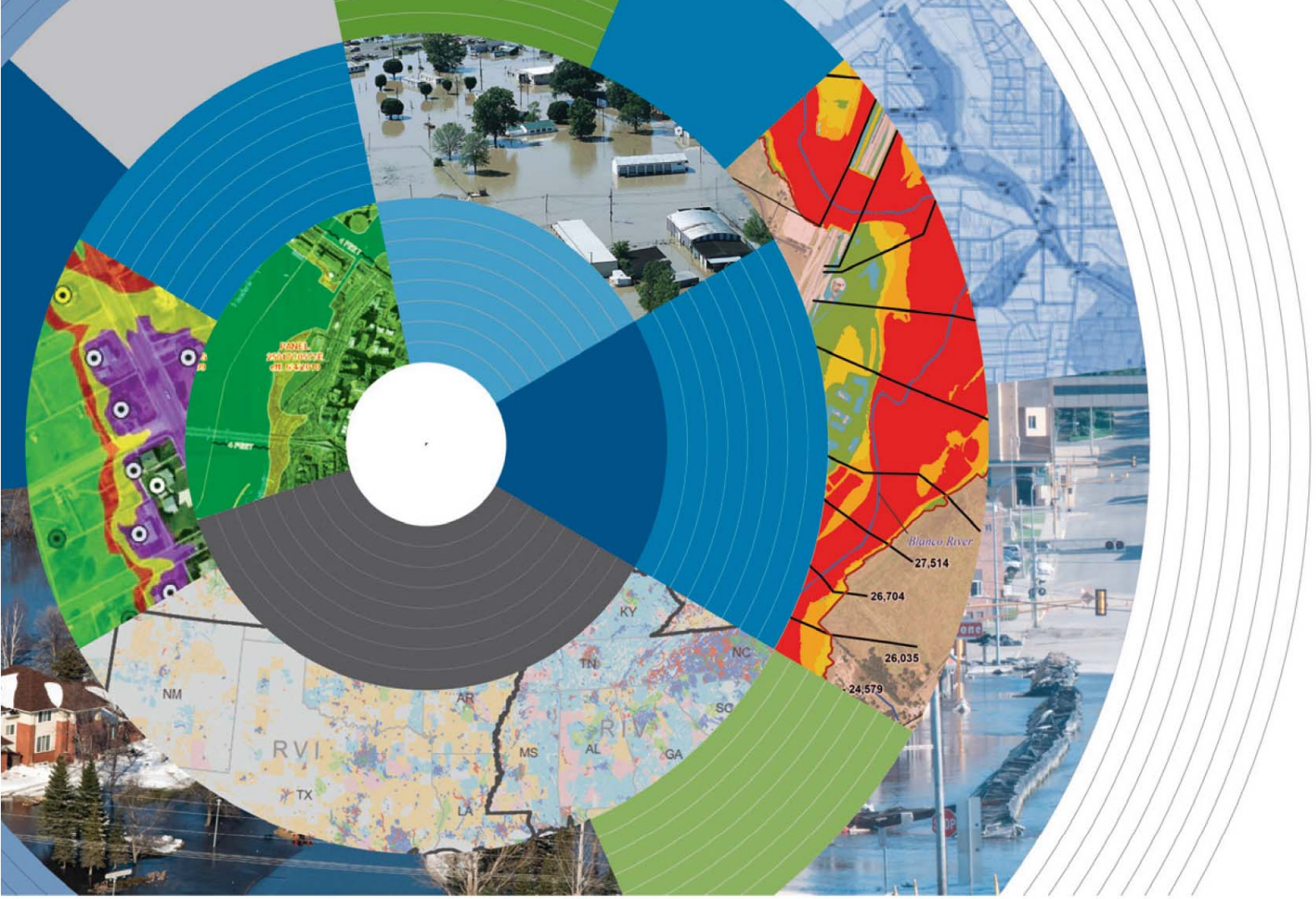

Flood Risk Report

Bayou Sara-Thompson Watershed

HUC8 08070201

Post-Discovery - November 2017

FEMA

Flood Risk Report History

Version Number	Version Date	Summary
1	January 2017	Draft BLE Report
2	July 2017	Pre-Discovery Report
3	November 2017	Post-Discovery Report

Preface

The Department of Homeland Security, Federal Emergency Management Agency's (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program provides states, tribes, and local communities with flood risk information, datasets, risk assessments, and tools that they can use to increase their resilience to flooding and better protect their residents. By pairing accurate floodplain maps with risk assessment tools and planning and outreach support, Risk MAP transforms the traditional flood mapping efforts into an integrated process of identifying, assessing, communicating, planning for, and mitigating flood-related risks.

This Flood and Natural Hazard Risk Report provides datasets for floods and other natural hazards to help local or Tribal officials, floodplain managers, planners, emergency managers, and others better understand their flood risk, take steps to mitigate that risk, and communicate the risk to their residents and local businesses. Flood risk often extends beyond community boundaries. This report provides flood risk data for communities within the Bayou Sara-Thompson Watershed.

Flood risk is always changing, and studies, reports, or other sources may be available that provide more comprehensive information. FEMA does not intend this report to be regulatory or the final authoritative source of all flood risk data in the project area. Rather, it should be used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area.

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Executive Summary

The Federal Emergency Management Agency's (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) program provides communities with flood hazard information to help them understand their current flood risk and make informed decisions about taking action to become stronger and more resilient in the face of future risk. The Risk MAP process provides communities with new or improved information about their flood risk based on watershed models that use information from local, regional, state, and federal sources. Communities can use the resulting tools and data to enhance mitigation plans and better protect their residents.

This report is one such tool for communities impacted by the updated flood hazard analysis of the Bayou Sara-Thompson Watershed. The Flood Risk Report has two goals: (1) **inform communities of their risks** related to certain natural hazards and (2) **enable communities to act** to reduce their risk. It is intended to assist federal, state, and local officials with the following:

- Update local hazard mitigation plans and community comprehensive plans
- Update emergency operations and response plans
- Communicate risk
- Inform the modification of development standards
- Identify potential mitigation projects

During this phase of the process, communities are encouraged to review the flood hazard changes closely and provide feedback to FEMA Region 6, based on their local knowledge and any additional data available.

Figure 1: Flooding Damage of Old Tunica Road in St. Francisville

About the Bayou Sara-Thompson Watershed

The Bayou Sara-Thompson study area intersects both Louisiana and Mississippi and covers several communities including eight municipalities (Baker, Baton Rouge, Jackson, Norwood, Wilson, St. Francisville, Woodville, and Zachary) and four counties/parishes (East Baton Rouge, East Feliciana, West Feliciana, and Wilkinson). The first FEMA flood hazard mapping for the Bayou Sara-Thompson Watershed was released over 40 years ago. Since that time, several communities in the watershed have received updating mapping, the most recent being in 2012.

About the Risk MAP Project

Through coordination and data sharing, the communities in the watershed will work as partners in the mapping process. In addition to providing data, the communities will also provide insight into flooding issues and flood prevention within their areas.

FEMA, through its contractor Compass, completed the collection and creation of Base Level Engineering (BLE) for the Bayou Sara-Thompson Watershed in April 2016. The Base Level Engineering analysis was performed to support the overall Risk MAP program and to perform a validation of the effective Zone A

Special Flood Hazard Areas (SFHAs) in the watershed. Additional information specific to the BLE analysis for the watershed can be found in the "Phase Zero: Investment" section of this report.

In January 2017 the Louisiana Department of Transportation and Development (LaDOTD) with support from FEMA Region 6, initiated the Phase 1 Discovery phase of this project. The goal of Discovery is to gain a more holistic picture of the flood hazards within a watershed, to collect data to validate the flood risks, identify opportunities to facilitate mitigation planning, and aid local communities in identifying further actions to reduce flood risk. Furthermore, because flood risks change over time, this Discovery project will help identify areas for future flood risk identification and assessment. The Discovery process is designed to open lines of communication and relies on local involvement for productive discussions. For additional information on the Discovery portion of this project see the section of this report titled "Phase 1: Discovery."

Introduction

Flood Risk

Floods are naturally occurring phenomena that can and do happen almost anywhere. In its most basic form, a flood is an accumulation of water over areas that are normally dry. Floods become hazardous to people and property when they inundate an area where development has occurred, causing losses. Minor flooding may have little impact on people or property, such as damage to landscaping or the accumulation of unwanted debris. Severe floods can destroy buildings and crops and cause injuries or death.

Calculating Flood Risk

It is not enough to simply identify where flooding may occur. Even if people know where a flood might occur, they may not know the risk of flooding in that area. The most common method for determining flood risk, also referred to as vulnerability, is to identify both the probability and the consequences of flooding:

> **Flood Risk** (or Vulnerability) **= Probability x Consequences**; where
>
> **Probability** = the likelihood of occurrence
>
> **Consequences** = the **estimated** impacts associated with the occurrence

The probability of a flood is the likelihood that it will occur. The probability of flooding can change based on physical, environmental, and/or engineering factors. Factors that affect the probability of flooding, such as changing weather patterns and the existence of mitigation projects, will have an impact on the area. The ability to assess the probability of a flood, and the level of accuracy for that assessment, are also influenced by modeling methodology advancements, better knowledge, and longer periods of record for the water body in question.

The consequences of a flood are the estimated impacts associated with its occurrence. Consequences relate to human activities within an area and how a flood affects the natural and built environment.

The Flood Risk Report has two goals: (1) inform communities of their risks related to certain natural hazards and (2) enable communities to act to reduce their risk. The information within this Risk Report is intended to assist federal, state, and local officials to:

- **Communicate risk** – Local officials can use the information in this report to communicate with property owners, business owners, and other residents about risks and areas of mitigation interest.
- **Update local hazard mitigation plans and community comprehensive plans** – Planners can use risk information to develop and/or update hazard mitigation plans, comprehensive plans, future land use maps, and zoning regulations. For example, zoning codes can be changed to provide for more appropriate land uses in high-hazard areas.
- **Update emergency operations and response plans** – Emergency managers can identify high-risk areas for potential evacuation and low-risk areas for sheltering. Risk assessment information may show vulnerable areas, facilities, and infrastructure for which continuity of operations plans, continuity of government plans, and emergency operations plans would be essential.

- **Inform the modification of development standards –** Planners and public works officials can use information in this report to support the adjustment of development standards for certain locations.
- **Identify mitigation projects –** Planners and emergency managers can use this risk assessment to determine specific mitigation projects of interest. For example, a floodplain manager may identify critical facilities that need to be elevated or removed from the floodplain.

This report showcases risk assessments, which analyze how a hazard affects the built environment, population, and local economy to identify mitigation actions and develop mitigation strategies.

The information in this report should be used to identify areas for mitigation projects as well as for additional efforts to educate residents on the hazards that may affect them. The areas of greatest hazard impact are identified in the Areas of Mitigation Interest section of this report, which can serve as a starting point for identifying and prioritizing actions a community can take to reduce its risks.

Watershed Basics

Like many watersheds in the Mississippi Delta, the Bayou Sara-Thompson Watershed represents a complex network of small ponds, creeks, and shallow pools that connect to form the larger whole. Bayou Sara is one of the few tributaries in Louisiana that flows into the Mississippi River from the east, entering Louisiana from Mississippi near Lake Rosemound. Thompson Creek, the other main waterway in the watershed also terminates at the Mississippi River after flowing out of Wilkinson County in Louisiana and then forming the boundary between East and West Feliciana Parishes. As recently as 2016, these waterways have proven to be unpredictable flooding sources that can cause damages to surrounding communities.

One of the unique characteristics of the Bayou Sara-Thompson Watershed is its massive water capacity. In drier summer months, the waterways can be reduced to an almost non-existent state; alternatively, in wetter months the bayous, streams, and creeks can be a major source of flooding. Typically, the the area is most suceptible to flooding in the spring. Because of its proximity to the Gulf of Mexio, the Bayou Sara-Thompson Watershed experiences annual rainfall that is above the national average. This rainfall is the primary contributor to flooding in the area.

Between 2010 and 2015, the population of the Bayou Sara-Thompson Watershed remained relatively static, experiencing an overall growth rate of 0.5 percent. However, this low overall growth rate conceals a wide variation in the population growth in individual localities. While population totals in the unincorporated areas of East and West Feliciana Parishes and Wilkinson County, as well as several municipalities, declined, the Town of St. Francisville, the City of Zachary, and the Town of Woodville experienced notable increases. The static to declining populations of the unincorporated areas combined with rising city populations suggests an increase in urbanization in some areas of the watershed. Such development creates a greater risk of increased flooding and opportunity for targeted mitigation efforts. While a more concentrated population could result in more concentrated flood damage in the event of a disaster, higher population density does free up otherwise developed land to revert to either its natural state or be used in mitigation efforts

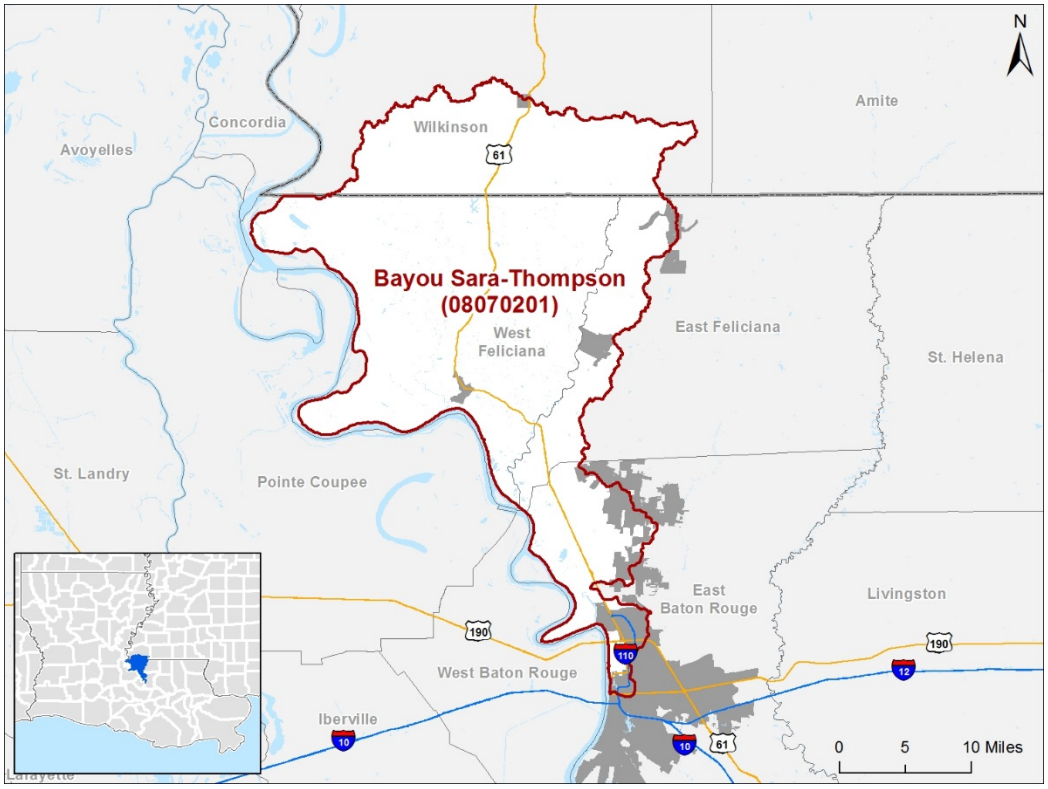

Figure 2 Overview map for the Bayou Sara-Thompson Watershed

To help mitigate the risk to areas where increased population and development are expected, communities can adopt (or exceed) the minimum floodplain management standards of the National Flood Insurance Program (NFIP). This is recommended as a proactive strategy to manage construction within the floodplain and avoid negative impacts to existing and future development.

Table 1: Population and Area Characteristics [1]

Risk MAP Project	Total Population	Average % Population Growth/Yr. (2010-2015)	Land Area	Developed Area	Open Water
Bayou Sara-Thompson	152,514	0.8%	694.7 sq.mi.	23.86%	1.08%

To increase mitigation efforts and community flood awareness through potentially discounted premium rates, an NFIP community that has adopted more stringent ordinances or is actively completing mitigation and outreach activities is encouraged to consider joining the Community Rating System (CRS). The CRS program is a voluntary, incentive-based program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's actions.

[1] Data obtained from the U.S. Census Bureau; National Hydrologic Database – Medium Resolution, and National Land Cover Database (2011)

While all communities within the project area participate in the NFIP, three communities have adopted a further level of regulation suitable for managing floodplains with mapped regulatory floodways and Base (1-percent-annual-chance) Flood Elevations (44 CFR 60.3d). The communities are the City of Baker (44 CFR 60.3c), the Village of Norwood (44 CFR 60.3b), and Wilkinson County (44 CFR 60.3c). Communities can review and update their current ordinances to reflect potential flood hazard changes by adopting updated ordinances early. This action can reduce future flood losses by affecting how substantial improvements or new construction are regulated. Table 2 depicts NFIP and CRS participation status and provides an overview of the effective flood data availability.

Table 2: Bayou Sara-Thompson Watershed NFIP and CRS Participation [2]

Participating NFIP Communities/ Total Communities	Number of CRS Communities	CRS Rating Class Range	Policies In CRS Communities	Dollars Saved by CRS Communities	Average Years since FIRM Update	Level of Regulations (44 CFR 60.3)
11/11	3	8-6	35,391	$4,029,156	12.1	CFR 60.3 (b), CFR 60.3 (c), CFR 60.3 (d)

The number of dams impacting the Bayou Sara-Thompson Watershed is reflected in Table 3. For a watershed of its size, it has a sizeable number of dams. While there are many dams, most are relatively small, with an average of only 437.9 acre-feet of storage in their respective reservoirs.

Table 3: Risk MAP Project Dam Characteristics [3]

Risk MAP Project	Total Number of Identified Dams	Number of Dams Requiring an Emergency Action Plan (EAP)	Percentage of Dams without EAP	Average Years since Inspection	Average Storage (acre-feet)
BAYOU SARA-THOMPSON	42	39	92.8%	4.9	437.9

Dams can be of particular concern, especially in areas prone to heavy rainfall, because many older dams were not built to any particular standard and thus may not withstand extreme rainfall events. Older dams are often made out of an assortment of materials and some of these structures may not have any capacity to release water in a controlled manner and could be overtopped, which could result in catastrophic failure. Furthermore, without proper regulation the downstream risk may have changed since the original hazard classification was determined. For other dams, the dam failure inundation zone may not be known. Not having knowledge of these risk areas could lead to unprotected development in these zones.

[2] Data obtained from the FEMA Community Information System.
[3] Data obtained from the U.S. Army Corps of Engineers (USACE) National Inventory of Dams (March 2017)

Project Phases and Map Maintenance

Background

FEMA manages several risk analysis programs that assess the impact of natural hazards and lead to effective strategies for reducing risk, including Flood Hazard Mapping, National Dam Safety, Earthquake Safety Program, Multi-Hazard Mitigation Planning, and the Risk Assessment Program. These programs support the Department of Homeland Security's objective to "strengthen nationwide preparedness and mitigation against natural disasters."

> *Flood-related damage between 1980 and 2013 totaled $260 billion, but the total impact to our nation was far greater—more people lose their lives annually from flooding than any other natural hazard.*
>
> *FEMA, "Federal Flood Risk Management Standard (FFRMS)" (2015)*

FEMA manages the NFIP, which is the cornerstone of the national strategy for preparing American communities for flood hazards. In the nation's comprehensive emergency management framework, analyzing and promoting awareness of natural hazard risks remains challenging. For communities to make informed risk management decisions and take action to mitigate risk, a consistent risk-based approach to assessing potential vulnerabilities and losses is needed, as well as tools to communicate the message. Flood hazard mapping remains a basic and critical component for a prepared and disaster-resilient nation.

In Fiscal Year 2009, FEMA's Risk MAP program began to synergize the efforts of federal, state, and local partners to create timely, viable, and credible information identifying natural hazard risks. The intent of the Risk MAP program is to share resources to identify the natural hazard risks a community faces and ascertain possible approaches to minimizing them. Risk MAP aims to provide technically sound flood hazard information to be used in the following ways:

- To update the regulatory flood hazard inventory depicted on Flood Insurance Rate Maps (FIRMs) and the National Flood Hazard Layer
- To provide broad releases of data to expand the identification of flood risk (flood depth grids, water-surface elevation grids, etc.)
- To support sound local floodplain management decisions
- To identify opportunities to mitigate long-term risk across the nation's watersheds

How are FEMA's Flood Hazard Maps Maintained?

FEMA's flood hazard inventory is updated through several types of revisions.

Community-submitted Letters of Map Change. First and foremost, FEMA relies heavily on the communities that participate in the NFIP to carry out the program's minimum requirements. These requirements include the obligation for communities to notify FEMA of changing flood hazard information and to submit the technical support data needed to update the FIRMs.

Although revisions to a FIRM may be requested at any time, FEMA generally will not revise an effective map unless the changes involve modifications to SFHAs. Be aware that the best floodplain management practices and proper assessments of risk result when the flood hazard maps present information that accurately reflects current conditions.

> *Under the current minimum NFIP regulations, a participating community commits to notifying FEMA if changes take place that will affect an effective FIRM no later than 6 months after project completion.*
>
> *Section 65.3, Code of Federal Regulations*

Letters of Map Amendment (LOMAs). The scale of an effective FIRM does not always allow for a site-specific analysis of a property's flood risk. FEMA's LOMA process provides homeowners with an official determination on the relation of their lot or structure to the SFHA. Requesting a LOMA often requires a homeowner to work with a surveyor or engineering professional to collect site-specific information related to the structure's elevation. It may also require working with local officials to determine a site-specific Base Flood Elevation (BFE); however, FEMA can determine a BFE for properties in flood zones with no published BFEs, such as Zone A. Fees are associated with collecting the survey data. Local surveying and engineering professionals will complete an Elevation Certificate for the lot or structure, and the property owner can use it to request a LOMA. A successful LOMA will remove the federal mandatory purchase requirement for flood insurance, but lending companies may still require flood insurance if they believe the structure is at risk.

FEMA-Initiated Flood Risk Project. Each year, FEMA initiates a number of Flood Risk Projects to create or revise flood hazard maps. Because of funding constraints, FEMA can study or restudy only a limited number of communities, counties, or watersheds. As a result, FEMA prioritizes study needs based on a cost-benefit approach whereby the highest priority is given to studies of areas where development has increased and the existing flood hazard data have been superseded by information based on newer technology or changes to the flooding extent. FEMA understands communities require products that reflect current flood hazard conditions to best communicate risk and implement effective floodplain management.

Flood Risk Projects may be delivered by FEMA or one of its Cooperating Technical Partners (CTPs). The CTP initiative is an innovative program created to foster partnerships between FEMA and participating NFIP communities, as well as regional and state agencies. Qualified partners collaborate in maintaining up-to-date flood maps. In FEMA Region 6, CTPs are generally state-wide agencies that include the state Floodplain Administrator. However, some Region 6 CTPS are also large River Authorities or Flood Control Districts. They provide enhanced coordination with local, state, and federal entities, engage community

officials and technical staff, and provide updated technical information that informs updates to the national flood hazard inventory.

Risk MAP has modified FEMA's project investment strategy from a single investment by fiscal year to a multi-year phased investment. This change allows FEMA to be more flexible and responsive to the findings of the project as it moves through the project lifecycle. Flood Risk Projects are funded and completed in phases.

General Flood Risk Project Phases

Each phase of the Flood Risk Project provides both FEMA and its partner communities with an opportunity to discuss the data that have been collected to determine a path forward. Local engagement throughout each phase of the project enhances the opportunities for partnership and discussion about current and future risk, as well as offering the opportunity to identify projects and activities that local communities may pursue to reduce their long-term natural hazard risk.

Flood Risk Projects may be funded for one or more of the following phases:

- Phase Zero – Investment
- Phase One – Discovery
- Phase Two – Risk Identification and Assessment
- Phase Three – Regulatory Product Update

Local input is critical throughout each phase of a Flood Risk Project. More detail about the tasks and objectives of each phase are included below.

Phase Zero: Investment

Phase Zero of a Flood Risk Project initiates FEMA's review and assessment of the inventories of flood hazards and other natural hazards within a watershed area. During the Investment Phase, FEMA reviews the availability of information to assess the current floodplain inventory. FEMA maintains several data systems to perform watershed assessments and selects watersheds for a deeper review of available data and potential investment tasks based on the following factors:

Availability of High-Quality Ground Elevation Data. FEMA reviews readily available and recently acquired ground elevation data. This information helps identify development and earth-moving activities near streams and rivers. Where necessary, FEMA may partner with local, state, and other federal entities to collect necessary ground elevation information within a watershed.

If high-quality ground elevation data is available for a watershed area and compliant with FEMA's quality requirements, FEMA and its mapping partners may prepare engineering data to assess, revise, replace, or add to the current flood hazard inventory.

Mile Validation Status within the Coordinated Needs Management Strategy (CNMS). FEMA uses the CNMS database to track the validity of the flood hazard information prepared for the NFIP. The CNMS database reviews 17 criteria to determine whether the flood hazard information shown on the current FIRM is still valid.

Communities may also inform and request a review or update of the inventory through the CNMS website at https://msc.fema.gov/cnms/. The CNMS Tool Tutorial provides an overview of the online tool and explains how to submit requests.

Local Hazard Mitigation Plans. Reviewing current and historic hazard mitigation plans provides an understanding of a community's comprehension of its flood risk and other natural hazard risks. The mitigation strategies within a local hazard mitigation plan provide a lens into local opportunities and underscore the potential for local adoption of higher standards related to development or other actions to reduce long-term risk.

Cooperating Technical Partner State Business Plans. In some states, a CTP generates an annual state business plan that identifies future Flood Risk Project areas that are of interest to the state. Within the Bayou Sara-Thompson Watershed, the Louisiana Department of Transportation and Development and the Louisiana Governor's Office of Homeland Security and Emergency Preparedness provided both information and insight. In this project area, FEMA has worked closely with these entities to develop the project scope and determine the necessary project tasks.

Communities that have identified local issues are encouraged to communicate their data needs and revision requests to the state CTP so that they can be prioritized and included in the state Business Plans.

Possible Investment Tasks. After a review of the data available within a watershed, FEMA may choose to (1) purchase ground elevation data and/or (2) create some initial engineering modeling against which to compare the current inventory. This type of modeling is known as Base Level Engineering (BLE).

Phase One: Discovery

Phase One, Discovery is the current phase of this study of the Bayou Sara-Thompson watershed.

Phase One, the Discovery Phase, provides opportunities both internally (between the state and FEMA) and externally (with communities and other partners interested in flood potential) to discuss local issues with flooding and examine possibilities for mitigation action. This effort is made to determine where communities currently are in their examination of their natural hazard risks and to identify how state and federal support can assist communities in achieving their goals.

The Discovery process includes an opportunity for local communities to provide information about their concerns related to natural hazard risks. Communities may continue to inform the project identification effort by providing previously prepared survey data, as-built stream crossing information, and engineering information.

For a wholistic community approach to risk identification and mapping, FEMA relies heavily on the information and data provided at the local level. Flood Risk Projects are focused on identifying (1) areas where the current flood hazard inventory does not provide adequate detail to support local floodplain management activities, (2) areas of mitigation interest that may require more detailed engineering information than is current available, and (3) community intent to reduce the risk throughout the watershed to assist FEMA's future investment in these project areas. Watersheds are selected for Discovery based on these evaluations of flood risk, data needs, availability of elevation data, regional knowledge of technical issues, identification of a community-supported mitigation project, and input from federal, state, and local partners.

Possible Discovery Tasks. Discovery may include a mix of interactive webinars sessions, conference calls, informational tutorials, and in-person meetings to reach out to and engage with communities for input. Data collection, interviews and interaction with community staff, and data mining activities provide the basis for watershed-, community- and stream-level reviews to determine potential projects that may benefit the communities. A range of analysis approaches are available to determine the extent of flood risk along streams of concern. FEMA and its mapping partners will work closely with communities to determine the appropriate analysis approach, based on the data needs throughout the community. These potential projects may include local training sessions, data development activities, outreach support to local communities wanting to step up their efforts, or the development of flood risk datasets within areas of concern to allow a more in-depth discussion of risk.

Phase Two: Risk Identification and Assessment

Phase Two (Risk Identification and Assessment) continues the risk awareness discussion with communities through watershed analysis and assessment. Analyses are prepared to review the effects of physical and meteorological changes within the project watershed. The new or updated analysis provides an opportunity to identify how development within a watershed has affected the amount of stormwater generated during a range of storm probabilities and shows how effectively stormwater is transported through communities in the watershed.

Coordination with a community's technical staff during engineering and model development allows FEMA and its mapping partners to include local knowledge, based on actual on-the-ground experience, when selecting modeling parameters.

The information prepared and released during Phase Two is intended to promote better local understanding of the existing flood risk by allowing community officials to review the variability of the risk throughout their community. As FEMA strives to support community-identified mitigation actions, it also looks to increase the effectiveness of community floodplain management and planning practices, including local hazard mitigation planning, participation in the NFIP, use of actions identified in the CRS Manual, risk reduction strategies for repetitive loss and severe repetitive loss properties, and the adoption of stricter standards and building codes.

FEMA is eager to work closely with communities and technical staff to determine the current flood risk in the watershed. During the Risk Identification and Assessment phase, FEMA would like to be alerted to any community concerns related to the floodplain mapping and analysis approaches being taken. During this phase, FEMA can engage with communities and review the analysis and results in depth.

Possible Risk Identification and Assessment Tasks. Phase Two may include a mixture of interactive webinars, conference calls, informational tutorials, and in-person meetings to reach out to and engage with communities for input. Flood Risk Project tasks may include hydrologic or hydraulic engineering analysis and modeling, floodplain mapping, risk assessments using Hazus-MH software, and preparation of flood risk datasets (water-surface elevation, flood depth, or other analysis grids). Additionally, projects may include local training sessions, data development activities, outreach support to local communities that want to step up their efforts, or the development of flood risk datasets within areas of concern to allow a more in-depth discussion of risk.

Phase Three: Regulatory Products Update

If the analysis prepared in the previous Flood Risk Project phases indicates that physical or meteorological changes in the watershed have significantly changed the flood risk since the last FIRM was printed, FEMA will initiate the update of the regulatory products that communities use for local floodplain management and NFIP activities.

Delivery of the preliminary FIRM and Flood Insurance Study (FIS) report begins another period of coordination between community officials and FEMA to discuss the required statutory and regulatory steps both parties will perform before the preliminary FIRM and FIS report can become effective. As in the previous phases, FEMA and its mapping partners will engage with communities through a variety of conference calls, webinars, and in-person meetings.

Once the preliminary FIRMs are prepared and released to communities, FEMA will initiate the statutory portions of the regulatory product update. FEMA will coordinate a Consultation Coordination Officer meeting and initiate a 90-day Appeal Period. During this appeal period, community members may coordinate the submittal of their comments and appeals through their local officials to FEMA for review and consideration.

FEMA welcomes this information because additional proven scientific and technical information increases the accuracy of the mapping products and better reflects the community's flood hazards identified on the FIRM.

Communities may host or hold Open House meetings for the public. The Open House layout allows attendees to move at their own pace through several stations to collect information. This format allows attendees to receive one-on-one assistance and ask questions pertinent to their situation or their interest in risk or flood insurance information.

All appeals and comments received during the statutory 90-day Appeal Period, including the community's written opinion, will be reviewed by FEMA to determine their validity. Once FEMA completes its review, the associated community and all appellants will receive an appeal resolution letter and FEMA will make any revisions to the preliminary FIRM, as appropriate. A 30-day period is then provided for review and comment on successful appeals. Once all appeals and comments are resolved, the flood map is ready to be finalized.

After the Appeal Period, FEMA will send community leaders a Letter of Final Determination (LFD) stating that the preliminary FIRM will become effective in 6 months. The letter also discusses the actions each affected community participating in the NFIP must take to remain in good standing in the NFIP.

After the preceding steps are complete and the 6-month compliance period ends, the FIRMs are considered effective maps and new building and flood insurance requirements become effective.

That is a brief general overview of a flood risk project. Next, the Flood Risk Report will provide details on the specific efforts in the Bayou Sara-Thompson Watershed.

Phase Zero: Investment

Straddling the border of Louisiana and Mississippi, the Bayou Sara-Thompson Watershed borders the Mississippi River and covers an area that stretches from just south of the Louisiana Capital in Baton Rouge into the southern portion of Wilkinson County, MS. The Bayou Sara-Thompson watershed covers three parishes, one county and eight municipalities. Those communities include approximately 756,000 people, with approximately 153,000 within the watershed, but when examining the actual watersheds and SFHAs, the areas of study become more focused. While the subject communities cover more than 2,000 square miles, only 143.2 square miles are currently designated within an SFHA. Of that total, the unincorporated areas of West Feliciana Parish accounts for 93.4 square miles, the unincorporated areas of East Baton Rouge Parish accounts for approximately 27.2 square miles of land designated in the SFHA. Combined with East Feliciana Parish's unincorporated areas total SFHA of almost 10.0 square miles, these three communities contain the vast majority of the currently affected areas. The Town of Woodville contains the smallest portion of SFHA at 0.02 square miles.

From the point where the watershed enters Louisiana, Bayou Sara flows across West Feliciana Parish before feeding into the Mississippi River. While the bayou acts as a tributary to the Mississippi, it has relatively few tributaries of its own. Similarly, Thompson Creek flows out of Wilkinson County, MS and then forms the boundary between East and West Feliciana Parishes before also converging with the Mississippi River.

Flooding typically comes in the form of rainwater runoff and post-hurricane events. Thompson Creek particular has a tendency to fluctuate greatly; often going from only a few feet wide and inches deep to several times that size in the span of a few weeks. Adding to the potential risk is the rainfall endemic to the region. Throughout the watershed, annual rainfall totals of more than 60 inches are not uncommon. This exceeds Louisiana's already high annual precipitation rate and represents one of the highest in the country. Combined with periodic hurricanes, the entire region is subject to both higher than normal rainfall and periods of torrential downpours, which create systemic flooding events.

Area of Interest Selection Factors

In large part, the selection of the Bayou Sara-Thompson Watershed stems from both its risk and the age of the data connected to it. On average, the age of data related to the watershed's previous study is 12.1 years old. In that time span, several hurricanes have impacted the watershed, while at the same time, the area has become more urbanized. This creates a scenario in which an inhabited area becomes larger, while the potential damage caused by a single flooding event is increased. Combined, these two factors make the further evaluation of the Bayou Sara-Thompson Watershed both pressing and imperative.

FEMA reviews many factors and criteria when selecting a watershed for a Flood Risk Project. They include flood risk, the age of the current flood hazard data, population growth trends and potential for growth, recent flood claims, and disaster declaration history. The availability of local data and high-quality ground elevation data is reviewed for use in preparing flood hazard data. The CNMS database is reviewed to identify large areas of unknown or unverified data for streams. FEMA consults the State of Louisiana CTP, the State NFIP Coordinator, and the State Hazard Mitigation Officer when watersheds are identified for study.

Flood Risk. In the past year, the Bayou Sara-Thompson Watershed experienced two FEMA-designated disasters. The first, declared on February 5, 2016, impacted West Feliciana Parish and caused over $100,000 in damage within the parish. The flood resulted from heavy winter rains. The second, and larger of the two floods became a FEMA-declared major disaster on August 14, 2016. It resulted in substantial property damage and adversely impacted all parishes in the study area. This disaster was also caused by heavy rains; demonstrating that the Bayou Sara-Thompson Watershed has the capacity to flood with remarkable rapidity.

Growth Potential. While overall population growth throughout the watershed is projected to be minimal, there is an emerging internal migration. With a larger proportion of the population moving to the watershed's urban areas, the potential flood risks for the area are rapidly concentrating. With a more concentrated population the potential for any one flooding event to hit a population center is lowered, but the damage a single flooding event can cause is magnified. Economically, the watershed continues to be dominated by the City of Baton Rouge. While the City of Baton Rouge's population declined slightly between 2010 and 2015, the unincorporated areas of East Baton Rouge Parish and the City of Zachary both grew. Additionally, the towns of St. Francisville and Woodville populations grew at much faster rates than their surrounding parish/county. If current trends continue, the watershed's population and economics will be concentrated in a more compact geographic areas.

Age of Current Flood Information. With an average of 12.1 years since maps were issued in the study area, the current information is dated. Newer maps should address this concern.

Local Data Availability - Flood Protection Planning Grant Studies. All communities in the watershed have dedicated some level of resources to acquiring more detailed information relating to their flood zones; some have gone farther than others. Specifically, communities in East Feliciana Parish have taken steps to collect data on existing drainage systems and modernize hydrologic models.

Local Data Availability – CITY SPECIFIC. The unincorporated areas of East Baton Rouge Parish, as well as the communities of Baker, Baton Rouge, and Zachary, have obtained drainage plans to better structure their mitigation efforts. In the process they have obtained increasingly detailed data relating to both their mitigation capabilities and the flood sources that affect them.

Coordinated Needs Management Strategy Database Review. The CNMS database indicates the validity of FEMA's flood hazard inventory. Streams that are indicated as ***Unverified*** or ***Unknown*** in the database indicate that the information used to map the floodplains currently shown on the FIRM is inaccessible or that a complete evaluation of the critical and secondary CNMS elements could not be performed.

The CNMS database for the Bayou Sara-Thompson Watershed represents a large, but incomplete set of information. Within the 585.9 stream miles of the Bayou Sara-Thompson Watershed, 225.7 miles were denoted as "valid" (27.1 miles in MS, 198.6 miles in LA). This leaves 360.3 miles as "to be studied" or "to be assessed" (301.6 miles in LA, 58.7 miles in MS). For further analysis of the Zone A miles see the "CNMS Validation and Assessment" portion of the "Base Level Engineering" section below.

Unmapped Stream Coverage. FEMA also reviewed the current stream coverage areas against the National Hydrography Dataset (NHD). The NHD medium-resolution data inventoried by the U.S. Geological Survey maps created at a 1:100,000 scale reflects the target streams for mapping within a

given watershed. The NHD medium resolution data shows approximately 358.1 stream miles not currently reflected in the CNMS database.

Base Level Engineering

This approach prepares multi-profile hydrologic (how much water) and hydraulic (how is water conveyed in existing drainage) data for a large stream network or river basin to generate floodplain and other flood risk information for the basin area.

Base Level Engineering provides an opportunity for FEMA to produce and provide non-regulatory flood risk information for a large watershed area in a much shorter period of time. The data prepared through BLE provides planning-level data that meet FEMA's Standards for Floodplain Mapping.

FEMA Investment (2016). The BLE analysis provides the following items for use in the Bayou Sara-Thompson Watershed:

- Hydrology modeling (regression) flow values for the 10-, 4-, 2-, 1- and 0.2-percent-annual-chance storm events
- Hydraulic (HEC-RAS) modeling for all study streams
- 1-, and 0.2-percent-annual-chance floodplain boundaries
- 1- and 0.2-percent-annual-chance Water-Surface Elevation Grids
- 1- and 0.2-percent-annual-chance Flood Depth Grids
- Hazus flood analysis for the watershed
- Point file indicating the location of culverts and inline structures that may be informed by local as-built information

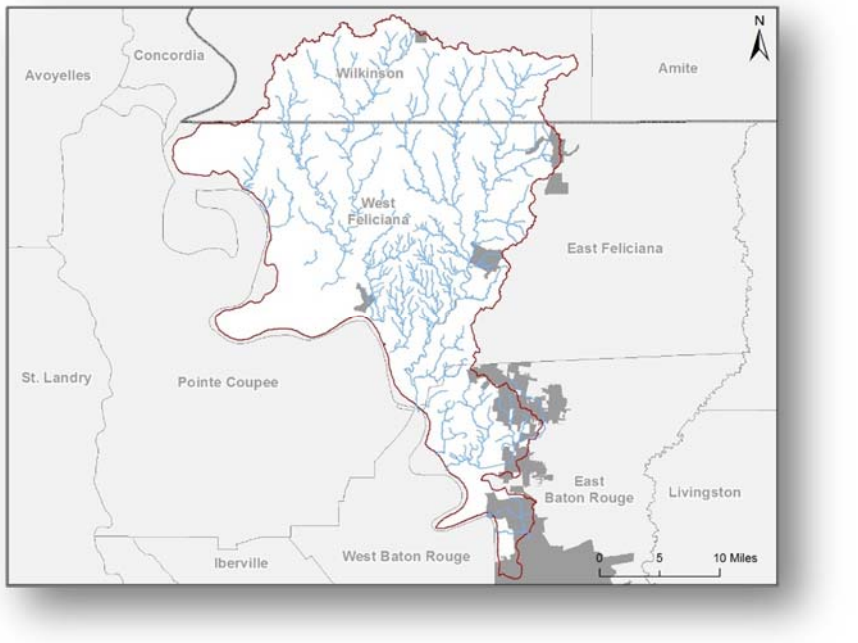

Figure 3: Base Level Engineering Study Streams, Bayou Sara-Thompson Watershed

CNMS Validation and Assessment. FEMA compared the BLE results to the current flood hazard inventory identified in the CNMS database. This assessment allowed FEMA to compare this updated flood hazard information to the current effective floodplain mapping throughout the watershed. The BLE information was prepared by Compass for FEMA Region 6 and was finalized in March 2016. The validation and assessment looked exclusively at the Zone A streams in the watershed as the Base Level Engineering data should not be used to validate Zone AE streams due to the fundamentally higher quality of studies that produce Zone AE areas. The following are brief summaries of the three initial

assessments and two validation checks defined in the Validation Checklist of the "Coordinated Needs Management Strategy (CNMS) Technical Reference":

Initial A1 Assessment – Significant Topography Update Check: Current topographic data was found to be significantly better than that used to map the effective flood zones in most of the watershed.

Initial A2 Assessment – Check for Significant Hydrology Changes: The regression equations for Wilkinson County are the most current. There are newer regression equations for both East Baton Rouge and East Feliciana Parishes. There was insufficient information available to determine the regression equations used in West Feliciana Parish.

Initial A3 Assessment – Check for Significant Development: None of the sixteen HUC-12 watersheds showed an increase in urbanization of 50% or more.

Validation Check A4 – Check of Studies Backed By Technical Data: Streams in East Baton Rouge Parish and Wilkinson County were deemed to pass this check. Streams in East Feliciana and West Feliciana Parishes were categorized as unknown due to insufficient information in the FIS reports detailing the study methods.

Validation Check A5 – Comparison of BLE and Effective Zone A: All streams failed the A5 comparison

Final Results: Of the 543.19 miles examined, all were categorized as "Unverified – To Be Studied." There were no streams categorized as "Valid – NVUE Compliant". Prioritization scores were calculated for each HUC-12 based on the A5 results and the National Flood Risk Percentages Dataset. Higher scores suggest a higher priority. A map of the prioritized HUC-12s is below.

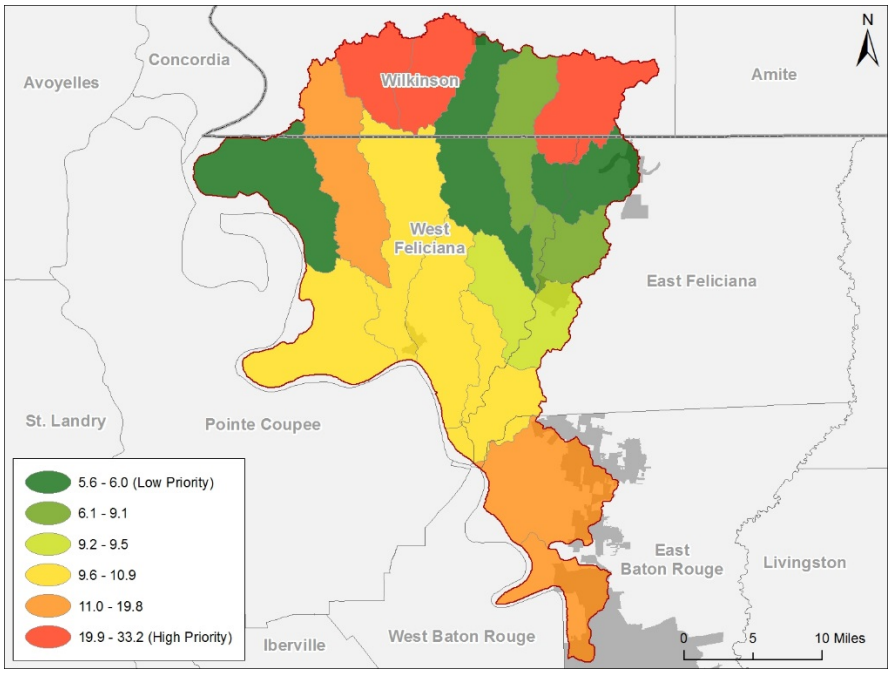

Figure 4: Bayou Sara-Thompson Watershed Prioritized HUC-12s

Community Coordination. FEMA has shared the BLE results with communities throughout the project area. Communities were provided the information, workshops, and training to support the use of BLE for planning, floodplain management, permitting, and risk communication activities. FEMA will continue to work with communities to review, interpret, and incorporate the BLE information into their daily and future community management and planning activities.

Follow-On Phase Project Decisions. The BLE results and the current effective inventory were compared to identify any areas of significant change. If the results show large areas of change (i.e. - expansions and contractions of the floodplain). Table 4 below shows the change in area for the effective SFHA and the flood mapping that was produced as part of the BLE analysis. It should be noted that the SFHA Decrease numbers are artificially high for East Baton Rouge Parish, East Feliciana Parish, West Feliciana Parish, and to a lesser extent the City of Baton Rouge and Town of St. Francisville because the BLE analysis did not include mapping of the large flood zones along the western boundary of the watershed that are associated with Mississippi River flooding. Figure 4 below illustrates these large areas. Additionally, it should also be noted that there some areas where SFHA Increases are due to additional streams being studied in the BLE analysis that were not studied for the effective SFHA. For example Little Bayou Sara, Hooks Creek, Beasley Creek, and Dunbar Creek in the western portion of Wilkinson County had not previously been mapped.

Table 4: Changes to SFHA (Effective SFHA vs. BLE Flood Mapping)

Community	Community Area (sq. miles)	No Change (sq. miles)	Decrease (sq. miles)	Increase (sq. miles)
Baker	3.3	0.73	0.02	0.97
Baton Rouge	12.6	0.22	1.37	0.01
East Baton Rouge Parish	64.6	11.42	15.76	2.67
East Feliciana Parish	76.6	7.82	2.14	1.53
Jackson	4.5	0.34	0.11	0.02
Norwood	3.0	0.04	0.01	0.01
St. Francisville	1.8	0.11	0.15	0.02
West Feliciana Parish	358.2	22.59	70.86	5.51
Wilkinson County	159.6	3.58	3.15	3.63
Woodville	0.8	0.01	0.01	0.00
Zachary	9.8	2.11	0.50	0.17
WATERSHED TOTAL	**694.8**	**48.97**	**94.08**	**14.54**

Looking at changes in previously mapped areas, some areas do stand out. At the southern end of Bayou Sara to the northwest of St. Francisville, there is an area where the flood zone seems to have increased. This stands out because the BLE analysis did not include backwater effects from the Mississippi River and this area is only slightly upstream of that confluence. Looking further upstream there are additional areas where the flood zone has grown along both Bayou Sara and Little Bayou Sara.

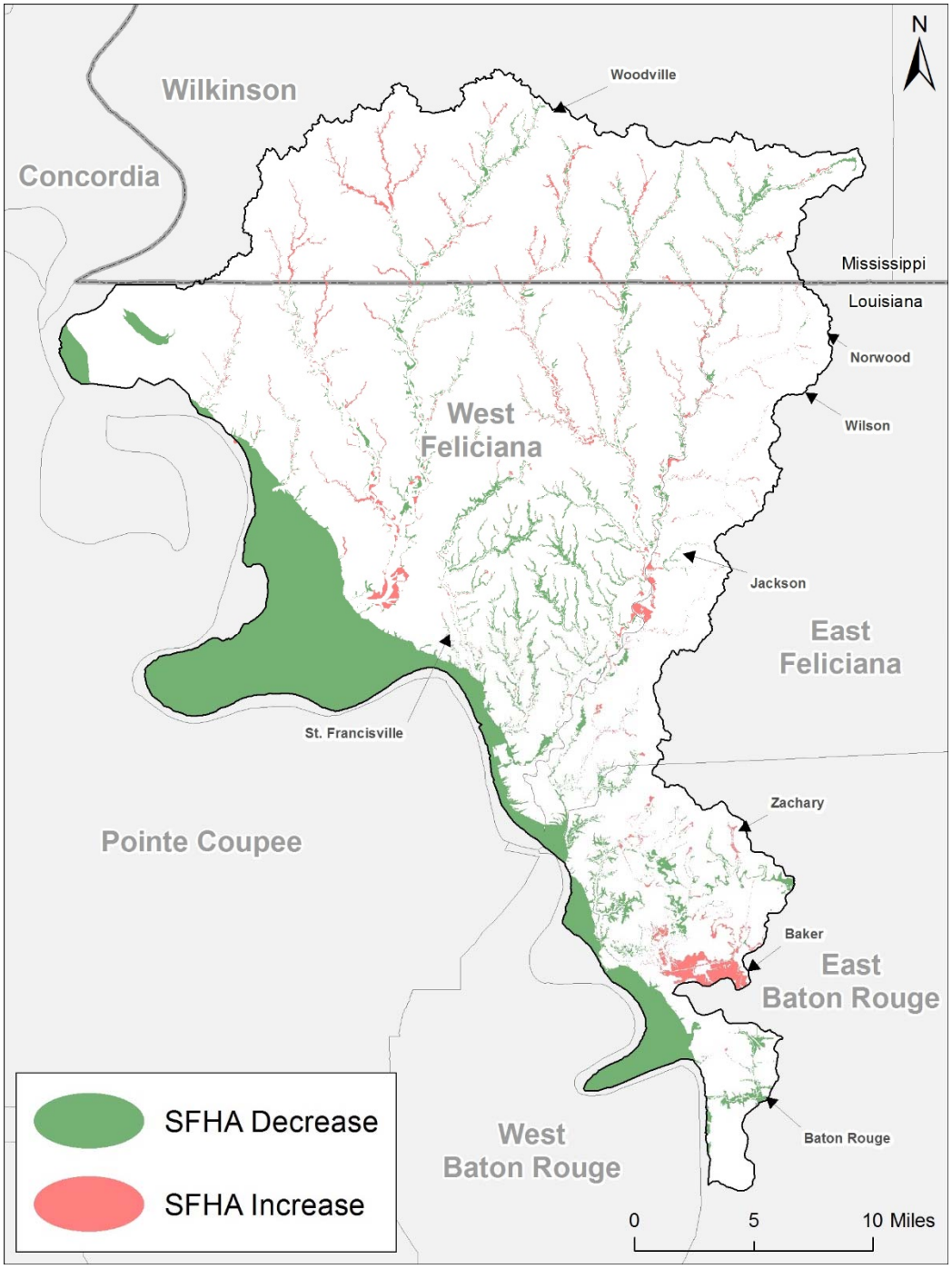

Figure 5: Changes Between Effective SFHA and BLE Flood Mapping

Please note that due to differences between the effective studies and the Base Level Engineering that there are areas on this map which may falsely reflect increases or decreases to the floodplains. These issues are discussed in the text of this section of the report.

Other areas that stand out include an area along the border between West Feliciana Parish and East Feliciana Parish just south of the Town of Jackson. In this location, the SFHA has increase fairly significantly along Thompson Creek, and a large area that covers the southern portion of the City of

Baker and extents west into East Baton Rouge Parish. In this second instance, the effective flood zone is AE, so that area underwent a more detailed study, so the BLE analysis may be less accurate in this location.

Finally, it should be noted that an overall trend can be seen when looking at the change data. Specifically areas with more recent studies tend to show less overall change than areas with newer studies,

FEMA will continue to coordinate with the communities to identify the streams that should be considered if the FIRMs are updated. To identify other streams for future refinement, local officials should discuss community growth patterns and potential growth corridors with FEMA. These areas of expected community growth and development may benefit from updated flood hazard information. Base Level Engineering can be further refined to provide detailed study information for a FIRM update.

Areas of communities that were developed prior to 1970 (pre-FIRM areas) may include repetitive and severe repetitive loss properties. They may also be areas where redevelopment is likely to occur. Having updated flood hazard information before redevelopment and reconstruction activities take place may benefit communities by providing guidance to mitigate future risk.

FEMA will work with communities following the delivery of BLE to identify a subset of stream studies to be updated and included on the FIRMs. Communities may wish to review these possible areas and provide feedback once the BLE data have been received. Communities can also refine BLE information and submit it through the Letter of Map Revision process to revise the existing flood hazard information and maintain the community's FIRM.

Phase One: Discovery

Overview

The Louisiana Department of Transportation and Development (LaDOTD) in conjunction with FEMA Region 6 elected to pursue a Phase 1 Discovery project in the Bayou Sara-Thompson Watershed during Fiscal Year 2017 (FY17). This was a natural progression given the completion of the BLE analysis in March 2016 and the results of its assessment and validation.

The Discovery process provides an opportunity not only to collect additional information that can be used to further refine areas of interest, but more importantly offers opportunities to work directly with communities within the watershed to discuss local issues which may not be apparent from the BLE analysis and research.

During Discovery the project team has contacted the communities through a variety of means to not only let them know that the project is underway, but to actively engage them so as to open lines of communication and make the resulting discussion more productive.

The following sections are a summary of the information gathered and a discussion of how that information may inform the discussion of future investments. The information that follows comes from FEMA, other Federal agencies, and the states and communities that make up the watershed.

Watershed Information and Review

The following section will explore data from a number of sources to develop a better understanding of the level of risk that the watershed communities face. This will include, but not be limited too, information on the number of flood insurance policies, the number of claims, past disaster declarations, information about hazard mitigation plans, and NFIP engagement with both FEMA and state representatives.

National Flood Insurance Program (NFIP) Information.

All of the communities within the watershed participate in the National Flood Insurance Program. It should be noted that the Parish of East Baton Rouge and the City of Baton Rouge are run by a consolidated government, so the City is not listed as an individual community as it related to the NFIP. Table 5 show community CRS ratings, the date and status of their effective maps, and the estimated 2015 population. Please note that the population figures represents the population for the entire community and not just the portion in the watershed.

Table 5: NFIP Information[4]

Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2015 ACS Estimate)
City of Baker	225193	Y	8	5/2/2008	Revised	13,695
City of Baton Rouge	220159	N/A	N/A	N/A	NOT NFIP Community	228,590
East Baton Rouge Parish	220058	Y	6	6/19/2012	Revised	446,753
East Feliciana Parish	220364	Y	-	4/3/2012	Original	19,696
Town of Jackson	220333	Y	-	4/3/2012	Revised	3,794
Village of Norwood	220302	Y	-	4/3/2012	All Zone A, C, X - No Elev	285
Town of St. Francisville	220246	Y	-	5/2/1977	Original	1,960
West Feliciana Parish	220245	Y	-	2/13/1979	All Zone A, C, X - No Elev	15,385
Wilkinson County	280202	Y	-	4/19/2010	Revised	9,122
Village of Wilson	220352	Y	-	4/3/2012	All Zone A, C, X - No Elev	548
Town of Woodville	280359	Y	-	4/19/2010	Original	1,245
City of Zachary	220061	Y	7	6/19/2012	Revised	16,448

Table 6 includes both the number of flood insurance policies in each community but the coverage of those policies.

Table 6: NFIP Policy Information[5]

Community Name	CID	Policies in Force	Insurance in Force
City of Baker	225193	749	$144,678,400
City of Baton Rouge	220159	N/A	N/A
East Baton Rouge Parish	220058	33,524	$8,207,576,900
East Feliciana Parish	220364	91	$22,354,400
Town of Jackson	220333	6	$1,425,000
Village of Norwood	220302	4	$1,400,000
Town of St. Francisville	220246	11	$2,868,100
West Feliciana Parish	220245	148	$30,734,700
Wilkinson County	280202	88	$14,005,100
Village of Wilson	220352	4	$1,400,000
Town of Woodville	280359	1	$107,100
City of Zachary	220061	992	$266,702,000

Table 7 shows the total number of flood insurance claims, the number of paid claims, the total amount paid out for those claims, and the number of substantial damage claims for each community since 1978.

[4] FEMA Community Information System (May 2017)
[5] FEMA Community Information System (May 2017)

Table 7: NFIP Claims Information[6]

Community Name	CID	Claims	Paid Claims	Losses Paid	Substantial Damage Claims Since 1978
City of Baker	225193	461	390	$16,244,696.27	111
City of Baton Rouge	220159	-	-	-	-
East Baton Rouge Parish	220058	17485	5,218	$964,530,902.97	4822
East Feliciana Parish	220364	10	9	$662,715.73	2
Town of Jackson	220333	3	2	$85,080.03	-
Village of Norwood	220302	-	-	-	-
Town of St. Francisville	220246	68	80	$564,662.56	28
West Feliciana Parish	220245	464	472	$4,212,059.69	121
Wilkinson County	280202	1864	1,586	$19,802,847.52	615
Village of Wilson	220352	-	-	-	-
Town of Woodville	280359	-	-	-	-
City of Zachary	220061	369	319	$15,318,893.76	47

Table 8 show the total number of properties that have repetitive flood claims, the total number of claims made for those properties, the total amount paid out for those claims, and the number of severe repetitive loss properties. Repetitive loss and severe repetitive loss properties are good targets for mitigation as they are certainly in a location that has a higher proclivity for flooding. Mitigation actions may include elevating the structure or a property buyout. Decisions on the best approach will likely be based on the depth and frequency of floods affecting the property.

Table 8: Repetitive Loss Property Information[7]

Community Name	Total Properties	Total Claims	Total Paid Losses	Severe Repetitive Loss Properties
City of Baker	23	63	$1,488,193.22	4
City of Baton Rouge	-	-	-	-
East Baton Rouge Parish	873	3281	$103,470,322.60	282
East Feliciana Parish	-	-	-	-
Town of Jackson	-	-	-	-
Village of Norwood	-	-	-	-
Town of St. Francisville	11	28	$332,430.79	3
West Feliciana Parish	70	221	$2,541,368.33	8
Wilkinson County	192	794	$13,770,351.43	65
Village of Wilson	-	-	-	-
Town of Woodville	-	-	-	-
City of Zachary	41	115	$4,104,329.49	5

[6] FEMA Community Information System (May 2017), FEMA Region 4 and FEMA Region 6 (February 2017)
[7] Information obtained from FEMA Region 4 and Region 6 (February 2017)

Disaster Declarations

Table 9 lists the Federal Disaster Declaration for the watershed. Disasters are declared at the county/parish level. In the Bayou Sara-Thompson watershed East Baton Rouge Parish has the largest number of declaration at 26, West Feliciana has 22, and both East Feliciana Parish and Wilkinson County have 20. Declarations for flood events include nine for Wilkinson County, eight for East Baton Rouge Parish, seven for West Feliciana Parish, and four for East Feliciana Parish.

Table 9: Disaster Declarations in the Watershed[8]

Date	Title	East Baton Rouge Parish	East Feliciana Parish	West Feliciana Parish	Wilkinson County
9/10/1965	HURRICANE BETSY	x	x	x	x
8/18/1969	HURRICANE CAMILLE				x
10/13/1971	HURRICANE EDITH	x			
1/19/1972	HEAVY RAINS & FLOODING				x
3/27/1973	HEAVY RAINS, TORNADOES & FLOODING				x
4/27/1973	SEVERE STORMS & FLOODING	x		x	
6/6/1975	HEAVY RAINS, TORNADOES & FLOODING			x	
2/22/1977	DROUGHT & FREEZING		x	x	x
5/2/1977	SEVERE STORMS & FLOODING	x	x		
4/16/1979	STORMS, TORNADOES, FLOODS				x
5/2/1979	SEVERE STORMS & FLOODING	x			
4/20/1983	SEVERE STORMS AND FLOODING	x			
6/1/1983	SEVERE STORMS, TORNADOES, AND FLOODING				x
5/20/1989	SEVERE STORMS & FLOODING		x		
6/16/1989	SEVERE STORMS & TORNADOES	x			
7/17/1989	TROPICAL STORM ALLISON	x			
2/28/1990	SEVERE STORMS, TORNADOES & FLOODING				x
8/26/1992	HURRICANE ANDREW	x	x	x	
11/25/1992	SEVERE STORMS, HIGH WINDS & TORNADOES				x
2/2/1993	SEVERE STORMS & FLOODING	x			
2/23/2001	SEVERE STORMS AND TORNADOES				x
6/11/2001	TROPICAL STORM ALLISON	x	x	x	
9/27/2002	TROPICAL STORM ISIDORE	x			
10/3/2002	HURRICANE LILI	x	x	x	
2/1/2003	LOSS OF SPACE SHUTTLE COLUMBIA	x	x	x	

[8] FEMA https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1 , (May 2017)

Date	Title	East Baton Rouge Parish	East Feliciana Parish	West Feliciana Parish	Wilkinson County
9/15/2004	HURRICANE IVAN	x	x	x	x
8/27/2005	HURRICANE KATRINA	x	x	x	
8/29/2005	HURRICANE KATRINA	x	x	x	x
9/21/2005	HURRICANE RITA	x	x	x	
9/24/2005	HURRICANE RITA	x	x	x	
5/8/2008	SEVERE STORMS AND FLOODING				x
8/29/2008	HURRICANE GUSTAV	x	x	x	x
9/2/2008	HURRICANE GUSTAV	x	x	x	x
5/12/2009	SEVERE STORMS, FLOODING, AND TORNADOES				x
5/4/2011	FLOODING				x
5/6/2011	FLOODING	x	x	x	
5/11/2011	FLOODING				x
8/18/2011	FLOODING	x		x	
10/28/2011	TROPICAL STORM LEE		x	x	
8/27/2012	TROPICAL STORM ISAAC	x	x		x
8/29/2012	HURRICANE ISAAC	x	x	x	x
7/13/2015	SEVERE STORMS AND FLOODING			x	
2/5/2016	FLOODING			x	
8/14/2016	SEVERE STORMS AND FLOODING	x	x	x	

Community Assistance

Representative from both FEMA and the state conduct periodic Community Assistance Contacts (CAC) and Community Assistance Visits (CAV). CACs are intended to re-establish contact with an NFIP community to see if they have any problems or issues and to offer assistance if needed. CACs can be phone calls or brief visits. CAVs are more comprehensive and are scheduled visits designed to identify floodplain management program deficiencies and violations.

The communities in the Bayou Sara-Thompson watershed have an extensive history of CACs and CAVs, with the first recorded engagements occurring in 1992 and the most recent occurring in late 2016. As of this time there are only two cases which have not been closed, both for Wilkinson County. A CAC initiated on January 15, 1992 has not been closed. The report for that case has no notes or follow-up entries, and there are subsequent cases that have been closed, so it seems likely that it was closed and the close date was simply not included on the report.

More recently a CAV for Wilkinson County initiated on March 13, 2014 has still not been closed. The report cites problems staffing, permits, and repetitive loss properties. The community was subsequently given an extension to address the issues on January 20, 2015.

Table 10 lists all CAC and CAV cases for the communities in the watershed.

Table 10: History of Engagement[9]

Community Name	Type of Engagement	Agency	Date Initiated	Date Closed
City of Baker	CAV	FEMA	10/30/1992	10/30/1992
City of Baker	CAC	STATE	10/31/1994	9/3/2003
City of Baker	CAV	STATE	1/3/2001	8/13/2003
City of Baker	CAV	STATE	9/3/2003	3/11/2004
City of Baker	CAC	STATE	1/4/2007	1/4/2007
City of Baker	CAV	STATE	12/11/2007	10/22/2008
City of Baker	CAC	FEMA	10/11/2012	10/15/2012
City of Baker	CAC	STATE	2/6/2013	2/14/2013
City of Baker	CAC	STATE	11/18/2016	12/31/2016
City of Baton Rouge	CAC	FEMA	10/11/2012	10/15/2012
East Baton Rouge Parish	CAC	STATE	9/5/2001	12/20/2001
East Baton Rouge Parish	CAV	STATE	8/20/2003	10/31/2006
East Baton Rouge Parish	CAC	STATE	10/31/2006	11/1/2006
East Baton Rouge Parish	CAV	STATE	9/22/2009	1/25/2011
East Baton Rouge Parish	CAC	FEMA	10/11/2012	10/15/2012
East Baton Rouge Parish	CAV	STATE	2/19/2014	9/25/2015
East Baton Rouge Parish	CAC	STATE	11/18/2016	12/31/2016
East Feliciana Parish	CAC	STATE	6/29/2007	7/17/2007
East Feliciana Parish	CAC	FEMA	10/18/2012	10/19/2012
East Feliciana Parish	CAC	STATE	2/18/2013	2/20/2013
Town of Jackson	CAV	STATE	3/1/1994	10/2/2007
Town of Jackson	CAC	STATE	2/29/1996	11/12/2004
Town of Jackson	CAC	STATE	12/14/1999	1/13/2000
Town of Jackson	CAC	STATE	9/3/2002	2/18/2003
Town of Jackson	CAV	STATE	7/24/2003	6/25/2007
Town of Jackson	CAC	STATE	8/18/2004	11/12/2004
Town of Jackson	CAV	STATE	7/21/2005	8/7/2005
Town of Jackson	CAC	FEMA	10/16/2012	10/18/2012
Town of Jackson	CAC	STATE	11/18/2014	11/24/2014
Village of Norwood	CAC	FEMA	10/16/2012	10/19/2012
Town of St. Francisville	CAC	STATE	6/17/1994	1/25/1995
Town of St. Francisville	CAC	STATE	4/10/2001	10/1/2003

[9] FEMA Community Information System (May 2017)

Community Name	Type of Engagement	Agency	Date Initiated	Date Closed
Town of St. Francisville	CAV	STATE	3/28/2003	6/18/2003
Town of St. Francisville	CAC	STATE	1/22/2007	1/22/2007
Town of St. Francisville	CAV	STATE	4/15/2010	9/2/2010
West Feliciana Parish	CAC	STATE	7/11/1994	1/23/1995
West Feliciana Parish	CAV	STATE	2/16/1995	10/12/1995
West Feliciana Parish	CAC	STATE	9/30/1997	10/8/1997
West Feliciana Parish	CAC	STATE	10/12/2000	2/6/2001
West Feliciana Parish	CAC	STATE	11/26/2001	12/20/2001
West Feliciana Parish	CAV	STATE	12/11/2003	3/1/2004
West Feliciana Parish	CAC	STATE	1/17/2008	1/17/2008
West Feliciana Parish	CAC	STATE	10/29/2015	10/31/2016
West Feliciana Parish	CAV	STATE	10/29/2015	10/29/2015
Wilkinson County	CAC	STATE	1/15/1992	-
Wilkinson County	CAV	STATE	9/15/1998	11/12/2002
Wilkinson County	CAC	STATE	10/3/2002	10/3/2002
Wilkinson County	CAV	STATE	11/13/2002	3/13/2003
Wilkinson County	CAV	STATE	12/18/2006	5/29/2007
Wilkinson County	CAC	FEMA	6/5/2008	7/11/2014
Wilkinson County	CAC	STATE	8/29/2011	8/29/2011
Wilkinson County	CAV	STATE	3/13/2014	-
Village of Wilson	CAC	FEMA	10/9/2012	10/22/2012
Village of Wilson	CAC	STATE	2/4/2014	2/11/2014
Town of Woodville	CAC	STATE	4/7/2010	4/8/2010
Town of Woodville	CAC	STATE	2/4/2015	2/6/2015
City of Zachary	CAV	FEMA	11/6/1992	11/6/1992
City of Zachary	CAV	STATE	8/27/1997	9/17/1997
City of Zachary	CAV	STATE	1/4/2000	1/19/2000
City of Zachary	CAC	STATE	10/29/2001	12/20/2001
City of Zachary	CAV	STATE	3/23/2004	10/18/2004
City of Zachary	CAC	STATE	10/19/2007	10/31/2007
City of Zachary	CAC	FEMA	4/13/2009	4/27/2009
City of Zachary	CAV	STATE	6/4/2009	7/15/2009
City of Zachary	CAC	FEMA	10/11/2012	10/15/2012
City of Zachary	CAV	STATE	12/12/2013	2/27/2014
City of Zachary	CAC	STATE	11/18/2016	12/31/2016

Hazard Mitigation Plan Review

Table 11 lists the status of hazard mitigation plans for the communities in the watershed. It should be noted that most communities participate in multi-jurisdiction plans that cover entire parishes, or in the case of Wilkinson County, an entire planning region, therefore there are only four plans listed.

Due to the regular cycle of hazard mitigation plan updates, all Louisiana communities within the Bayou Sara-Thompson watershed were going through the process of updating, reviewing, and adopting their hazard mitigation plans. Due to the timing of this study the expired plans were reviewed for East Feliciana Parish and West Feliciana Parish. The expired plan for East Baton Rouge Parish was not available at the time of this review. Draft plans were not available for review as they had not been finalized and adopted. The current hazard mitigation plan for Wilkinson County was approved on August 21, 2012 and is set to expire on August 21, 2017. As the plan for Wilkinson County is still in effect that plan was reviewed.

Table 11: Hazard Mitigation Plan Status

Plan	Date Plan Approved	Plan Expiration Date
East Baton Rouge Parish Hazard Mitigation Plan	6/10/2011	6/10/2016
East Feliciana Parish Hazard Mitigation Plan	9/27/2011	9/27/2016
West Feliciana Parish 2012 Natural Hazard Mitigation Plan Update	3/8/2012	3/8/2017
Southwest MS Planning and Development District Regional Multi-Jurisdictional Hazard Mitigation Plan	8/21/2012	8/21/2017

East Feliciana Parish

The East Feliciana Parish Hazard Mitigation Plan (2011) is a multi-jurisdictional plan that includes the Town of Jackson, the Village of Norwood, and the Village of Wilson. Mitigation actions identified within the plan are organized based on the goals identified by the steering committee. In every case, there were multiple actions listed, however many of the action items were categorized as deferred for funding reasons. Communities within the parish had actions that mirrored the parish actions or mandated cooperation with the parish. Funded mitigation actions identified include:

- Goal 1 – Preventive measures to reduce future damages
    - Upgrade power generators to continue essential operations during power outages
    - Pass new development code to allow for underground power lines
    - Develop a master drainage plan
    - Establish firebreaks to prevent damage to structures
    - Hardening of critical infrastructure to allow operations to continue during disasters
- Goal 2 – Increase public awareness and understanding of disaster preparedness
    - Utilize various methods to distribute hazard information to the public
    - Promote the purchase of flood insurance
    - Sponsor a hazard awareness week to educate the public
- Goal 3 – Implement training exercises to prepare government officials to mitigate against, respond to, and recover from disasters
    - Sponsor training activities for local officials to improve planning and response
- Goal 4 – Facilitate sound development to reduce or eliminate impact of hazards
    - Develop and pass ordinances to regulate new development, such as requiring adequate drainage, requiring freeboard above the base flood elevation, or encouraging underground utilities.

West Feliciana Parish

The West Feliciana 2012 Natural Hazard Mitigation Plan Update is a multi-jurisdictional plan that includes the Town of St. Francisville. Mitigation actions identified in the plan are organized based on seven mitigation goals. The mitigation actions are listed according to the objectives identified for each goal. Actions are not specific projects, though there are tables in the plan that list specific projects and their status. The specific projects are not linked to the goals, objectives, or actions. The below is a summary of the goals, objectives, and actions.

- Goal 1 – Protect Infrastructure
    - Objectives – Protect public infrastructure, upgrade public emergency shelter system, establish white goods pickup program, and harden critical facilities
        - Action - Educate public on gas line protection measures and protect gas infrastructure
        - Action - Upgrade creek crossings/bridges, address erosion issues
        - Action - Upgrade communications systems, install generators
        - Action - Educate public on shelter in place procedures
        - Action - Evaluate facilities for shelter capabilities and for possible storm protection measures (hardening) to ensure continuity of operations and protection of contents
- Goal 2 – Provide safe evacuation routes
    - Objectives Improve water crossings and educate the public
        - Action – Upgrade low water bridge crossings and improve crossing status signage
        - Action - Educate the public on the dangers of flood waters
- Goal 3 – Reduce the impact of future flooding
    - Objectives - Identify and study feasibility of raising structures, reduce the effects of hazards on new development
        - Action – Harden critical facilities
        - Action - Update codes/ordinances to implement underground utilities and prevent development in flood prone areas
- Goal 4 – Reduce losses from wildfires
    - Objectives – Educate public about hazards of open pit burning
        - Action – Disseminate information via media and other means.
        - Action – Improve the handling and collection of primary fuel materials
        - Action – Create a public awareness campaign on the dangers of wildfires
- Goal 5 – Educate the public on self-mitigation measures
    - Objectives - Educate the public on self-mitigation measures
        - Action – Disseminate information through the media and other means
        - Action – Coordinate information available through local agencies
        - Action – Create a public awareness campaign in elementary schools
- Goal 6 – Provide excellent public emergency assistance
    - Objectives – Improve EMS and Fire Protection services, and improve GIS Data Management
        - Action – Establish additional fire stations

        - Action – Enact sign ordinance to enact street sign conformity
        - Action – Transition to enterprise GIS system to add capabilities
- Goal 7 – Improve Floodplain Management
    - Objectives – Obtain a CRS Rating of 8 and maintain NFIP eligibility.
        - Action – Complete requirements to achieve CRS rating of 8
        - Action – Improve building codes for new construction
        - Action – Acquire or raise repetitive loss properties

Wilkinson County

The hazard mitigation plan for Wilkinson County and the Town of Woodville was prepared by the Southwest Mississippi Planning and Development District. The Planning District covers 10 counties in southwestern Mississippi. The mitigation plan organizes actions based on hazard type. The following is a listing of high priority actions for Wilkinson County or the Town of Woodville.

- Hurricane
    - Utilize the StormReady program to improve community preparedness.
    - Purchase and install backup generators for critical public facilities
    - Improve communication by acquiring a satellite phone system.
- Flooding
    - Attend regular floodplain management workshops to build capabilities.
    - Acquire improved GIS data to assess flood risk.
- Tornado
    - Install sirens/warning system throughout the county
- Dam Failure
    - Perform community outreach and education regarding dam failure risk
- Wildfire
    - Offer public information and outreach workshops on the Firewise program and encourage attendance of public officials, vulnerable residents and firefighters at workshops presented by the Forestry Commission.
- Radiological
    - Recommend community officials, first responders, and primary care facility employees periodically attend workshops on evacuation procedures and treatment of affected individuals.
    - Conduct community workshops and media campaign to educate public on evacuation routes and procedures should a radiological release occur
    - Improve the condition of evacuation routes
- Winter Storms
    - Utilize StormReady program to better prepare for and mitigate effects of extreme weather

Ordinances and Regulations Review

A review of development regulations helps shed light on how a community tries to limit their exposure to damages from disasters by guiding development away from floodplains or insuring flood proofing strategies are utilized. The following section will review the ordinances, development regulations, and

any additional guidelines as they related to development activities, or renovations, within flood zones or areas affected by flooding.

East Baton Rouge Parish/City of Baton Rouge

The City of Baton Rouge and East Baton Rouge Parish operate as a unified government so the ordinances and regulations discussed below govern the both the City and the unincorporated areas of the Parish.

The City/Parish government has a Unified Development Code (UDC) which defines zoning and planning regulations. The UDC is available online at http://brgov.com/dept/planning/UDC/UDC.asp .

Chapter 15 of the UDC, titled "Floodways, Floodplains, Drainage and Water Quality" specifically addresses issues pertaining to flooding and storm water. The document details various provisions for reducing flood hazards, this includes: the designation of a floodplain administrator and a listing of their duties, procedures for obtaining a development permit and procedures for obtaining a variance. The document also covers stormwater management plans for developments, drainage requirements, drainage impact studies, water quality as it relates to stormwater and runoff management, and water quality studies. Lastly, the document addresses flood prevention and lists a number of methods used to reduce flood losses. The list includes restricting or prohibiting uses that are dangerous in times of flood, requiring that uses vulnerable to floods be protected against flood damage at the time of initial construction, control the alteration of natural floodplains, stream channels, etc., control filling, grading, and dredging, and preventing or regulating the construction of flood barriers which will unnaturally divert floodwaters. The following sections address standards for new development as well as certain redevelopment activities. Some examples include anchoring structures to prevent flotation, the use of flood resistant materials, and locating electrical, plumbing and other service facilities so as to prevent ware from entering or accumulating. Additionally, the document calls for providing FEMA approved Certificates of Elevation for new and substantially improved structures to show compliance with slab elevations and freeboard based on the BFE or other floods of record depending on the mapped flood zone for the property. The document also specifics a number of standards that apply to subdivision development, development within AO or AH Zones, and permitted developments and standards for properties located within floodways.

There are additional specifications included within the Baton Rouge, East Baton Rouge Parish Code of Ordinances which is available here: https://www.municode.com/library/la/baton_rouge,_east_baton_rouge_parish/codes/code_of_ordinances .

The relevant portion of the Code of Ordinances is "Title 8 - Building Regulations". This section is a lightly amended version of the International Building Code (IBC), International Residential Code (IRC), and International Existing Building Code (IEBC). Amendments largely consist of codes updated by the Louisiana State Uniform Construction Code Council (LSUCCC). The portion of this code that addresses flooding is a small, generic section of text that mirrors the underlying fundamentals detailed within the UDC.

Though not a portion of the code of ordinances or development regulations, the City-Parish does have a storm water manual. The document titled "Stormwater: Best Management Practices for East Baton Rouge Parish – Master Development Program" was prepared in a joint effort by the Louisiana Department of Environmental Quality (LDEQ), the City-Parish Planning Commission (CPPC), and the

Louisiana State University's School of the Coast and Environment in association with a grant titled "Mitigating Nonpoint Source Pollution in Urban Watersheds with Spatial Modeling, Best Practices for Wetland and Community Outreach." In addition to preventing nonpoint source pollution the manual discusses various drainage systems and techniques such as detention and retention ponds which can have an added benefit of reducing flood hazards.

City of Baker

Chapter 12 of the City of Baker code of ordinances addresses floods. This chapter of the ordinance establishes the need and purpose to prevent flood damage and then provides a framework for ensuring that purpose is fulfilled. Specifically, the ordinance creates the floodplain administrator position and assigns their duties and responsibilities, and also outlines the need for and processes related to development permits, including procedures for obtaining variances.

Article two, division 4, of the chapter identifies the provisions for flood hazard reduction. This article is divided into four sections general standards, specific standards, standards for subdivision proposals, and standards for areas of shallow flooding. General standards include, but are not limited to, providing proper anchoring to prevent structures from being moved by flood waters, utilizing construction methods that minimize potential flood damage, using materials that are flood resistant, locating service facilities in a manner that minimizes flood damage, and ensuring water supply systems and sanitary sewage systems are designed to minimize or eliminate infiltration of floodwaters as well as the discharge of sewage into flood waters. Specific standards require having the lowest floor be elevated above the base flood elevation and certification requirements, as well as specific requirements for the placement of manufactured homes and restrictions on the placement of recreational vehicles on sites within floodplains. The subdivision standards require compliance with the general and specific standards outlined in the previous sections. The standards for areas of shallow flooding add the requirement that the elevation of structures and facilities be above the base flood elevation in AO and AH zones, that drainage paths be provided around structures on slopes to guide flood waters around and away from the structure, and that a professional engineer provide certification to the floodplain administrator that these standards are met.

The City of Baker Code of Ordinances can be found here:
https://www.municode.com/library/la/baker/codes/code_of_ordinances

City of Zachary

Chapter 46 of the City of Zachary code of ordinances addresses flood damage prevention. This chapter of the ordinance establishes the need and purpose to prevent flood damage and then provides a framework for ensuring that purpose is fulfilled. Specifically, the ordinance creates the floodplain administrator position and assigns their duties and responsibilities, and also outlines the need for and processes related to development permits, including procedures for obtaining variances.

Article five of the chapter identifies the provisions for flood hazard reduction. This article is divided into nine sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding, standards for floodways, minimum lowest floor elevation requirements, requirements for structures on piers, the prohibition on the use of landfill material, and the prohibition of depositing material in waterways. General standards include, but are not limited to, providing proper anchoring to prevent structures from being moved by flood waters, utilizing construction methods that

minimize potential flood damage, using materials that are flood resistant, locating service facilities in a manner that minimizes flood damage, and ensuring water supply systems and sanitary sewage systems are designed to minimize or eliminate infiltration of floodwaters as well as the discharge of sewage into flood waters. Specific standards require having the lowest floor be elevated above the base flood elevation and certification requirements, as well as specific requirements for the placement of manufactured homes and restrictions on the placement of recreational vehicles on sites within floodplains. The subdivision standards require compliance with the general and specific standards outlined in the previous sections. The standards for areas of shallow flooding add the requirement that the elevation of structures and facilities be one foot above the base flood elevation in AO and AH zones, that drainage paths be provided around structures on slopes to guide flood waters around and away from the structure, and that a professional engineer provide certification to the floodplain administrator that these standards are met. The floodway standards prohibit and sort of encroachment on the floodway, including fill, new development or substantial improvements to existing development within the floodway without hydrologic and hydraulic analyses indicating that such encroachment would not increase flood levels. The minimum lowest floor elevation standards provide elevations for all new structures regardless of their mapped flood zone. For example zone A and AE are required to meet all of the following: one foot about the base flood elevation, one foot above the recorded inundation, one foot above the centerline of the street, and one foot above the nearest upstream or downstream sanitary sewer. The next section requires that structures on piers not enclose the space beneath the lowest floor in a manner that inhibits the free flow of flood waters. The landfill prohibition section restricts the use of fill material in special flood hazard areas unless various listed requirements are met. Lastly, the standards for depositing material in waterways prohibits any person from discarding trash or other materials into waterways that potentially carry surface water runoff. Persons found to violate this will face penalties outlined within the ordinance.

The City of Zachary Code of Ordinances can be found here:
https://www.municode.com/library/la/zachary/codes/code_of_ordinances

East Feliciana Parish

Chapter 5A of the East Feliciana code of ordinances addresses floods. This chapter of the ordinance establishes the need and purpose to prevent flood damage and then provides a framework for ensuring that purpose is fulfilled. Specifically, the ordinance creates the floodplain administrator position and assigns their duties and responsibilities, and also outlines the need for and processes related to development permits, including procedures for obtaining variances.

Article four, division 1, of the chapter identifies the provisions for flood hazard reduction. This article is divided into five sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding, and floodways. General standards include, but are not limited to, providing proper anchoring to prevent structures from being moved by flood waters, utilizing construction methods that minimize potential flood damage, using materials that are flood resistant, locating service facilities in a manner that minimizes flood damage, and ensuring water supply systems and sanitary sewage systems are designed to minimize or eliminate infiltration of floodwaters as well as the discharge of sewage into flood waters. Specific standards require having the lowest floor be elevated above the base flood elevation and certification requirements, as well as specific requirements for the placement of manufactured homes and restrictions on the placement of recreational vehicles on

sites within floodplains. The subdivision standards require compliance with the general and specific standards outlined in the previous sections. The standards for areas of shallow flooding add the requirement that the elevation of structures and facilities be increase by a minimum of two feet above the base flood elevation in AO and AH zones and that drainage paths be provided around structures on slopes to guide flood waters around and away from the structure. The floodway standards prohibit and sort of encroachment on the floodway, including fill, new development or substantial improvements to existing development within the floodway without hydrologic and hydraulic analyses indicating that such encroachment would not increase flood levels.

West Feliciana Parish

The West Feliciana Parish Code of Ordinances is broken into two parts. The first part is dedicated to general ordinances and the second part is the Land Development Code. Within the Land Development Code, Chapter 110 is dedicated to Flood Damage Prevention. This chapter of the ordinance establishes the need and purpose to prevent flood damage and then provides a framework for ensuring that purpose is fulfilled. Specifically, the ordinance creates the floodplain administrator position and assigns their duties and responsibilities, and also outlines the need for and processes related to development permits, including procedures for obtaining variances.

Article four of the chapter identifies the provisions for flood hazard reduction. This article is divided into three sections general standards, specific standards, and standards for subdivision proposals. General standards include, but are not limited to, providing proper anchoring to prevent structures from being moved by flood waters, utilizing construction methods that minimize potential flood damage, using materials that are flood resistant, locating service facilities in a manner that minimizes flood damage, and ensuring water supply systems and sanitary sewage systems are designed to minimize or eliminate infiltration of floodwaters as well as the discharge of sewage into flood waters. Specific standards require having the lowest floor be elevated above the base flood elevation and certification requirements, as well as specific requirements for the placement of manufactured homes. The subdivision standards require compliance with the general and specific standards outlined in the previous two sections.

The West Feliciana Parish Code of Ordinances can be found here:
https://www.municode.com/library/la/west_feliciana_parish/codes/code_of_ordinances

Town of Woodville

The Town of Woodville's Planning and Zoning Ordinance includes a "Flood Plain Overlay District" which is to be "governed by the provisions of the Woodville Floodplain Ordinance." Unfortunately, the ordinance was not available for review at the time of this review.

Other Communities

Communities not included in the above review were omitted because the text of the ordinances and regulations was not available through their website or other websites which make these documents available. If these ordinances and regulations are made available at a later time, this section will be updated accordingly.

Land Use Change

Growth within the watershed has been relatively limited. Examining National Land Cover Data (https://www.mrlc.gov/finddata.php) from 2001, 2006, and 2011, the latest available, the watershed

has seen some development but in a limited quantity. From 2001 to 2006 developed land increased by 1.84 square miles. From 2006 to 2011 developed areas increase by about 0.3 square miles, bringing the total for the entire 10 year period to 2.1 square miles or a change of 0.3 percent.

Letters of Map Change

Letters of Map Change are letters that revise the special flood hazard area on a given map panel or panels. A Letter of Map Amendment, or LOMA usually applies to a single property that is higher than the mapped 1%-annual-chance floodplain, but due to limitations of scale or topographic detail appears to be located within the floodplain on the FIRM panel. A Letter of Map Revision is a letter that revises a FIRM panel or panels usually due to a project designed to reduce flood risk in an area. A Letter of Map Revision Based on Fill, or LOMR-F, revises a FIRM panel of panels due to a property having fill placed on it that raises it above the map flood elevation for an area. The number and types of map revisions in a community can provide insight into measures being taken to reduce or manage flood risk, or be an indication that a community's maps are in need of revision. Communities within the Bayou Sara-Thompson Watershed have a total of 77 Letters of Map Change, consisting of 44 LOMAs and 33 LOMR-Fs. Table 12 below illustrates which communities have Letter of Map Change and their types.

Table 12: Letters of Map Change

Community Name	LOMA	LOMR-F
City of Baker	4	2
City of Baton Rouge	3	3
East Baton Rouge Parish	4	1
East Feliciana Parish	1	-
West Feliciana Parish	18	-
Wilkinson County	1	-
City of Zachary	13	27

Hydraulics and Floodplain Analysis

Hydraulics, floodplain, and floodways were reviewed based on the FIS reports, available hydraulic models, and FIRMs. Hydraulic modeling data was not available for any streams within the Bayou Sara Thompson watershed. Upper Cypress Creek was restudied using detailed methods in 2005 however the model could not be located in the engineering library on the MIP. Utilizing the limited hydraulic analysis data available and with engineering judgment, several disconnects in floodplain boundaries along streams were identified, with all of these issues located at county/parish boundaries. No floodway or BFE disconnects were identified in this research.

Mismatches at corporate limits or county boundaries often appear when community-based FIRMs and FISs are compiled together. Several mismatches at corporate limits were apparent including:

- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Sara Bayou. There are no hydrology and hydraulics data available to review for these streams.
- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Thompson Creek. There are no hydrology and hydraulics data available to review for these streams.

- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for West Fork Thompson Creek. There are no hydrology and hydraulics data available to review for these streams.
- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Middle Fork Thompson Creek. There are no hydrology and hydraulics data available to review for these streams.
- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Jews Creek. On the Wilkinson County side the floodplain is defined as Zone A but on the West Feliciana Parish side the floodplain is defined as Zone C. The floodplain needs to be revised based on future analysis.
- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Little Bayou Sara. On the Wilkinson County side the floodplain is defined as Zone X but on the West Feliciana Parish side the floodplain is defined as Zone A. The floodplain needs to be revised based on future analysis.
- The Zone A floodplains do not match at the county boundary between Wilkinson County and West Feliciana Parish for Bell Creek. On the Wilkinson County side the floodplain is defined as Zone X but on the West Feliciana Parish side the floodplain is defined as Zone A. The floodplain needs to be revised based on future analysis.

Flood Risk Assessment

Flood risk assessment data is developed using a FEMA flood loss estimation tool, Hazus. Hazus (www.fema.gov/hazus) is a standardized risk assessment tool that estimates potential losses from a variety of disaster types. For the Bayou Sara-Thompson watershed Hazus was used in conjunction with the 1-percent-annual-chance and 0.2-percent-annual-chance flood depth grids created during the Phase Zero Base Level Engineering analysis to perform a Level 2 analysis for the communities in the watershed. The flood loss estimates that were calculated are expressed in dollar amounts and cover only the portion of the community that falls within the watershed. These estimates should be used to understand relative risk from flood and potential losses. Flood loss estimates provide by this project include asset losses (building and content loss) for residential, commercial, industrial, government, education, and religious uses, as well as business disruption losses. The following section offers a high level discussion of these losses, however communities can dig into the results further by using data found in the Flood Risk Database that will be available upon the completion of this project. Specific data that communities will find useful include the S_Cen_Blk_Ar feature layer and accompanying L_Exposure, L_RA_Results, and L_RA_Summary tables. For additional information on the Flood Risk Database and the data contained within please visit https://www.fema.gov/risk-map-flood-risk-products or download the "Flood Risk Database Technical Reference" (https://www.fema.gov/media-library/assets/documents/34519) and "Flood Risk Database Guidance" (https://www.fema.gov/media-library/assets/documents/34953) from FEMA's website.

Losses From the 1% Annual-Chance Flood

The 1%-annual-chance flood is the standard flood used for mapping flood zones on NFIP FIRM Panels. In the Bayou Sara-Thompson watershed ten of the eleven communities sustained losses during the 1%-annual-chance flood modeled during the BLE analysis, with the Village of Norwood being the exception that sustained no losses. Of the ten communities that did sustain losses the City of Baker saw the greatest losses at more than $38 million while the Town of Woodville saw about $40K in losses. Figure 6 below show the losses for all of the communities in the watershed. For specific loss numbers for each

community see the "TOT_LOSSES" column of the L_RA_Summary table found in the Flood Risk Database.

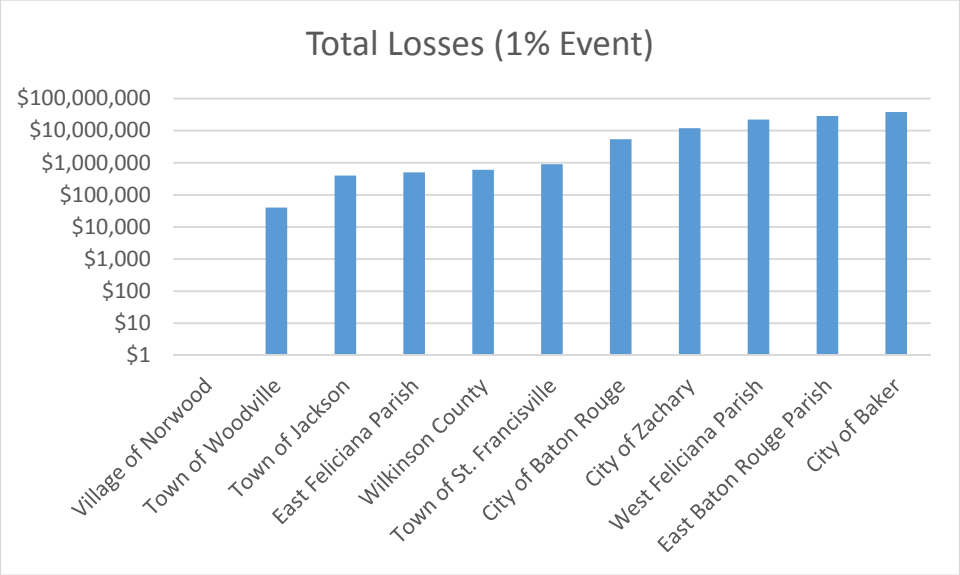

Figure 6: Total Losses for the 1-Percent-Annual-Chance Flood Event

Since communities vary in terms of physical size and population, the total losses incurred during a flood may not reflect the magnitude of the loss. In order to more accurately compare the losses Figures 7 and 8 below normalize the dollar losses for population and the area covered by the community respectively.

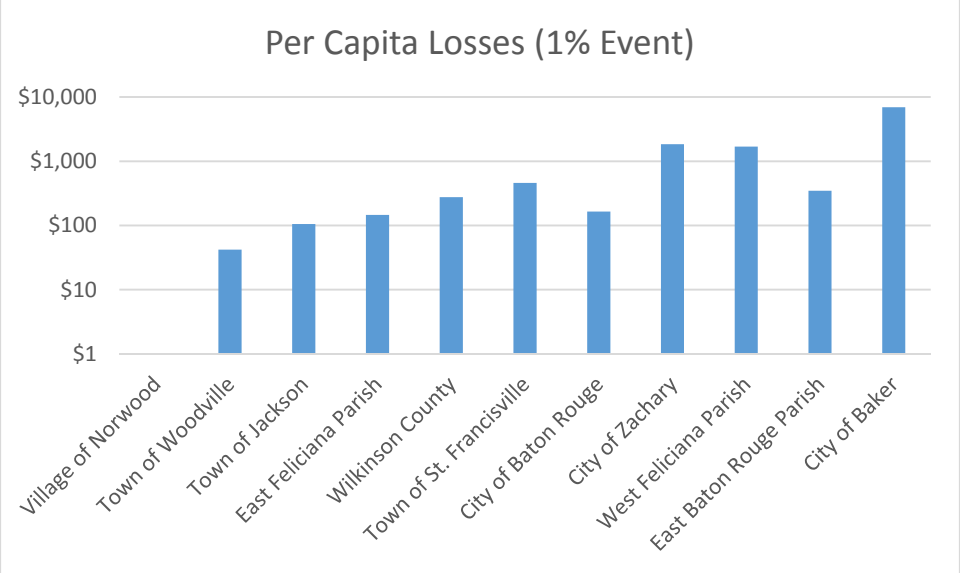

Figure 7: Per Capita Losses for the 1-Percent-Annual-Chance Flood Event

When normailized for population (Figure 7 above), the City of Baker and Town of Woodville maintain their positions in the ranking, but the communities between have changed. For instance, the more densely populated City of Baton Rouge has a lower per person loss amount than the far smaller and less populated Town of St. Francisville.

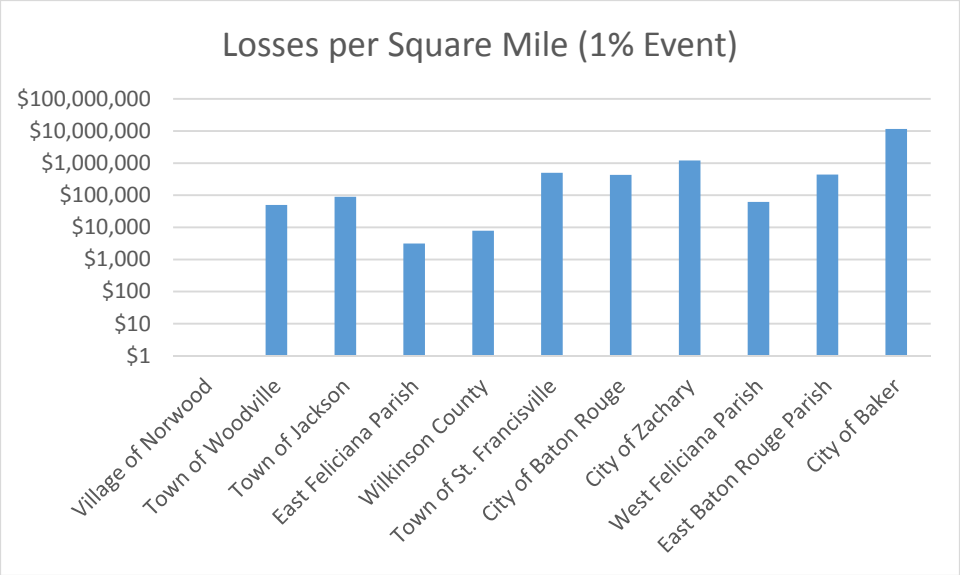

Figure 8: Losses Per Square Mile for the 1-Percent-Annual-Chance Flood Event

When normalized for area (Figure 8 above) the City of Baker continues to show the greatest losses, but the Town of Woodville now finds itself in the middle of the group and East Feliciana Parish finds itself with the lowest losses per square mile of area.

Losses From the 0.2% Annual-Chance Flood

The 0.2%-annual-chance flood is also commonly shown on NFIP FIRM Panels, though it is not used to determine flood insurance rates as the 1%-annual-chance flood zones are. Loss estimates based on the BLE analysis for the 0.2%-annual-chance flood can be found below in Figures 9, 10, and 11.. More detailed data can be found in the Flood Risk Database.

Figure 9 below shows the total dollar losses for each community based on the estimated damage done by the 0.2%-annual-chance flood. Just as with the 1%-annual-chance flood, the Village of Norwood saw no losses, the City of Baker saw the highest losses, the Town of Woodville saw the lowest losses, and the overall ranking in terms of total dollar losses has remained the same while the losses have generally risen for each community with a few exceptions.

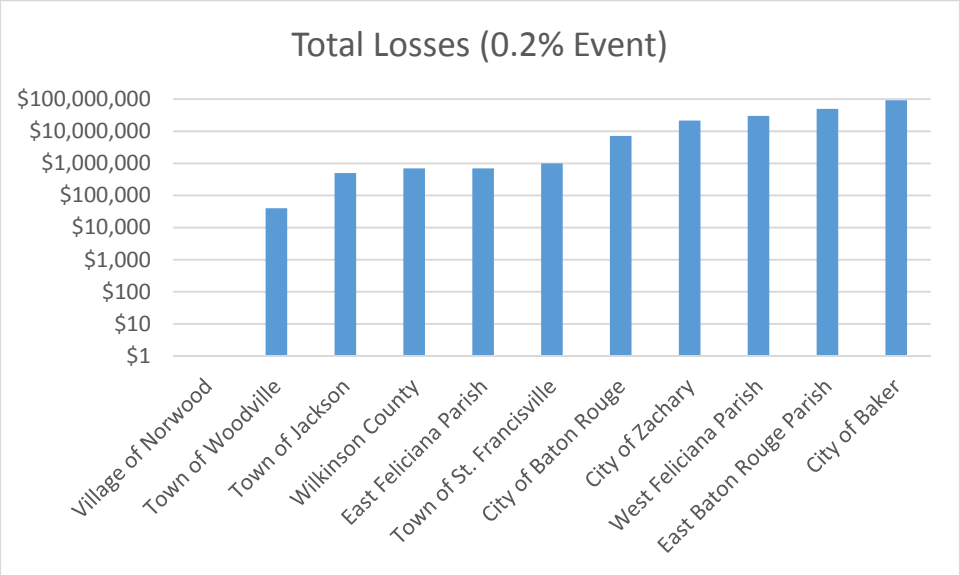

Figure 9: Total Losses for the 0.2-Percent-Annual-Chance Flood Event

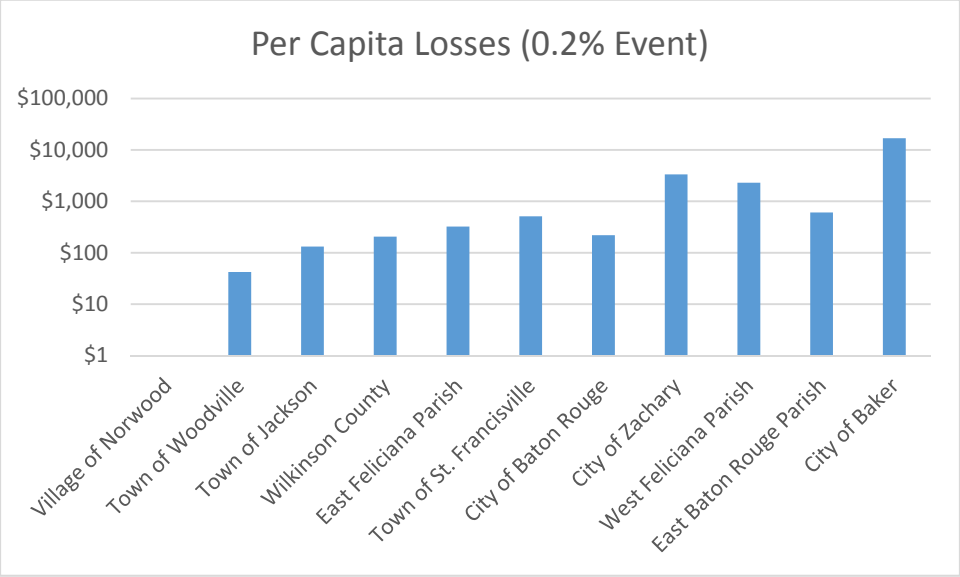

Figure 10: Per Capita Losses for the 0.2-Percent-Annual-Chance Flood Event

Figure 10 above, normailizes the losses based on population. Again the City of Baker continues to show the greatest losses and the Town of Woodville the lowest, but the ranking of the community's inbetween has changed. As before, the City of Baton Rouge has a lower loss rate per person, but communities like the City of Zachary and West Feliciana Parish move up in the rankings as their population density is lower.

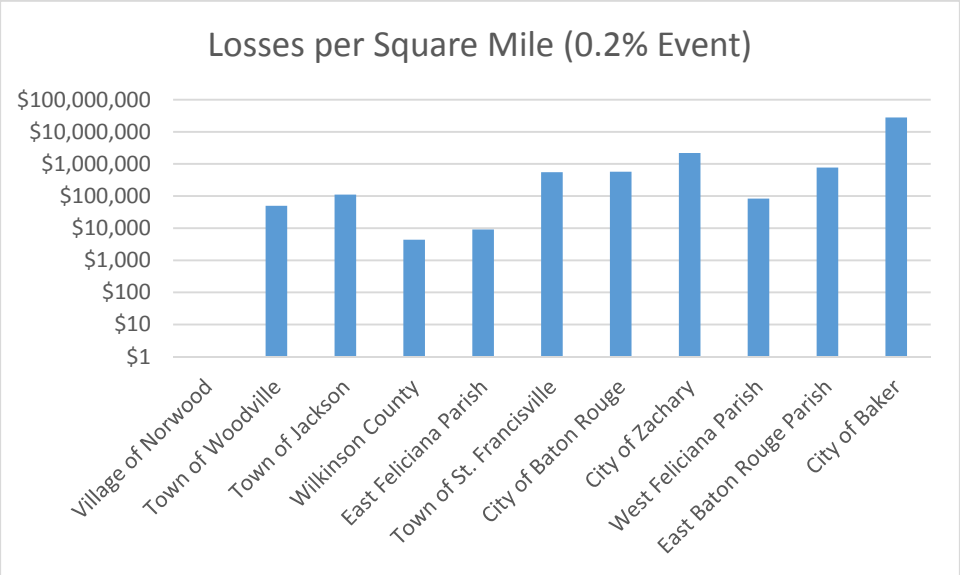

Figure 11: Losses Per Square Mile for the 0.2-Percent-Annual-Chance Flood Event

Discovery Outreach and Meeting

In developing a comprehensive analysis of the Bayou Sara-Thompson watershed, several government agencies and departments contributed information. In March 2017 staff of the Louisiana Department of Transportation and Development and Dewberry, the state's CTP contractor, held a project kickoff meeting. Having finalized a list of community contacts compiled from DOTD information and public sources, the communities within the watershed were first contacted in April 2017 via telephone to inform them on the Discovery Project and to verify contact information. The week of June 19th, 2017 saw the first mailing go out to the communities. This mailing included a Discovery Introduction letter that outlines the purpose and goals of the project, informed the communities that planning was underway for a meeting to be held in late summer or early fall, and asked that they begin sending relevant information to the CTP contractor. The mailing also include a Pre-Discovery newsletter which provided further information on the Discovery process and listed specific kinds of information that the project team could utilize.

In preparation for the Discovery Meeting, the project team held another meeting in July 2017 to review draft deliverables and begin to plan out the Discovery meeting in more detail.

An email to follow up with the communities after the initial mailing was sent on July 26th, 2017. This email reiterated the points made in the mailing and was intended to maintain awareness of the Discovery process.

On August 24, 2017 letters were mailed to all those invited to the Discovery Meeting. The letter discussed the purpose of the Discovery Meeting, stipulated the date, time and location, and asked for any pertinent data to be brought to the meeting. The enclosures to the letter included the Discovery Newsletter and the draft of this Flood Risk Report.

On September 14-19, 2017 phone calls to each community floodplain administrator were made to ensure receipt of the letter and email invitations to the meeting. Most were unsure and an explanation of the meeting purpose was given.

The Discovery Meeting was held on September 20, 2017 from 10:00 AM til 1:00 PM. The West Feliciana Parish Library, 5114 Burnett Road, St. Francisville, LA served as the location.

The meeting room was arranged into four stations with map exhibits on easels in the center of the room. This provided an interactive setting between Project Team staff and the Discovery Meeting attendees. Upon arrival attendees were asked to sign in. The following communities were represented at the meeting:

- City of Baton Rouge
- East Baton Rouge Parish
- East Feliciana Parish
- Town of Jackson
- Village of Norwood
- Town of St. Francisville
- West Feliciana Parish
- Wilkinson County
- Town of Woodville

Attendees rotated around the stations focused on Planning and Grants, NFIP Compliance and Mapping. The following information was provided at each station:

- Planning & Grants – Mitigation Planning information and Information on grant opportunities and community projects. This station was staffed by Jeff Giering, the State Hazard Mitigation Officer at the Governor's Office of Homeland Security and Preparedness (GOHSEP).

- NFIP Compliance Station – Information about the National Flood Insurance Program and Community Rating System

- Mapping Station – Discovery maps illustrating flood risk and flood hazard areas, draft Pre-Discovery Flood Risk Reports. Since this study included BLE data, the CSLF data was also shown on a map comparing the BLE data to the current Effective FIRM data within the watershed. Custom maps for each community were on display depicting the Effective FIRM data and the BLE data overlain in a way for easy comparison with aerial photography as a backdrop.

- Interactive Mapping Station – This station had a computer with an interactive map that allowed Discovery Meeting attendees to enter community concerns by location directly into a Geographic Information System (GIS) database "live" at the meeting. A GIS staff person was provided to run the computer and guide the attendee in providing needed information.

The data collected on the Discovery worksheet forms was also entered into the GIS database after the meeting.

Attendees were asked to contribute information about concerns in the watershed by indicating the location on the large watershed map with a numbered sticker, and to provide a short write-up that was recorded on a comment form. The GIS station allowed attendees to pinpoint areas of concern that were recorded digitally on the watershed map. The activity at the stations was intended to be interactive, with attendees and staff working together to listen, discuss and document any topical items for the watershed. Staff from the Regional Project Team were available at each station to answer questions and engage in conversation with everyone.

No official minutes were recorded during this meeting. Information sheets were collected at each station and the Discovery watershed maps were labeled at locations within the watershed. These sheets are included in the supplemental digital data that accompanies this report. The data from the information sheets was also digitized.

The meeting was overall considered a success. Nine of the 12 communities in the watershed were represented. The LaDOTD District 61 Engineering office responsible for maintenance and drainage issues in this area were represented along with a representative from The Water Institute of the Gulf. Concerns were mostly collected in West Feliciana Parish. They greatly desire new FIRMs.

Figure 12: Map of concerns collected at the Discovery Meeting

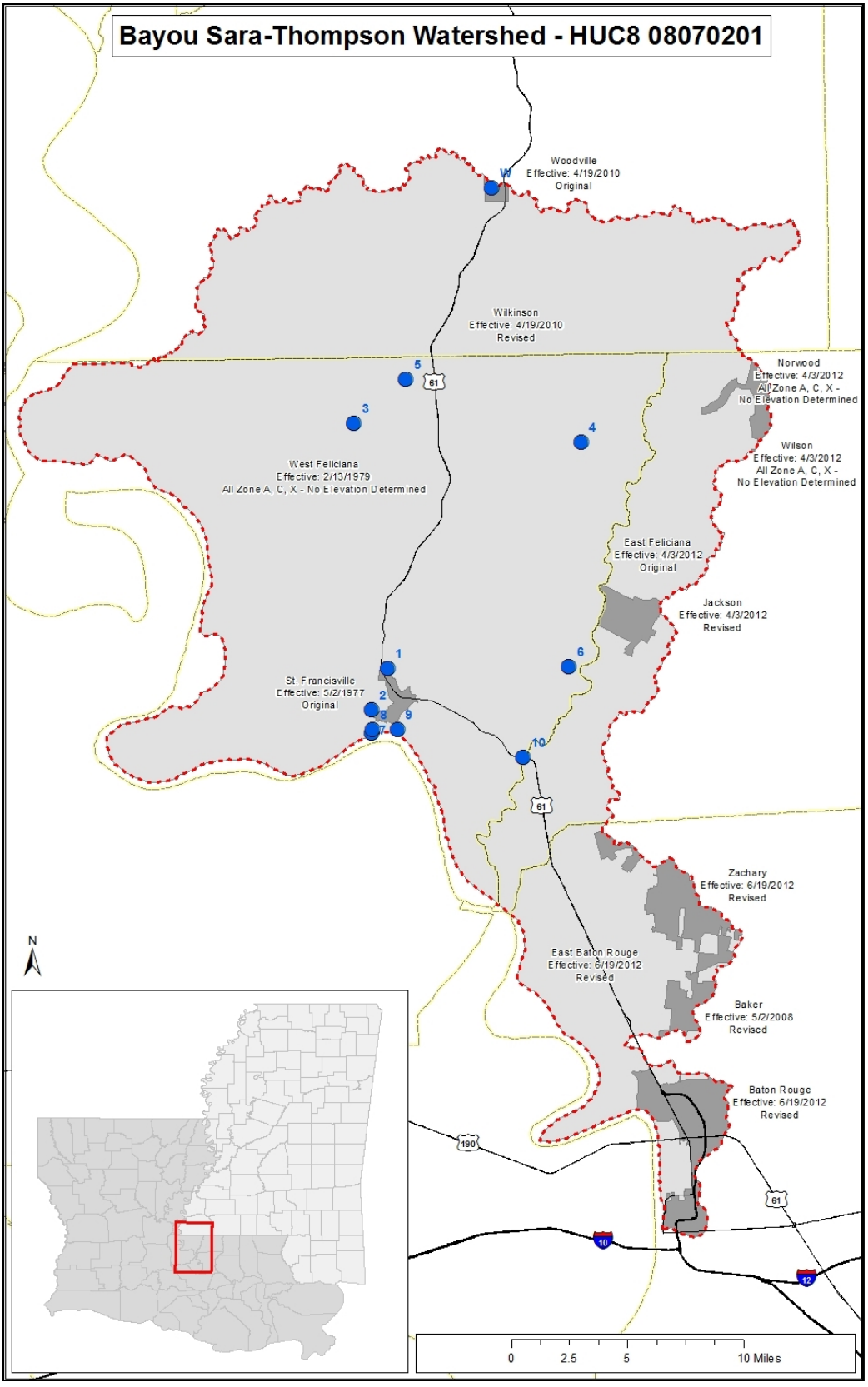

Table 13. Issues and Concerns Collected During the Discovery Process

Item	Location	Information Provided By	Discovery Workshop Comment Summary
1	West Feliciana Parish	Community Official	Hardwood subdivision experiences frequent localized flooding
2	West Feliciana Parish	Community Official	Low water bridge (Mahoney Rd.)
3	West Feliciana Parish	Community Official	Low water bridge (Sligo Rd.)
4	West Feliciana Parish	Community Official	Flooding
5	West Feliciana Parish	Community Official	Lake Rosemound, levee controlled. Private levee above the Rosemound community that could pose risk.
6	West Feliciana Parish	Community Official	Bluffs, Freeland Rd. goes under
7	West Feliciana Parish	Community Official	Access to river from town goes under from Mississippi River
8	West Feliciana Parish	Community Official	Princeville Canning Company Rd.
9	West Feliciana Parish	Community Official	Gate valve drains Princeville Canning Company
10	West Feliciana Parish	Community Official	Bridge closed due to high water on 10/22/2017
W	Town of Woodville	Community Official	Local drainage issues. Undersized culverts, urban concrete, some storm drainage needs.
PW	Parish-wide	Community Official	Bridge restrictions that impact upstream/downstream cause flooding.
PW	Parish-wide	DOTD District 61 Engineers	No concerns in the watershed. Most issues in this district are south of the watershed in Baton Rouge.
PW	Parish-wide	Community Official	East Feliciana Parish feels their maps are accurate and does not request an update at this time.

FEMA Investment Decision

Based on the information collected at the Discovery Meeting, it is recommended that future projects be initiated within the Bayou Sara Thompson Watershed. They are as follows:

1. Advance West Feliciana Parish and the Town of St. Francisville to Phase 2
2. Investigate the City of Baker BLE data differences when compared to Effective data
3. Investigate the mis-matched boundaries and FIRMs in adjacent watersheds to see if Discovery should be initiated.

Appendix I: Community-Specific Reports

The following list depicts the parish and community-specific reports contained within this appendix.

Communities
EAST BATON ROUGE PARISH
EAST BATON ROUGE PARISH UNINCORPORATED AREAS
CITY OF BAKER
CITY OF BATON ROUGE
CITY OF ZACHARY
EAST FELICIANA PARISH
EAST FELICIANA PARISH UNINCORPORATED AREAS
CITY OF JACKSON
WEST FELICIANA PARISH
WEST FELICIANA PARISH UNINCORPORATED AREAS
TOWN OF SAINT FRANCISVILLE
WILKINSON COUNTY
TOWN OF WOODVILLE

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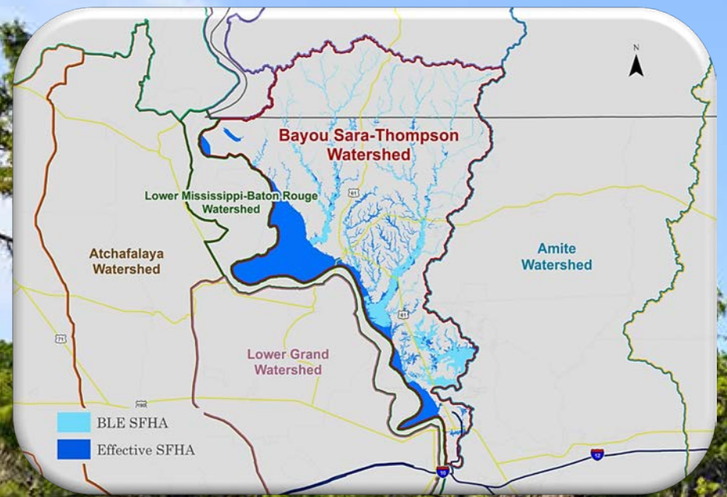
BAYOU SARA-THOMPSON WATERSHED

KNOW YOUR RISK



531.5 sq. miles

in Risk MAP project extent

468,883

Population based on 2010 census

2% avg. expected population growth from 2010-2021

3,077

Total claims for structures repeatedly damaged by flood

15

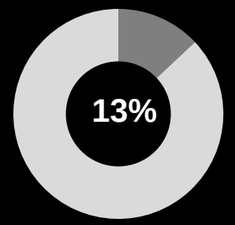
Average years since last effective FIRM

7 communities participating in the National Flood Insurance Program

CNMS Stream Miles

714.6

Stream Miles Detailed Study



55 dams require **Emergency Action Plans**

$84M

in total severe repetitive loss

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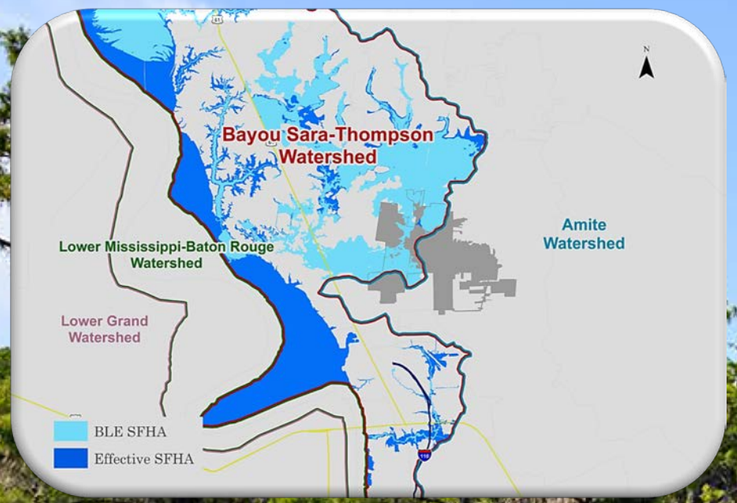
CITY OF BAKER

KNOW YOUR RISK



3.3
Sq. Miles

of the community is in the BLE study area

13,895

Population based on 2010 census

1.1% expected population growth from 2010-2021

57

claims for structures repeatedly damaged by flood

22.7%

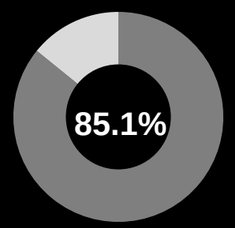
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

10.3

Stream Miles Detailed Study



24

Flood-related presidential disaster declarations in your parish

$1.3M

in severe repetitive loss

CITY OF BAKER

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **Month Day, Year**.

The hazard mitigation goals identified projects for:

- Higher floodplain management standards
- Public awareness programs.
- Installation of a warning system and generators
- Acquisition of floodprone structures
- Design, engineering, and installation of drainage utility infrastructure to minimize or reduce the impact of stormwater

Information about Floodplain Management can be obtained through the Louisiana Floodplain Management Office[1].The office can assist with floodplain ordinance development. Another resource is the Association of State Floodplain Managers' Guide to Higher Regulatory Standards in Floodplain Management[2], which describes stricter measures to minimize flooding impacts. Implementing higher development standards reduces the risk to life and displacement of residents, property, and environment damage, and the burden on community infrastructure and services.

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure, as well as Localized Flood Risk Reduction Projects such as culverts and drainage channel reconstruction. HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Information about FEMA's HMA grants[3] can be found on our website, as well as on the Governor's Office of Homeland Security & Emergency Preparedness[4] website. Parish emergency managers or the State Hazard Mitigation Officer may be contacted for additional information.

Green Infrastructure has become a cost-effective approach for flood loss avoidance in Stormwater Management. It reduces and treats stormwater at its source, while delivering environmental, social, and economic benefits. The **U.S. Environmental Protection Agency** [5] website offers more information on development and funding.

1 http://floods.dotd.la.gov/lafloods/
2 http://www.floods.org/ace-files/documentlibrary/committees/Insurance/ASFPM_Higher_Standards_Reference_Guide_1010.pdf
3 https://www.fema.gov/hazard-mitigation-assistance.
4 http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview.
5. https://www.epa.gov/green-infrastructure

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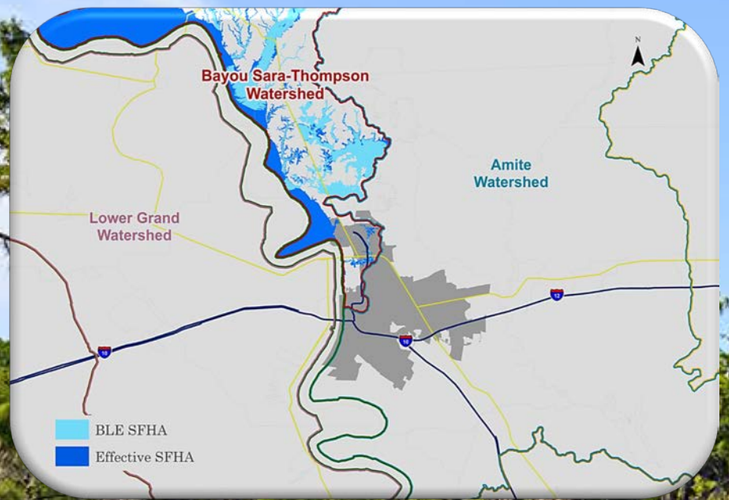
CITY OF BATON ROUGE

KNOW YOUR RISK



12.6
Sq. Miles

of the community is in the BLE study area

229,493

Population based on 2010 census

1.1% expected population growth from 2010-2021

2,846

claims for structures repeatedly damaged by flood

12.6%

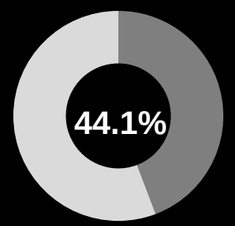
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

110.5

Stream Miles Detailed Study



24

Flood-related presidential disaster declarations in your parish

$78.7M

in severe repetitive loss

CITY OF BATON ROUGE

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **Month Day, Year**.

The hazard mitigation goals identified projects for:

- Public awareness programs
- Installation of a warning system
- Design, engineering, and installation of drainage utility infrastructure to minimize or reduce the impact of stormwater.

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure, as well as Localized Flood Risk Reduction Projects such as culverts and drainage channel reconstruction. HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Information about FEMA's HMA grants[1] can be found on our website, as well as on the Governor's Office of Homeland Security & Emergency Preparedness[2] website. Parish emergency managers or the State Hazard Mitigation Officer may be contacted for additional information.

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1 https://www.fema.gov/hazard-mitigation-assistance.
2 http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview.
3. https://www.epa.gov/green-infrastructure

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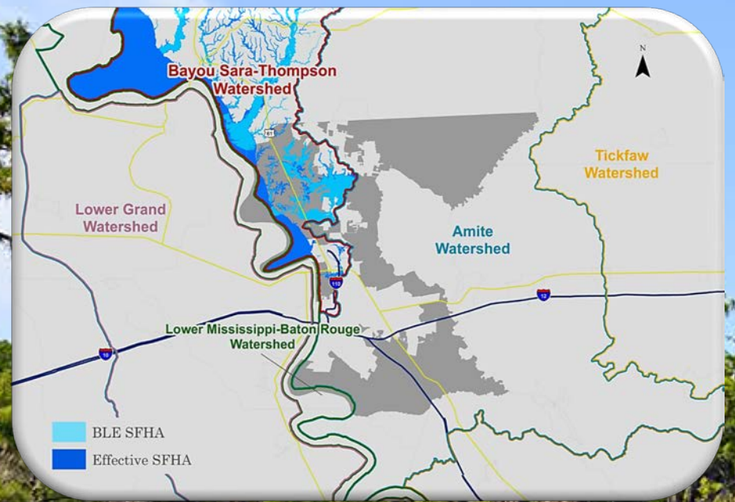
EAST BATON ROUGE PARISH

KNOW YOUR RISK



64.5
Sq. Miles

of the community is in the BLE study area

169,919

Population based on 2010 census

-0.1% expected population growth from 2010-2021

2,846

claims for structures repeatedly damaged by flood

18.8%

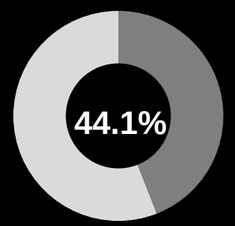
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

110.5

Stream Miles Detailed Study



24

Flood-related presidential disaster declarations in your parish

$78.7M

in severe repetitive loss

EAST BATON ROUGE PARISH

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **Month Day, Year**.

The hazard mitigation goals identified projects for:

- Public awareness programs
- Installation of a warning system
- Design, engineering, and installation of drainage utility infrastructure to minimize or reduce the impact of stormwater.

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure, as well as Localized Flood Risk Reduction Projects such as culverts and drainage channel reconstruction. HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Information about FEMA's HMA grants[1] can be found on our website, as well as on the Governor's Office of Homeland Security & Emergency Preparedness[2] website. Parish emergency managers or the State Hazard Mitigation Officer may be contacted for additional information.

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2 http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview.
3. https://www.epa.gov/green-infrastructure

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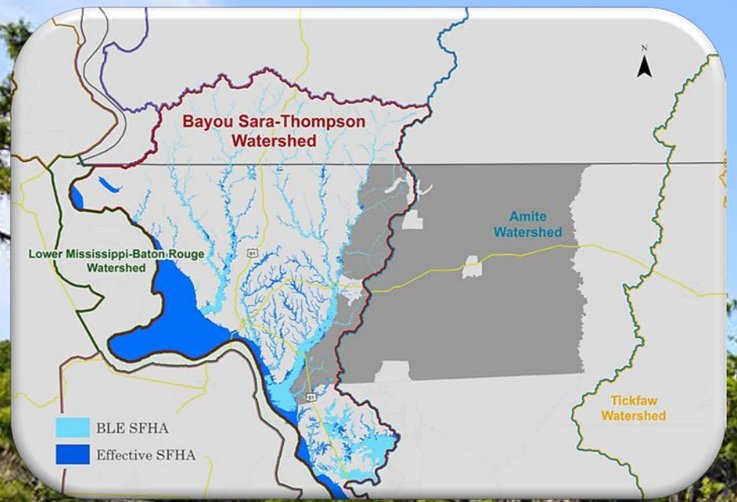
EAST FELECIANA PARISH

KNOW YOUR RISK



76.7
Sq. Miles

of the community is in the BLE study area

13,007

Population based on 2010 census

1.7% expected population growth from 2010-2021

8

total number of NFIP insurance claims

12.2%

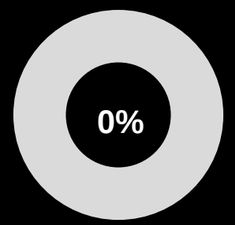
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

147.8

Stream Miles Detailed Study



17

Flood-related presidential disaster declarations in your parish

$573K

total amount in NFIP insurance claims

EAST FELECIANA PARISH

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **September 27, 2016**.

The hazard mitigation goals identified projects for:

- Upgrade the generators at critical facilities
- Develop a CWPP and fire management program
- Higher floodplain management standards

FEMA's Pre-Disaster Mitigation Grant and the Flood Mitigation Assistance Grant allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Information about FEMA's HMA grants[1] can be found on our website, as well as on the Governor's Office of Homeland Security & Emergency Preparedness[2] website. Parish emergency managers or the State Hazard Mitigation Officer may be contacted for additional information.

The U.S. Forest Service can provide resources on vegetation management planning and techniques[3]. The Bureau of Land Management has resources as well.[4] Community Wildfire Protection Plans (CWPPs) are a mechanism for communities to address their wildfire risk. These plans promote collaboration and local action to prioritize fuel reduction and reduction of wildfire risk to structures. The National Fire Protection Association's (NFPA) FireWise program encourages communities to develop an action plan that guides risk reduction activities, while engaging and encouraging residents to become active participants in building a safer place to live. The program offers training, outreach materials, and recognitions[5].

Information about Floodplain Management can be obtained through the Louisiana Floodplain Management Office[6].The office can assist with floodplain ordinance development. Another resource is the Association of State Floodplain Managers' Guide to Higher Regulator Standards in Floodplain Management[7], which describes stricter measures to minimize flooding impacts. Implementing higher development standards reduces the risk to life and displacement of residents, property, and environment damage, and the burden on community infrastructure and services.

[1] https://www.fema.gov/hazard-mitigation-assistance.
[2] http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview
[3] http://www.fs.fed.us/forestmanagement/
[4] http://www.blm.gov/nifc/st/en/prog/fire/fuelsmgmt.html
[5] http://www.firewise.org/usa-recognition-program.aspx
[6] http://floods.dotd.la.gov/lafloods/
[7] (http://www.floods.org/ace-files/documentlibrary/committees/Insurance/ASFPM_Higher_Standards_Reference_Guide_1010.pdf

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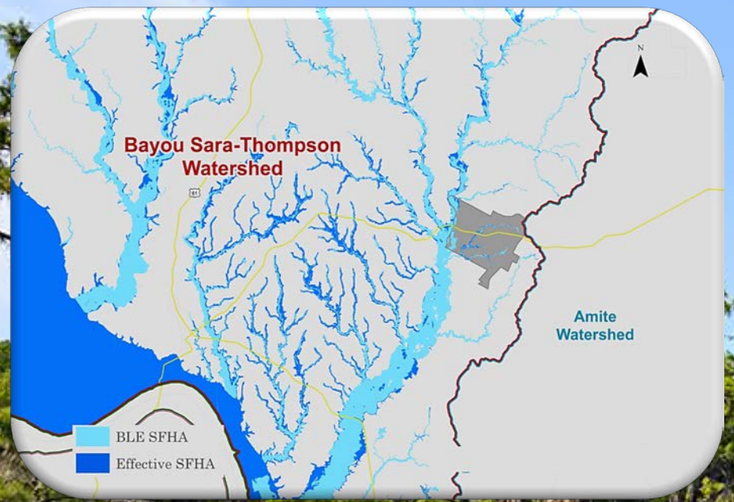
CITY OF JACKSON

KNOW YOUR RISK



4.5
Sq. Miles

of the community is in the BLE study area

3,842

Population based on 2010 census

-3.3% expected population growth from 2010-2021.

2

total number of NFIP insurance claims

9.8%

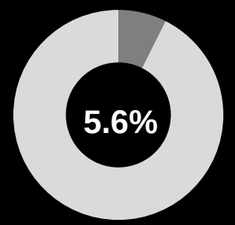
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

21.8

Stream Miles Detailed Study



17

Flood-related presidential disaster declarations in your parish

$85K

total amount in NFIP insurance claims

CITY OF JACKSON

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **September 27, 2016**.

The hazard mitigation goals identified projects for:

- Public facilities improvement
- Update generators at critical facilities
- Enact additional floodplain management standards

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure. HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness. Information about FEMA's HMA grants can be found here[1]. Contact your Parish Emergency Manager or State Hazard Mitigation Officer[2] for more information.

Information about Floodplain Management can be obtained through the Louisiana Floodplain Management Office[3]. The office can assist with floodplain ordinance development. Another resource is the Association of State Floodplain Managers' Guide to Higher Regulatory Standards in Floodplain Management[4], which describes stricter measures to minimize flooding impacts. Implementing higher development standards reduces the risk to life and displacement of residents, property and environmental damage, and the burden on community infrastructure and services.

[1] https://www.fema.gov/hazard-mitigation-assistance
[2] http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview
[3] http://floods.dotd.la.gov/lafloods/
[4] http://www.floods.org/ace-files/documentlibrary/committees/Insurance/ASFPM_Higher_Standards_Reference_Guide_1010.pdf

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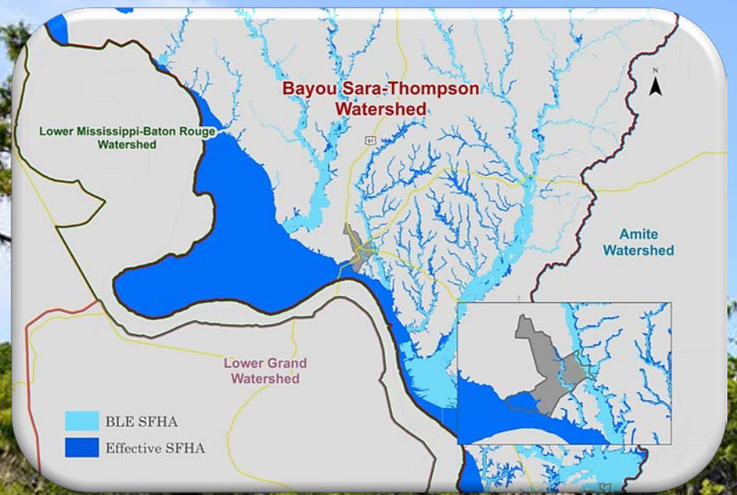
TOWN OF SAINT FRANCISVILLE

KNOW YOUR RISK



1.8
Sq. Miles

of the community is in the BLE study area

1,765

Population based on 2010 census

-4.7% expected population growth from 2010-2021

7

claims for structures repeatedly damaged by flood

40

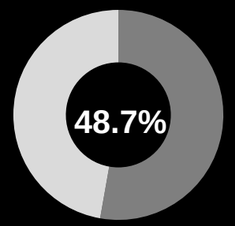
Years since last effective FIRM

Participating in the National Flood Insurance Program.

CNMS Stream Miles

3.9

Stream Miles Detailed Study



19

Flood-related presidential disaster declarations in your parish

$131K

in severe repetitive loss

TOWN OF SAINT FRANCISVILLE

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **March 8, 2017**.

The hazard mitigation goals identified projects for:

- Elevate existing structures in floodprone areas

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness. Information about FEMA's HMA grants can be found here[1]. Contact your Parish Emergency Manager or State Hazard Mitigation Officer[2] for more information.

1 https://www.fema.gov/hazard-mitigation-assistance
2 http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview

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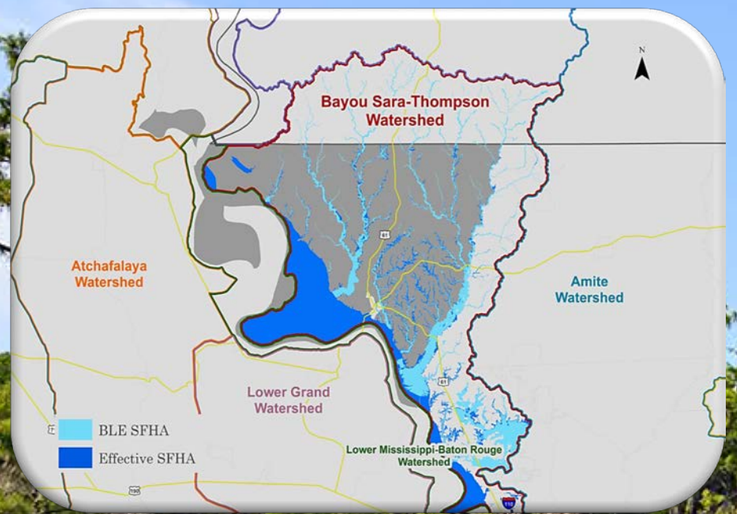
WEST FELICIANA PARISH

KNOW YOUR RISK



358.4
Sq. Miles

of the community is in the BLE study area

13,860

Population based on 2010 census

3.6% expected population growth from 2010-2021

47

claims for structures repeatedly damaged by flood

0.1%

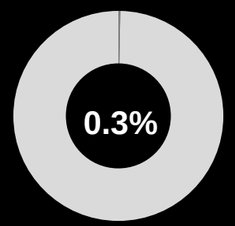
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

377

Stream Miles Detailed Study



19

Flood-related presidential disaster declarations in your parish

$1.1M

in severe repetitive loss

WEST FELICIANA PARISH

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **March 8, 2017**.

The hazard mitigation goals identified projects for:

- Roadway and subdivision drainage improvements
- Obtain generators for critical facilities
- Retrofit critical facilities
- Installation of flood protection structures
- Vegetation maintenance in fire-prone areas

FEMA's Mitigation Assistance (HMA) Grants[1], the Hazard Mitigation Grant Program[2], the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure, as well as Localized Flood Risk Reduction Projects such as culverts and drainage channel reconstruction. The HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Localized flood-risk reduction structures and the acquisition of floodprone properties are also eligible projects under HMGP and PDM.

The U.S. Forest Service can provide resources on vegetation management planning and techniques[3]. The Bureau of Land Management has resources as well[4]. Community Wildfire Protection Plans (CWPPs) are a mechanism for communities to address their wildfire risk. These plans promote collaboration and local action to prioritize fuel reduction and reduction of wildfire risk to structures. The National Fire Protection Association's (NFPA) FireWise program encourages communities to develop an action plan that guides risk reduction activities, while engaging and encouraging residents to become active participants in building a safer place to live. The program offers training, outreach materials, and recognitions[5].

[1] Information about FEMA's HMA grants can be found at https://www.fema.gov/hazard-mitigation-assistance.
[2] http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview
[3] Additional information can be found at http://www.fs.fed.us/forestmanagement/
[4] http://www.blm.gov/nifc/st/en/prog/fire/fuelsmgmt.html
[5] http://www.firewise.org/usa-recognition-program.aspx

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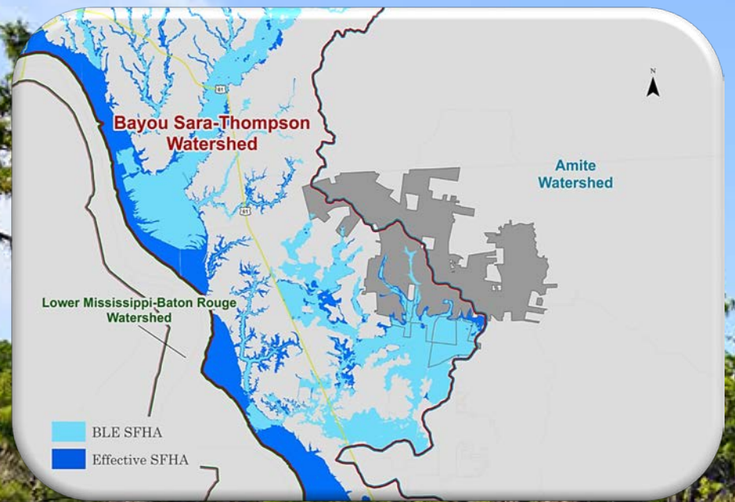
CITY OF ZACHARY

KNOW YOUR RISK



9.8
Sq. Miles

of the community is in the BLE study area

14,960

Population based on 2010 census

15.1% expected population growth from 2010-2021

98

claims for structures repeatedly damaged by flood

26.8%

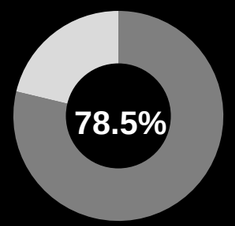
of the area being studied is floodprone during a 1% annual chance storm event

Participating in the National Flood Insurance Program.

CNMS Stream Miles

13.0

Stream Miles Detailed Study



24

Flood-related presidential disaster declarations in your parish

$3.1M

in severe repetitive loss

CITY OF ZACHARY

TAKE ACTION: Potential Next Step

Your Hazard Mitigation Plan is set to expire **Month Day, Year**.

The hazard mitigation goals identified projects for:

- Install back up generators
- Public building/utilities improvement
- Obtain and install a public warning system
- Design, engineering, and installation of drainage utility infrastructure to minimize or reduce the impact of stormwater

FEMA's Mitigation Assistance (HMA) Grants, the Hazard Mitigation Grant Program, the Pre-Disaster Mitigation Grant, and the Flood Mitigation Assistance Grant all allow for retrofits to existing structures and infrastructure, as well as Localized Flood Risk Reduction Projects such as culverts and drainage channel reconstruction. HMGP and PDM allow for the funding of generators. There may be eligibility, benefit cost analysis, and cost-share requirements. The 5% Initiative in the HMGP is used for projects for which it may be difficult to conduct a standard BCA to prove cost-effectiveness, such as emergency notification or sirens. Information about FEMA's HMA grants[1] can be found on our website, as well as on the Governor's Office of Homeland Security & Emergency Preparedness[2] website. Parish emergency managers or the State Hazard Mitigation Officer may be contacted for additional information.

Green Infrastructure has become a cost-effective approach for flood loss avoidance in Stormwater Management. It reduces and treats stormwater at its source, while delivering environmental, social, and economic benefits. The U.S. Environmental Protection Agency [3] website offers more information on development and funding.

[1] https://www.fema.gov/hazard-mitigation-assistance
[2] http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview
3. https://www.epa.gov/green-infrastructure

Appendix II: Resources

State Partners

Organization/Title	Name	Partner Location	Contact Information
Louisiana Department of Transportation & Development State NFIP Coordinator	Cindy O'Neal, CFM	P.O. Box 94245 Baton Rouge, LA 70804	Phone: 225-379-3005 Email: cindy.oneal@la.gov Web Page: http://floods.dotd.la.gov
Mississippi Emergency Management Agency State NFIP Coordinator	Al Goodman Jr., CFM	P.O. Box 4501 Fondren Station Jackson, MS 39296	Phone: 601-366-6325 Email: agoodman@mema.ms.gov Web Page: http://www.msema.org/floodplain-management/
Louisiana Governor's Office of Homeland Security and Emergency Preparedness State Hazard Mitigation Officer	Jeffrey Giering, CFM	1201 Capitol Access Rd. Baton Rouge, LA 70802	Phone: 225-379-3005 Email: jeffrey.giering@la.gov Web Page: http://gohsep.la.gov
Mississippi Emergency Management Agency State Hazard Mitigation Officer	Bob Boteler, CFM	P.O. Box 4501 Fondren Station Jackson, MS 39296	Phone: 601-366-5706 Email: bboteler@mema.ms.gov- Web Page: http://www.msmema.org

Watershed Follow-up Points of Contact

Subject/Topic of Interest	Name	Contact Information
FEMA Project Monitor *Project Outreach*	Diane Howe Risk Analysis Branch FEMA Region 6	Phone: 940-898-5171 Email: diane.howe@fema.dhs.gov
• Floodplain Management • Floodplain Ordinance • Community Assistance Visits • Higher Standards	John Miles, Jr.	Phone: 840-297-0185 Email: john.milesjr@fema.dhs.gov
• Community Rating System • Flood Insurance	Jonathan Smith	Phone: 228-235-6506 Email: jsmith@iso.com
• How to find and read FIRMs • Letters of Map Change and Elevation Certificates • Flood zone disputes • Mandatory insurance purchase guidelines • Map Service Center (MSC) & National Food Hazard Layer	FEMA Map Information eXchange	Phone: 877-FEMA-MAP (336.2627) Email: FEMAMapSpecialist@riskmapcds.com Live Chat: https://www.floodmaps.fema.gov/fhm/fmx_main.html

Governor's Office of Homeland Security and Emergency Preparedness

http://gohsep.la.gov/

Louisiana is a high-risk state for emergency events and disasters. The Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) is the agency responsible for coordinating the state's efforts throughout the emergency management cycle to prepare for, prevent where possible, respond to, recover from, and mitigate against to lessen the effects of man-made or natural disasters that threaten the state. GOHSEP can save lives and reduce property damage by understanding risks and taking action to address those risks, as well as minimizing disaster impacts and increasing the resiliency in our communities, environment, and economy.

HELPFUL LINKS:

FLOOD INDEX: http://gohsep.la.gov/ABOUT/LOUISIANA-HAZARDS-THREATS/FLOODING

GOHSEP CONTACTS: http://gohsep.la.gov/ABOUT/CONTACT-US/GOHSEP-CONTACTS

FLOOD MITIGATION ASSITASTANCE GRANT PROGRAM: http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance

GOHSEP MITIGATION PLANNING: http://getagameplan.org/planMitigate.htm

Louisiana Department of Transportation and Development

http://floods.dotd.la.gov

The Louisiana Department of Transportation and Development (DOTD) is the State Coordinating Agency for the NFIP as designated by the Governor. The purpose of the program is to promote local government compliance with NFIP regulations to ensure the availability of low-cost flood insurance, and in doing so, minimize loss of life and property due to catastrophic flooding. This is accomplished through on-site assessments, distribution of a quarterly newsletter, conducting workshops, providing technical assistance on local government ordinance development, and participation in post-disaster Flood Hazard Mitigation activities.

DOTD FLOOD INFORMATION & RESOURCES

Louisiana Floodplain Management Desk Reference—The Louisiana Floodplain Management Desk Reference is a comprehensive guide that gives detailed information on administering floodplain ordinances at the community level.

POINTS OF CONTACT:

Cindy O'Neal, CFM
State NFIP Coordinator
Phone: 225-379-3005
Fax: 225-379-3002
Email: cindy.oneal@la.gov

Mississippi Emergency Management Agency

http://www.msema.org/floodplain-management/

The Mississippi Emergency Management Agency (MEMA) is the designated the state agency for NFIP. The flood management branch has responsibility for the 312 communities that participate in the NFIP and the 23 communities that belong to the Community Rating System. We continue our commitment to reducing flood losses and preserving natural floodplain functions by embracing the broad and ever-changing field of floodplain management, flood hazard mitigation and the requirements of NFIP..

MEMA FLOOD INFORMATION & RESOURCES

http://www.msema.org/floodplain-management/nfip/

POINTS OF CONTACT:

Al Goodman, Jr., CFM
State NFIP Coordinator
Phone: 601-366-6325
Fax: 601-366-5349
Email: agoodman@mema.ms.gov

Floodplain Management Associations

The LFMA and AFMM are organizations of professionals involved in floodplain management, flood hazard mitigation, the NFIP, flood preparedness, warning, and disaster recovery. The associations includes flood hazard specialists from local, state, and federal governments; the mortgage, insurance and research communities; and the associated fields of flood zone determination, engineering, hydraulic forecasting, emergency response, water resources, geographic information systems, and others.

Organization	Contact Information	Website
Louisiana Floodplain Management Association (LFMA)	Phone: 318-226-6934	http://lfma.org
Association of Floodplain Managers of Mississippi (AFMM)	Phone: 601-408-7426	http://msafmm.org

Certified Floodplain Manager (CFM) Certification

The Association of State Floodplain Managers (ASFPM) established a national program for certifying floodplain managers. This program recognizes continuing education and professional development that enhances the knowledge and performance of local, state, federal, and private-sector floodplain management professionals.

The role of the nation's floodplain managers is expanding due to increases in disaster losses, the emphasis on mitigation to alleviate the cycle of damage-rebuild-damage, and a recognized need for professionals to adequately address these issues. This certification program will lay the foundation for ensuring that highly qualified individuals are available to meet the challenge of breaking the damage cycle and stopping its negative drain on the nation's human, financial, and natural resources.

CFM® is a registered trademark and available only to individuals certified and in good standing under the ASFPM Certified Floodplain Manager Program.

For more information, you may want to review these available CFM Awareness Videos:

- What is the CFM Program?
- Who can be a CFM?
- What are the Benefits of a CFM?

Study materials for those interested in applying for the CFM certification can be found on the ASFPM Website at: http://www.floods.org/index.asp?menuID=215.

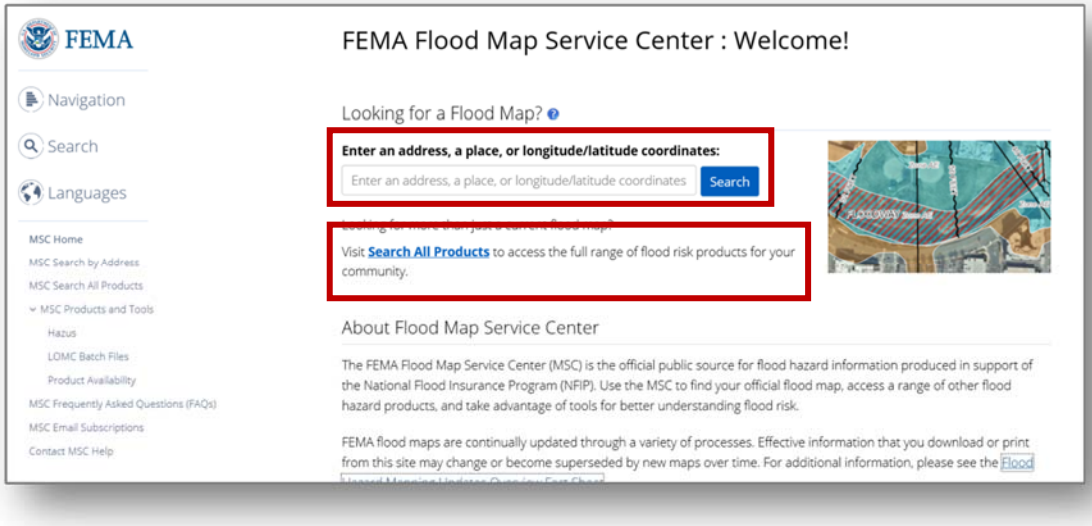
Map Service Center – Preliminary Map Data

The FEMA Flood Map Service Center (MSC) is the official public source for flood hazard information produced in support of the NFIP. Use the MSC to find your official effective flood map, preliminary flood maps, and access a range of other flood hazard products.

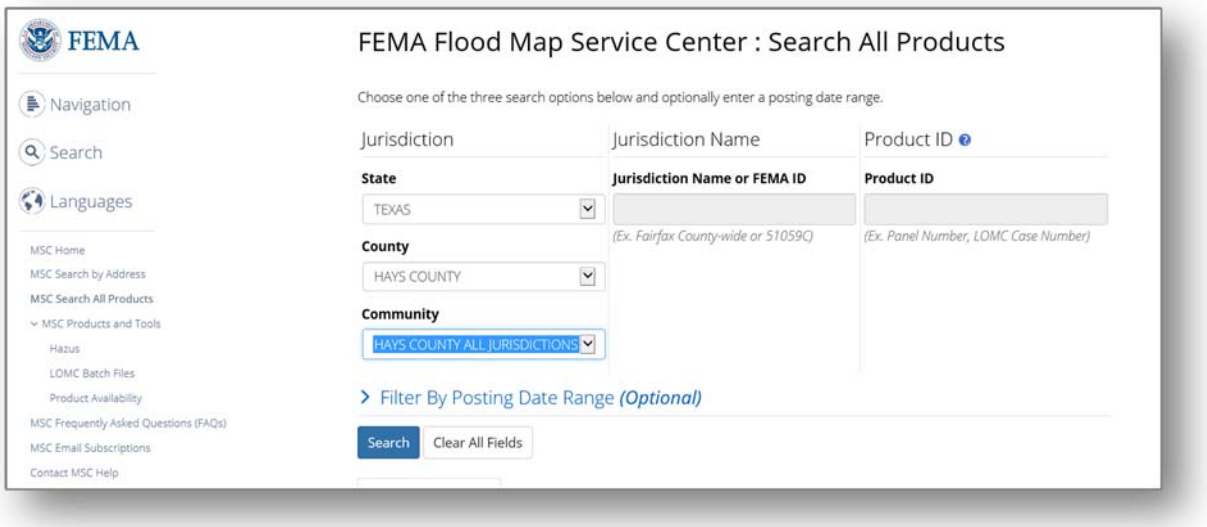
FEMA flood maps are continually updated through a variety of processes. Effective information that you download or print from this site may change or become superseded by new maps over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet.

At the Map Service Center, there are two ways to locate flood maps in your vicinity.

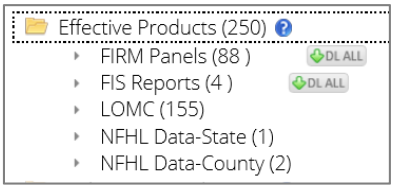
1. Enter an address, place name, or latitude/longitude coordinates and click search. This will provide the current effective FIRM panel that the location exists on.
2. Or Search All Products, which will provide access to the full range of flood risk information available.



Visiting the more advanced search option, “Search All Products,” users may access current, preliminary, pending, and historic flood maps. Additionally, GIS data and flood risk products may be accessed through the site with these few steps.



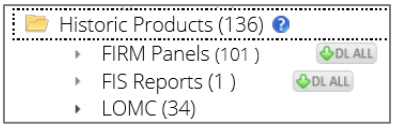
Using the pull down menus, select your state, county, and community of interest. For this example, we selected Hays County - All Jurisdictions. After the search button is selected, the Map Service Center will return all items in the area. There are five types of data available.



Effective Products. The current effective FIS, FIRM, and DFIRM database (if available) is available through the MSC. If users click on the available effective products they are presented a breakdown of the available products. FIRM panels, FIS reports, Letters of Map Revision, statewide NFHL, and countywide NFHL data may be available, as indicated in the breakdown on the right.

Preliminary Products. Once a project area has been issued preliminary products, the FIRM panels, FIS report, and preliminary DFIRM database are available for download.

Pending Products. After the appeal and comment period is held and the received appeals and comments are incorporated, the Letter of Final Determination (LFD) is issued, establishing an effective issuance date for the study. Panels are available here once an LFD is issued.



Historic Products. A range of historic flood hazard maps, FIS texts, and LOMCs are available through the MSC.

Flood Risk Products. The Flood Risk Report, Flood Risk Map, and Flood Risk Database will be made available through the MSC once they have been compiled and completed. These products are made available after the flood study analysis and mapping have been reviewed and community comments can be incorporated.