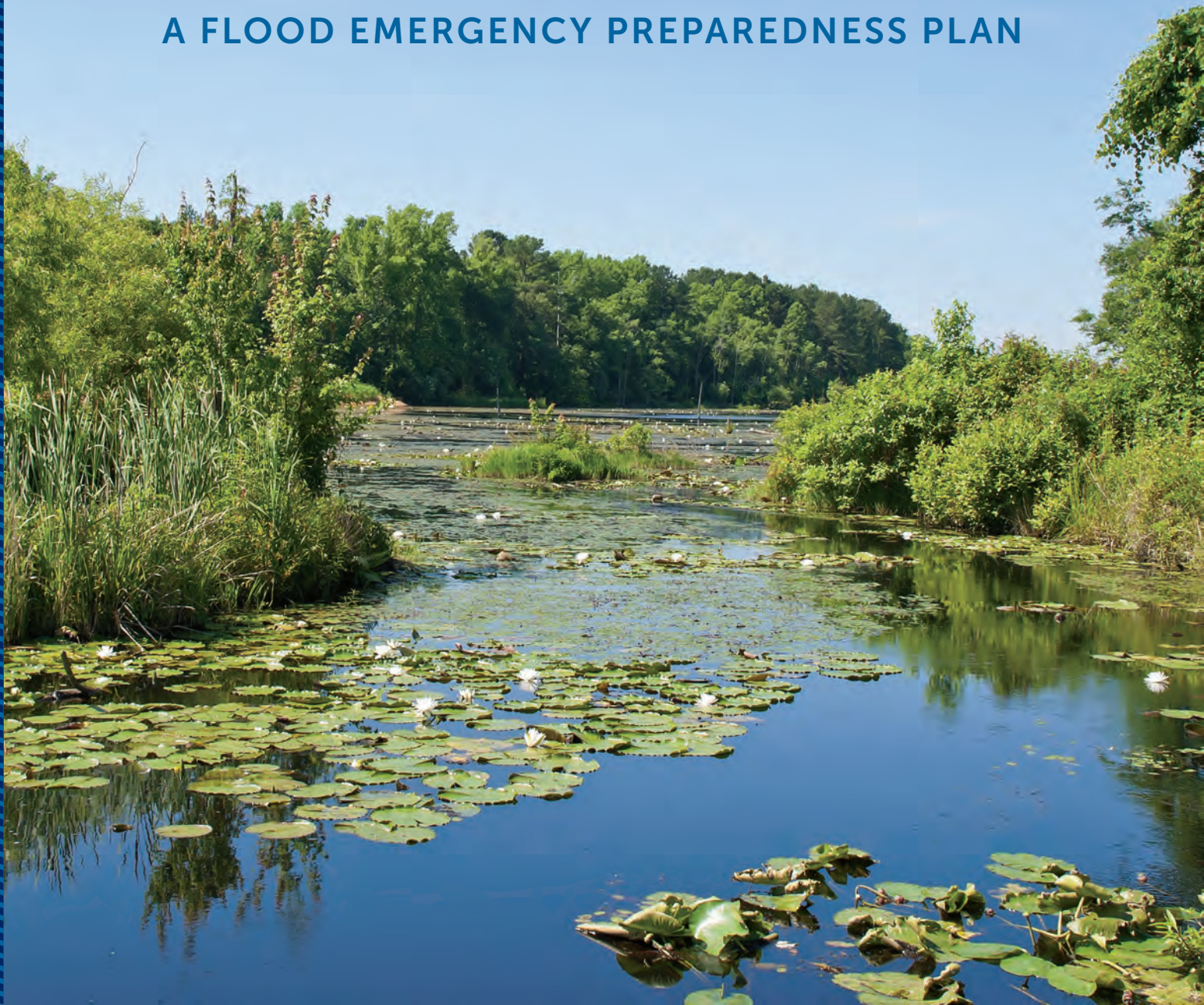
Resilient Jean Lafitte, LOUISIANA

A FLOOD EMERGENCY PREPAREDNESS PLAN



INTRODUCTION

Purpose

Jean Lafitte has a long history of living with water. For centuries, residents in the Barataria Bay area have lived off of the water and adapted to the events associated with living in this natural ecosystem. Since the late 19th and early 20th centuries, residents in the Jean Lafitte area have harvested shrimp, crabs, oysters and fish from the estuaries. They logged the forests, harvested moss for filling mattresses and furniture, and trapped mink, muskrats and alligators for their skin and fur. Along with a knowledge of how to make a living off of all the natural resources, residents also gained knowledge of how to weather storms and to live in this constantly changing environment.

This Flood Emergency Preparedness Plan (FEPP) builds off of this historic wealth of knowledge and suggests additional tools and strategies that will enable Jean Lafitte's residents to continue to live in harmony with an environment that continues to be threatened by natural and man made events.

Effective and continuous collaboration between State, Local and Federal agencies is critical to successfully reducing the risk of flooding and other natural disasters in the United States. No single agency has all the answers, but often multiple programs can be leveraged to provide a cohesive solution. The recommended projects and programs in this plan focus primarily on "nonstructural" solutions such as elevation, public education, and preservation of natural assets, but "structural" investments like levees are also included.

This FEPP leverages existing planning work at the state, parish, and municipal levels to situate such projects and programs within Jean Lafitte's unique risk profile. Jean Lafitte is located in the extreme southeast of the state, and unlike much of the developed and urbanized portions of south and southeast Louisiana, it does not currently have 100-year levee protection. It is therefore acutely exposed to flooding from storm events, a risk that is exacerbated by coastal erosion and relative sea-level rise.

If Jean Lafitte is to survive as a community and thrive economically, the town must continue to pursue an approach to flood resiliency that allows it to "live with water."

2. Overview

This FEPP document is divided into four sections:

Background and Context provides an overview of the community and its capabilities, as well as pro-files of the hazards and risks it faces.

Risk Reduction Framework describes the planning and funding environment at the federal, state, parish, and municipal levels that is intended to improve the resiliency of the town.

Risk Reduction Initiatives describes existing, ongoing, and planned risk-mitigation initiatives at the federal, state, parish, and municipal levels. It also presents an integrated program of recommended risk reduction initiatives and investments. These recommendations focus on activities that allow the community to "live with water," recognizing a context wherein levees and other structural risk reduction projects may be completed many years in the future, if ever.

The Conclusion summarizes this document and references the Flood Preparedness Toolkit. This Toolkit provides best practices and guidelines for reducing risks and implementing many of the recommendations.

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About Silver Jackets

The Silver Jackets program provides communities with an opportunity to work with all appropriate State and Federal agencies to develop a comprehensive flood risk management program to achieve community goals and address flood risk management priorities. The program's primary goals are to:

- Collaboratively identify, prioritize, and address risk management issues and implement solutions
- Increase and improve risk communication through a unified interagency effort
- Leverage information and resources
- Provide focused, coordinated hazard mitigation assistance in implementing high priority actions such as those identified by state mitigation plans
- Identify gaps among agency programs and/or barriers to implementation

Through the Silver Jackets Program, the town of Jean Lafitte has requested a Flood Emergency preparedness Plan (FEPP). This FEPP will position the town of Jean Lafitte to take advantage of funding opportunities from multiple State and Federal programs for the development and implementation of nonstructural hazard mitigation projects and programs.

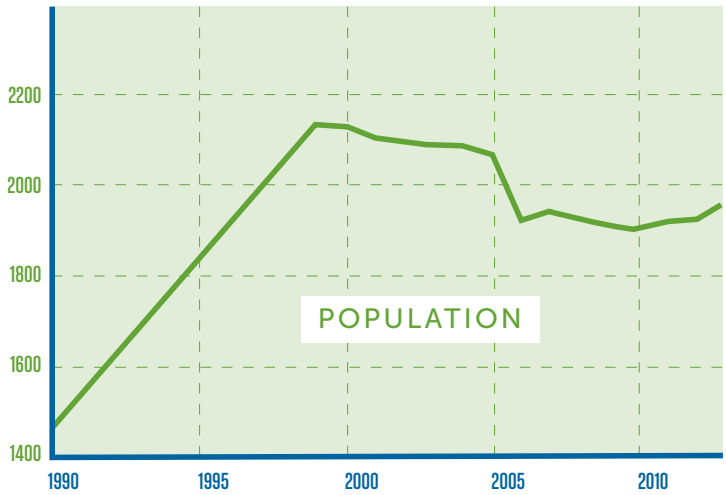
Background and Context

Existing Conditions

Demographics

Jean Lafitte, population 1,956, is located in the Barataria Basin, at the intersection of the Gulf Intracoastal Waterway and Bayou Barataria. Smaller, unincorporated communities hug Bayou Barataria up- and downstream. Together with Jean Lafitte, these communities comprise the southernmost continuously inhabited stretch of Jefferson Parish (Grand Isle, approximately 40 miles south, is accessible by land only from Lafourche Parish). Crown Point (est. population 800) lies just north of Jean Lafitte and on the other side of the bayou; Barataria (est. population 1,300) is to the west, also across the bayou; and Lafitte (pop. 1,305) extends about five miles down both sides of the bayou.

According to the US Census data, the town of Jean Lafitte's population rose from about 1,470 people in 1990 to 2,130 in 2000, due in part to retirees and commuters to New Orleans, but it has since leveled off. Recent growth has generally been flat, with the exception of a sharp one-year drop following the 2005 hurricane season. Similar drops were not seen following subsequent floods, perhaps indicating effective hazard mitigation in the wake of 2005.



As of 2014, the median age in the town of Jean Lafitte is **37.9** (almost two years older than the state median), and the average household size is **3.0.**

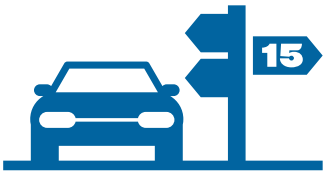
Owner-occupied dwellings account for **90%** of all housing in Jean Lafitte; **26%** of housing is mobile homes, and there are no multi-unit dwellings in the town. According to the National Association of Realtors, the average home price in Jean Lafitte is **$69,000**, about half of the average for Louisiana, and one third of the US average.

In terms of education, **76%** of residents have at least a high school diploma; **8%** have a college degree.

Economic Profile

Jean Lafitte's economy depends on the estuary, which supports a thriving ecosystem. The town contributes significantly to the local, state, and national seafood industry. Economic activity is also generated by servicing, provisioning, and maintaining the seafood industry. Finally, swamp tourism, hunting, and sport-fishing also rely on the natural beauty and bounty of the wetlands, with their waterways and cypress swamps, as well as on the area's colorful history.

As of 2014, Jean Lafitte has an unemployment rate of 6%. Median income is $24,819 (about $3,500 below the state median), and 10% of the local population lives below the poverty line.



Most employed adults in Jean Lafitte work outside of town: 75% commute **more than 15 minutes to work**, and of these 11% commute more than an hour. Jean Lafitte residents typically commute about 5 minutes longer than the state average.

Blue-collar jobs account for 42% of employed Jean Lafitte's residents, 14% higher than the national average. The largest employers within Jean Lafitte are SEMCO, Lafitte Frozen Food, Grand Isle Shipyard, LeBlanc Seafood, Hard Rock Marine Service, and the public school system. Additional seafood businesses include Higgins, Nunez, Chris, Lee Ken, and Bundy. The town is also building a new Fish Market facility to support the local seafood industry (see below).

There are several gas station/ convenience stores, one Piggly Wiggly supermarket, and a Dollar General; several seafood businesses also offer retail sales. There are several restaurants, motels, and tour operators in town, and others nearby. The town has one doctor's office, but no lawyers, accountants, dentists, or other services.

Jean Lafitte has two schools, Leo E. Kerner Elementary and Fisher Middle-High School, with **437 and 498 students enrolled respectively**. Students from the town of Jean Lafitte, as well as unincorporated Lafitte, Barataria, and Crown Point attend these schools.

Public Buildings, Services and Infrastructure

The town of Jean Lafitte has essential core public services, including a US Post Office, Fire Department, Police Department, Emergency Command Center, and two public schools. Residents of the unincorporated communities of Crown Point, Barataria, and Lafitte all depend on public facilities and services in the town.

Jean Lafitte invests heavily in its public infrastructure. Recent projects include a nature trail and adjoining Multi-Purpose Center, which houses a library and museum and also serves as a community center. The nature trail is open and accessible year round and provides an outdoor learning environment about Louisiana's cypress swamp ecosystem. The town has plans to extend the nature trail. The museum describes the town's history, including the pirate Jean Lafitte, area occupations, and Cajun culture.

Recent improvements to school and athletic facilities include a new football field. The football field doubles as a retention basin during rain and storm events.

The town's new Fish Market, being developed along Bayou Barataria, will support the local seafood industry by leasing space directly to fisherman to prepare and sell seafood. The market is located next to public landing on Bayou Barataria, and it was built to weather storm events with minimal damage. The town also has plans to link the Fish Market to the nature trail and museum via a water taxi.

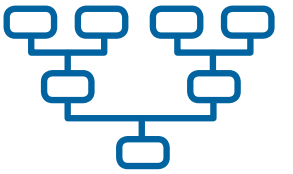
Local Culture and History

Jean Lafitte's culture is heavily influenced by its proximity to the water and natural re-sources, its history, and its long-time residents.

What is now the Town of Jean Lafitte provided a base of operations for the privateer Jean Lafitte in the early years of the nineteenth century. Later the area was settled by the largest Filipino community in Louisiana; a plaque now marks the area that was once home to Manila Village, which was destroyed by Hurricane Betsy in 1965.

Of those now reporting their ancestry to the US Census, 53% indicated it as "French" (Cajun), with significant percentages self-identified as German, Italian, or Irish.

Most of the population of Jean Lafitte has multi-generational ties to the area. A full 94% of town residents were born in Louisiana, and 71% of the population has been in Jean Lafitte for 20 or more years.



Many families also have long histories in town: **69% of current families been there for more than one generation,** and 29% have been in Jean Lafitte for four generations or longer.

Town Capabilities

According to the results of a survey Jean Lafitte completed as part of the Parish Hazard Mitigation Plan (PHMP) process, the town has significant planning, permitting, regulatory, and administrative capabilities – especially for a jurisdiction of its small size. It has a Town Resiliency Plan, a Master Drainage Plan, and a planning commission with zoning, subdivision, and floodplain ordinances to implement these plans. All development

within the town is in both the Special Flood Hazard Area (SFHA) and the Coastal Zone Management (CZM) area, and therefore requires a local permit. It some instances, development requires a federal permit from the US Army Corps of Engineers. Compliance with local zoning and flood control ordinances, and the International Building Code are required for a town permit (municipal and parish enforcement of the International Building Code State -- also known as the Uniform Construction Code in Louisiana -- has been required by state law since 2007).

The town has a floodplain administrator and a civil engineer on staff, but no community planner or building official, and no GIS or HAZUS capability. Jean Lafitte's local capacity benefits from support from non-profit groups, including the Baton Rouge-based Center for Planning Excellence (CPEX), which supported the development of the Town Resiliency Plan and this Flood Emergency Preparedness Plan and Toolkit. Jean Lafitte was also a participant in the Sci-TEK study, a multidisciplinary approach to incorporate traditional ecological knowledge into coastal Louisiana's restoration decision-making process.

The town also employs an Emergency Manager, but there are no local Emergency Operations or Continuity of Operations plans. Jean Lafitte also has no emergency notification capabilities, such as reverse 9-1-1 or outdoor warning sirens.

The town has limited funding capacity. There are no property taxes levied, and the town does not collect any fees on development. Jean Lafitte does participate in HUD-CDBG funding programs.

The town participates in the Jefferson Parish United Mitigation Professionals (JUMP), an initiative to support participation in the National Flood Insurance Program's Community Rating System (NFIP CRS). The JUMP meets regularly to share information, exchange approaches, and coordinate efforts that advance the CRS ratings of Jefferson Parish and its municipalities. Jean Lafitte currently has a CRS rating of 8.

Flood and Related Hazards and Risks

The State Hazard Mitigation Plan (SHMP), the PHMP, and this FEPP all generally define flooding as "the accumulation of water within a water body and the overflow of excess water onto adjacent floodplain lands." The cause of the flooding may be overland (flash, sheet, ponding), riverine (upstream or backwater), or storm surge. These causes may be accentuated by coastal erosion and relative sea-level rise.

In low-lying areas such as Jean Lafitte, several factors may simultaneously contribute to a particular flood event. Therefore, historical incidents of flooding are presented below all together, regardless of their root cause(s). Following this, the individual factors contributing to flood risk are then each discussed separately.

Historical Occurrences

Flooding across coastal southeastern Louisiana -- including Jean Lafitte -- is a frequent occurrence. The primary cause is almost exclusively named storms. The events in bold indicate when Jean Lafitte experienced either wind or flood damage despite significant efforts to reduce flooding. For all these events, Jean Lafitte has to prepare extensively in order to avoid major disaster.

The list by NOAA chronicles flood events since 1950

- September 24, 1956: Hurricane Flossy dumped more than 16 inches of rain in less than 24 hours in parts of Southeastern Louisiana, causing three-to-four foot floods in some communities
- **September 9-10, 1965**: Hurricane Betsy pushed a nearly 16-foot storm surge at Grand Isle, damaging or destroying nearly every structure in town. In addition to the surge, New Orleans recorded more than 12 inches of rain and parts of the city were flooded for days. In all, 2.4 million acres in South Louisiana were submerged at some point.
- **August 17-18, 1969**: Hurricane Camille generated a 16-foot surge at Ostrica Lock, near Buras, and Plaquemines Parish was devastated by the storm. Coastal Mississippi saw surges up to 24 feet. Southeast Louisiana received seven inches of rain.
- September 7-8, 1974: Hurricane Carmen raised tides four-to-six feet above normal along the south-east Louisiana coast, including in Jefferson Parish.
- **October 27-31, 1985**: Hurricane Juan meandered multiple days, battering the coast, and washing ashore four feet of storm surge at Grand Isle, stranding residents who had not evacuated.
- August 26, 1992: Hurricane Andrew
- October 4, 1995: Hurricane Opal. From Grand Isle eastward, significant property damage resulted from three-to-five foot surges during Hurricane Opal.
- July 17-18, 1997: Hurricane Danny pushed about five-and-a-half feet of storm surge at Grand Isle; more than 11 inches of rain fell at Buras.
- September 10-14, 1998: Hurricane Frances. Storm surge combined with river flooding on the Mississippi during Hurricane Frances; more than $31 million in property damage reported in Louisiana coastal parishes, including Jefferson.
- **July 4-11, 2001**: Tropical Storm Allison
- September 23-27, 2002: Hurricane Isadore made landfall just west of Grand Isle.
- October 3, 2002: Hurricane Lili pushed six feet of surge west of Jefferson Parish, filling Barataria Basin with several feet of brackish water.
- **August 29, 2005:** Hurricane Katrina. Jean Lafitte was spared the full fury of Hurricane Katrina. That storm drove nearly 28 feet of surge -- the highest on record in the U.S. -- into coastal Mississippi, and surges reached 12 feet in Lake Pontchartrain at New Orleans Lakefront Airport. At Grand Isle, west of the storm's track, the surge was only five feet, but this was enough to cause widespread damage to the island.

- **September 27, 2005**: Hurricane Rita. Jean Lafitte flooded up to 3 feet and sustained damage from winds that were up to 45 mph.
- August 28 - September 3, 2008: Hurricane Gustav tracked just southwest of Jefferson Parish, pushing surges of 10-15 feet across southeastern Louisiana. At Grand Isle the surge was approximately 10 feet.
- **September 11, 2008**: Hurricane Ike delivered the significant damage to Jean Lafitte. Residential areas near Jean Lafitte Boulevard were completely inundated, including homes that has been elevated after the 2005 hurricanes.
- September 2, 2011: In advance of Tropical Storm Lee, a mandatory evacuation was issued for Jean Lafitte and nearby areas outside the levee system. Approximately fifty homes in Jean Lafitte were flooded by Lee's surge.
- August 28, 2012: Hurricane Isaac's storm surge reached as high as six feet. Numerous homes in Jean Lafitte suffered property and structural damage -- including some elevated structures. Widespread flooding prevented residents from returning home for days after the storm.

The above history makes clear that although catastrophic flooding has largely spared Jean Lafitte since 1950, nearby areas of the Gulf Coast have been decimated, demonstrating the extreme vulnerability of the entire coast.


NO
PASSING
ZONE

Flooding

Most of the southern part of Jefferson Parish – including the entire town of Jean Lafitte – is in FEMA's 100-year flood zone, the NFIP-designated SFHA. FEMA determines flood risk by examining historical floods, meaning that all contributing causes and factors are included. All of Town of Jean Lafitte lies within an NFIP AE zone, which is defined as "areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage. Mandatory flood insurance purchase requirements and floodplain management standards apply" (PHMP, pp. 43, 65-6).

The majority of flooding in Jean Lafitte results from hurricanes and storm surge. In fact, according to the PHMP, all flood events in Jean Lafitte since 1998 have been the result of hurricanes or tropical storms. The most flood-prone areas in the Town of Jean Lafitte are located along Jean Lafitte Boulevard.

The PMHP provides projections of potential losses from different flood events, based on their likelihood.

It estimates that a 2-year flood event would result in losses in Jean Lafitte of $1,077, $2.5 million during a 10-year event, and $5.0 million during a 20-year event

Two parish-defined critical facilities – the Town Hall and Multipurpose Center – are listed as having "moderate" vulnerability to flood (PHMP, p. 75).

Jean Lafitte had 91 "repetitive loss" properties in 2014, or 1.4% of Jefferson parish's total (which is more than triple the town's proportion of the parish's population). Repetitive loss properties are those that have received at least two NFIP insurance payments of more than $1,000 each in any rolling ten-year period. In Jean Lafitte, repetitive loss properties represent 248 claims, at an average of $36,412 (1.6 times more than the parish-wide average claim) PHMP, p. 67)

NFIP requirements have clearly reduced risk in the town. In 1976 Jefferson Parish adopted its first Flood Insurance Rating Map (FIRM), and new structures built after that date needed to be built above the Base Flood Elevation (BFE) in order to be insurable under the NFIP. "Pre-FIRM" (pre-1976) structures in Jean Lafitte, built without any FEMA-enforced regulations, are at higher flood risk, both in terms of likelihood of flood losses and value of losses. Jean Lafitte has more paid claims than it has policies on pre-FIRM houses (220 claims on 72 policies, or 3.1 claims per policy) indicating numerous repetitive loss properties. On the other hand, post-FIRM dwellings in Jean Lafitte have a lower number of paid claims per property (114 claims on 181 policies, or 0.6 claims per policy). Payouts on pre-FIRM houses were also larger, averaging $32,086 per claim versus $12,289 per post-FIRM property claim (PHMP, p. 70).

Storm Surge

Flooding in Jean Lafitte is often the result of storm surge. Storm surges result from strong coastal storms with cyclonic flows and low pressure, typical of hurricanes and tropical storms. Storm surges in Louisiana are deeper and travel further inland than in other Gulf Coast states, according to experts. Storm surge causes nine out of every ten hurricane-related deaths, according to the National Weather Service. In addition to flooding coastal areas, storm surge can also reach further inland, inundating coastal floodplains and impacting lakes, bayous, and rivers (PHMP, p. 94).

Jefferson Parish ranks among the highest (most at-risk) parishes in Louisiana in composite risk from hurricanes, and among the most impacted by annualized losses from hurricanes (more than $32 million). These criteria combine all hurricane impacts – wind, surge, and other destructive forces (SHMP, pp. 2-172-173).

The southern part of Jefferson Parish, including Jean Lafitte, is the most likely to be affected by storm surges. Based on past records, all parts of the parish can expect storm surge as high as nine feet in future events. The Town of Jean Lafitte can experience storm surge from the Gulf of Mexico, Bayou Barataria, the Gulf Intracoastal Waterway, and from Bayou Rigolettes. Although the town's limited levee system provides some protection, Jean Lafitte has repeatedly been impacted by storm surge (PHMP, p. 100).

During the last 15 years, the Town of Jean Lafitte and its surrounding communities have endured storm surge flooding from Hurricanes Katrina and Rita in 2005, Gustav and Ike in 2008, Hurricane Isaac in 2012, and tidal surge from Tropical Storm Lee in 2011. During these events, structures not elevated or otherwise protected were flooded - repeatedly.

Due to its location between the Gulf of Mexico and the GIWW West Closure Complex, Jean Lafitte could see large amounts of water coming both from the north from backwater flooding and the south from surge during a storm event.

Coastal Erosion

Coastal erosion is the wearing away of land by wave action or drainage. Coastal erosion along Louisiana's Gulf Coast is an ongoing process that continues to threaten wetlands and barrier islands. Erosion is accelerated by strong storms and hurricanes, which can erode large sections of coastline during a single event. Erosion is a significant problem along the entire Louisiana Gulf Coast. Barrier islands and marshes are important because they act as a buffer against wind and especially storm surges, providing protection for inland development and populated areas, like Jean Lafitte.

According to the SHMP, Jefferson is among the parishes with highest vulnerability to coastal land loss in the state, and in the top two (along with Orleans) in annualized losses due to coastal land loss (over $10 million) (SHMP, p. 2-234-242). According to the PMHP, coastal erosion most directly impacts the southern half of Jefferson Parish, particularly Jean Lafitte and Grand Isle.

Coastlines in southern Jefferson Parish are sinking or eroding away as incoming water undermines marshes and wetlands that buffer and drain the higher drier land. Louisiana has the highest rate of wetlands loss in the country, accounting for 80% of total US wetland loss. The USGS estimates wetland loss in the Mississippi River Delta Plain to be 27 square miles per year, the equivalent of a football field every 20 minutes. In total, the USGS estimates that Louisiana has lost approximately 1,900 square miles since 1932, and will lose another 500 square miles by 2050.

According to the PHMP, "The slow movement and advancement of coastal erosion is not life threatening, but has the potential to cause substantial property damage and negative impacts to the Louisiana economy … [and] the nation's energy supplies, seafood industry, economic security, and environmental integrity" (PHMP, pp. 122-3).

Jefferson Parish is a member of the Parishes Against Coastal Erosion (PACE) formed in 1999 to encourage joint cooperation between the southern Louisiana parishes and communities to protect the coastline. The organization meets periodically to discuss issues and encourage policy that reduces coastal erosion. Jean Lafitte has been involved with PACE to coordinate levee protection efforts and coastal erosion mitigation.

Subsidence and Relative Sea-Level Rise

Subsidence is the settlement of organic soils or of saturated, low-density mineral soils and sands, typically following drainage. Subsidence usually occurs gradually over a period of years or decades, but in some cases subsidence can happen much faster. It can be highly localized or spread over large regions.

Subsidence and sea level rise impact Louisiana in a similar manner, making it difficult to separate the impacts. Together they are treated as "relative sea level rise." This can accelerate coastal erosion and wetland loss, exacerbate flooding, and increase the extent and frequency of storm impacts.

All low-lying coasts are vulnerable to relative sea-level rise, but Louisiana's coast is much more so because of rapid subsidence in the Mississippi River delta. The rates of natural subsidence and sea-level rise along the Louisiana coast have been exacerbated by human modifications – primarily levees – which have isolated

the Mississippi River from a delta complex that depends on an annual flooding cycle to build up its elevation.

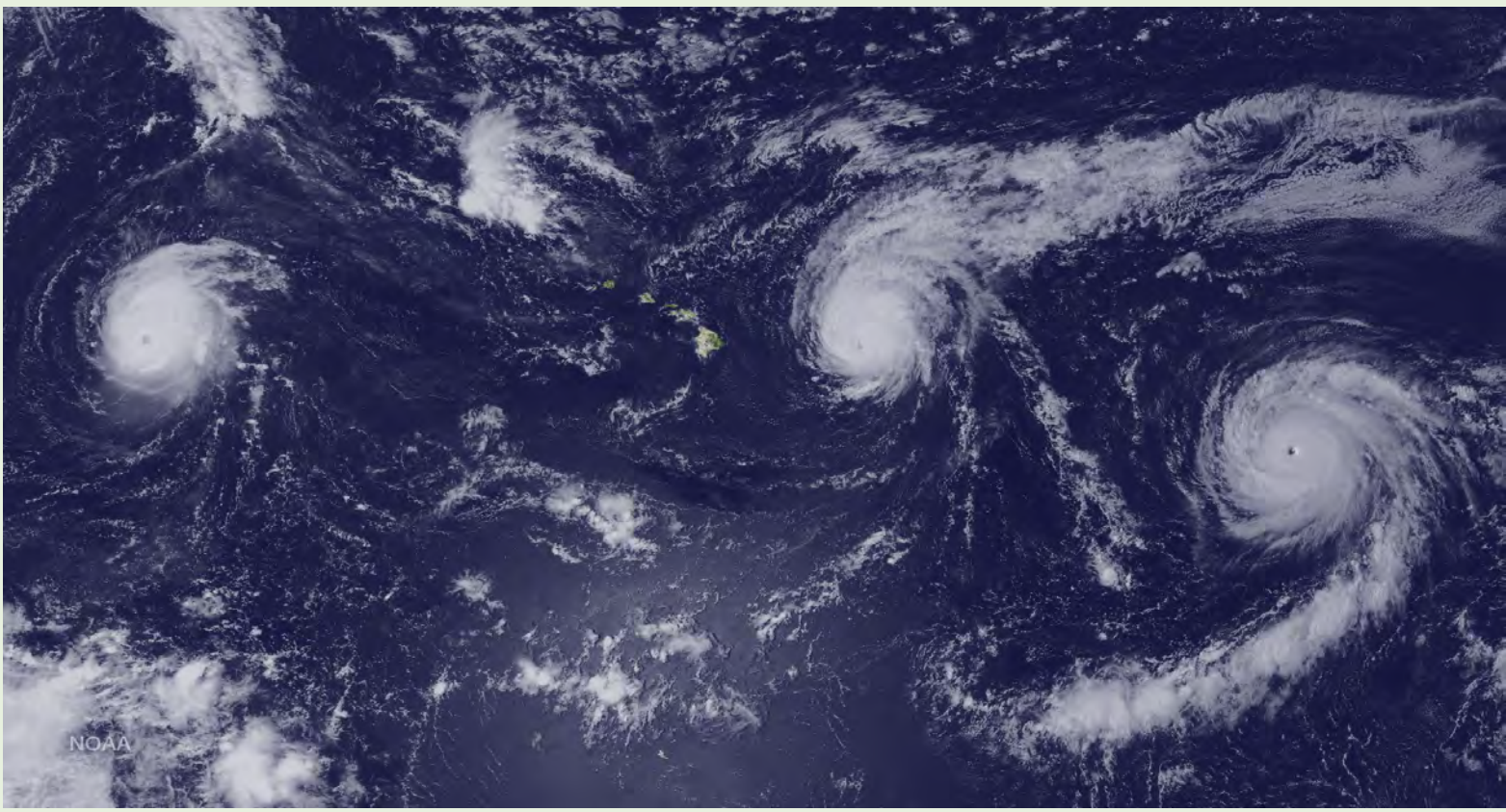
According to state data, the town of Jean Lafitte is literally sinking at a rate of 0.39 inches per year. Including sea-level rise, NOAA data suggests that over the next 100 years, relative sea levels could rise anywhere from four to nine feet in Jefferson Parish (PHMP, p. 125-6).

The direct effect of subsidence is to exacerbate losses from other flood-related hazards. According to SHMP analysis, subsidence will result in a roughly 11% increase in flood exposure over just the next 10 years (PHMP, p. 129).

Climate Change

According to the National Climate Assessment, the southeast United States will be impacted by increased temperatures, sea level rise, extreme heat events, hurricanes, and decreased water availability. These changes will have an effect on the coastal wetlands (continued land loss); infrastructure (inundation of roads and facilities that deliver critical resources to the nation); transportation (need for reconfiguration of ports, harbors, and roads); and increased future losses from hurricanes (wind and storm surge), land subsidence, and sea level rise. Thus, climate change will not only affect the environment, but the economy as well. Furthermore, changes in the geographic distribution, frequency, and intensity of weather-related hazards have been observed and are attributed to climate change. Those areas that are experiencing droughts will also continue to experience increased volume, intensity, frequency of heavy daily precipitations that can lead to flooding and certain kinds of tropical storms. These types of changes area are already having an impact on the Town of Jean Lafitte, and with future predictions, flooding, sea level rise, and heavy downpours will only increase.

Jean Lafitte is already taking measures to avert the worst, including participation in hazard mitigation planning activities, and the implementation of structural and nonstructural flood mitigation measures.



Risk Reduction Framework

FEMA/GOHSEP and Hazard Mitigation Planning

FEMA's hazard mitigation grants and supporting planning requirements comprise a primary component of the U.S. risk reduction framework. A number of FEMA grants are available to jurisdictions (states, parishes and municipalities) that prepare hazard mitigation plans. Some of these grants (e.g., Pre-Disaster Mitigation (PDM) grants) are available at any time, on a competitive basis, while others, especially the Hazard Mitigation Grant Program (HMGP), are only available after a declared disaster.

Both the State of Louisiana and Jefferson Parish maintain current hazard mitigation plans; the Town of Jean Lafitte participates in the parish plan.

State Hazard Mitigation Plan

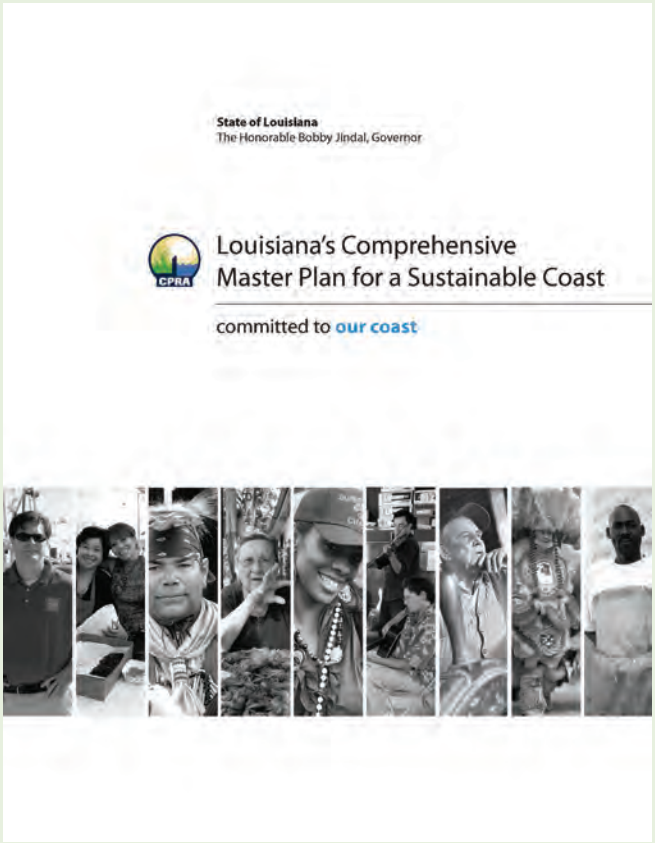
The 2012 State Hazard Mitigation Plan (SHMP) was developed by Governor's Office of Homeland Security and Emergency Preparation (GOHSEP) as an element of the hazard mitigation planning and funding framework established by FEMA.

The SHMP is useful to this FEPP mainly in establishing a general context for hazard and risk. The SHMP does not generally engage risk at a smaller geography than the parish, meaning that issues specific to Jean Lafitte are not specifically called out. Also, the SHMP's recommendations are aimed at state actions, not parish or municipal.

Parish Hazard Mitigation Plan

This FEPP is heavily informed by the hazard identification and risk assessments in the 2015 Jefferson Parish Hazard Mitigation Plan (PHMP), as well as its recommendations. Local hazard mitigation plans are developed by municipalities (often working collaboratively at the parish level) as an element of the hazard mitigation planning and funding framework established by FEMA. They include specific parish and local projects for funding and implementation.

Jean Lafitte was one of six incorporated municipalities to participate in the development of the 2015 Jefferson PHMP, joining Gretna, Harahan, Kenner, Westwego, and Grand Isle. During the planning process, Jean Lafitte Clerk and Floodplain Manager Yvette Crain served as a member of the nine-member Parish Mitigation Planning Team and the 19-member Jurisdictional Sub-Team. Mayor Tim Kerner sat on the 17-member Stakeholders Group .



Coastal Protection and Restoration Authority and the Coastal Master Plan

Certain federal and state funds are administered by the Louisiana Coastal Protection and Restoration Authority (CPRA), which was established after Katrina and Rita to coordinate state flood mitigation activities. Funds consist of recurring revenue sources, including the CPR Trust Fund, and DOTD Interagency Transfer. Other sources of funds are those from the National Resources Damage Assessment (NRDA), Community Development Block Grants through OCD-DRU, Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), Coastal Impact Assistance program (CIAP), Water Resources Development Act (WRDA), Hurricane and Storm Damage Risk Reduction System, and state surplus funds. Additional funds are anticipated, including those from RESTORE and GOMESA.

To guide the use of these funds, the CPRA developed the Comprehensive Master Plan for a Sustainable Coast, and updates it every five years. As of the 2012 plan, "structural" protection and restoration projects are described in detail, but "non-structural" initiatives are addressed generically and conceptually only.

This FEPP anticipates implementation of structural projects as described in the plan, but it strives to further reduce risk through nonstructural strategies in advance of structural project completion, and also as a means of buttressing the risk-reduction forecast from these large investments through a "multiple lines of defense" approach.

The 2012 Master Plan update contains protection and restoration projects in and around Jean Lafitte. Important area projects include the Mid-Barataria Diversion on the west bank of the Mississippi River (001.DI.03), which is intended to build and maintain land; and the Lafitte Ring Levee (002.HP.07), which is discussed in greater detail on page 26. Both projects are to be completed by 2032.

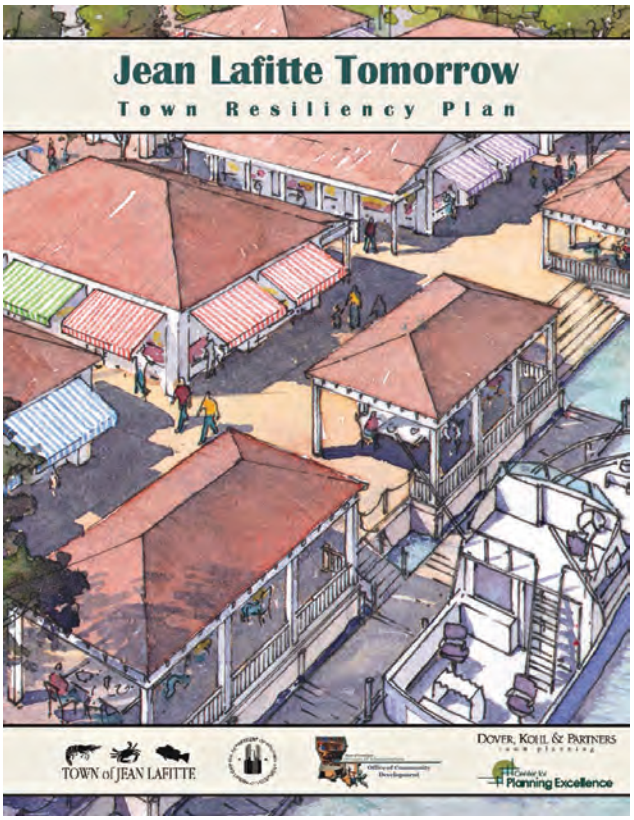
US Army Corps of Engineers

To protect Louisiana's residents from hurricane & storm damage, facilitate navigation along the Mississippi River, and assist with restoration of Louisiana's coastal ecosystem, the U.S. Army Corps of Engineers (USACE) provides engineering expertise. To address the flood protection needs of the area between Donaldsonville and the Gulf of Mexico, the USACE conducted the "Donaldsonville, Louisiana to the Gulf of Mexico, Flood Control, Mississippi River, and Tributaries Feasibility Scoping" study to "identify economically justified and environmentally acceptable alternatives to provide flood protection to the Donaldsonville, Louisiana to the Gulf of Mexico study area." This study covered the Town of Jean Lafitte. The study determined, "Many of the residential structures have previously been elevated but not to the design flood elevation being considered for this project. A small ring levee to protect Jean Lafitte is a logical option considering that it is the Central Business District of the area" (p. 42). However, in 2012, USACE determined not to move forward with the project, leaving the area, including Jean Lafitte, with no USACE-led regional plan to address flood risk.

The USACE operates within several programs that protect public safety. One of those is the Flood Risk Management Program, which provides assistance for interagency nonstructural and general flood risk management projects. As such, CPEX, Jean Lafitte, and USACE partnered to develop this FEPP with the goal of providing nonstructural risk reduction measures appropriate for Jean Lafitte.

HUD/ OCD-DRU

After the hurricanes of 2005 and 2008, OCD-DRU provided funding on a competitive grant basis to develop risk reduction tools, including resiliency planning. Jean Lafitte, in partnership with CPEX, was awarded a grant to develop the Town Resiliency Plan, Jean Lafitte Tomorrow, which lays out how the town can develop and redevelop over the next 20 years to diversify its economy and to Live with Water®. With the development of the FEPP, Jean Lafitte continues to implement this plan and further positions itself to take advantage of additional OCD-DRU funding opportunities as they become available.



Town and Parish Plans, Ordinances, and Regulations

Jean Lafitte Tomorrow: Town Resiliency Plan

This FEPP's risk reduction initiatives (pg 18, below) are heavily informed by "Jean Lafitte Tomorrow: Town Resiliency Plan." Jean Lafitte Tomorrow proposes to establish a broad and comprehensive definition for "resiliency" by addressing structural and nonstructural flood mitigation measures in tandem with issues of cultural continuity, economic stability, and the livability and comfort of the built and natural environments.

Jean Lafitte Tomorrow offers numerous recommendations, including policies, programs, and projects; the recommendations in this FEPP borrow heavily from these. Overall, Jean Lafitte Tomorrow calls for Jean Lafitte to learn to "live with water." This includes focusing new development where there is existing infrastructure, discouraging new development from draining wet areas, and having new development retain stormwater on-site. It also recognizes the need for continued pumping into the bayou to alleviate flooding.

Town Zoning

Zoning is a useful tool in advancing risk reduction strategies, but in Jean Lafitte, the zoning code largely pre-dates such initiatives.

In 1978 the town adopted a Comprehensive Zoning Ordinance, which was revised in 1997. Town zoning regulates land use, permitted uses, height of structures, off-street parking requirements, and - in some cases - loading zone requirements. The town is zoned by use for suburban, single-family residential, two-family residential, multiple-family residential, medical service, neighborhood commercial, general commercial, industrial, unrestricted, and growth and conservation districts.

Existing town zoning was not designed to address flood risk directly, and in some cases it can actually be a hindrance to mitigation activities. The current Comprehensive Zoning Ordinance does not engage the SFHA, BFE, or freeboard; the existing growth and conservation district may need to be reviewed and updated to reflect current and anticipated environmental conditions; and existing use designations can make infill development difficult. Also, the maximum building height of 35 feet can limit structural elevation as a flood mitigation measure.

Parish Drainage Master Plans

As of 2014, Jefferson Parish has engaged the services of an engineering consulting firm to prepare Comprehensive Drainage Master Plans for both the east and west banks in order to address the inefficiencies in the parish's subsurface drainage system. Once this project is complete, the parish will be in a better position to determine, prioritize, and optimize drainage projects to reduce local flooding (PHMP, p. 153).

Risk-Reduction Initiatives

Risk-reduction measures have been proposed in many of the plans and reports mentioned above. The most promising, practical, and locally appropriate of these are described in detail below.

A number of the initiatives described below should improve Jean Lafitte's CRS rating and thereby reduce NFIP premiums. Most of these activities will directly support risk-reduction in advance of -- and eventually in tandem with -- major CPRA structural investments, in particular the 16-foot ring levee planned to be built around the town by 2032. Furthermore, these initiatives should help Jean Lafitte to meet CPRA's criteria for receiving priority funding. Furthermore, all of these recommendations will serve to empower Jean Lafitte and its residents to reduce the exposure of families, property, and the community to risk from major flood events, which will support the resiliency and sustainability of the Town of Jean Lafitte over the long-term.

Site Evaluation and Planning

While living near the water's edge has many benefits and is desired all over the world, trade-offs, such as flooding and unsuitable soil for development are critical considerations. Compared to most situations in the United States, the land along Louisiana's bayous has been accumulating over centuries due to frequent flooding that brought in sediment. While the natural elevation of sites on the water's edge might be higher than further away, they are also first in line for flooding from storm surge. Additionally, flood depth could be greater than when the property is further from the source of flooding. If the site is located near or on wetlands, development can be very costly due to mitigation requirements of developing near or on wetlands.

In Jean Lafitte, properties along the bayou are desirable and have been developed, but these are also the sites that will flood first and deepest from storm surge. The further south and closer to the Gulf of Mexico the site is, the higher that risk; storm surge in Jean Lafitte travels north along Bayou Barataria. Understanding the particular conditions of the building site is a necessary step in preparing to build new construction or elevate an existing structure.

RECOMMENDATION

Prior to building new construction or elevating an existing structure, a thorough understanding of the site's flood type and levels, geology, vegetation, and size of site should be evaluated for suitability of the development. In addition, potential impacts on adjacent properties should be analyzed and mitigated. The types of analysis needed as well as potential issues are included in the Flood Preparedness Toolkit.

Elevation

Elevation refers to the practice of constructing a building such that its lowest occupied floor is above a certain flood height. In Louisiana, elevation is the most commonly used flood-risk mitigation measure at the scale of individual buildings.

Elevation can be applied to new construction, retrofitted to existing buildings, or implemented as part of a repair. Any type of elevation requires a permit. The height to which a structure is elevated can vary. Typically, minimal floodplain management and NFIP requirements call for elevation to the 100-year flood level, or BFE. Additional elevation above the BFE, which results in additional risk-reduction, is known as "freeboard."

Depending on flood heights, structure elevations may range anywhere from a few inches to 25 feet or more. In many locations (especially in NFIP "Excluded" Zones behind levees, where the BFE is at grade), structures are often elevated well above the required height. Buildings may be elevated singly or in groups.

Elevation can be achieved using a variety of techniques. These include:

- Simple vertical piers (stilts);
- More complex reinforced structures, trusses, and lattices;
- Earthen mounds (these are addressed in the next section).

Buildings may be elevated using steel, various types of wood and wood products, reinforced concrete, masonry, or even earth. Excluding the case of earthen mounds, it is critical that the structural supports allow water to pass through; elevations also need to be able to withstand strong lateral pressure from flood waters.

Cost can be a concern for elevating structures.

Current FEMA programs to fund elevations require up to 25% local cost share. In some jurisdictions, this share is borne by the parish or municipality; in others, it falls to the homeowner. For homeowners, this can result in a substantial upfront cost.

Elevation grants have typically been disbursed on a first-come-first-served basis. Also, program implementation tends to be reactive, so properties substantially damaged by floods are first in line for the highly competitive elevation funds. Together, these factors have created a patchwork of elevated structures throughout southern Louisiana.

Elevation has several inherent urban-design problems. Assuming houses are elevated one-at-a-time, elevation will have the effect of atomizing a street or neighborhood, and reducing the neighborliness that is an important aspect of life in a small town like Jean Lafitte. Elevation also creates physical challenges for the elderly or those with physical disabilities; this is a significant concern given that 16% of Jean Lafitte's (non-institutionalized) population has some form of disability, 37% of those over 65 have a disability, and the town's population is older than the state average.

It is a best practice that new space created by elevation be treated as outdoor storage, with all the exposure that this entails; effectively, it is a carport. However, as the memory of the last flood fades, some homeowners with elevated structures are tempted to enclose and adapt the "new space" under their homes for storage or even living space. This practice is not uncommon but it is hugely problematic, as it undermines the risk-reduction potential of the elevation.

Another concern is that elevation requirements are not stable; instead, they typically continue to rise, both as the result of FIRM revisions to incorporate the latest storm data and from subsidence and relative sea-level rise. In Jean Lafitte, approximately 70% of homes are already elevated, but many no longer meet the current eight-foot elevation requirement per the FIRM (if they ever did). Many commercial structures are also below the required height.

CPRA estimates that elevating all structures in Jean Lafitte with one foot of freeboard would cost about $153.6 million over 50 years, but that it would reduce damages more than ten-fold: by $1.6 billion over the same time-span. Four feet of freeboard would cost $167.7 million and reduce dam-ages by about 15 times that amount totaling $2.5 billion.

RECOMMENDATION

Jean Lafitte should inventory those structures that either remain to be elevated or are currently elevated below the requirements (BFE plus freeboard). Jean Lafitte should establish priorities for elevation grants based on need, and it should establish dedicated funding to assist with local match support for elevation projects.

Elevation on Earthen Fill (or Mounds)

Mounds are built by placing earthen fill to elevate a structure. This is considered to be a real estate improvement in the CZM Area, and thus requires a Coastal Use Permit (CUP), which is handled by LA DNR. Elevating residences on mounds appeals to many because one can still walk and drive up to the entrance door. Compared to a conventionally elevated house, one built on a mound has no "echo" when walking on the floor, and the fill provides insulation from the cold during the winter months. Some prefer elevating on

fill simply to avoid their house from looking "like a camp." During storm events, a structure on mounds may also experience less wind load than one elevated on pilings or stilts. Typically, excavating for the mound material leaves behind a borrow pit, which functions as a retention pond on the same property.

Mounding, however, also has adverse environmental impacts. Jean Lafitte currently does not have a slope requirement, so mounds may result in slopes deep enough to disturb existing vegetation. Mounds can also create hydrological problems due to water displacement, wetlands encroachment, and increased runoff, which can in turn lead to increased flood risk to neighboring properties, erosion of land, destructive channelization of runoff, and degradation of the mound itself due to silt deposits. As a result of these possible environmental impacts, numerous local communities have adopted fill ordinances. To address adverse effects of mounding at the state level, DNR recently introduced a Hydrological Modification Impact Analysis as part of its CUP application for development.

In Jean Lafitte, like elsewhere, a combination of elevating a structure with fill and stilts can be found, which requires two permits. The environmental impacts of this practice are the same as mounding.

RECOMMENDATION

To avoid negative impacts to the property from mounding, the Town should discourage mounding unless the site is of a certain acreage (to be determined by the Jean Lafitte Planning Commission/ Town Council). Careful consideration should be given to the slope ratio of the mound. The installation of appropriate landscape design and features can assist with water management on the site.

CRS opportunity: adopting regulatory language for freeboard and to prohibit fill can earn significant points.

2 ft freeboard + fill prohibited = 280 pts
3 ft freeboard + fill prohibited = 500 pts

Floodproofing

Floodproofing refers to the practice of making a structure invulnerable to damage from waters that rise above floor level on the lowest occupied level of the building. This can be accomplished in two distinct ways: by sealing the exterior building envelope against water ("dry floodproofing"), or by utilizing materials for the construction, interior surfaces, and contents that will not be damaged by water ("wet floodproofing"). In either method, electrical, air-handling, and other building systems must be elevated above expected flood levels. Currently, neither wet nor dry floodproofing is recognized as a substitute for elevation for purposes of compliance with floodplain management ordinances, nor does the NFIP consider floodproofing measures when determining if a structure is above the BFE or otherwise as a factor in calculating premiums.

RECOMMENDATION

To incentivize floodproofing (especially wet floodproofing) of structures, Jean Lafitte could waive permit fees for new construction and reconstruction if the practice is implemented. Additionally, (existing) educational materials about floodproofing should be made available to those applying for permits.

Open Space Preservation and Conservation

Open space preservation is the practice of preserving undeveloped sites. The wetlands surrounding Jean Lafitte are to some degree protected from development due by local zoning laws and wetland mitigation requirements. Jean Lafitte established a growth conservation line due to "the ecological and economic characteristics of the area," beyond which development is not permitted (Jean Lafitte Comprehensive Zoning Ordinance, pg 57).

Additionally, any property acquired by the town through federal mitigation funds must be taken out of commerce. As of 2014, the parish has acquired and mitigated 40 repetitive loss properties in Jean Lafitte, and deeded them to the town (1.9% of the repetitive loss (RL) properties mitigated in the parish).

Although Jean Lafitte is not actively acquiring RL and severe RL properties, the town is looking into purchasing and working with Jefferson Parish to preserve 2,425 acres of wetland as open space in and around Jean Lafitte (see picture above).

At the individual site level, many additional conservation measures can be taken that would help property owners to better manage water. If a sufficient number of individual sites implement small-scale water management measures in coordination, the effect would be collective and the community could further reduce its risk from flooding.

RECOMMENDATION

Jean Lafitte should comprehensively identify sites or zones to be targeted for permanent designation as open space, through regulation or acquisition, or otherwise limited as to the types of landscape alteration or development permitted. This will not only assist with reducing flood risk but will also earn significant points in the CRS program. There are several entities, public and private, that can assist with conservation and preservation projects.

CRS Opportunity: ≤ 2,020 pts for Open Space Preservation element.

Open Space Preservation (OSP): ≤ 1,450 pts (regulation or ownership)

OR

Open space incentives (OSI): ≤ 250 pts for local requirements and incentives that keep flood-prone portions of new development open.

Low-density zoning (LZ): ≤ 600 pts for zoning districts that require lot sizes of 5 acres or larger.

AND

Natural shoreline protection (NSP): ≤ 120 pts for programs that protect natural channels and shorelines.

Deed restriction: ≤ 50 pts for legal restrictions that OSP parcels will never be developed

Natural function open space: ≤ 350 pts for OPS-credited parcels that are preserved in or restored to their natural state.

Special flood-related hazards open space (SHOS): ≤ 50 pts if the OPS-credited parcels are subject to one of the special flood-related hazards or if areas of special flood-related hazard are covered by low density zoning regulations.

National Flood Insurance Program (NFIP) and Community Rating System (CRS)

The PHMP observes that utilization of NFIP is critical to the reduction of future flood damage costs to taxpayers. The PHMP recommends that the parish continue to promote the purchase of flood insurance (PHMP, p. 160).

Jean Lafitte has participated in the NFIP since 1971. Participation requires that the town adopt a floodplain ordinance that meets or exceeds the minimum NFIP criteria, and it must also adopt any FIRM for the community (PHMP, p. 45).

According to the PHMP, there are 253 total NFIP policies in Jean Lafitte, on a total of 1522 structures, meaning just 16.6% of structures have flood insurance, despite the entire town's designation as being in the SFHA.

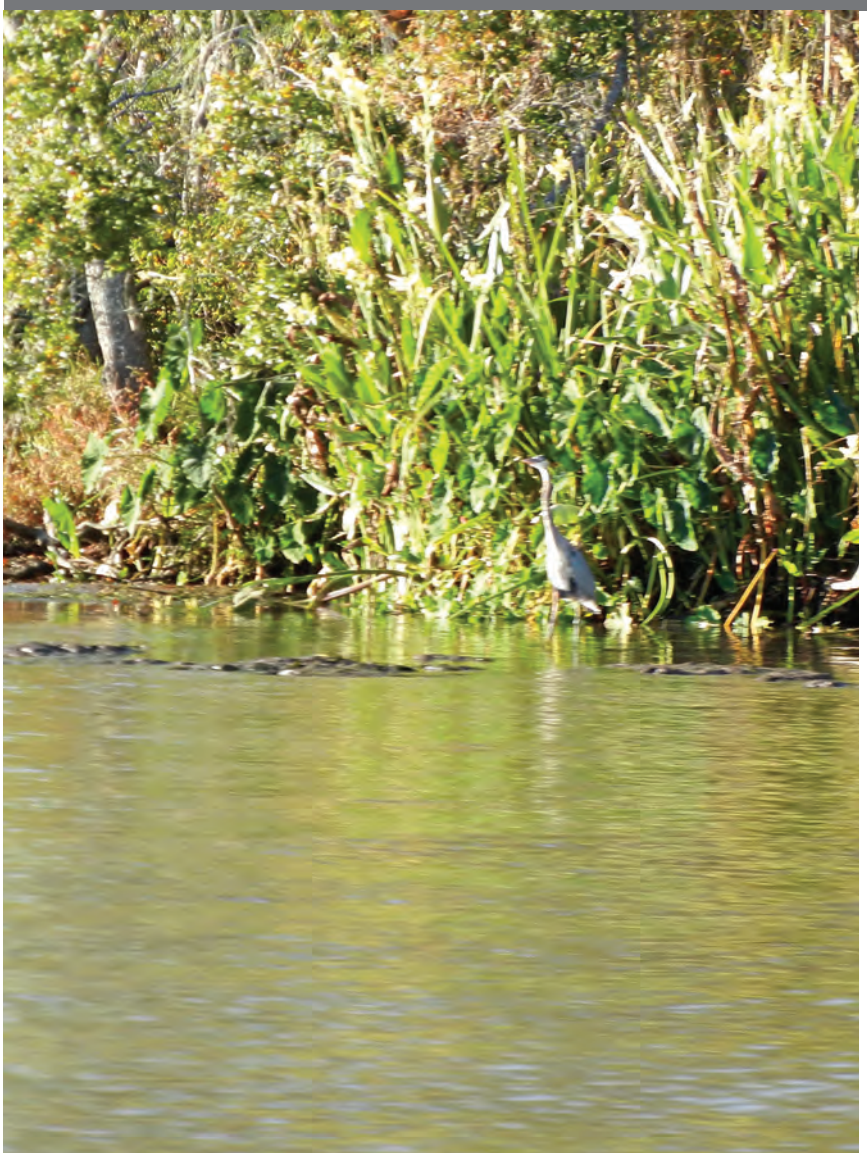
This may reflect the fact that NFIP requirements are tied to mortgages, so homeowners who own their properties free-and-clear may have diminished incentive to participate in the NFIP. Total NFIP flood losses for all properties in Jean Lafitte between 1978-2014 were just over $9.5 million (0.4% of the parish total, the same as the town's overall proportion of the parish's population) (PHMP, p. 68).

The town currently carries a CRS rating of 8. However, floodplain regulations do not exceed FEMA and state minimum standards, and floodplain management in Jean Lafitte is not one dedicated staff function.

As a provision of the Flood Insurance Reform Act of 2004, all updated FIRMs are now available in digital format on FEMA's Map Service Center website. Although Jefferson Parish is in the process of updating its FIRM, the preliminary maps panels are available digitally. Community officials can therefore locate properties simply by typing in an address, thus increasing accuracy in determining a property's BFE.

RECOMMENDATION

Jean Lafitte should encourage its residents to obtain coverage, with the goal that a majority of structures in the town be covered. The town should therefore continue its public education and outreach efforts to this end. Another way to increase participation is by lowering the cost of participation. Jean Lafitte currently receives a 10% discount on premiums through the CRS. Many of the recommendations in this FEPP, if implemented, will further reduce flood risk to Jean Lafitte.



Floodplain Management and Freeboard

Building Code Effectiveness Grading Schedule (BCEGS)

BCEGS assess the effectiveness of building codes and their level enforcement in a given municipality, with a focus on how well the codes protect buildings from natural hazards. Effective building codes can significantly reduce damage to buildings during storms and hurricanes, subsequently reducing property loss and yielding safer communities. Each reviewed municipality is given a BCEGS grade of 1-10, with 1 being the highest. The grade is based on a number of factors, including zoning provisions to mitigate natural hazards; training/ qualification of code enforcers and building officials; contractor/builder licensing and bonding; and performance evaluations for building plans; and the level of detail of building inspections. BCEGS is both applicable to commercial and residential buildings and points are awarded that assist in lowering insurance premiums, similar to the CRS program.

The PHMP observes that improved floodplain management, including land use planning, zoning, and enforcement at the local level can reduce flood related damages (PHMP, p. 160).

Jean Lafitte has a Floodplain Management Ordinance (which will incorporate requirements from the PHMP upon its next update) and a Floodplain Manager.

FEMA's Flood Recovery Guidance (2006) included new floodplain guidance for substantially damaged structures and new construction inside and outside of the levee protected areas in Jefferson Parish. For areas of Jefferson Parish outside of the levee-protected areas, FEMA encouraged freeboard above the BFEs shown on the FIRM. As a result, Jefferson Parish revised its Flood Damage Prevention Ordinance in 2014 to include two feet of freeboard for structures on the West Bank of Jefferson Parish that are outside of the Hurricane Storm Damage Risk Reduction System.

RECOMMENDATIONS

The town floodplain management ordinance should be reviewed and updated if necessary to support Jean Lafitte's resiliency and development priorities. The certified Floodplain Manager should continue to enforce the town's floodplain management ordinance. Per the PHMP, development and adoption of additional subdivision guidelines to help reduce flooding and damage from storm surge should be considered.

CRS point opportunity: ≤ 380 pts for Stormwater Management Regulations

The PHMP calls on Jean Lafitte to adopt two-feet of freeboard within the town (PHMP, p. 153) Alternately, the town might consider e.g. a 30-year forecast for relative sea-level rise the life of a mortgage,

and also a sufficient timespan to reach into completion of the ring levee, and use this to establish freeboard requirements. The new freeboard, plus the BFE elevation of approximately eight feet, would become the minimum elevation requirement for new construction and substantial reconstruction in Jean Lafitte. Even after the CPRA ring levee is completed, a freeboard requirement would provide a "second line of defense" against levee failure.

CRS point opportunity: ≤ 375 pts for freeboard (1 ft =100 pts; 2 ft = 225 pts; 3 ft = 375 pts)

The PHMP recommends that the town investigate ways to improve the parish's CRS rating via adoption of higher regulatory development standards (PHMP. P. 160).

CRS points opportunity: Foundation Protection against differential settling, scour, and erosion ≤ 80pts

Building Codes

The International Building Code (IBC) is rendered as the Universal Construction Code (UCC) in Louisiana, and its adoption and enforcement have been required by state law since 2007. A building official reviews plans and ensures compliance by conducting periodic inspections at construction sites.

The IBC is continuously updated and "provides minimum requirements to safeguard the public health, safety and general welfare of the occupants of new and existing buildings and structures." (International Code Council)

Currently, the IBC applies to all primary residences in Louisiana; second homes are exempt. The IBC covers dwellings and buildings in various situations, including those in flood hazard areas.

RECOMMENDATION

Jean Lafitte should consider participating in BCEGS to ensure all structures are at a minimum compliant with IBC and to take full advantage of available CRS points.

CRS points opportunity: In order to be a Class 6 or better in the CRS program, Jean Lafitte must have received and continue to maintain a classification of 5 or better under the BCEGS in both the residential and commercial rating.

Public Outreach and Education

CRS gives points for public outreach, education, and information programs, and Jean Lafitte and the surrounding jurisdictions participate in several. Additionally, the parish supports several public safety information and emergency notification capabilities.

Integrated Public Alert and Warning System

In 2006 FEMA launched Integrated Public Alert and Warning System (IPAWS). IPAWS provides a web portal enabling all levels of government to share information during a crisis. Emergency management officials can create emergency communication groups that can be used to transmit emergency information to first responders in the field. Jefferson was the first parish in the state to adopt IPAWS, and it continues to support the system.

IPAWS also includes an Emergency Alert System (EAS) that can inform residents of emergency situations via text and email, and it can communicate with evacuated residents regarding conditions in the parish and when it is safe to return. The EAS was funded and developed in coordination with FEMA (PHMP, p. 153).

Early Warning

The PHMP notes that with sufficient warning of a flood, a community and its residents can take protective measures such as moving property and people out of harm's way. A comprehensive education and outreach program is critical to the success of early warning systems so that the general public, operators of critical facilities, and emergency response personnel will know what actions to take when warning is disseminated (PHMP, p. 160).

Program for Public Information

The Program for Public Information (PPI) is a strategic outreach plan within CRS that jurisdictions undertake to educate the community about flooding impacts and mitigation ideas. A PPI must involve the public and follow a seven-step process put forth by the CRS program. As of 2015, Jefferson Parish's CRS user group, JUMP, is developing a PPI. Jean Lafitte has distributed the Jefferson Parish flyer to its residents as a water bill insert. The flyer contains information on CRS topics and activities, including Flood Insurance, Drainage System Maintenance, Property Protection, Flood Safety, Flood Hazards, Floodplain Development Permit Requirements, Flood Warning System, and Important Numbers. Additionally, Jean Lafitte has distributed a letter to its residents highlighting what they can do to help protect themselves and their property from future flooding.

General Public Education and Awareness

The PHMP states that although concerted local and statewide efforts to inform the public exist, lives and property continue to be threatened when segments of the population remain uninformed or chose to ignore the information available. Educating the public of these life and property saving techniques must remain a high priority item at the local, state, and federal level. Jean Lafitte is already participating in the CRS PPI activities and additional measures can build on these efforts.

RECOMMENDATION

Jean Lafitte should continue and expand its public outreach and education activities. Participation in the IPAWS is recommended.

To raise awareness and educate the public, Town of Jean Lafitte should also, per the PHMP, consider the following:

- Develop a Multi-Hazard Awareness Week;
- Continue distributing information regarding flood hazards, SFHAs and mitigation measures. This information could be housed on the Town's website, made available in print at the local library, senior center, schools, and other outlets;
- Provide public education on the importance of maintaining drainage ditches.

Levees

Jean Lafitte currently has a system of levees that only partially mitigates flood risk. The levees are currently five feet high, and provide protection for only a portion of Jean Lafitte.

According to the CPRA Master Plan, 100-year protection for the town would require 16-foot levees completely encircling Jean Lafitte in a "ring." Such a ring levee is currently in the conceptual phase at CPRA.

In the meantime, the town's existing levees are being raised and extended, but not yet to 100-year protection levels. In 2009, the Town of Jean Lafitte, Lafitte Area Independent Levee District, Jefferson Parish, the West Jefferson Levee District, and USACE completed phase one of the Fisher Basin tidal levee project, including 4.7 miles of earthen levees along the southern edge of the town that abuts marshland. Phase two (initiated in 2014) and phase three will ring the town to protect from nearby marshes and Bayou Barataria. When the entire $24 million project is complete, including the Rosethorne Tidal Protection and Jean Lafitte Tidal Protection projects, the town will be ringed by seven-foot levees, or seven-foot floodwalls in those areas that do not have levees.

RECOMMENDATION

Jean Lafitte Tomorrow: Town Resiliency Plan endorses the higher, 16-foot CPRA Ring Levee, but it also argues for a levee alignment that would create a reservoir area to store large amounts of water to limit the need for pumping (RP, p. 88). CPRA should give careful consideration to the costs and benefits of the ring levee's alignment prior to a final alignment being determined and project engineering begun.

Conclusion

Jean Lafitte, Louisiana is a small, historic town with a robust lively culture and maritime economy based on the fishing and oil & gas industry. Historically, due to its proximity to the Gulf of Mexico, the Town of Jean Lafitte has always lived with the risk of flooding. Responding to annual storm threats is a way of life, and dealing with these challenges have brought the community closer together. This has made Jean Lafitte leaders and residents experts at weathering the storms and

bouncing back from annual hurricanes, winds, and other natural events. However, this risk has been exacerbated by both natural and man-made disasters, including climate change and subsidence. The result is that wetlands along Louisiana's coast transform into open water at an alarming rate, bringing the Gulf of Mexico closer than ever and making Jean Lafitte more vulnerable to storm and tidal surge. The threat of flooding has intensified the need for timely flood risk reduction measures - not just for a bright future, but to ensure the Town's history, culture and very existence.

With assistance of the Silver Jackets, this Flood Emergency Preparedness Plan (FEPP) was developed to address flood hazard in Jean Lafitte and provide recommendations that will strengthen the town's approach to flood resiliency. It addresses the existing and potential threats facing Jean Lafitte and its neighbors along Bayou Barataria. This culturally rich area has a deeply rooted community but hasn't seen significant growth in recent decades. Its economy is stagnant with major employers in the maritime and seafood industry - as Jean Lafitte is a major contributor to the local and national seafood industry which was devastated after the BP Oil Spill. The FEPP also considers the town government's planning, regulatory, and emergency management capabilities - which are very strong for its size but severely limited in resources - and multiple aspects of flood hazards such as historical occurrence, causes, and exacerbating factors associated with flooding, inclusive of overland, riverine, and backwater flooding, plus storm surge, coastal erosion, relative sea-level rise, and climate change.

To date, Jean Lafitte has taken numerous steps to reduce flood risk: more than 70 percent of its housing stock and all of the town's critical infrastructure have been elevated, resiliency plans and hazard mitigation plans have been developed and a levee is being built to further reduce flood risk from Bayou Barataria; natural areas for open space preservation have been identified; and the existing zoning code is guiding land use decision-making. However, as flood risk continues to increase locally and globally, additional measures are needed to ensure Jean Lafitte will adapt to an ever changing environment.

The FEPP evaluated risk at both the local and regional contexts, with an understanding that many risk-reduction efforts must be coordinated with Jefferson Parish and state and federal agencies. FEMA and GOHSEP, the CPRA, USACE, HUD and OCD-DRU, and various municipal initiatives are framing and funding existing planning and implementation efforts towards flood-risk reduction. These include existing levees around the town (and the ongoing and planned expansion and heightening of these levees), elevation of private structures, open space conservation, flood insurance participation, floodplain management, implementation and compliance with building codes, and public outreach and education. Understanding the current and anticipated future challenges and proposed solutions raise the questions: What existing programs and policies can be built upon to aid with local flood risk reduction? Which new programs and/or policies must be developed and embraced to support flood risk reduction efforts?

This FEPP and an accompanying Flood Preparedness Toolkit respond to these questions about how Jean Lafitte can increase its resiliency moving forward. First, this FEPP presents a series of recommendations related to advancing risk reduction in Jean Lafitte, particularly via non-structural means. Many of these recommendations are made with the intent to improve the town's Community Rating System score, thereby reducing resident's overall insurance rates. These included:

- Incentivizing and promoting wet floodproofing
- Inventorying and targeting parcels for open space preservation, via regulation or acquisition
- Continuing the promotion of the NFIP
- Enforcing the town's floodplain management ordinance, and adopting additional free-board requirements
- Participation in BCEGS
- Enhancing public outreach, education, and notification programs
- Promoting the expanded ring levee, but also consider realigning it to encompass water retention
- Carefully restricting and regulating structural elevation using earthen fill (mounds)

Second, the analysis and recommendations presented in this FEPP are supported by a companion Flood Preparedness Toolkit. The Toolkit is designed to be used by individuals and municipal governments and includes Site and Building Scale as well as Community Scale development best practices and guidelines to reduce flood risk. The toolkit addresses Flood Preparedness Design Guidelines, Landscape Design and Stormwater Management, and a number of municipal tools to improve conditions of living with water.

Implementation of the recommendations through deep involvement of the town's and parish's leadership and residents will continue to improve Jean Lafitte's ability to bounce back after natural and man-made disasters, allowing residents to live in the rich culture and natural environment that residents call home.

CENTER *for* PLANNING EXCELLENCE