



Flood Risk Report

Tickfaw Watershed

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FEMA

Flood Risk Report History

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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 those risks, and communicate those risks to their residents and local businesses. Flood risk often extends beyond community limits. This report provides flood risk data for the Tickfaw Watershed.

Flood risk is always changing, and studies, reports, or other sources may be available that provide more comprehensive information. This report is not intended 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 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 an updated flood hazard analysis of the Tickfaw 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:

- Updating local hazard mitigation plans (HMPs) and community comprehensive plans;
- Updating emergency operations and response plans;
- Communicating risk;
- Informing the modification of development standards; and
- Identifying mitigation projects.

Most important, 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.

About the Tickfaw Watershed

The Tickfaw study area intersects both Louisiana and Mississippi and covers several communities including twelve municipalities (Albany, Amite City, Greensburg, Hammond, Independence, Killian, Livingston, Montpelier, Ponchatoula, Roseland, Springfield, and Tickfaw) and four counties/parishes (Amite, Livingston, St. Helena, and Tangipahoa). The first FEMA flood hazard mapping for the watershed was released over 40 years ago. Since that time, the communities have received updated mapping, the most recent being in 2013. Catastrophic flooding occurred in August 2016, when over 20 inches of rain fell when the rivers and streams reached record levels.



Figure 1: Flooding in Livingston Parish

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 Tickfaw Watershed in September 2017. 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.

In April 2018 the Louisiana Department of Transportation and Development (LA DOTD) 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 migration 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.”

For more information about ways your community can take action or take advantage of available resources, please review the attached appendices.

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 normally dry areas. Floods become hazardous to people and property when they inundate an area where development has occurred, causing losses. Mild flood losses may have little impact on people or property, such as damage to landscaping or the accumulation of unwanted debris. Severe flood losses can destroy buildings and crops and cause severe 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 affecting the probability that a flood will have an impact on an area range from changing weather patterns to the existence of mitigation projects. 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 body of water 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 HMPs and community comprehensive plans** – Planners can use risk information to develop and/or update HMPs, 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. They help 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 Tickfaw Watershed represents a complex network of small ponds, creeks, and shallow pools that connect to form the larger whole. The Tickfaw River is the main tributary of the watershed. It starts in Amite County, MS, flows south through St. Helena Parish, then Livingston Parish, and then drains into Lake Maurepas. The watershed flows into Lake Maurepas, which is combined with Lake Pontchartrain. The Tickfaw watershed is one of the main sources of freshwater inflow into Lake Pontchartrain.



Figure 2: Overview map for the Tickfaw Watershed

Between 2010 and 2016, the population of the Tickfaw Watershed experienced some growth, experiencing an overall growth rate of 4.4%. This growth was mainly in Tangipahoa Parish and its incorporated communities, Town of Amite City, City of Hammond, Town of Independence, City of Ponchatoula, Town of Roseland, and the Village of Tickfaw. This growth is focused primarily on the eastern edge of the watershed.

Table 1: Population and Area Characteristics ¹

Risk MAP Project	Total Population	Average % Population Growth/Yr (2010-2016)	Land Area	Developed Area	Open Water
Tickfaw	96,856	4.4%	658.8 sq. mi.	9.7%	0.53%

To help mitigate the risk to areas where increased population and development are expected, communities can adopt (or exceed) the minimum standards of the National Flood Insurance Program

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

(NFIP). This is recommended as a proactive strategy to manage construction within the floodplain and avoid negative impacts to existing and future development.

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 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 actions.

Communities can review their current ordinances and 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.

Participating NFIP Communities/ Total Communities	Number of CRS Communities	CRS Rating Class Range	Policies In CRS Communities	Average Years since FIRM Update	Level of Regulations (44 CFR 60.3)
16/16	2	9	22,645	6.8	CFR 60.3d

Table 2: NFIP and CRS Participation ²

The number of dams impacting the Tickfaw Watershed is reflected in Table 3. There are very few dams in the watershed, most are very small, with an average of 109.2 acre-feet of storage in their respective reservoirs.

Table 3: Risk MAP Project Dam Characteristics³

Risk MAP Project	Total Number of Identified Dams	Number of Dams Requiring EAP	Percentage of Dams without EAP	Average Years since Inspection	Average Storage (acre-feet)
Tickfaw	10	0	0%	8.6	109.2

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.

Project Phases and Map Maintenance

Background

FEMA manages several risk analysis programs, including the Flood Hazard Mapping, National Dam Safety, Earthquake Safety, Multi-Hazard Mitigation Planning, and Risk Assessment Programs, that assess the impact of natural hazards and lead to effective strategies for reducing risk. 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 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, the analysis and awareness of natural hazard risk remains challenging. For communities to make informed risk management decisions and take action to mitigate

FEMA, “Federal Flood Risk Management Standard (FFRMS)” (2015)

² Data should be obtained from FEMA Community Information Systems.

³ Data obtained from the U.S. Army Corps of Engineers (USACE) National Inventory of Dams (June 2018)

risk, a consistent risk-based approach to assessing potential vulnerabilities and losses is needed, as are 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 FIRMs and the National Flood Hazard Layer (NFHL);
- 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; and
- 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 local 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 may be requested at any time to change information on a FIRM, 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 (LOMA). The scale of an effective FIRM does not always provide the information required 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 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 the determination of a site-specific Base Flood Elevation (BFE). Fees are associated with collecting the survey data and developing a site-specific BFE. Local survey and engineering professionals usually provide an Elevation Certificate to the homeowner, who can use it to request a LOMA. A successful LOMA may 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 has 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 Region 6, CTPs are generally statewide agencies that house the State Floodplain Administrator. However, some Region 6 CTPs are also large River Authority 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, which allows the Agency 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 an opportunity to discuss the data that has 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 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 flood plain inventory. FEMA maintains several data systems in order 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. 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 both 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 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 (HMPs). Reviewing current and historic HMPs provides an understanding of a community's comprehension of its flood risk and other natural hazard risks. The mitigation strategies within a local HMP provide a lens to local opportunities and underscore a 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 Tickfaw 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 both entities to develop the project scope and determine the necessary project tasks.



Communities that have identified local issues are encouraged to indicate 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.

Phase One: Discovery

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 with their examination of natural hazard risk throughout their community 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 holistic community approach to risk identification and mapping, FEMA relies heavily on the information and data provided at a 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 currently 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, 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 indicate 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 FIRMs and Flood Insurance Study (FIS) reports 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 reports 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 (CCO) meeting and initiate a 90-day comment and appeal period. During this appeal period, local developers and residents may coordinate the submittal of their comments and appeals through their community 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 risks identified on the FIRMs.



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, collecting information in their own time. This format allows residents to receive one-on-one assistance and ask questions pertinent to their situation or their interest in risk or flood insurance information.

FEMA will review all appeals and comments received during the statutory 90-day appeal period, including the community's written opinion, to determine the validity of the appeal. Once FEMA issues the appeal resolution, the associated community and all appellants will receive an appeal resolution letter and FEMA will make any revisions to the FIRM as appropriate. A 30-day period is 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 six months. The letter also

discusses the actions each affected community participating in the NFIP must take to remain in good standing with the NFIP.

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

Next, the Flood Risk Report will provide details on the efforts in the Tickfaw Watershed.

Phase One: Discovery

Overview

The Louisiana Department of Transportation and Development (LA DOTD) in conjunction with FEMA Region 6 elected to pursue a Phase 1 Discovery project in the Tickfaw Watershed during Fiscal Year 2017 (FY18). This was a natural progression given the completion of the BLE analysis in September 2017 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. Table 4 shows community CRS ratings, the date and status of their effective maps, and the estimated 2016 population. Please note that the population figures represents the population for the entire community and not just the portion in the watershed.

Table 4: NFIP Information⁴

Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2016 ACS Estimate)
Town of Albany	220114	Y	-	4/3/2012		1,429
Amite County	280268	Y	-	9/29/2010		12,692
Town of Amite City	220207	Y	-	7/22/2010		4,321
Town of Greensburg	220330	Y	-	4/2/2013		780
City of Hammond	220208	Y	-	7/22/2010		20,389
Town of Independence	220209	Y	-	7/22/2010	All Zone A, C, X – No Elev	1,704
Town of Killian	220355	Y	-	4/3/2012		1,108
Livingston Parish	220113	Y	9	4/3/2012		135,925
Town of Livingston	220118	Y	-	4/3/2012		1,816
Village of Montpelier	220300	Y	-	4/2/2013		302
City of Ponchatoula	220221	Y	-	7/22/2010		6,944
Town of Roseland	220212	Y	-	7/22/2010	All Zone A, C, X - Original	1,031
Town of Springfield	220120	Y	-	4/3/2012	All Zone A, C, X – No Elev	422
St. Helena Parish	220161	Y	-	4/2/2013		10,714
Tangipahoa Parish	220206	Y	9	7/22/2010		127,115
Village of Tickfaw	220214	Y	-	7/22/2010		715

Table 5 includes both the number of flood insurance policies in each community but the coverage of those policies.

Table 5: NFIP Policy Information⁵

Community Name	CID	Policies in Force	Insurance in Force
Town of Albany	220114	132	\$4,727,600
Amite County	280268	16	\$328,800
Town of Amite City	220207	100	\$2,888,300
Town of Greensburg	220330	4	\$118,700
City of Hammond	220208	1,470	\$34,733,400
Town of Independence	220209	142	\$2,746,900
Town of Killian	220355	229	\$5,131,800
Livingston Parish	220113	15,163	\$328,587,900
Town of Livingston	220118	165	\$4,823,100
Village of Montpelier	220300	8	\$91,000
City of Ponchatoula	220221	507	\$14,073,500
Town of Roseland	220212	12	\$138,400
Town of Springfield	220120	62	\$2,572,500

⁴ FEMA Community Information System (June 2018)

⁵ FEMA Community Information System (June 2018)

Community Name	CID	Policies in Force	Insurance in Force
St. Helena Parish	220161	133	\$2,987,900
Tangipahoa Parish	220206	7,482	\$185,856,100
Village of Tickfaw	220214	81	\$1,242,500

Table 6 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.

Table 6: NFIP Claims Information⁶

Community Name	CID	Claims	Paid Claims	Losses Paid
Town of Albany	220114	28	27	\$2,735,182
Amite County	280268	-	-	-
Town of Amite City	220207	20	14	\$770,910
Town of Greensburg	220330	3	3	\$136,473
City of Hammond	220208	328	204	\$3,669,531
Town of Independence	220209	25	21	\$933,829
Town of Killian	220355	395	350	\$10,860,399
Livingston Parish	220113	9,733	8,544	\$534,869,477
Town of Livingston	220118	40	38	\$1,424,759
Village of Montpelier	220300	2	2	\$209,179
City of Ponchatoula	220211	59	46	\$2,494,898
Town of Roseland	220212	4	1	\$17,629
Town of Springfield	220120	18	16	\$1,131,168
St. Helena Parish	220161	44	31	\$1,974,147
Tangipahoa Parish	220206	2,647	2,237	\$110,744,936
Village of Tickfaw	220214	26	18	\$396,073

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 7: Repetitive Loss Property Information⁷

Community Name	Total Properties	Total Claims	Total Paid Losses	Severe Repetitive Loss Properties
Town of Albany	2	5	\$576,790.66	-

⁶ FEMA Community Information System (June 2018), FEMA Region 6 (June 2018)

⁷ Information obtained from FEMA Region 6 (June 2018)

Community Name	Total Properties	Total Claims	Total Paid Losses	Severe Repetitive Loss Properties
Amite County				
Town of Amite City	-	-	-	-
Town of Greensburg	1	2	\$78,896.09	
City of Hammond	31	77	\$1,522,052.82	3
Town of Independence	3	6	\$326,554.89	
Town of Killian	70	238	\$7,844,744.17	17
Livingston Parish	932	2,977	\$78,149,831.82	206
Town of Livingston	4	8	\$256,712.59	-
Village of Montpelier	-	-	-	-
City of Ponchatoula	6	14	\$1,417,407.84	-
Town of Roseland	-	-	-	-
Town of Springfield	7	27	\$348,179.17	1
St. Helena Parish	5	12	\$525,800.90	-
Tangipahoa Parish	463	1,195	\$57,286,352.47	56
Village of Tickfaw	2	4	\$57,542.59	-

Disaster Declarations

Table 8 lists the Federal Disaster Declaration for the watershed. Disasters are declared at the parish level. In the Tickfaw watershed, Livingston Parish has the largest number of declarations at 32, Tangipahoa has 28, St. Helena Parish has 19, and Amite County has 18. Declarations for flood events include seven for Livingston, six for Tangipahoa, two for St. Helena, and one for Amite.

Table 8: Disaster Declarations in the Watershed⁸

Date	Title	Amite County	Livingston Parish	St. Helena Parish	Tangipahoa Parish
9/10/1965	HURRICANE BETSY	x	x	x	x
8/18/1969	HURRICANE CAMILLE	x			
1/19/1972	HEAVY RAINS & FLOODING	x			
3/27/1973	HEAVY RAINS, TORNADOES & FLOODING	x			
4/27/1973	SEVERE STORMS & FLOODING		x		x
2/22/1977	DROUGHT & FREEZING	x	x	x	x
5/2/1977	SEVERE STORMS & FLOODING		x		x
4/24/1978	TORNADOES	x			
5/2/1979	SEVERE STORMS & FLOODING		x		

⁸ FEMA <https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1> , (April 2018)

Date	Title	Amite County	Livingston Parish	St. Helena Parish	Tangipahoa Parish
4/20/1983	SEVERE STORMS AND FLOODING		x		x
11/1/1985	HURRICANE JUAN		x		x
6/16/1989	SEVERE STORMS & TORNADOES		x	x	x
2/28/1990	SEVERE STORMS, TORNADOES & FLOODING	x			
5/3/1991	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		x
5/10/1995	SEVERE STORMS & FLOODING				x
9/23/1998	HURRICANE GEORGES/TS FRANCES		x		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	x		x
10/3/2002	HURRICANE LILI		x	x	x
2/1/2003	LOSS OF SPACE SHUTTLE COLUMBIA		x		x
4/24/2003	SEVERE STORMS, TORNADOES, FLOODS	x			
6/8/2004	SEVERE STORMS AND FLOODING		x		
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
11/2/2006	SEVERE STORMS AND FLOODING			x	
8/29/2008	HURRICANE GUSTAV	x	x	x	x
9/2/2008	HURRICANE GUSTAV	x	x	x	x
9/13/2008	HURRICANE IKE		x		x
5/12/2009	SEVERE STORMS, FLOODING, AND TORNADOES	x	x		
8/27/2012	TROPICAL STORM ISAAC	x	x	x	x
8/29/2012	HURRICANE ISAAC	x	x	x	x
2/22/2013	SEVERE STORMS AND FLOODING		x		
3/13/2016	SEVERE STORMS AND FLOODING		x	x	x
8/14/2016	SEVERE STORMS AND FLOODING		x	x	x
2/11/2017	SEVERE STORMS, TORNADOES, AND STRAIGHT-LINE WINDS		x		
10/6/2017	TROPICAL STORM NATE		x	x	x

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.

Table 9: Hazard Mitigation Plan Status

Plan	Date Plan Approved	Plan Expiration Date
Livingston Parish Hazard Mitigation Update - 2015	2/21/2016	2/21/2021
MEMA District 7 Regional Hazard Mitigation Plan	Pending Approval	
St. Helena Parish Hazard Mitigation Update - 2015	12/28/2015	12/28/2020
Tangipahoa Parish Hazard Mitigation Update - 2015	12/14/2015	12/14/2020

Livingston Parish

The Livingston Parish Hazard Mitigation Plan Update (2016) is a multi-jurisdictional plan that includes the Village of Albany, Town of Killian, Town of Livingston, and the Town of Springfield. Mitigation actions identified within the plan are organized by four goals identified by the plan committee. Funded mitigation actions identified include:

- Goal 1 - Identify and pursue preventative measures that will reduce future damages
 - Hardening of critical infrastructure to allow operations to continue during disasters
 - Construct safe rooms in critical facilities
 - Construct new shelters and upgrade current shelters
 - Install generators at critical facilities
- Goal 2 – Increase public awareness and understanding of disaster preparedness
 - Advertise public meetings during hazard mitigation planning process
 - Sponsor a “Multi-Hazard Awareness Week”
- Goal 3 – Reduce repetitive flood losses
 - Elevation or acquisition projects for severe repetitive loss and repetitive loss properties
 - Flood proof public buildings that are vulnerable to flood damage
 - Public outreach campaign to homeowners in floodplains to explain NFIP coverage
 - Evaluate CRS participation
- Goal 4 – Facilitate sound development to reduce or eliminate the impact of hazards
 - Install hazard early warning system
 - Upgrade drainage system
 - Creation of a cohesive drainage plan
 - Guide development away from hazard areas using zoning regulations

St. Helena Parish

The St. Helena Parish Hazard Mitigation Plan Update (2015) is a multi-jurisdictional plan that includes the Town of Greensburg and the Village of Montpelier. Mitigation actions identified within the plan are organized by four goals identified by the steering committee. Communities within the parish had actions that mirrored the parish actions or mandated cooperation with the parish. Funded mitigation actions identified include:

- Goal 1 – Identify and pursue preventative measures that will reduce future damages

- Hardening of critical infrastructure to allow operations to continue during disasters
- Construct emergency shelters
- Develop a master drainage plan
- Install generators at critical facilities
- Construct safe rooms in government buildings
- Goal 2 – Increase public awareness and understanding of disaster preparedness
 - Utilize various methods to distribute hazard information to the public
 - Sponsor a “Multi-Hazard Awareness Week”
 - Creation of public education programs
- Goal 3 – Reduce repetitive flood losses in the parish
 - Elevation or acquisition projects for severe repetitive loss properties
 - Floodproofing or structural solutions for repetitive loss properties
- Goal 4 – Facilitate sound development to reduce or eliminate the impact of hazards
 - Implement mitigation measures that will alleviate road erosion
 - Implement a public notification system
 - Participate in the “Community Rating System (CRS)”
 - Develop and pass ordinances to regulate new development, such as requiring proper drainage, requiring freeboard above the base flood elevation, or encouraging underground utilities

Tangipahoa Parish

The Tangipahoa Parish Hazard Mitigation Plan (2015) is a multi-jurisdictional plan that includes the Town of Amite City, City of Hammond, Town of Independence, City of Ponchatoula, Town of Roseland, and Village of Tickfaw. Mitigation actions identified within the plan are organized on 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- Identify and pursue preventative measures that will reduce future damages from hazards
 - Hardening public buildings so they may be used during and after events
 - Update drainage to relieve flooding problems
 - Retrofit public boat launches
 - Upgrade public sewerage infrastructure, including pump stations
 - Construction of safe room for first responders
- Goal 2- Reduce repetitive flood losses in the Parish and municipalities
 - Elevate or acquire residential repetitive loss properties
- Goal 3- Regulate sound development in the Parish and municipalities so as to reduce or eliminate the potential impact of hazards.

Amite County

The hazard mitigation plan for Amite County is part of the MEMA District 7 Regional Mitigation Plan. This district covers nine counties, Adams, Amite, Franklin, Jefferson, Lawrence, Lincoln, Pike, Walthall,

and Wilkinson. There are six mitigation goals identified by the county in coordination with the other participating jurisdictions.

- Goal 1 – Increase public awareness of natural hazards in the region
- Goal 2 – Retrofit critical facilities and/or critical infrastructure to lower risk from hazards
- Goal 3 – Improvement of regional or local mitigation planning
- Goal 4 – Support state identified mitigation initiatives
- Goal 5 – Reduce loss of life, property, economic costs, recovery and disruption of economic activity
- Goal 6 – Foster cooperation among government and private sector to improve, update, and implement the hazard mitigation plan

The mitigation actions proposed are organized by the hazards addressed. The following is a listing of high priority actions for Amite County.

- 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.
 - Creation of a Comprehensive Land Use Plan.
 - Retrofit existing public buildings for wind resistance.
 - Construct a new emergency shelter
- 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.
 - Use GIS to create detailed hazard risk assessments.
 - Retrofit existing public buildings for wind resistance.
- 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.
 - Use GIS to create detailed hazard risk assessments.
- 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.
- 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 are related to development activities, or renovations, within flood zones or areas affected by flooding.

Livingston Parish

Chapter 13, article V of the Livingston Parish 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.

Division III states the provisions for flood hazard reduction. This section is divided into six sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), floodways, and coastal high hazard areas. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels. The standards for coastal high areas include elevation on pilings and columns so that the lowest floor is elevated above the base flood level, the space below the lowest floor is free of obstruction or use breakaway walls, the use of fill for structural support is prohibited, man-made alteration of sand dunes or mangroves is prohibited, and there are restrictions on recreational vehicles.

The Livingston Parish Code of Ordinances can be found here:

https://library.municode.com/la/livingston_parish_council/codes/code_of_ordinances

Village of Albany

Chapter 20 of the Village of Albany 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 III states the provisions for flood hazard reductions. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), and floodways. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels.

The Village of Albany Code of Ordinances can be found here:

https://library.municode.com/la/albany/codes/code_of_ordinances

St. Helena Parish

Chapter 5, subchapter F of the St. Helena Parish 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.

Part V states the provisions for flood hazard reduction. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), and floodways. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated to or above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels.

The St. Helena Parish Code of Ordinances can be found here:

https://library.municode.com/la/st._helena_parish_police_jury

Tangipahoa Parish

Chapter 10 of the Tangipahoa Parish code of ordinances addresses flood prevention and protection. 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 III states the provisions for flood hazard reduction. This section is divided into six sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), floodways, and coastal high hazard areas. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated at least 12 inches above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels. The standards for coastal high areas include elevation on pilings and columns so that the lowest floor is elevated 12 inches above the base flood level, the space below the lowest floor is free of obstruction or use breakaway walls, the use of fill for structural support is prohibited, man-made alteration of sand dunes or mangroves is prohibited, and there are restrictions on manufactured homes and recreational vehicles.

The Tangipahoa Parish Code of Ordinances can be found here:

https://library.municode.com/la/tangipahoa_parish_council/codes/code_of_ordinances

Town of Amite City

Part 4, chapter 4 of the Amite City 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.

Section 4-4005 states the provisions for flood hazard reduction. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), and floodways. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated to or above the base flood elevation, that mobile homes are elevated and anchored and

restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels.

The Town of Amite City Code of Ordinances can be found here:
https://library.municode.com/la/amite_city/codes/code_of_ordinances

City of Hammond

Article 12 of the Hammond unified development code addresses floods. This article 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.

Section 12.1.4 states the provisions for flood hazard reduction. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, standards for areas of shallow flooding (AO/AH zones), and floodways. General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated to or above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway unless it is certified by a professional registered engineer providing that the encroachment will not increase flood levels.

The City of Hammond Unified Development Code can be found here:
http://www.hammond.org/wp-content/uploads/2018/03/Amended-UDC_6.2017.pdf

City of Ponchatoula

Chapter 54 of the Ponchatoula 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 V states 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 (AO/AH zones). General standards include proper anchoring to prevent the structure from floatation, using construction methods that minimize flood damage, the use of construction materials that are resistant to flood damage, locating service facilities where flood damage will be minimized, and water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters. Specific standards require that the lowest floor is elevated to or above the base flood elevation, that mobile homes are elevated and anchored and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. The standards for shallow flooding state that the lowest floor is elevated at least two feet or at least as high as the depth number specified on the FIRM, adequate drainage paths to guide floodwaters around and away, and that a registered professional engineer submits certification to the floodplain administrator.

The City of Ponchatoula code of ordinances can be found here:
https://library.municode.com/la/ponchatoula/codes/code_of_ordinances

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 makes 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 and 2011, the latest available, the watershed has seen some development but in a limited quantity. From 2001 to 2011, developed land increased by 2 square miles, which is a 3.2% increase.

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 Tickfaw Watershed have a total of 224 Letters of Map Change, consisting of 192 LOMAs and 32 LOMR-Fs. Table 12 below illustrates which communities have Letter of Map Change and their types.

Table 10: Letters of Map Change

Community Name	LOMA	LOMR-F
Town of Albany	10	-
Amite County	-	-
Town of Amite City	-	-
Town of Greensburg	-	-

Community Name	LOMA	LOMR-F
City of Hammond	35	12
Town of Independence	5	1
Town of Killian	3	-
Livingston Parish	51	1
Town of Livingston	1	-
Village of Montpelier	-	-
City of Ponchatoula	3	2
Town of Roseland	1	-
Town of Springfield	-	-
St. Helena Parish	2	-
Tangipahoa Parish	80	16
Village of Tickfaw	1	-

Flood Risk Assessment

Flood risk assessment data is developed using a FEMA flood loss estimation tool, Hazus. Hazus (<https://www.fema.gov/hazus>) is a standardized risk assessment tool that estimates potential losses from a variety of disaster types. For the Tickfaw 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 BLE 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_RA_Results table. For additional information on the BLE Database and the data contained within please visit <https://www.fema.gov/media-library/assets/documents/160060>.

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 Tickfaw watershed all of the 15 communities sustained losses during the 1%-annual-chance flood modeled during the BLE analysis. Tangipahoa Parish saw the greatest losses at more than \$214 million, while the City of Ponchatoula saw \$1.6 million in losses. Figure 3 below shows the losses for all the communities in the watershed. For specific loss numbers for each community see the "TOT_LOSSES" column of the L_RA_Results table found in the BLE Database.

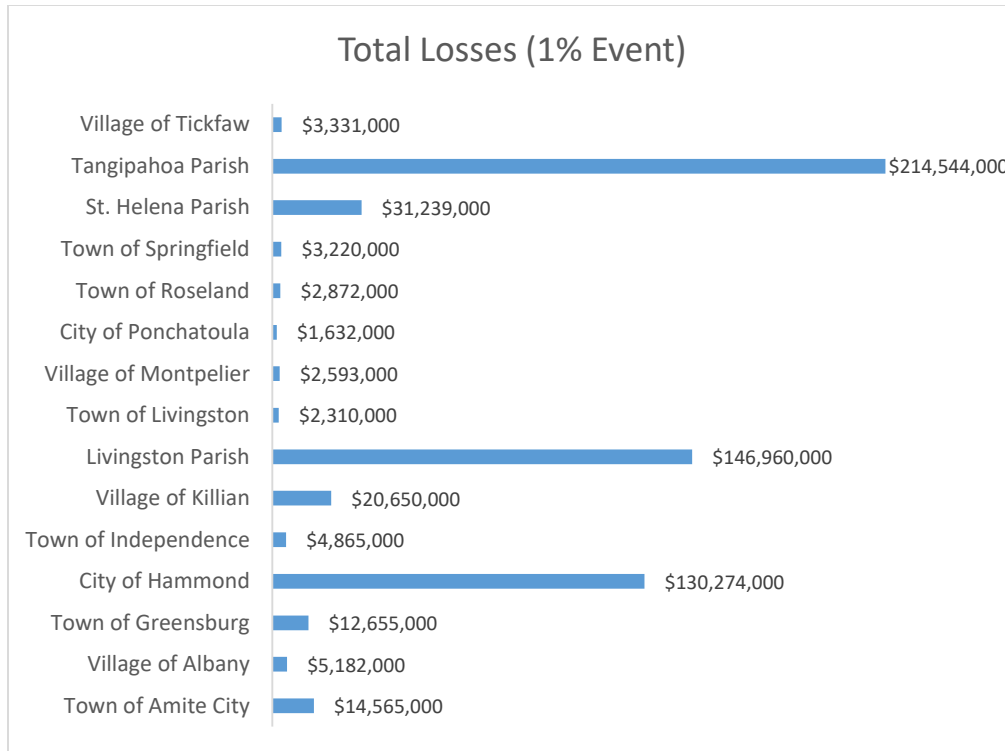


Figure 3: Total Losses for the 1-Percent-Annual-Chance Flood Event

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 4 and 5 below normalize the dollar losses for population and the area covered by the community respectively.

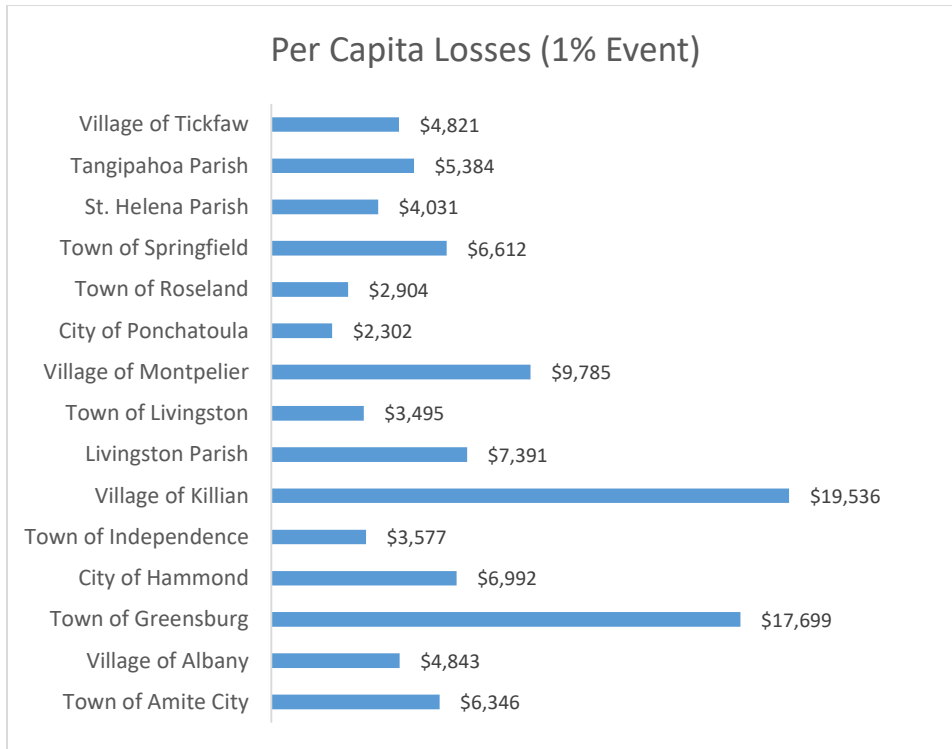


Figure 4: Per Capita Losses for the 1-Percent-Annual-Chance Flood Event

When normalized for population (Figure 4) above, with its low population the Village of Killian has the highest per person loss amount. The other small towns and villages in the watershed also have high per person loss amounts.

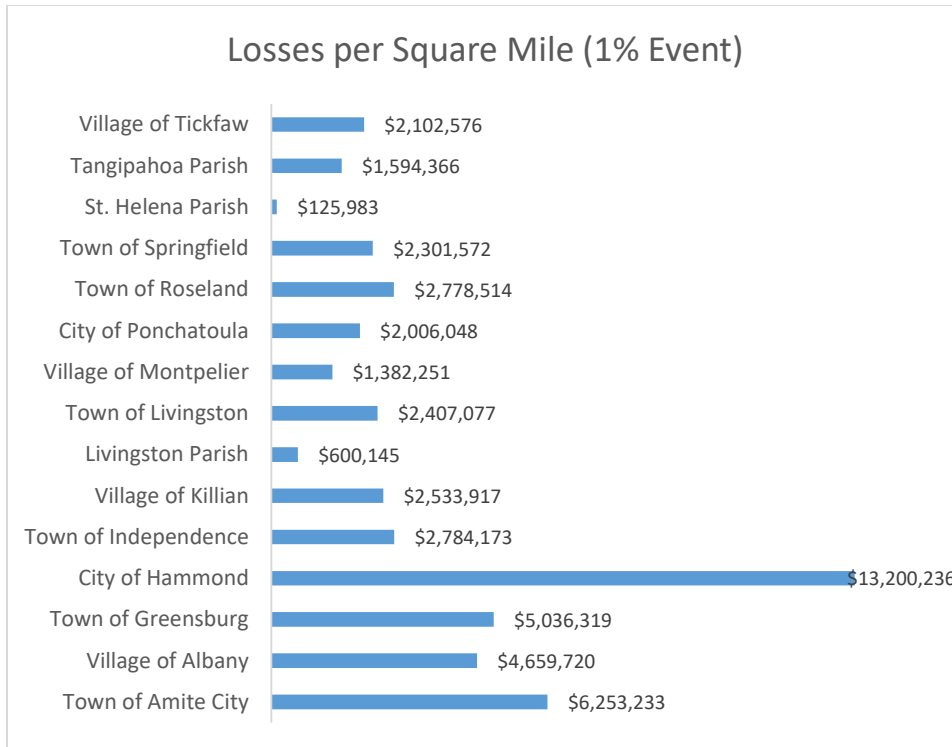


Figure 5: Losses per Square Mile for the 1-Percent-Annual-Chance Flood Event

When normalized for area (Figure 5 above), the City of Hammond has the highest losses per square mile of area. Tangipahoa Parish has the highest losses of the parishes.

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 6, 7, and 8. More detailed data can be found in the BLE Database.

Figure 6 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, Tangipahoa Parish saw the highest losses, followed by Livingston Parish, while the City of Ponchatoula saw the lowest losses. The ranking is similar to the 1% event, while the losses have risen.

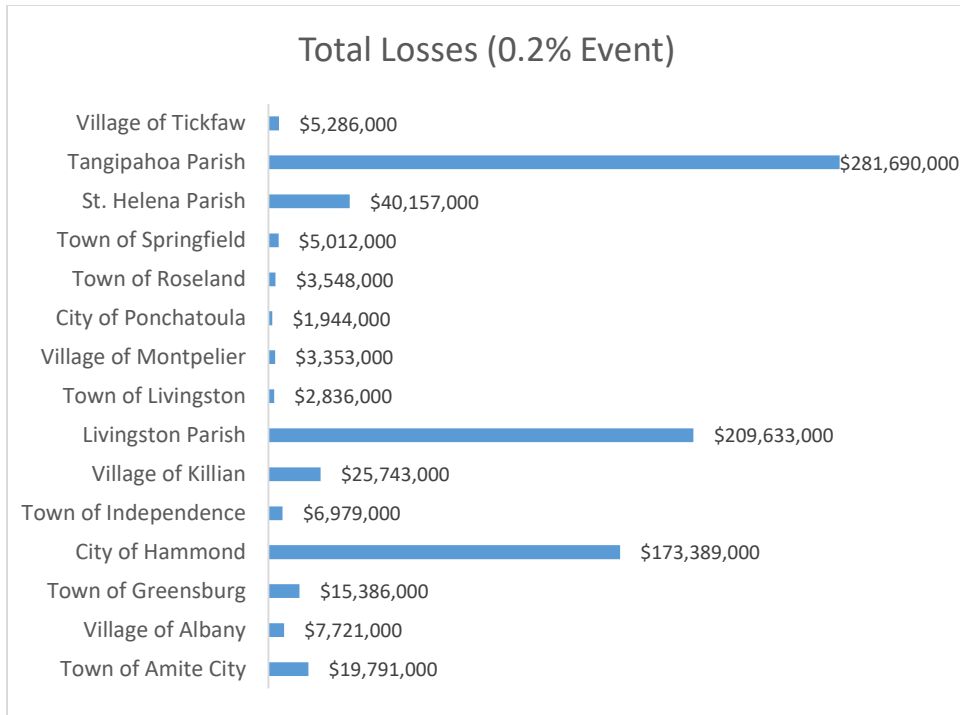


Figure 6: Total Losses for the 0.2-Percent-Annual-Chance Flood Event

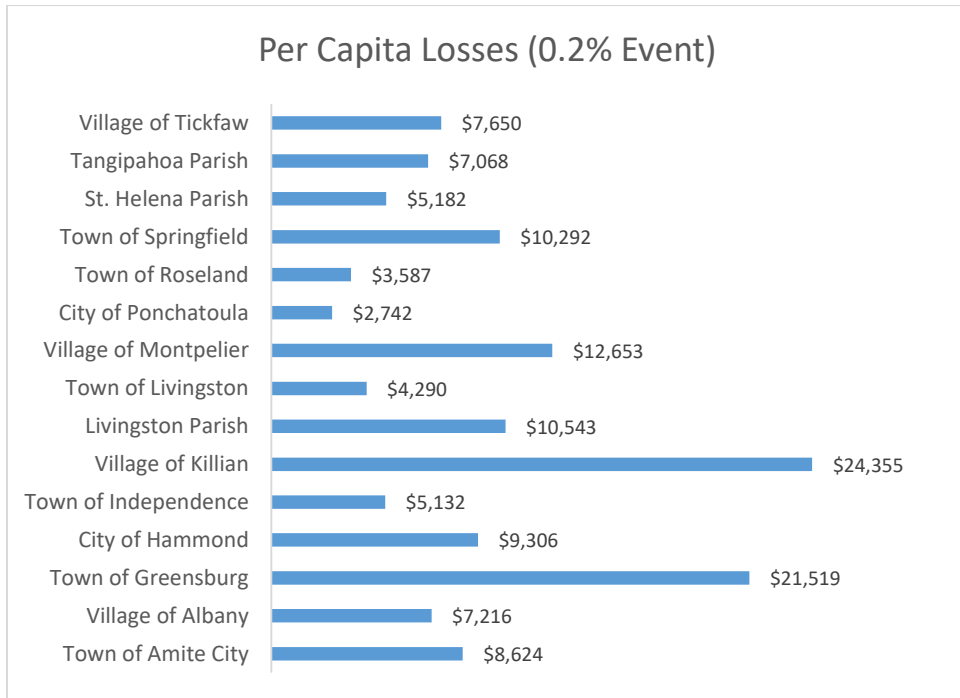


Figure 7: Per Capita Losses for the 0.2-Percent-Annual-Chance Flood Event

Figure 7 above, normalizes the losses based on population. The Village of Killian still has the highest losses per person. Figure 8 below, normalizes the losses based on area. The City of Hammond still has the highest losses by square mile.

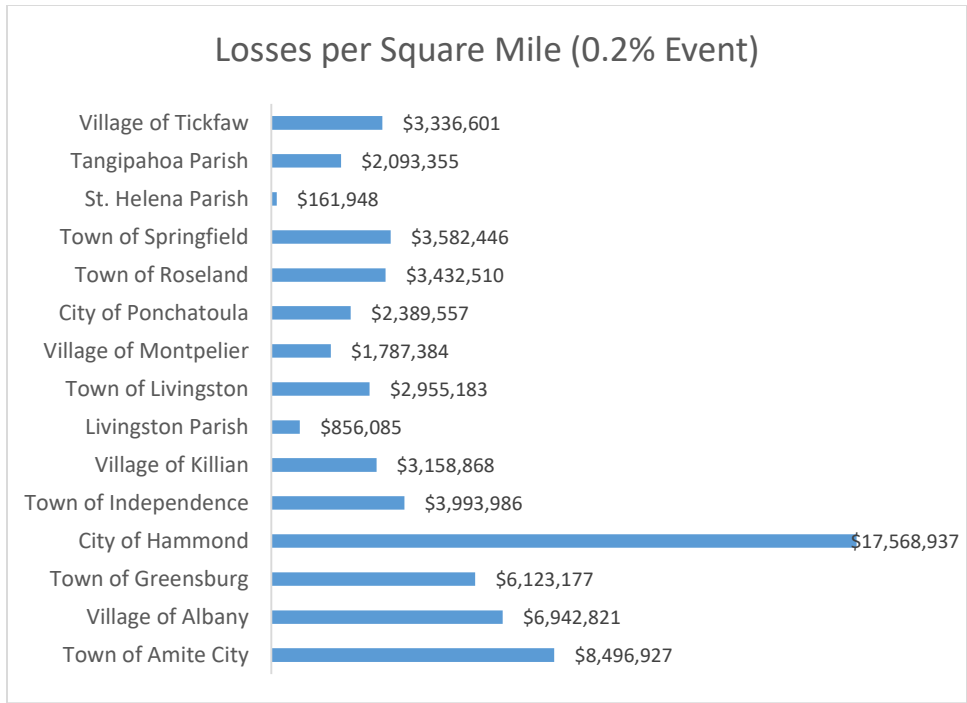


Figure 8: Losses per Square Mile for the 0.2-Percent-Annual-Chance Flood Event

Discovery Outreach and Meeting

In developing a comprehensive analysis of the Tickfaw watershed, several government agencies and departments contributed information. In April 2018 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 2018 via telephone to inform them on the Discovery Project and to verify contact information. The week of September 3rd, 2018 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 the week of September 17th 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.

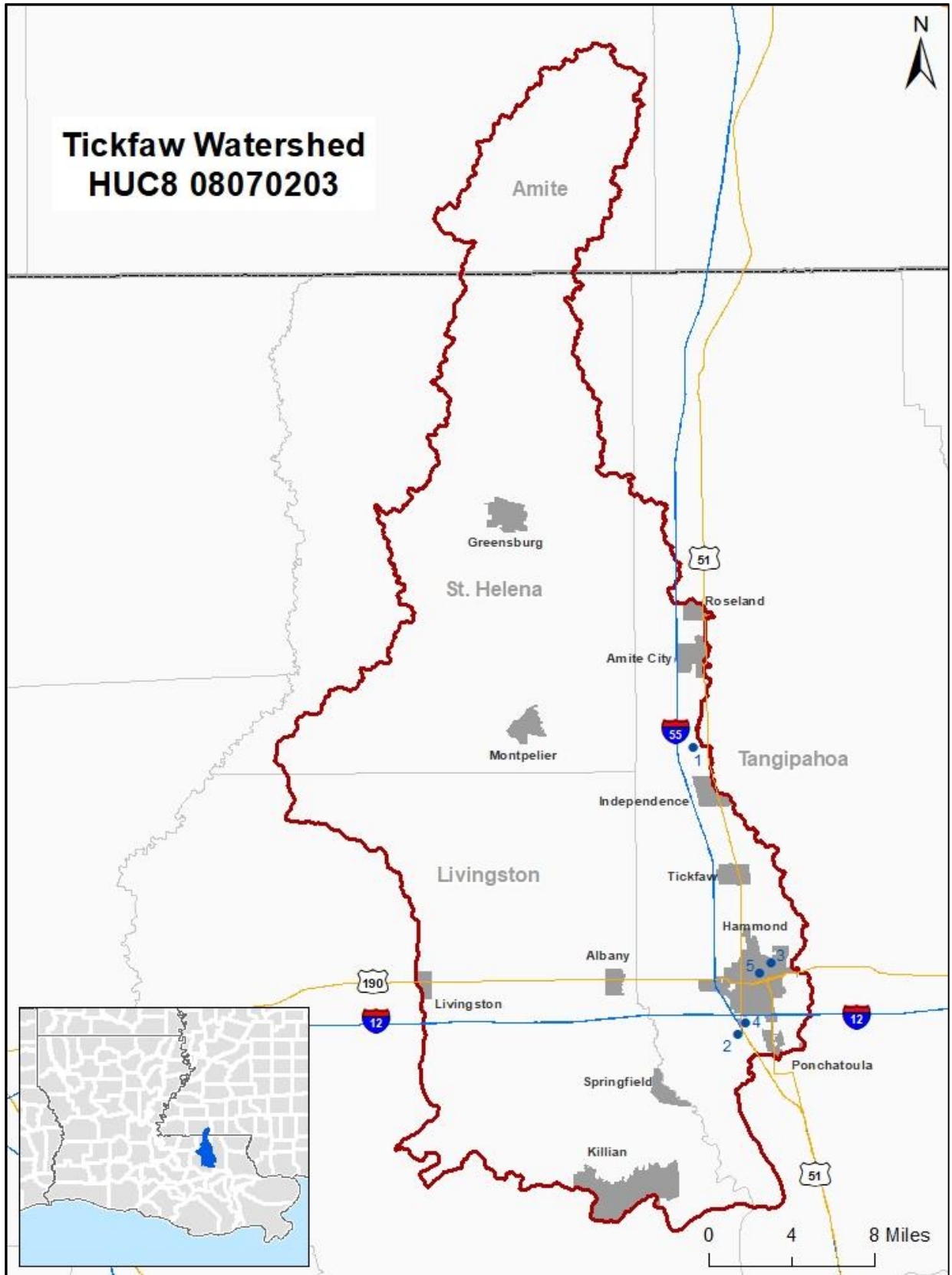


Figure 9: Map of concerns collected at the Discovery Meeting

Table 12: Issues and Concerns Collected During Discovery

Item	Location	Information Provided By	Discovery Workshop Comment Summary
1	Tangipahoa Parish	Community Official	North of Independence, East of 55. BFE's are too high. No flooding in 2016. No backwater flooding in area.
2	Tangipahoa Parish	Community Official	Lots of development in the area. Need to look at planned development LOMRs in area for subdivisions. Apartments in subdivisions. North of 22, south of Interstate 50, 60 lots
3	City of Hammond	Community Official	Councilman Jason Hood has initiated a drainage study. Chuck Spangler, city engineer, is involved.
4	City of Hammond	Community Official	Currently studying area that they have annexed. The city boundary has changed.
5	City of Hammond	Community Official	Feel the FIRMs are too conservative between the tracks and the university.

Appendix I: 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	Stacey Ricks, CFM	P.O. Box 5644 Pearl, MS 39288	Phone: 601-933-6610 Email: sricks@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	Jana Henderson, CFM	P.O. Box 5644 Pearl, MS 39288	Phone: 601-933-6636 Email: jhenderson@mema.ms.gov Web Page: http://www.msema.org/

Watershed Follow-up Points of Contact

Subject/Topic of Interest	Name	Contact Information
FEMA Project Monitor <i>Project Outreach</i>	Diane Howe Risk Analysis Branch FEMA Region 6	Phone: 940-898-5171 Email: diane.howe@fema.dhs.gov
<ul style="list-style-type: none"> • Floodplain Management • Floodplain Ordinance • Community Assistance Visits • Higher Standards 	John Miles, Jr.	Phone: 840-297-0185 Email: john.milesjr@fema.dhs.gov
<ul style="list-style-type: none"> • Community Rating System • Flood Insurance 	Jonathan Smith	Phone: 228-235-6506 Email: jsmith@iso.com
<ul style="list-style-type: none"> • 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 Flood Hazard Layer 	FEMA Map Information eXchange	Phone: 877-FEMA-MAP (336.2627) Email: FEMAMapSpecialist@riskmapcdfs.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 ASSISTANCE 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>.

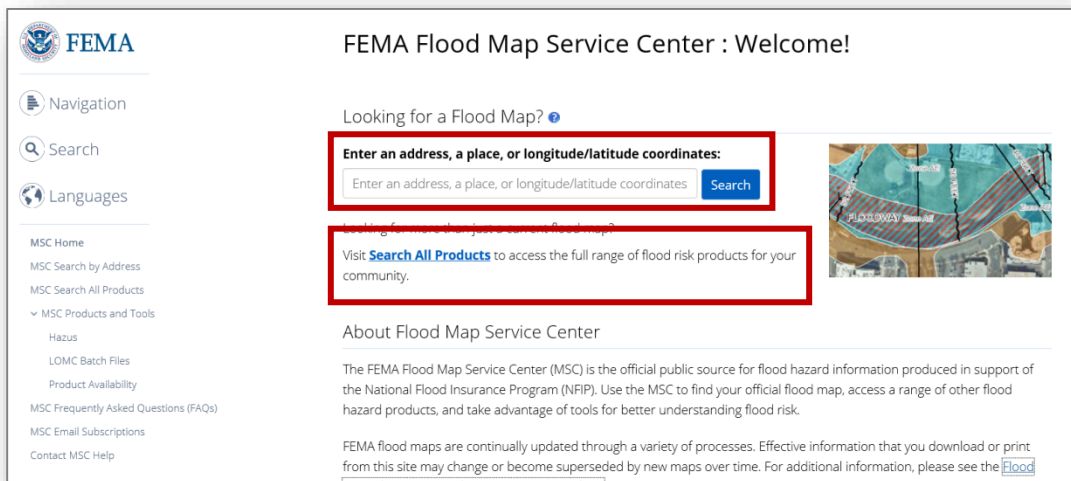
Map Service Center – Preliminary Map Data

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.

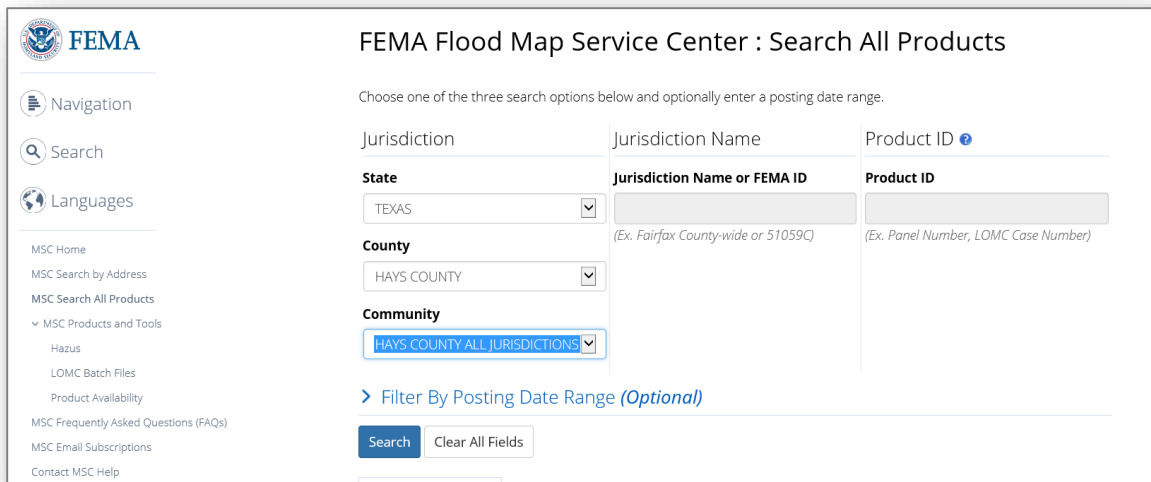
FEMA flood maps are continually updated through a variety of processes. Effective information that you download or print from this site may change or become superseded by new maps over time. For additional information, please see the [Flood Hazard Mapping Updates Overview Fact Sheet](#).

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.

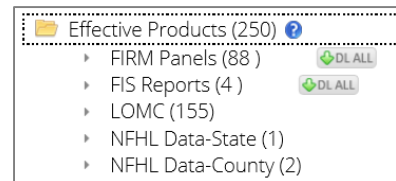


Visiting the more advanced search option, “Search All Products,” users may access current, preliminary, pending, and historic flood maps. Additionally, GIS data and flood risk products may be accessed through the site with these few steps.



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.

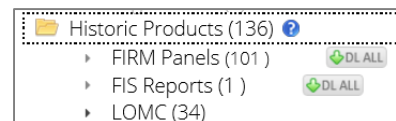
Effective Products. The current effective FIS, FIRM, and DFIRM database (if available) is available through the MSC. If users click on the available effective products they are presented a breakdown of the available products. FIRM panels, FIS reports, Letters of Map Revision, statewide NFHL, and countywide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