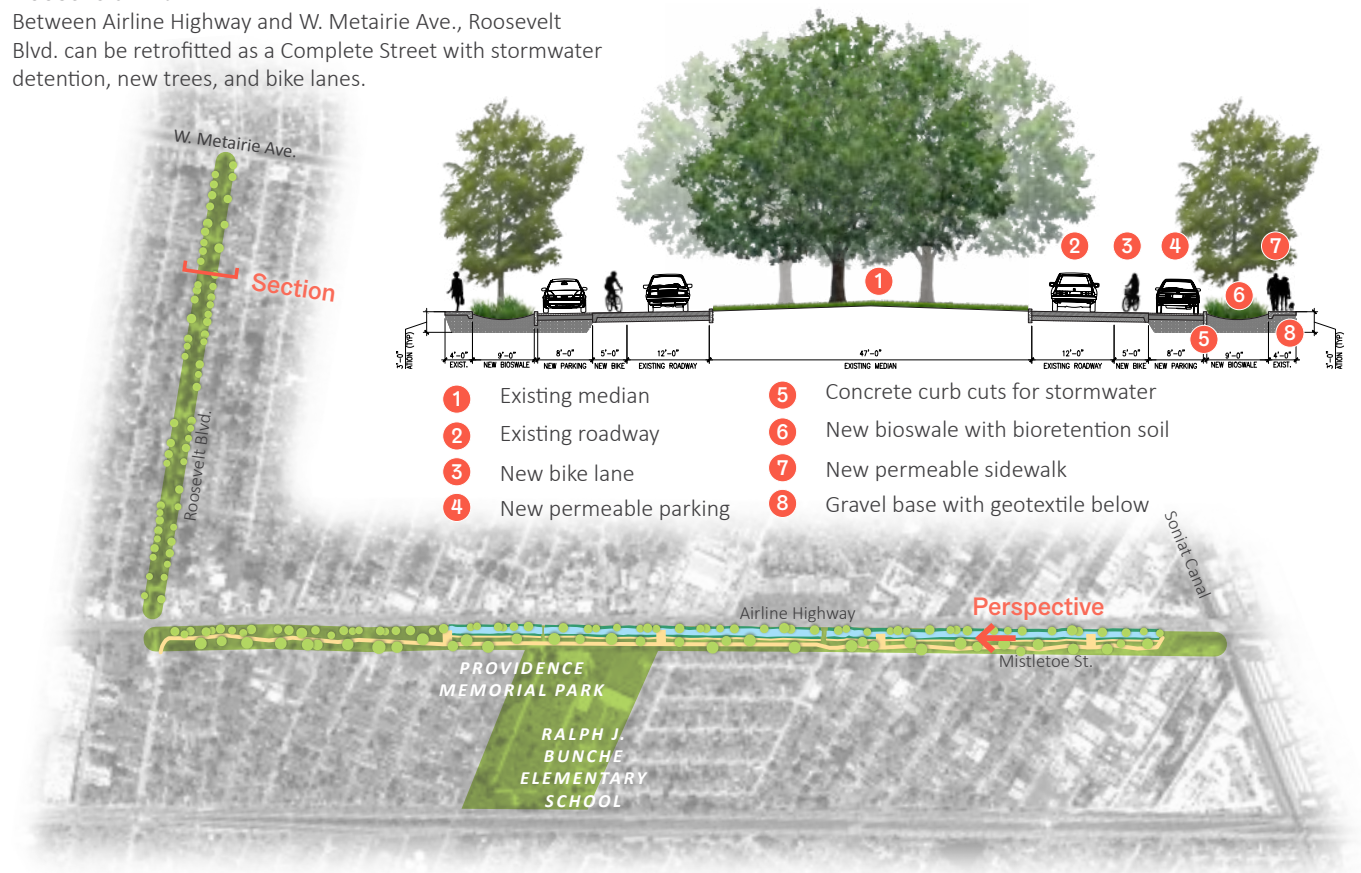
Vision: A Regional Park

These improvements to Roosevelt Blvd. and the Airline Highway canal could be the first step in a long-term vision of a regional park stretching from Louis Armstrong New Orleans International Airport to downtown New Orleans.



Roosevelt Blvd.

Between Airline Highway and W. Metairie Ave., Roosevelt Blvd. can be retrofitted as a Complete Street with stormwater detention, new trees, and bike lanes.



Implementation Plan

During the Round 5 meetings, residents evaluated and marked their preferences among six catalytic project proposals. The six proposals reflect the vision and input gathered throughout the engagement process and targeted opportunities that Jefferson Parish residents identified throughout the LA SAFE process.

Following the Round 5 meetings, a selection committee whose membership includes officials from the Louisiana Office of Community Development reviewed each of the projects and used a point system to rank their potential for funding and implementation, taking into account public preference, leveraged funds available, LMI benefit, public benefit (quantitative and qualitative), and CRS score.

The projects selected via this process for Jefferson Parish, **Gretna Resilience District Kickstart** and **Louisiana Wetlands Education Center**, are described below.

Gretna Resilience District Kickstart

The Gretna Resilience District Kickstart is an ambitious Resilient Infrastructure and Community Nonstructural Mitigation/ Flood Risk Reduction project. Two major components of the district—Gretna City Park and the 25th Street Canal—are of interest to the LA SAFE team for potential investment. Improvements to the park include greater stormwater retention, enhanced entryways, pathways, and signage, additional seating and pavilions, and the installation of a tiered dock that will connect visitors to the water. The canal improvements include green infrastructure features to increase water storage capacity and improve conveyance of stormwater in an area with a high concentration of repetitively flooded homes and businesses. In addition, the canal enhancements include the creation of recreational amenities for biking, walking, and interactive community spaces.

During the first round of LA SAFE meetings, the project team hosted stakeholders from Jefferson Parish at the Alario Center in Westwego. At this meeting, many attendees pointed out that the quality of drainage and stormwater management infrastructure in the parish needs improvement. Specifically, residents mentioned drainage, flooding, and stormwater management as major concerns a combined 51 times in a meeting that was attended by approximately 57 people. Attendees expressed that there is a lack of recreational opportunities in the parish as well as a lack of connection to the natural environment; increases in green space and recreational opportunities were mentioned as priorities a combined 36 times. Attendees recognized the need and opportunity for multifunctional green spaces that both serve recreational purposes and drain and store water during storm events.

In the second round of meetings, attendees again stressed the critical need for recreational space and improved stormwater detention capabilities. During Round 2, participants from the west bank directly referenced the area where the Gretna Resilience District Kickstart is proposed as an area where flooding is prevalent and repetitive flood loss properties are many. In the Round 3 and 4 meetings, the project team continued to work collaboratively with residents as well as parish leadership to develop a project based on the ideas presented by residents in previous rounds. The proposed project would be located where the City of Gretna has proposed implementation of a resilience district modeled after the Gentilly Resilience District in New Orleans.

Through ongoing conversations with parish officials, residents and other stakeholders, the LA SAFE team identified the Gretna City Park and 25th Street Canal improvements as opportunities to help kick-start the parish's efforts with projects that closely align with residents' desire to see increased green space and stormwater management in a low-risk area. Strong support for this project was affirmed in person and online in Round 5, when residents representing 20 different zip codes in Jefferson Parish collectively chose this project as their number one preference.

Louisiana Wetlands Education Center

The Louisiana Wetlands Education Center is a public services/education project in the Town of Jean Lafitte, located on Jefferson Parish's west bank. LA SAFE has emphasized the value of educating our coastal population about current and future environmental conditions and the effects of flood risk. The center will be an educational asset serving students and families in the region, with programming for all ages, including a research outpost and meeting location for agencies and institutions. The center will promote preservation, conservation, and adaptation related to wetland ecosystems, using its location in the Jean Lafitte area as an outdoor classroom. Future phases would include an expanded fishing village to teach visitors about coastal community traditions; a treetop ropes course; water taxis to Grand Isle; kayak and canoe rentals; and overnight cabins. This project is complementary to the existing Jean Lafitte Fisheries Market and adjacent to the auditorium, nature trail, and multipurpose facility and museum. Under this proposal, LA SAFE would provide funding toward the center's construction.

During the first round of LA SAFE meetings, the project team hosted stakeholders of Jefferson Parish at the Alario Center in Westwego. At this meeting, residents expressed concern over the continued loss of land and wetlands as well as a lack of attractions and recreation in the parish. Meeting participants specifically mentioned challenges and opportunities relating to wetland loss, coastal education, ecotourism, and recreation a combined 65 times. Residents also identified the parish's natural resources, traditions, and cultures as major strengths. In the Round 2 meetings, residents again stressed the need for expanded recreational opportunities and placed additional emphasis on the need for more education, especially for children, about the region's environment and coastal issues. Residents of the Lafitte area were particularly keen on harnessing and further developing the natural resources of the area; they recommended swamp tours, environmental curricula, and environmentally oriented attractions for visitors, among others. In Round 3, meeting attendees identified education as the most important issue for the future of Jefferson Parish during the snap polling activity. Between Rounds 3 and 4, the project team continued to work collaboratively with parish stakeholders as well as parish leadership to develop a project based on the ideas presented by residents in previous rounds.

During this engagement process, Jean Lafitte's mayor, Timothy Kerner, suggested the Louisiana Wetlands Education Center, a project conceived prior to LA SAFE, fits squarely with residents' goals for recreation and wetland education in the parish. The center has broad support from residents, who ranked it second in the Round 5 preference polling.

It is anticipated that funding for these projects will become available mid-2018. Project completion is expected by September 2022.

Priority Implementation Table

The Jefferson Parish Adaptation Strategy has been specifically outlined in previous sections of this document. Implementing the vision will require an effective partnership between the private businesses and stakeholders, federal, state and local public entities, nonprofits and the members of the community. This Implementation Table provides a road map for the parish and other stakeholders to follow that prioritizes those relationships based on a series of action items over the near-term (1 to 10 years), medium-term (11 to 25 years), and long-term (over 25 years). Based on the issues identified by the extensive public input and on the concepts forwarded in this strategy, action items have been organized into the following key goals:

- Goal 1: Manage Flooding and Subsidence
- Goal 2: Direct Growth to Low-Risk Areas
- Goal 3: Improve Mobility Throughout the Parish and Region
- Goal 4: Strengthen and Diversify Local Economies
- Goal 5: Protect and Promote Historic and Cultural Assets

Strategy	Action	Risk Zone	Timeline
Stormwater Management			
Retain and detain stormwater	Promote the use of shared detention areas to adjacent property owners.	Low Moderate	Ongoing (1 – 50 years)
	Minimize water conveyance across ridges; hold water in the basins.	Low Moderate High	Ongoing (1 – 50 years)
	Expand capacity of existing drainage canals.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Limit water table drawdown; raise water table where possible in subsidence-prone areas.	Low Moderate High	Ongoing (1 – 50 years)
	Establish a groundwater management unit of the parish to monitor water tables and provide standards limiting impacts of subsidence.	Low Moderate High	Near Term* (1 – 2 years)
	Increase multipurpose canals on the west bank.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
Reduce impervious surfaces	Continue and expand incorporating green infrastructure into development designs and drainage updates.	Low Moderate High	Near Term* (1 – 2 years) Medium Term (11 – 25 years)
	Incorporate green streets infrastructure and water management into road design.	Low Moderate	Ongoing (1 – 50 years)
	Discourage elevated fill and incentivize pier-and-beam foundations for structures.	Low Moderate High	Ongoing (1 – 50 years)
Review and upgrade stormwater policies and programs	Continue to conduct an audit of all parish plans, regulations, policies, and practices relevant to stormwater regulation and amend development codes to achieve consistency with stormwater management best practices.	Low Moderate High	Near Term* (1 – 2 years)
	Implement and enforce stormwater management program.	Low Moderate High	Near Term (1 – 10 years)
	Continue to develop and update stormwater utilities that create fee-based services to help pay for green infrastructure flood risk reduction projects.	Low Moderate	Ongoing (1 – 50 years)
	Provide incentives for private developers to handle stormwater on site.	Low Moderate	Ongoing* (1 – 2 years)

Stormwater Management

Reduce the impact of storm surge

Sufficiently elevate structures in moderate- and high-risk areas.

Moderate
High

Ongoing*
(1 – 2 years)

Conserve and restore wetlands.

Low
Moderate
High

Ongoing*
(1 – 2 years)

Housing and Development

Encourage dense, sustainable, mixed-use development on higher ground

Restrict development in high-risk areas to recreational, fishing, and coastal/water-based business support uses.

High

Ongoing
(1 – 50 years)

Prepare areas of higher ground for increased concentrations of development.

Low
Moderate
High

Near Term
(1 – 10 years)
Medium Term
(11 – 25 years)

Create a housing relocation fund.

High

Near Term
(1 – 10 years)

Repurpose unused properties and retrofit existing developments and amenities.

Low
Moderate
High

Ongoing
(1 – 50 years)

Create and maintain a diverse and resilient housing stock for people at all income levels

Expand affordable housing and senior housing.

Low

Near Term
(1 – 10 years)
Medium Term
(11 – 25 years)

Create a more resilient housing stock throughout the parish.

Low
Moderate

Ongoing
(1 – 50 years)

Increase housing choices.

Low

Ongoing
(1 – 50 years)

As growth occurs, maintain and enhance the parish's existing diverse communities.

Low
Moderate

Ongoing
(1 – 50 years)

Expand access to legal help for low-income homeowners with title issues.

Low
Moderate
High

Near Term*
(1 – 2 years)

Strategy	Action	Risk Zone	Timeline
Transportation			
Expand and diversify transportation options	Develop a reliable mass transit system in preparation for population growth and anticipated traffic congestion.	Low Moderate	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Develop a comprehensive bikeway network that is continuous, easy to access, and well-marked.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Plan for safe and efficient evacuation routes when planning and designing new roadways, as applicable.	Low Moderate High	Ongoing (1 – 50 years)
Adopt and implement a Complete Streets program	Design and construction roadways and intersections to enable safe access for all users.	Low Moderate	Ongoing (1 – 50 years)
	Incorporate stormwater management into roadway design.	Low Moderate	Ongoing (1 – 50 years)
	Set appropriate design standards for rural and urban areas.	Low Moderate	Near Term (1 – 10 years)
	Evaluate capital improvements and coordinate design.	Low Moderate	Ongoing (1 – 50 years)
	Establish a monitoring and evaluation process to measure progress and provide a focus on health equity.		

Education, Economy, and Jobs

Retain existing business and develop new business opportunities throughout the parish	Support the local seafood industry through marketing and technical support.	Low Moderate High	Near Term* (1 – 2 years)
	Support local business development and innovation.	Low Moderate High	Near Term* (1 – 2 years)
Improve career ladders and links to workforce development	Connect residents to job opportunities in growing industry clusters.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Integrate coastal history, culture, and future environmental challenges into school curricula and extracurricular activities.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)

Culture and Recreation

Ensure public and community assets provide recreational and educational opportunities	Retrofit underutilized urban areas as new recreational and cultural assets.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Provide vital fishing and maritime recreation and livelihood opportunities.	Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)
	Design stormwater management facilities on vacant and abandoned lots and public lands as recreational assets.	Low Moderate High	Ongoing (1 – 50 years)
Protect and promote cultural assets	Preserve and support historic district restoration and cultural protection and preservation.	Low Moderate	Ongoing (1 – 50 years)
	Provide educational signage at key locations to learn about the culture and natural assets of the area.	Low Moderate High	Near Term (1 – 10 years) Medium Term (11 – 25 years)



Catalytic Project Implementation

On April 20, 2018, Governor John Bel Edwards announced the 10 projects across six parishes selected for development.

“We believe LA SAFE represents a crucial step forward in cementing Louisiana’s place on the cutting edge in resilience-building activities. Although our Coastal Master Plan is the country’s preeminent effort to reduce future land loss and coastal flood risk, LA SAFE has taken the next step in illuminating a path forward for how our communities develop future housing, economic, social and transportation needs to withstand future disasters and adapt to environmental changes over time. In an age of heightened risk, now is the time to start addressing the needs of our communities.”

—Governor John Bel Edwards

Call to Action

Jefferson Parish has a lively culture and robust maritime economy based on the fishing and oil and gas industries. Due to Lake Pontchartrain and the Gulf of Mexico's proximity and the Mississippi River's lower course, Jefferson Parish has always endured the risk of flooding. Responding to annual storm threats is a way of life, and dealing with these challenges has brought the community closer together. This has made Jefferson Parish's leaders and residents experts at weathering storms and bouncing back from hurricanes, damaging winds, and other natural events. However, these hazards have lately been exacerbated by both natural and man-made disasters, including climate change and increased development. The result is that wetlands along Jefferson Parish's coast are transforming into open water at an alarming rate, bringing the Gulf of Mexico closer than ever and making the parish more vulnerable to storm and tidal surge. Outdated stormwater management is contributing to this flood risk, as drainage capacities are now easily overwhelmed by simple downpours. The threat of flooding has intensified the need for timely flood risk reduction measures and adaptation strategies—not only to secure a bright and viable future but also to preserve the parish's history, culture, and very existence.

To date, Jefferson Parish has planned and implemented numerous flood protection projects and mitigated repetitive and severe repetitive loss properties. However, as flood risk continues to increase locally and globally, different strategies are needed to ensure Jefferson Parish will adapt to an ever-changing environment.

Through funding from the National Disaster Resilience Competition, LA SAFE was conceived to address flood hazards in Jefferson Parish and five other parishes and to provide adaptation strategies that will strengthen each parish's approach to flood resilience. Throughout this plan's development, residents, stakeholders, and experts took into account the existing and potential threats facing the parish. They considered the complex aspects of flood hazards such as historical occurrence, causes, and exacerbating factors. Risks include overland, riverine, and backwater flooding as well as storm surge, shoreline erosion, relative sea level rise, and climate change. The Adaptation Strategy is built on the parish's planning, regulatory, and emergency management capabilities, which are very strong but severely limited in resources.

Through the LA SAFE process, Jefferson Parish residents and stakeholders developed a variety of strategies that will enable their communities to chart a new path in known territory—one that will allow the rich and deeply rooted traditions to persevere, economies to diversify, and communities to make informed and wise development decisions. The adaptation strategies identified and prioritized through this project aim to propel Jefferson Parish toward a future where flood risk is mitigated by—

- ensuring that no one is left behind in the highest-risk areas;
- building on existing assets and repurposing buildings to accommodate a smaller, more concentrated community footprint that will be easier to protect from flood risk;
- providing economic opportunities and safe properties for those in the moderate-risk areas; and
- using natural functions of our wetlands and bayous to manage water.

The adaptation strategies were developed by the people of Jefferson Parish for the people of Jefferson Parish. Implementation of the strategies through deep involvement of the parish's leadership and residents will continue to improve Jefferson Parish's ability to reduce impacts from hazards and bounce back after natural and man-made disasters, allow residents to live in the rich cultural and natural environment that people love to call home, and create a recognizable gateway to the Greater New Orleans Region.

References

Unless otherwise noted, all photos and drawings were produced by the LA SAFE project team.

Additional Map Sources

These additional sources were used to create the maps throughout the Jefferson Parish Adaptation Strategy—

Atlas: The Louisiana Statewide GIS, accessed 2017

CPRA 2017 Coastal Master Plan: Structural Projects, 2017

OpenStreetMap, accessed 2017

National Land Cover Database created by the Multi-Resolution Land Characteristics (MRLC) Consortium, 2011

USACE Louisiana Geographic Information Center, 2006

USGS National Hydrology Dataset, accessed 2017

Endnotes

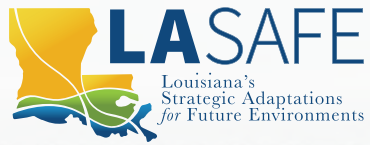
1. Coastal Protection and Restoration Authority, *Louisiana's Comprehensive Plan for a Sustainable Coast: committed to our coast*, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/2017-Coastal-Master-Plan_Web-Book_CFinal-with-Effective-Date-06092017.pdf.
2. Coastal Protection and Restoration Authority, *Louisiana's Comprehensive Master Plan for a Sustainable Coast*.
3. Devin L. Galloway, D. R. Jones, and S.E. Ingebritsen. Land Subsidence in the United States. U.S. Geological Survey, Circular 1182, 1999.
4. National Research Council. Mitigating losses from land subsidence in the United States. National Academy Press, 1991.
5. B. R. Couvillion, H. Beck, D. Schoolmaster, and M. Fischer. "Land area change in coastal Louisiana 1932 to 2016: US Geological Survey Scientific Investigations Map 3381." Pamphlet (2017). <https://doi.org/10.3133/sim3381>.
6. John M. Grymes III, "Precipitation Patterns Over the Bayou State," *Louisiana Agriculture* 54, no. 4 (Fall 2011): 26-27.
7. Coastal Protection and Restoration Authority, *2017 Coastal Master Plan: Attachment A9: Parish Fact Sheets*, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-A9_FINAL_10.02.2017.pdf.

8. Coastal Protection and Restoration Authority, *2017 Coastal Master Plan: Attachment E2: Parish Profiles*, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-E2_FINAL_04.06.2017.pdf.
9. Coastal Protection and Restoration Authority, *2017 Coastal Master Plan: Attachment C2-2: Subsidence*, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-C2-2_FINAL_3.16.2017.pdf.
10. Coastal Protection and Restoration Authority, *2017 Coastal Master Plan: Attachment C2-1: Eustatic Sea Level Rise*, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-C2-1_FINAL_3.16.2017.pdf.
11. Devin L. Galloway, D. R. Jones, and S.E. Ingebritsen. Land Subsidence in the United States. U.S. Geological Survey, Circular 1182, 1999.
12. National Research Council. Mitigating losses from land subsidence in the United States. National Academy Press, 1991.
13. Waggonner & Ball Architects. *Greater New Orleans Urban Water Plan*. 2013.
14. Alice Fothergill and Lori A. Peek. "Poverty and disasters in the United States: A review of recent sociological findings." *Natural hazards* 32, no. 1 (2004): 89-110.
15. Siri H. Eriksen and Karen O'Brien. "Vulnerability, poverty and the need for sustainable adaptation measures." *Climate policy* 7, no. 4 (2007): 337-352.
16. United States Census Bureau. "Selected Economic Characteristics." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed April 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/DP03/0500000US22051.
17. United States Census Bureau. "Selected Economic Characteristics." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed April 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/DP03/0400000US22.
18. The Gulf Coast Region is defined as Texas, Louisiana, Mississippi, Alabama, and Florida.
19. United States Census Bureau. "Poverty Status in the Past 12 Months." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed April 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/S1701/0400000US01|0400000US12|0400000US22|0400000US28|0400000US48.
20. United States Census Bureau. "Poverty Status in the Past 12 Months." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed April 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/S1701/0100000US.

21. United States Census Bureau. "Profile of Selected Economic Characteristics: 2000, Census 2000 Summary File 3 (SF 3) – Sample Data." Decennial Census. Accessed April 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/DEC/00_SF3/DP3/0500000US22051.
22. United States Department of Housing and Urban Development Office of Community Planning and Development. "CDBG Low Moderate Income Area Data ACS-Based." FY 2014 CDBG Grantees and LMISD Block Groups, Places, County Subdivisions & Counties. Accessed April 2, 2018. <http://www.arcgis.com/home/item.html?id=9642c475e56f49efb6e62f2d8a846a78>.
23. United States Census Bureau. "Selected Housing Characteristics." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed May 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/DP04/0500000US22051.
24. United States Census Bureau. "General Housing Characteristics: 2000, Census 2000 Summary File 1 (SF 1) 100-Percent Data." Decennial Census. Accessed April 26, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/DEC/00_SF1/QTH1/0500000US22051
25. United States Census Bureau. "Selected Housing Characteristics." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed May 2, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/DP04/0500000US22051.
26. United States Census Bureau. "Gross Rent as a Percentage of Household Income in the Past 12 Months." 2011 – 2015 American Community Survey 5-Year Estimates. Accessed March 15, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/15_5YR/B25070/0500000US22051.
27. United States Census Bureau. "Gross Rent as a Percentage of Household Income in 1999, Census 2000 Summary File 1." Decennial Census. Accessed March 15, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/DEC/00_SF3/H069/0500000US22051.
28. Nick Sorrells, *A growing burden: Rising homeowners insurance premiums are taking a toll on Louisiana's coastal communities* (Boston: Oxfam America, 2016), https://www.oxfamamerica.org/static/media/files/A_Growing_Burden_combined.pdf.
29. Sorrells, *A growing burden*.
30. Sorrells, *A growing burden*.
31. Ann Carrns, "Flood Insurance: Pricier This Year, and May Go Higher," *New York Times*, April 7, 2017, <https://www.nytimes.com/2017/04/07/business/flood-insurance-financial-tips.html>.

32. Federal Emergency Management Agency. "Changes to the National Flood Insurance Program – What to Expect." Accessed April 3, 2018. https://www.fema.gov/media-library-data/1403633987258-7a504b5ba12674c0f36adb67fe103ee7/Changes_to_the_NFIP_What_to_Expect.pdf.
33. Aubry Killion, "80,000 Properties in Jefferson Parish expected to see lower flood insurance rates," *WDSU News*, Feb. 6, 2018, <http://www.wdsu.com/article/80-000-properties-in-jefferson-parish-expected-to-see-lower-flood-insurance-rates/16602070>.
34. Coastal Protection and Restoration Authority, 2017 Coastal Master Plan: Attachment E2: Parish Profiles, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-E2_FINAL_04.06.2017.pdf.
35. Terry Spencer, Meghan Hoyer, and Michael Kunzelman, "AP Exclusive: Fewer Carrying Flood Insurance Despite Risk," *Chicago Tribune*, Sept. 2, 2017, <http://www.chicagotribune.com/news/sns-bc-us--harvey-no-flood-insurance-20170902-story.html>.
36. Coastal Protection and Restoration Authority, 2017 Coastal Master Plan: Attachment E2: Parish Profiles, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-E2_FINAL_04.06.2017.pdf.
37. United States Census Bureau. "1980 Census of Population: Volume 1 Characteristics of the Population Chapter B General Population Characteristics." Decennial Census. Accessed April 3, 2018. https://www2.census.gov/prod2/decennial/documents/1980a_laABC-03.pdf.
38. United States Census Bureau. "ACS Demographic and Housing Estimates." 2012 – 2016 American Community Survey 5-Year Estimates. Accessed March 15, 2018. https://factfinder.census.gov/bkmk/table/1.0/en/ACS/16_5YR/DP05/0500000US22051.
39. Camille Manning-Broome, Jeannette Dubinin, and Pamela Jenkins. *The View from the Coast: Local Perspectives and Policy Recommendations on Flood-Risk Reduction in South Louisiana* (Baton Rouge: Center for Planning Excellence, 2015) https://static1.squarespace.com/static/536d55f1e4b07afeea8cef61/t/589b56542e69cf66eee7102d/1486575239051/Coastal_06102015.pdf.
40. United States Census Bureau. "Louisiana: 2000; Summary Population and Housing Characteristics; 2000 Census of Population and Housing; Issued September 2002." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2000/phc-1-20.pdf>.

41. United States Census Bureau. "Louisiana:2010; Summary Population and Housing Characteristics; 2010 Census of Population and Housing; Issued July 2012." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2010/cph-1-20.pdf>.
42. United States Census Bureau. "Louisiana: 2000; Summary Population and Housing Characteristics; 2000 Census of Population and Housing; Issued September 2002." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2000/phc-1-20.pdf>.
43. United States Census Bureau. "Louisiana:2010; Summary Population and Housing Characteristics; 2010 Census of Population and Housing; Issued July 2012." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2010/cph-1-20.pdf>.
44. United States Census Bureau. "Louisiana: 2000; Summary Population and Housing Characteristics; 2000 Census of Population and Housing; Issued September 2002." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2000/phc-1-20.pdf>.
45. United States Census Bureau. "Louisiana:2010; Summary Population and Housing Characteristics; 2010 Census of Population and Housing; Issued July 2012." Decennial Census. Accessed March 15, 2018. <https://www.census.gov/prod/cen2010/cph-1-20.pdf>.
46. *Jefferson Parish: 2015 Multijurisdictional Hazard Mitigation Plan Update*. March 2015. <http://www.jeffparish.net/modules/showdocument.aspx?documentid=9777>.
47. Coastal Protection and Restoration Authority, 2017 Coastal Master Plan: Attachment E2: Parish Profiles, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-E2_FINAL_04.06.2017.pdf.
48. *Envision Jefferson 2020. August 2003*. https://library.municode.com/la/jefferson_parish/codes/code_of_ordinances?nodeId=PTIICOOR_CH25PLDE_ARTVICOPL.
49. Coastal Protection and Restoration Authority, 2017 Coastal Master Plan: Attachment A9: Parish Fact Sheets, April 2017, http://coastal.la.gov/wp-content/uploads/2017/04/Attachment-A9_FINAL_10.02.2017.pdf.
50. John A. Lopez, "The Multiple Lines of Defense Strategy to Sustain Coastal Louisiana," *Journal of Coastal Research* (2009): 186-197.



**Working together for community resilience, economic prosperity,
and a better quality of life for everyone in Louisiana.**

