Flood Risk Report

Liberty Bayou-Tchefuncta Watershed

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FEMA

Version Number	Version Date	Summary
1	August 2018	Pre-Discovery Report
2	November 2018	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 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 communities within the Liberty Bayou-Tchefuncta 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.

Contents

Figures

Tables

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 Liberty Bayou-Tchefuncta Watershed. The Flood Risk Report has two goals: (1) **inform communities of their land** 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.

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 Liberty Bayou-Tchefuncta Watershed

Figure 1: Flooding along the Tchefuncta River: March 12, 2016

The Liberty Bayou-Tchefuncta Watershed is in Louisiaana and six municipalities (Abita Springs, Covington, Folsom, Madisonville, Mandeville, and Slidell) and three parishes (St. Tammany, Tangipahoa, and Washington). The first mapping for the Liberty Bayou-Tchefuncta Watershed was released almost 50 years ago. Since that time, several communites in the watershed have received updated mapping, the most recent being in 2010. The Liberty Bayou-Tchefuncta Watershed was affected by the March 2016 flood. During the storm, rainfall ranged from 2 inches to 19 inches in the Tchefuncta River basin. Approximately 38 percent of the watershed falls within a Special Flood Hazard Area (SFHA). Almost 20 percent of the regulatory SFHA in the watershed is Zone AE with the remaining SFHA falling into Zones A and VE.

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 Liberty Bayou-Tchefuncta Watershed in June 2018. 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 April 2018, 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 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

The Liberty Bayou-Tchefuncta Watersehed is situated at the southern tip of the vast Mississippi-Missouri River System in Southeast Lousiana. It drains into the north side of Lake Ponchatrain covering the majority of St. Tammany Parish, the eastern side of Tangipahoa Parish, and the southern edge of Washington parish. The watershed comprises 723 stream miles, predominantly drained by the Tchefuncta River, which originates in northeastern Tangipahoa Parish. It flows southerly and defines part of the eastern Tangipahoa parish boundary with Washinton Parish. The river meets St. Tammany parish before turning southeast and passing the city of Covington, where it intersects its largest tributary, the Bogue Falaya. The Tchefuncta River then continues south where it drains into Lake Pontchartrain. Other significant sources of water are the Abita River, Bogue Falaya River, Lacombe Bayou and Gorman Creek (FEMA, 2017). Please reference Figure 2.

Figure 2: Overview map for the Liberty Bayou Tchefuncta Watershed

A natural result of its location off the Gulf of Mexico, Louisiana has a humid subtropical climate. Its geographical location yields humid thunderstorms that bring frequent rain showers during spring and summer months as associated with continental weather patterns (FEMA, 2017). The Liberty Bayou-Tchefuncta Watershed

experiences annual rainfall that is above the national average. This rainfall is the primary contributor to flooding in the area. The watershed and state are also prone to tropical storms and hurricanes between the months of June and November.

The populations of the watershed's communities are expanding, reflected below in Table 1. Every NFIP community experienced positive growth rates between 0.7 percent-13.9 percent. City of Covington, Village of Folsom, and Washington Parish Unincorporated Areas grew in size by more than 10%.

Table 1: Community Population Characteristics [1]

Community Name	Total Population 2010	Total Population 2016	Population Change (2010-2016)	Population Percent Change (2010-2016)
City of Covington	8,875	10,310	1435	13.9%
City of Mandeville	11,960	12,424	464	3.7%
City of Slidell	21,162	21,302	140	0.7%
St. Tammany Parish Unincorporated Areas	149,829	158,594	8765	5.5%
Tangipahoa Parish Unincorporated Areas	1,734	1,792	58	3.2%
Town of Abita Springs	2,376	2,529	153	6.0%
Town of Madisonville	752	835	83	9.9%
Village of Folsom	719	810	91	11.2%
Washington Parish Unincorporated Areas	2,638	3,051	413	13.5%

Population changes influence the land cover patterns of the watershed, as reflected in Table 2. Many of these communities are located along major bodies of water, evoking continued flood risk management. Between 2001 and 2011, Liberty Bayou-Tchefuncta experienced an increase in impervious surface percentage of 13%, equating to 2742 acres (Gibson, 2017). The static to increasing populations of the unincorporated areas combined with rising city populations suggests an increase in urbanization in some areas of the watershed. Development creates a greater risk of increased flooding and opportunity for targeted mitigation efforts. A more concentrated population could result in more concentrated flood damage in the event of a disaster. Land use changes in otherwise undeveloped areas of the Parish through development has the potential to increase runoff and change the rate and flow of water

[1] Information for the portion of the community within the Bayou Tchefuncta Watershed

throughout the watershed. These changes can exacerbate already flood prone areas and create new ones.

Table 2: Population and Area Characteristics [2]

Risk MAP Project	Total Population in Deployed Area	Average % Population Growth/Yr. (2010-2016)	Predicted Population (by 2023)	Land Area (sq. mile)	Developed Area	Open Water
Liberty Bayou-Tchefuncta	208,145	1.19%	216,068	695	14.75%	2.76%

All 9 major communities participate in the NFIP program, with more details in Table 2. 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 3: Liberty Bayou-Tchefuncta Watershed NFIP and CRS Participation [3]

Participating NFIP Communities/ Total Communities	Number of CRS Communities	CRS Rating Class Range	NFIP Policies In CRS Communities	Dollars Saved by CRS Communities	Average Years since FIRM Update	Level of Regulations (44 CFR 60.3)
9 / 9	5	7-10	38,923	$5,203,528	22	CFR 60.3 (b-d)

To further combat flooding risks, all communities have partnered with their respective parishes to produce Hazard Mitigation Plans. Conditional to their participation, all parish jurisdictions commit to maintaining NFIP coverage for all municipal buildings, address Repetitive Loss properties, Maintain Elevation Certificates for all new development, as well as regulating Floodproofing Certificates and V-Zone Design Certificates for coastal high hazard areas (V-Zones, Coastal A-Zones) as appropriate. Additionally, 5 communities voluntarily agreed to actively take part in the Community Rating System (CRS). This voluntary incentive program recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions meeting the three goals of the CRS.

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.

[2] Data obtained from the U.S. Census Bureau; National Hydrologic Database – Medium Resolution, and National Land Cover Database (2011)
[3] Data obtained from the FEMA Community Information System.

Table 4: Risk MAP Project Dams and Levees[4]

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)
Liberty Bayou-Tchefuncta	30	3	3%	5.8	219.8

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."

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 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.

> *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)*

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

[4] Data obtained from the U.S. Army Corps of Engineers (USACE) National Inventory of Dams (March 2017)

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 - Coordinated Needs Management Strategy (CNMS). FEMA uses the CNMS database to track the validity of the flood hazard information prepared for the NFIP. The 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 Liberty Bayou-Tchefuncta 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 Liberty Bayou-Tchefuncta Watershed.

Phase Zero: Investment

Near the border of Louisiana and Mississippi, the Liberty Bayou-Tchefuncta Watershed rests completely in Louisiana under three parishes and nine municipalities. It covers 694 square miles and over 723 stream miles. The Watershed borders the northern portion of Lake Pontchartrain. The bayou contains and houses over 208,145 people. This area is projected to grow by 8.3% by there year 2023, reaching a potential 216,068 people in the watershed. The watershed contains 104,422 residential structures and 19,206 non-residential structures. Though examining the SFHAs specifically, there are 36,865 residential structures (35%) and 6,149 (32%) non-residential structures present in the designated SFHA. 1,881 of these structures are repetitive loss properties.

The watershed begins at the start of the Tchefuncta River, which is situated on the norther border between Tangipahoa Parish and Washington Parish. It flows southernly and meets St. Tammany parish before turning southeast and passing the city of Covington, where it intersects its largest tributary, the Bogue Falaya. The Tchefuncta River then continues south where it drains into Lake Pontchartrain.

Flooding typically comes in the form of rainwater runoff and post-hurricane events. The Tchefuncta River in 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.

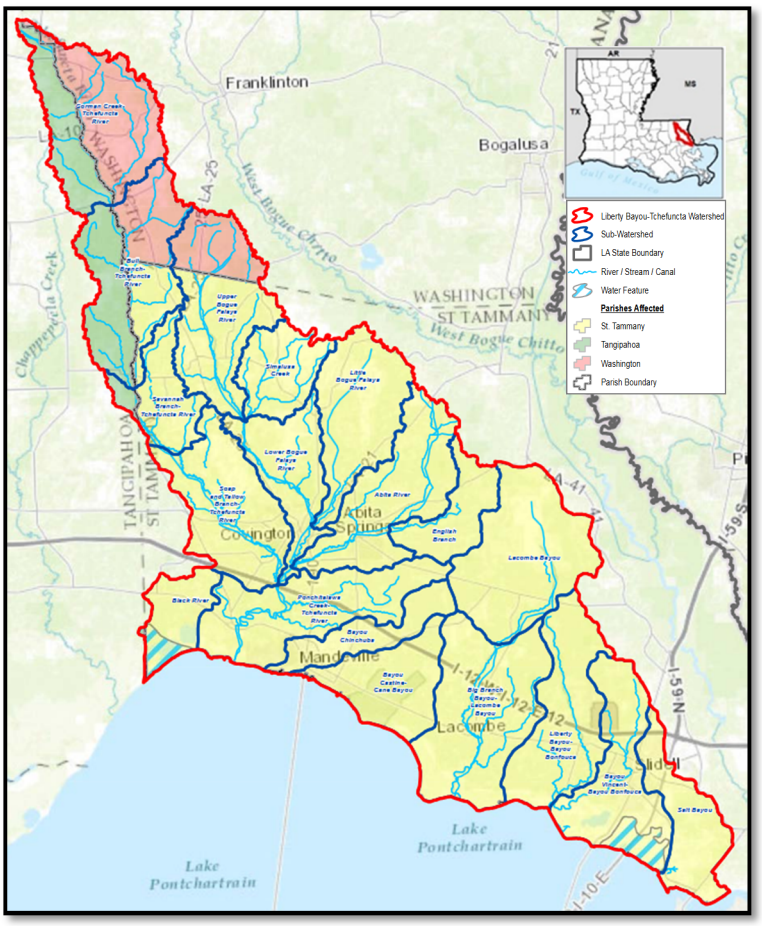


Figure 3: Parishes and sub-watersheds of the Tchefuncta Watershed

Area of Interest Selection Factors

In large part, the selection of Liberty Bayou-Tchefuncta 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 22.8 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. As of 2016, a total of 28,353 NFIP claims have been filed, which accumulates to $48,699,884. Combined, these two factors make the further evaluation of the Liberty Bayou-Tchefuncta Watershed both pressing and imperative.

Many factors and criteria are reviewed to determine which watershed is selected: 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 basins are identified for study.

Flood Risk - The Liberty Bayou-Tchefuncta Watershed is historically susceptible to flooding from seasonal rainfall and tropical storm activity. Elevation generally declines from 323 feet to -25 feet to the south as the major drainage features flow into Lake Pontchartrain. Soil drainage classes generally decline from north to south, contributing to water backup. The watershed was heavily affected by the March 2016 rain storms, which resulted in 2-19 inches of rainfall across the watershed

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. The population is expected to grow by 8.3% by 2023. Only 14.75% of the watershed is developed.

Age of Current Flood Information With an average of 22.8 years since maps were issued in the study area, the current information is dated. Newer maps should address this concern.

Availability of High-Quality Ground Elevation Data - High-quality ground elevation data is available state-wide through the United States Geological Survey (USGS) and Louisiana State University (LSU) sponsored Atlas LiDAR Program. The systems being used in the project are accurate to 15-30 cm RMSE, depending upon land cover, and will support contours of 1'-2' vertical map accuracy standards. These accuracies meet FEMA standards for floodplain reevaluation studies and map modernization programs designed to update the Flood Insurance Rate Maps (Cunningham, Giisclair, & Craig, 2003).

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. Figure 4 illustrates the status of streams for The Liberty Bayou-Tchefuncta Watershed.

The CNMS database for the Liberty Bayou-Tchefuncta Watershed retains well-mapped coverage, but moderately lacks in the respect of NVUE compliant and modernized maps. Table 4 details the latest NVUE report for the watershed. Within the 723.2 stream miles of the Watershed, 422.4 miles were denoted as "valid". This leaves 300.8 miles as "to be studied". There are zero unmapped or unknown streams in the CNMS database for this watershed. For further analysis of the Zone A miles see the "CNMS Validation and Assessment" portion of the "Base Level Engineering" section below.

Table 5: CNMS NVUE Report[5]

	Valid		Unverified	
	Compliant	**Being studied**	**To be studied**	**Being studied**
Modern inventory	216.13	192.52	49.18	56.95
Paper inventory	0	13.77	0	194.68

Unmapped Stream Coverage. FEMA also reviewed the current stream coverage and reviewed the areas against the National Hydrography Dataset (NHD). The NHD medium-resolution data inventoried by the U.S. Geological Survey (USGS) maps created at a 1:100,000 scale was used to review the watercourses within the Liberty bayou Tchefuncta Watershed. There are 457.9 miles of streams being studied, and 59 to be studied, which will validate 506.9 miles of streams in the watershed.

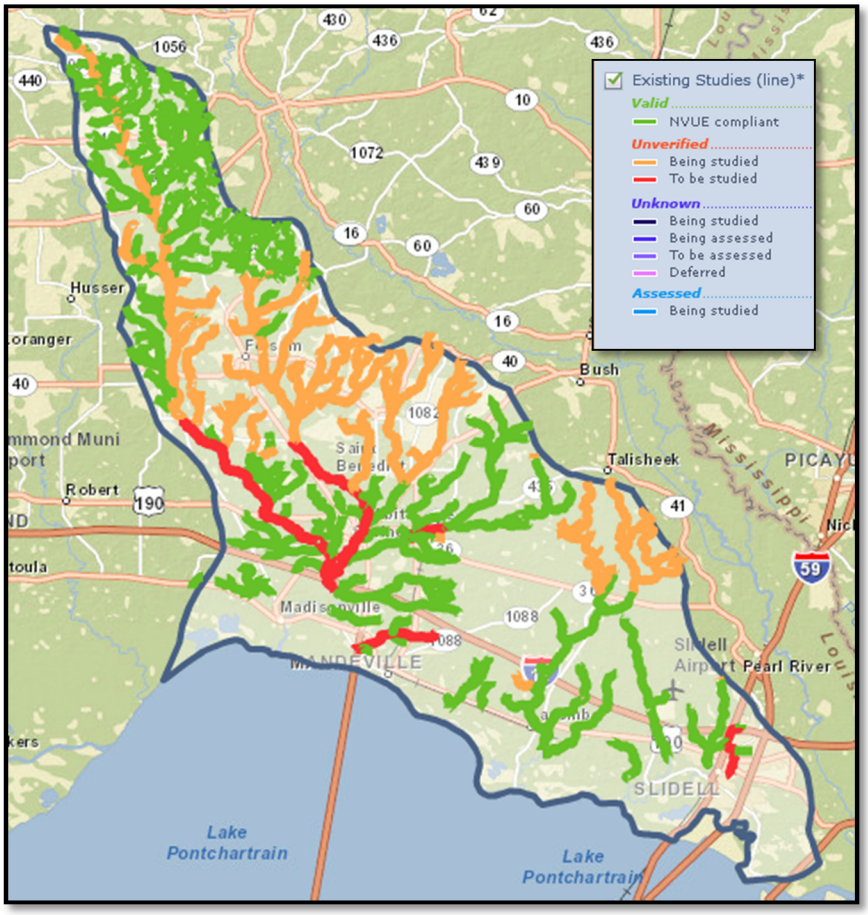


Figure 4: Current status of stream studies in the Liberty Bayou-Tchefuncta Watershed

[5] Collected from the FEMA Map Service Center CNMS Report 21 September 2018.

Base-Level Engineering

A Base-level Engineering study was approved on November 14, 2017, and completed June 7, 2018 for the Liberty Bayou-Tchefuncta Watershed.

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 Base-Level Engineering provides planning-level data that is prepared to meet FEMA's Standards for Floodplain Mapping.

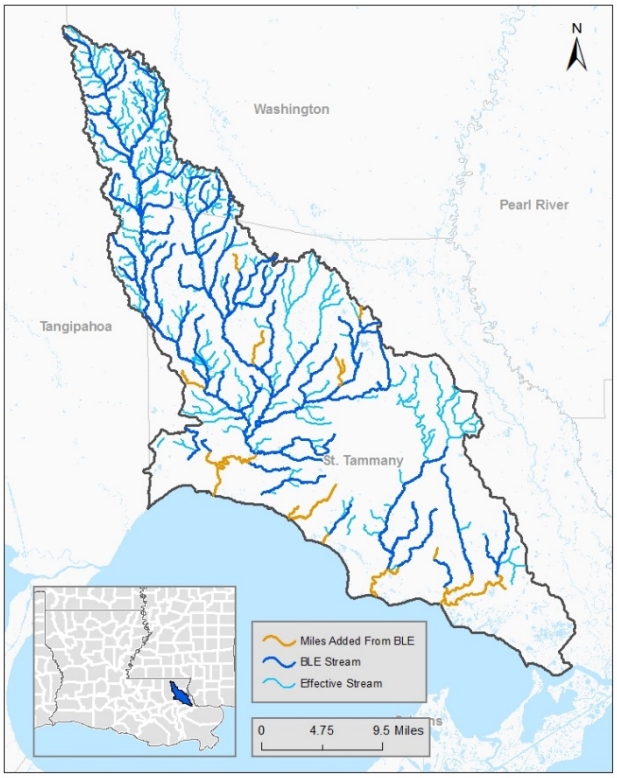


Figure 5: Base-Level Engineering Study Streams Liberty Bayou-Tchefuncta Watershed

FEMA Investment (2018). The Base-Level Engineering (BLE) will provide the following items for use in the Liberty Bayou-Tchefuncta Watershed

- Hydrology modeling (regression) flow values for the 10-percent, 4-percent, 2-percent, 1-percent and 0.2-percent-annual-chance storm events
- Hydraulic (HEC-RAS) modeling for all study streams
- 10-percent, 1-percent, and 0.2-percent-annual-chance floodplain boundaries

  1-percent and 0.2-percent-annual-chance Water Surface Elevation Grids

  1-percent 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

The Base-Level Engineering study completed in June 2018 and will be provided to the communities throughout the basin for planning, risk communication, floodplain management, and permitting activities.

CNMS Validation and Assessment. FEMA will compare the Base-Level Engineering results to the current flood hazard inventory identified in the CNMS database. This assessment will allow FEMA to compare this updated flood hazard information to the current effective floodplain mapping throughout the basin.

Community Coordination. FEMA will share the Base-Level Engineering results (once complete) with communities throughout the project area. Communities will be provided the information, workshops,

and training to support the use of Base-Level Engineering for planning, floodplain management, permitting, and risk communication activities. FEMA will work with communities to review, interpret and incorporate the Base-Level Engineering 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 6 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 Increase numbers can be attributed to the differences in modeling methodology used in the effective analysis and the BLE analysis. Effective analysis models a specific riverine flooding sources by methods that differ from that of a rain on grid 2-dimensional model which is the basis of the BLE analysis. 2-dimensional rain on grid models determine the flood hazard extent with consideration for the pluvial flooding beyond that of the fluvial (riverine) channel. Figure 6 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.

Table 6: Changes to SFHA (Effective SFHA vs. BLE Flood Mapping)

Community	Community Area (sq. miles)	No Change (sq. miles)	Decrease (sq. miles)	Increase (sq. miles)
St. Tammany Parish Unincorporated Areas	546.4	182.2	30.4	168.1
City of Covington	8.2	2.7	0.3	2.9
City of Mandeville	7.0	2.8	1.6	0.9
Town of Abita Springs	4.5	1.5	0.4	1.3
Village of Folsom	1.7	0.1	0.1	0.3
Town of Madisonville	2.5	2.4	0.1	0.1
City of Slidell	14.3	5.7	2.3	3.7
Tangipahoa Parish Unincorporated Areas	44.6	12.1	0.8	5.4
Washington Parish Unincorporated Areas	65.2	12.4	0.4	7.5

Looking at changes in previously mapped areas, some areas do stand out. Within Rapides Parish many tributaries to Spring Creek are apparent that are not in the effective analysis. Little Spring Creek and Tributaries within Rapides Parish, Town of Glenmora and Village of McNary is depicted as a flooding source. Hurricane Creek in Rapides Parish and the Village of Forest Hill is depicted as a flooding source. Also in Rapides Parish upstream areas of Brown Creek, Valentine Creek, Castor Creek, Bayou Clear, Indian Creek, Cockrell Creek, Beaver Creek, Bayou Carron, Bayou Cocodrie and their tributaries. Bayou Boeuf and Bayou Des Glaises and tributaries run north to south. Bayou Boeuf drains from the west into Bayou Teche near the Town of Washington in St. Landry Parish. Bayou Cocodrie continues further south and drains into Bayou Teche from the east near Chitimacha Tribe of Louisiana in St. Mary Parish. Both bayou's account for additional flooding not depicted on the current effective FIRMs.

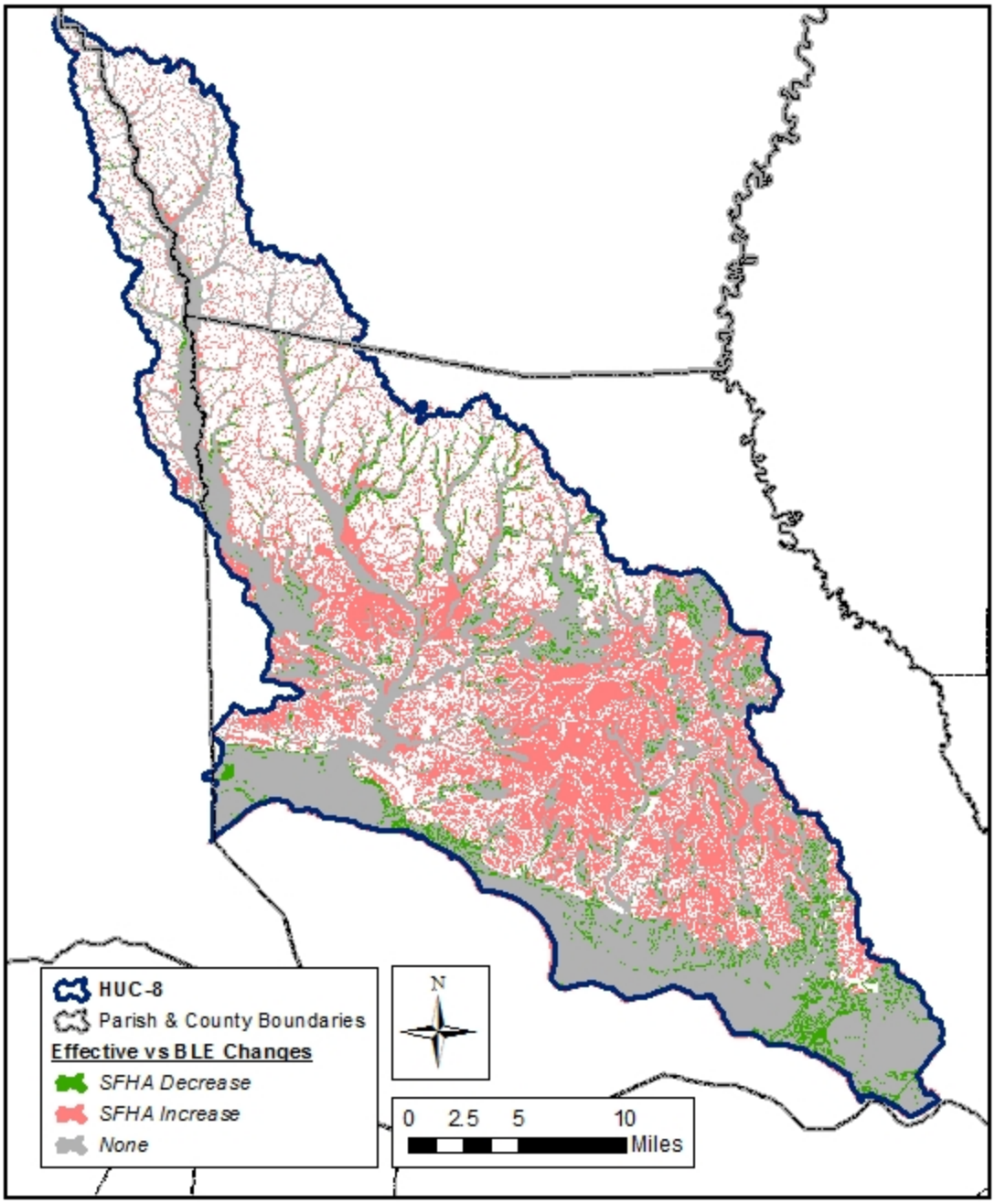


Figure 6: Changes between Effective SFHA and BLE Flood Mapping

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.

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 Base-Level Engineering 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 Base-Level Engineering data has been received. Local communities can also refine Base-Level Engineering information and submit it through the Letter of Map Revision (LOMR) process to revise the existing flood hazard information and maintain the FIRMs throughout their community.

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 Liberty Bayou-Tchefuncta Watershed during Fiscal Year 2017. This was a natural progression given the completion of the BLE analysis in June 2018 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 7 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 7: NFIP Information[6]

Community Name	CID	NFIP Participant	CRS Rating	FIRM Date	FIRM Status	Population (2017 Estimate)
Town of Abita Springs	220199	Y	-	05/17/1988	Original	2,540
City of Covington	220200	Y	10	11/19/1980	Original	10,416
Village of Folsom	220285	Y	-	03/16/1982	Original	841
Town of Madisonville	220201	Y	-	03/16/1983	Original	831
City of Mandeville	220202	Y	7	05/16/2012	Revised	12,318
City of Slidell	220204	Y	7	04/21/1999	Revised	27,883
St. Tammany Parish	225205	Y	7	04/21/1999	Revised	246,269
Tangipahoa Parish	220206	Y	9	07/22/2010	Revised	127,115
Washington Parish	220230	Y	-	12/03/2009	Revised	46,367

Table 8 includes both the number of flood insurance policies in each community and the coverage of those policies.

Table 8: NFIP Policy Information[7]

Community Name	CID	Policies in Force	Insurance in Force
Town of Abita Springs	220199	412	$188,920
City of Covington	220200	1,560	$1,153,970
Village of Folsom	220285	15	$7,902
Town of Madisonville	220201	315	$472,620
City of Mandeville	220202	3,156	$2,230,342
City of Slidell	220204	6,619	$6,716,111
St. Tammany Parish	225205	38,445	$22,485,877
Tangipahoa Parish	220206	7,791	$4,054,434
Washington Parish	220230	533	$377,491

Table 9 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.

[6] United States Census Bureau

[7] FEMA Community Information System (May 2018)

Table 9: NFIP Claims Information[8]

Community Name	CID	Claims	Paid Claims	Losses Paid
Town of Abita Springs	220199	89	51	$ 662,788
City of Covington	220200	717	490	$ 15,070,135
Village of Folsom	220285	15	9	$270,232
Town of Madisonville	220201	391	306	$13,347,617
City of Mandeville	220202	1,751	1,222	$44,082,572
City of Slidell	220204	9,454	7,938	$456,248,589
St. Tammany Parish	225205	22,243	13,495	$1,149,425,542
Tangipahoa Parish	220206	2,647	2,237	$112,003,683
Washington Parish	220230	369	303	$7,562,065

Table 10 shows 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 10: Repetitive Loss Property Information[9]

Community Name	Total Properties	Total Claims	Total NFIP Paid Losses	Severe Repetitive Loss Properties
Town of Abita Springs	2	9	$274,874	0
City of Covington	35	197	$16,175,354	6
Village of Folsom	0	4	$0	0
Town of Madisonville	42	141	$13,912,884	6
City of Mandeville	114	647	44,501,155	15
City of Slidell	1635	3176	$442,782,195	214
St. Tammany Parish	2105	6264	$880,109,934	185
Tangipahoa Parish	1	1195	$316,840	0
Washington Parish	1	124	$179,904	0

Disaster Declarations

Table 11 lists the Federal Disaster Declaration for the watershed. Disasters are declared at the county/parish level. In the Liberty Bayou-Tchefuncta watershed St. Tammany Parish has the largest number of declaration at 30, Tangipahoa has 28, and Washington has 22. Declarations for flood events include seven for St. Tammany Parish, six for Tangipahoa Parish, and five for Washington Parish.

[8] FEMA NFIP Policy Statistics, bsa.nfipstat.fema.gov (August 2018)

[9] Information obtained from FEMA Region 4 and Region 6 (February 2017)

Table 11: Disaster Declarations in the Watershed[10]

Date	Title	St. Tammany Parish	Tangipahoa Parish	Washington Parish
9/10/1965	HURRICANE BETSY	x	x	x
8/18/1969	HURRICANE CAMILLE	x		x
4/27/1973	SEVERE STORMS & FLOODING	x	x	x
2/22/1977	DROUGHT & FREEZING	x	x	x
5/2/1977	SEVERE STORMS & FLOODING	x	x	
5/2/1979	SEVERE STORMS & FLOODING	x		
4/9/1980	SEVERE STORMS & FLOODING	x		x
4/20/1983	SEVERE STORMS AND FLOODING	x	x	x
11/1/1985	HURRICANE JUAN	x	x	
6/16/1989	SEVERE STORMS & TORNADOES		x	
5/3/1991	SEVERE STORMS, TORNADOES & FLOODING	x		
8/26/1992	HURRICANE ANDREW	x	x	x
2/2/1993	SEVERE STORMS & FLOODING	x	x	
5/10/1995	SEVERE STORMS & FLOODING	x	x	
9/23/1998	HURRICANE GEORGES/TS FRANCES	x	x	x
6/11/2001	TROPICAL STORM ALLISON	x	x	x
9/27/2002	TROPICAL STORM ISIDORE	x	x	
10/3/2002	HURRICANE LILI	x	x	x
2/1/2003	LOSS OF SPACE SHUTTLE COLUMBIA	x	x	
9/15/2004	HURRICANE IVAN	x	x	x
8/27/2005	HURRICANE KATRINA	x	x	x
8/29/2005	HURRICANE KATRINA	x	x	x
9/21/2005	HURRICANE RITA	x	x	x
9/24/2005	HURRICANE RITA	x	x	x
8/29/2008	HURRICANE GUSTAV	x	x	x
9/2/2008	HURRICANE GUSTAV	x	x	x
9/13/2008	HURRICANE IKE	x	x	
8/27/2012	TROPICAL STORM ISAAC	x	x	x
8/29/2012	HURRICANE ISAAC	x	x	x
3/13/2016	SEVERE STOMRS AND FLOODING	x	x	x
8/14/2016	SEVERE STORMS AND FLOODING	x	x	x
10/6/2017	TROPICAL STORM NATE	x	x	x

[10] FEMA https://www.fema.gov/openfema-dataset-disaster-declarations-summaries-v1 , (March 2018)

Hazard Mitigation Plan Review

Table 13 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.

Due to the regular cycle of hazard mitigation plan updates, all Louisiana communities within the Liberty Bayou Tchefuncta watershed were going through the process of updating, reviewing, and adopting their hazard mitigation plans.

Table 12: Hazard Mitigation Plan Status

Plan	Date Plan Approved	Plan Expiration Date
St. Tammany Parish Hazard Mitigation Update	7/28/2015	7/28/2020
Tangipahoa Parish Hazard Mitigation Plan	12/14/2015	12/14/2020
Washington Parish Hazard Mitigation Plan	2/29/2016	2/29/2021

St. Tammany Parish

The St. Tammany Parish Hazard Mitigation Plan (2015) is a multi-jurisdictional plan that includes the cities of Covington, Mandeville, Slidell, the towns of Abita Springs, Madisonville, Pearl River, and the villages of Folsom and Sun.

- Goal 1- Protect the lives and health of the Parish's residents from the dangers of natural hazards
  - Educate public through public outreach programs on awareness of risks and safety
- Goal 2- Ensure that public services and critical facilities operate during and after a disaster
  - Construction of multi-use facility and safe room
  - Hardening of public facilities
- Goal 3- Ensure that adequate evacuation routes, streets, utilities and public and emergency communications are maintained and available during and after a disaster
- Goal 4- Protect homes and businesses from damage
- Goal 5- Use new infrastructure and development planning to reduce the impact of natural hazards
  - Restoration and creation of shorelines and marshes
  - Build additional storm water detention ponds
  - Improve levee system
- Goal 6: Give special attention to repetitively flooded areas
  - Elevate repetitive loss structures
- Goal 7: Maintain and improve CRS ratings throughout the parish

Tangipahoa Parish

The Tangipahoa Parish Hazard Mitigation Plan (2015) is a multi-jurisdictional plan.

- 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.

Washington Parish

The Washington Parish Hazard Mitigation Plan (2016) is a multi-jurisdictional plan.

- Goal 1- Identify and pursue preventative measures that will reduce future damages from hazards including the reduction of repetitive losses in the parish and its municipalities.
    - Hardening of public buildings
    - Elevate or acquire and demolish residential repetitive loss properties
    - Construction of safe rooms for first responders
    - Construction of emergency shelters
    - Install emergency generators at critical facilities
- Goal 2- Enhance public awareness and understanding of hazard mitigation.
    - Better public outreach programs
- Goal 3- Facilitate sound development in the parish and municipalities so as to reduce or eliminate the potential impact of hazards.
    - Upgrade drainage to relieve flooding problems
- Goal 4- Enhance local capability and improve data collection as it relates to hazard mitigation.

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.

City of Covington

Code of Ordinances > Appendix B- Comprehensive Zoning Ordinance of 2010 > Part 3- Use Districts > Sec. 3.50- Statutory authority, findings of fact, purpose and methods of flood hazard prevention

Sec. 3.5008 states the provisions for flood hazard reduction. This section is divided into four sections general standards, specific standards, standards for subdivision proposals, 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 above the base flood elevation and that mobile homes are elevated and anchored. 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.

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

Town of Madisonville

Flood Damage Prevention Ordinance

Article 5 states the provisions for flood hazard reduction. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, 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 and certification requirements, as well as specific requirements for the placement of manufactured homes and restrictions on the placement of recreational vehicles. The subdivision standards require compliance with the previous standards. 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.

http://c3filedepot.s3.amazonaws.com/townofmadisonville/files/COMPOSITE-ORIG-FLOODPLAIN-ORD-02-04-2013.pdf

City of Mandeville

Article 8, section 3 of the City of Mandeville code of ordinances addresses the flood damage prevention regulations. 8.3.5 Provisions for Flood Hazard Reduction

Section 8.3.5 states the provisions for flood hazard reduction. This section is divided into five sections general standards, specific standards, standards for subdivision proposals, 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 24 inches above the base flood elevation and certification requirements. All manufactured homes are to be located out of the special flood hazard areas and in zone X. The subdivision standards require compliance with the previous standards. The floodway standards prohibit encroachments on the floodway, including fill new construction, substantial improvements and other development within the floodway without hydrologic and hydraulic analyses indicating that such encroachment would not increase flood levels. The standards for coastal high areas include elevation on pilings and columns so that the lowest floor is elevated 2 feet 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.

http://www.cityofmandeville.com/Images/Interior/departments/planning/cluro%206-25-15%20adopted.revised%2012-15-17.pdf

City of Slidell

Chapter 15 code of ordinances article ii sec 33-38

Article II sections 33-36 state the provisions for flood hazard reduction. These six sections are general construction requirements, specific standards for different types of construction, standards for subdivision proposals, and recreational vehicles. General construction requirements 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, water supply and sanitary sewage systems will minimize or eliminate infiltration of floodwaters and the discharge into floodwaters, and that an elevation certificate is to be submitted for all new or substantially improved structures. Specific standards require that the lowest floor is elevated above the base flood elevation and certification requirements, as well as specific requirements for the placement of manufactured homes and accessory structures. The subdivision standards require compliance with the previous standards and that subdivision proposals will include a drainage plan. The standards for recreational vehicles places restrictions on use and location.

https://library.municode.com/la/slidell/codes/code_of_ordinances?nodeId=PTIICOOR_CH15FL

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, 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 3.47 square miles or 3.5% increase. From 2006 to 2011 developed areas increase by about 2.3 square miles or 2.37%, bringing the total for the entire 10 year period to 5.84 square miles or a change of 5.7 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 Liberty Bayou-Tchefuncta Watershed have a total of 425 Letters of Map Change, consisting of 304 LOMAs and 121 LOMR-Fs. Table 12 below illustrates which communities have Letter of Map Change and their types.

Table 13: Letters of Map Change

Community Name	LOMA	LOMR-F
Town of Abita Springs	9	-
City of Covington	20	8
Village of Folsom	-	-
Town of Madisonville	2	2
City of Mandeville	15	-
City of Slidell	8	-
St. Tammany Parish	250	111
Tangipahoa Parish	-	-
Washington Parish	-	-

Hydraulics and Floodplain Analysis

Hydraulics, floodplain, and floodways were reviewed based on the FIS reports, available hydraulic models, and FIRMs. CNMS identified flooding sources with effective flood data. Where CNMS validation is considered 'valid' accounting for ~216 miles of detailed study and ~206 miles of approximate the most recent BLE analysis was used for comparison. Comparison is looking for notable changes in the horizontal (X, Y) extent of flooding that are captured in the Changes Since Last FIRM (CSLF). This assessment will be summarized below. In addition where CNMS has not assessed the effective Zone A analysis CSLF/BLE will be leverage in order to note significant horizontal changes in the SFHA. 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 community or parish boundaries. No floodway or BFE disconnects were identified in this research.

Generally where CNMS is denoted as 'valid' along approximate Zone A flooding sources the BLE analysis is showing an increase in horizontal flooding extents. This increase can be attributed to several causes that should be looked at in more detail if a new study were to be recommended. Increase in WSEL could be attributed due to difference in modeling used between the effective approximate study 1-dimentional hydraulics and the BLE 2-dimentional hydraulics, hydrology difference between the studies, and more recent higher resolution topography (LiDAR). This trend is also seen along other effective approximate study (Zone A) flooding sources where in CNMS they are tagged as 'unverified'. These trends seem to indicate that the effective analysis might be dated and in need of evaluation to determine if an updated study is warranted. Stated previously in this report the effective analysis models a specific riverine flooding sources by methods that differ from that of a rain on grid 2-dimensional model which is the basis of the BLE analysis. 2 dimensional rain on grid models determine the flood hazard extent with consideration for the pluvial flooding beyond that of the fluvial (riverine) channel. A closer look at the effective detailed analysis (Zone AE) as compared to the more recent BLE analysis is summarized below:

St. Tammany

- St. Tammany Parish Unincorporated Areas tributaries to Tchefuncta River, Horse Branch and tributaries, Mile Branch and tributaries, tributaries to Bogue Falaya River, Abita River and tributaries, Soap & Tallow Branch and tributaries, Timber Branch, Ponchitolawa Creek and tributaries, Black River and tributaries, Little Creek, and the bayou's of de Zaire, Tete, Chinchuba, Cane, Lacombe, Cypress, Paquet, Liberty, Vincent and their tributaries these are all

detailed and approximate study areas that are 'valid' within CNMS. BLE analysis depicts inundation outside of the effective analysis indicating more areas flooding. There are a number of structures within this area of concern.

- City of Covington Lateral A, B, Mile Branch and their tributaries as well as Tchefuncta River Tributary 3 these are all detailed study areas that are 'valid' within CNMS. BLE analysis depicts inundation outside of the effective analysis indicating more areas flooding. There are a number of structures within this area of concern.
- City of Mandeville Parc du Lac is a detailed study area that is 'valid' within CNMS. BLE analysis depicts inundation outside of the effective analysis indicating more areas flooding. There are a number of structures within this area of concern.
- Town of Abita Springs Abita River and its tributaries are all detailed study areas that are 'valid' within CNMS. BLE analysis depicts inundation outside of the effective analysis indicating more areas flooding. There are a number of structures within this area of concern.
- City of Slidell bayous of Liberty, Vincent and their tributaries and the canals of Reine, Tributary, and West Diversion are all detailed study areas that are 'valid' within CNMS. BLE analysis depicts inundation outside of the effective analysis indicating more areas flooding. There are a number of structures within this area of concern.

Tangipahoa Parish and Washington Parish

- General pattern for approximate zones in Tangipahoa Parish and Washington Parish is that the effective analysis does not deviate noticeably from the BLE analysis where they are coincident. Although availability of more accurate topographic information in the form of LiDAR and mapping of water surface elevations from more recent models allows for better definition of flood inundation in localized areas throughout both parishes.

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:

St. Tammany

- St. Tammany Parish Unincorporated Areas between the community boundaries with Washington Parish there is a mismatch. These are effective approximate studies. The difference could be attributed to the temporal difference between the studies and model input and terrain used between the two.
- City of Covington the Tchefuncta River serves as the community boundary between Covington and the Unincorporated Areas of St. Tammany Parish. Upstream at a location near the confluence with the Tchefuncta River and Tchefuncte River Tributary 3 there is a mismatch in numbered A zones between the two communities.
- City of Covington and St. Tammany Parish Unincorporated Areas boundary on Lateral B there is a mismatch in study type that results in the flood hazard boundary being mismatched.
- City of Mandeville and St. Tammany Parish Unincorporated Areas boundary at the confluence with Bayou Chinchuba and Parc du Lac there is a mismatch in numbered A zones between the two communities. Mismatch in study type results in the flood hazard boundary being mismatched.
- Town of Abita Springs the most upstream portion of the detailed study for LA 36 South Tributary seems to follow a political boundary and looks unnatural.

- Village of Folsom has approximate Zone A tributaries to the Bogue Falaya River that have a mismatch between the community boundaries with the Unincorporated Areas of St. Tammany Parish.
- Town of Madisonville there are mismatches between coastal detailed A and V zones.
- City of Slidell on Bayou Liberty at Interstate 12 there is a mismatch in numbered A zones between the two communities. Mismatch in study type results in the flood hazard boundary being mismatched.

Washington Parish

- Washington Parish Unincorporated Areas between the community boundaries with St. Tammany Parish there is a mismatch. These are effective approximate studies. The difference could be attributed to the temporal difference between the studies and model input and terrain used between the two.
- Washington Unincorporated Areas between the community boundaries with Tangipahoa Parish there is a mismatch along the entire length of the Tangipahoa River. These are effective approximate studies. This is probably due to the use of two different political boundaries as the river serves as the political boundary.

Tangipahoa Parish

- Tangipahoa Unincorporated Areas between the community boundaries with Washington Parish there is a mismatch along the entire length of the Tangipahoa River. These are effective approximate studies. This is probably due to the use of two different political boundaries as the river serves as the political boundary.

The table below summarizes the effective FIS and the modeling used in the effective analysis.

Table 14: Effective Hydrology and Hydraulic Modeling

Community Name	CID	NFIP Participant	Date H&H analysis	Hydrology Model	Hydraulics Model
St. Tammany Parish Unincorporated Areas	225205	Y	December 1989	Detailed Studies: rainfall-runoff Approximate Studies: Unknown Zone A	Detailed Studies: HEC-2 Approximate Studies: Unknown Zone A
City of Covington	220200	Y	February 1969	Detailed Studies: rainfall-runoff Approximate Studies: Unknown Zone A	Detailed Studies: HEC-2 Approximate Studies: Unknown Zone A
City of Mandeville	220202	Y	October 1977 April 2008	Detailed Studies: rainfall-runoff Approximate Studies: regression equations	Detailed Studies: HEC-2 Approximate Studies: HEC-RAS
Town of Abita Springs	220199	Y	April 1986	Detailed Studies: rainfall-runoff Approximate Studies: regression equations	Detailed Studies: HEC-2 Approximate Studies: Unknown Zone A
Village of Folsom	220285	Y	March 1982	Approximate Studies: Unknown Zone A	Approximate Studies: Unknown Zone A
Town of Madisonville	220201	Y	February 1980	National Academy of Sciences Wave Height Analysis, 1977.	National Academy of Sciences Wave Height Analysis, 1977.
City of Slidell	220204	Y	February 1979	Detailed Studies: rainfall-runoff Approximate Studies: Unknown Zone A	Detailed Studies: HEC-2 Approximate Studies: Unknown Zone A

Community Name	CID	NFIP Participant	Date H&H analysis	Hydrology Model	Hydraulics Model
Tangipahoa Parish Unincorporated Areas	220206	Y	September 1988	Detailed Studies: regression equations Approximate Studies: Unknown Zone A	Detailed Studies: HEC-2 Approximate Studies: Unknown Zone A
Washington Parish Unincorporated Areas	220230	Y	July 1986	Approximate Studies: Unknown Zone A	Approximate Studies: Unknown Zone A

Discovery Outreach and Meeting

In developing a comprehensive analysis of the Liberty Bayou-Tchefuncta 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 DODT 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 22nd 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 in late summer or early fall, and asked that they begin sending relevant information to the CTP contractor. The mailing also included a Pre-Discovery newsletter which provided further information on the Discovery process and listed specific kinds of information that the project team could utilize.

The mailing also included 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 weekly meetings in August and September 2018 to review draft deliverables and begin to plan out the Discovery meeting in more detail.

Phone calls to follow up with the communities after the initial email occurred the week of September 17th, 2018. These phone calls reiterated the points made in the email and was intended to maintain awareness of the Discovery process.

The Discovery Meeting was held on September 18, 2018 from 2:00 PM until 4:00 PM. St. Tammany Parish hosted the meeting at Council Chambers, Building A 21490 Koop Drive Mandeville, LA 70471.

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:

- St. Tammany Parish Unincorporated Areas
- City of Covington
- City of Mandeville

- Town of Abita Springs
- Town of Madisonville
- City of Slidell
- Tangipahoa Parish Unincorporated Areas

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. 7 of the 9 communities or 77% in the watershed were represented. All communities acknowledged having received the emails in the follow-up phone calls. Representative from The Water Institute of the Gulf were present. Concerns were mostly collected in Tangipahoa and St. Tammany Parishes.

Figure 7: Map of concerns collected at the Discovery Meeting

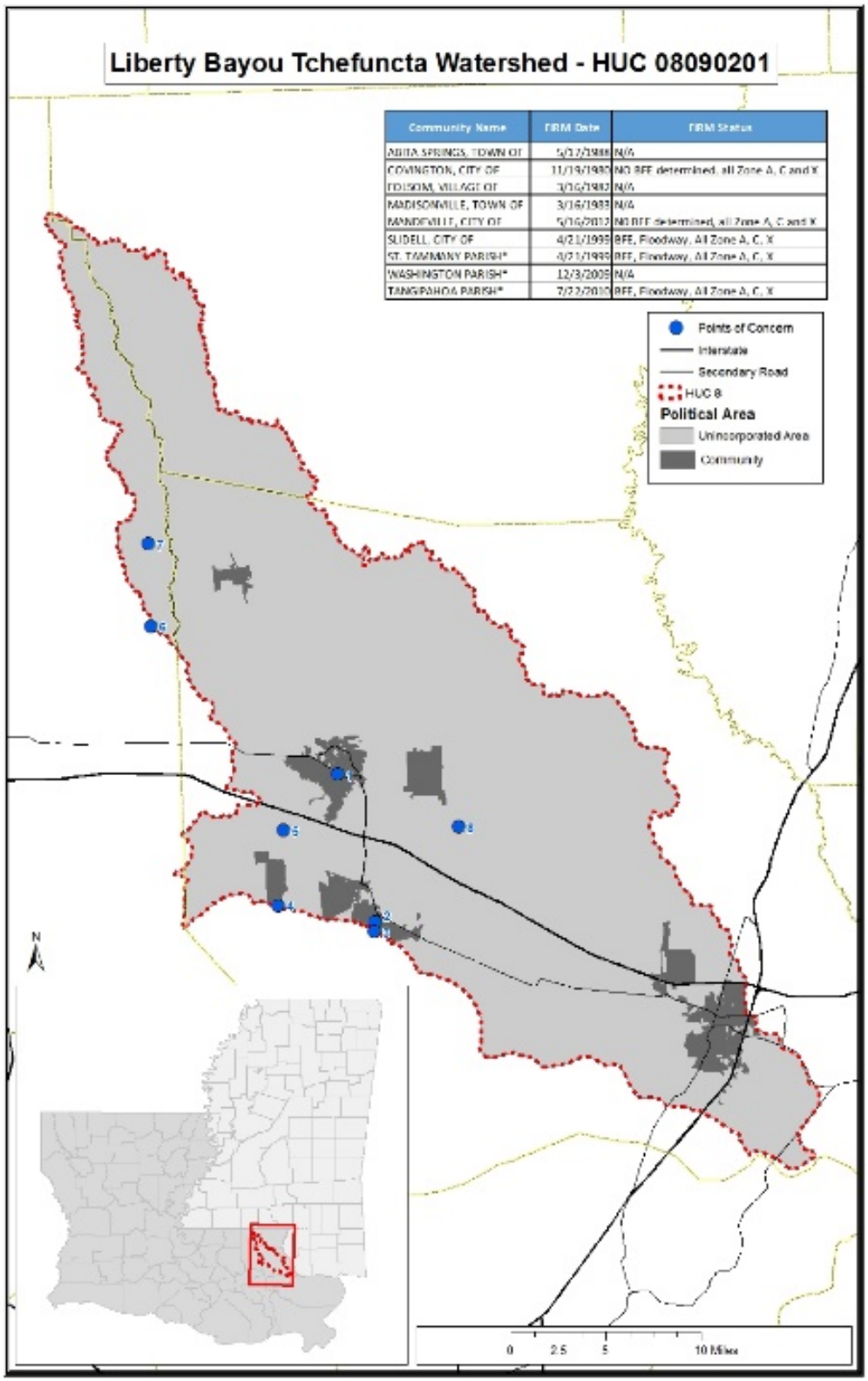


Table 15: Effective Hydrology Issues and Concerns Collected During the Discovery Process

Item	Location	Information Provided By	Discovery Workshop Comment Summary
1	City of Covington	Community Official	Currently using effective maps from 1980. Huge amounts of development have occurred in the last 40 years. The model used in 2008 DFIRM was completed in 2003-4 and is now 15 years old. Have serious questions regarding validity of the modeling
2	City of Mandeville	Community Official	Not interested in updating or changing any of the maps.
3	City of Mandeville	Community Official	Looking at elevating wall on the lake to reduce V zones. Having trouble selling it politically.
4	Town of Madisonville	Community Official	Mayor is concerned about the southern tip of 1077 and possibly rebuilding the land that was lost to storm surge in the past. The mayor spoke to Ross White about this matter.
5	Town of Madisonville	Community Official	Impact studies on new developments that effect the watershed for all these areas south of I-12, were any done or any in the future planned?
6	Tangipahoa Parish	Community Official	Elevation changes between 10-12 feet headed towards the river.
7	Tangipahoa Parish	Community Official	Tangipahoa developer has produced H+H model requested by community. HMGP mitigations and activities ongoing and planed drainage district 1 activity. HMD and HMGP grants.
8	St. Tammany Parish	Community Official	Has pertinent info about developments and capital projects as well as models. Would like to set up a work session.

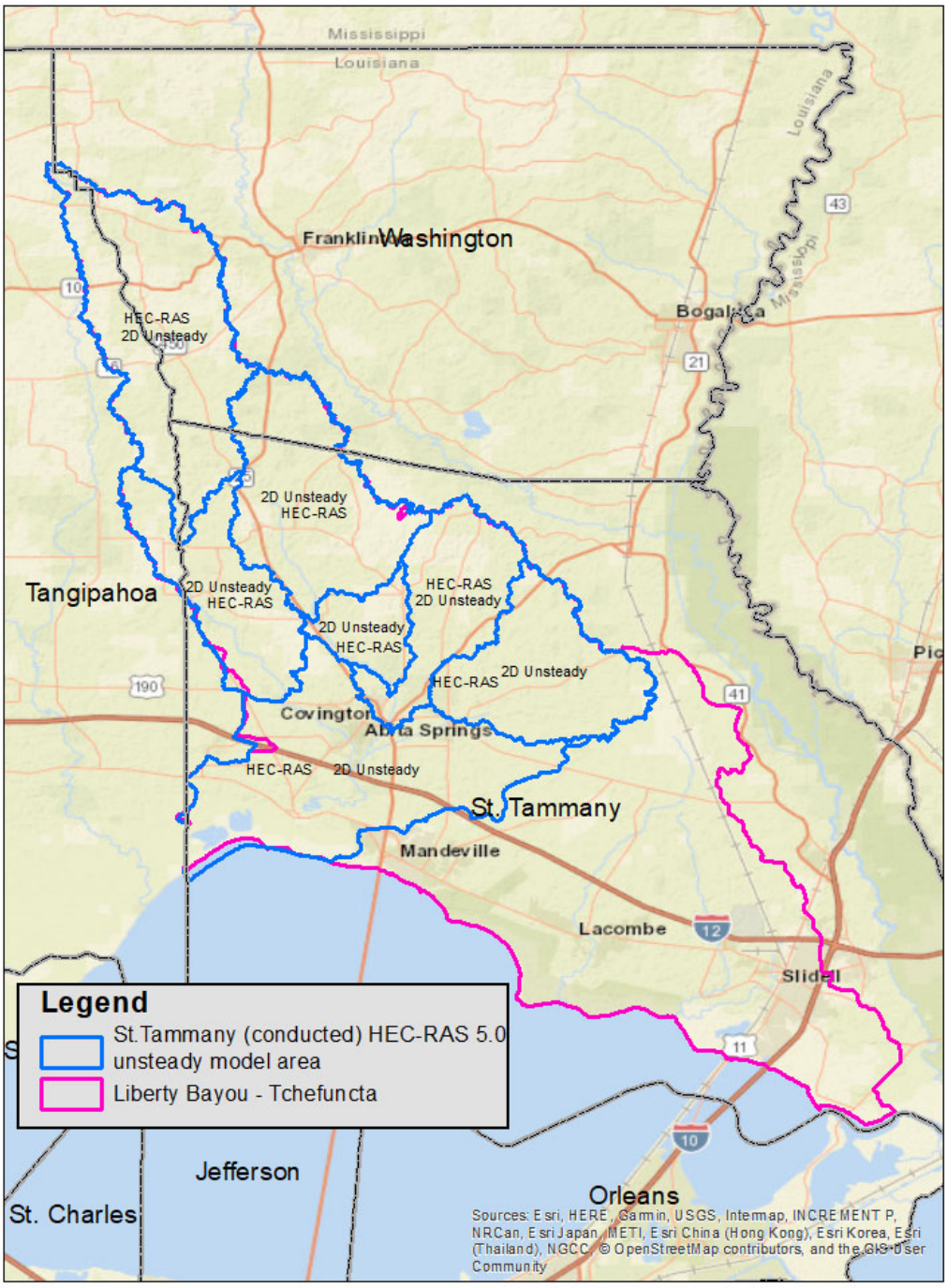
FEMA Investment Decision

St. Tammany Parish has indicated that they have extensive 2D unsteady riverine modeling throughout the Parish. Leverage of their modeling effort into FEMA specifications would address 50% of the concerns brought up as part of the Liberty Bayou Tchefuncta watershed Discovery effort, figure 8. St. Tammany effective FIS for most communities is over 30 years old and development has occurred in sub watersheds throughout the region that impact runoff and flood patterns within the Parish. BLE indicates significant changes and will be an important tool in focusing areas that are in need of an updated analysis. Based on the information collected at the Discovery Meeting, it is recommended that future projects be initiated within the Liberty Bayou Tchefuncta Watershed. They are as follows:

1. Leverage results of existing studies, Item 8 data from St. Tammany Parish:
    - Superimpose the resulting water surface elevations of the 2D BLE analysis with the resulting water surface elevations of the St. Tammany analysis to identify areas where pluvial flooding may be of concern and is not captured with 1D methodologies.

2. Leverage existing hydrology calculations:
    - Hydrology calculations used in the St. Tammany analysis will be reviewed and utilized where 1D steady state modeling is deemed applicable. These results can then be compared to peak discharges determined from flow frequency analysis of neighboring stream gauges for agreement.
    - In cases of fluvial flooding near urbanized areas or in very flat areas with extensive low lying overbanks where pluvial flooding is of concern, an unsteady hydraulic model may be more applicable. In such situations it may be possible to leverage existing sub basin delineations from the regression analysis to construct a rainfall-runoff model. This model would produce the direct runoff hydrographs required for an unsteady hydraulic analysis. Additionally, the existing 1D model could be used for the routing within the rainfall-runoff model if the modified Puls methodology were adopted. The resulting peak discharges could then be compared to existing regression results and peak discharges resulting from a flow frequency analysis of neighboring stream gauges. Furthermore, the rainfall-runoff model could be calibrated if both precipitation and gauge data exist for historical events.
3. Leverage existing hydraulic data:
    - Existing channel geometry and structure data can be extracted from existing 1D analysis for 1D steady, 1D unsteady, or 1D/2D hydraulic modeling.
    - Where structure information is not included in the existing 1D model, as-built drawings can be requested from the cities, parishes, or state DOTD.
    - Breaklines used in the 2D BLE data can be recycled into any newly scoped 2D areas. Existing road and levee centerline datasets can also be enforced as Breaklines into any 2D areas.
    - The 2D BLE data can be used to inform the development of 1D models by identifying inundated areas that have zero or near-zero velocities in the direction of the 1D stream. These are areas of zero conveyance and should be implemented in scoped 1D models as ineffective flow areas.
    - For areas identified for 1D steady state hydraulic modeling the existing 1D analysis can be reviewed and possibly used as is. If the model is adequate as is it would simply need to be packaged in FEMA spec.

Figure 8: St. Tammany 2D Unsteady Modeling Locations



Future Investments for Refinement

FEMA will work closely with communities to identify additional areas for model refinement and FIRM panel updates. Once the Base Level Engineering information is prepared and released to communities, FEMA will coordinate with watershed communities to identify additional areas for future investment.

Bibliography

Cunningham, R., Giisclair, D., & Craig, J. (2003). *The Louisiana Statewide LiDAR Project.* Baton Rouge: Louisiana State University.

FEMA, F. E. (2017, August). Louisiana Watershed Resiliency Study Appendix I: Liberty Bayou-Tchefuncta. Washington, DC: FEMA Hazard Performance Analysis Group.

Gibson, S. (2017). *Watershed Resiliency Study (LaWRS) Briefing.* Baton Rouge: Federal Emergency Management Agency.

Appendix [1]: Community-Specific Reports

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

Communities
ST. TAMMANY PARISH
ST. TAMMANY PARISH UNINCORPORATED AREAS
TOWN OF ABITA SPRINGS
CITY OF COVINGTON
VILLAGE OF FOLSOM
TOWN OF MADISONVILLE
CITY OF MANDEVILLE
CITY OF SLIDELL
TANGIPAHOA PARISH
TANGIPAHOA PARISH UNINCORPORATED AREAS
WASHINGTON PARISH
WASHINGTON PARISH UNINCORPORATED AREAS

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
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

Watershed Follow Up Points of Contact

Subject/Topic of Interest	Name	Contact Information
FEMA Project Monitor *Project Outreach*	Diane Howe Risk Analysis Branch	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 (FMIX)	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

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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

Louisiana Floodplain Management Association

Organization	Contact Information	Website
Louisiana Floodplain Management Association (LFMA)	Phone: 318-226-6934	http://lfma.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

Estimated Base Flood Elevation (BFE) Viewer

As a part of the Risk MAP process, FEMA is completing **Base Level Engineering (BLE)** to provide a complete picture of flood hazard throughout a watershed. The BLE analysis uses high resolution ground elevation data, flood flow calculations, and fundamental engineering modeling techniques to define flood extents for streams.

To provide a look at BLE data availability and relative engineering analysis, FEMA developed the through the **Estimated BFE Viewer** for community officials, property owners, and land developers to identify the flood risk (high, moderate, low), expected flood elevation, and estimated flood depth near any property or structure within watersheds where BLE has been prepared.

It should be noted that Note: Due to differences between the effective studies and the Base Level Engineering there are areas on this map which may inaccurately show increases or decreases to the floodplains. In other areas the BLE analysis may show SFHA increases because waterways in that area had not been previously studied and mapped. Base Level Engineering cannot be compared to detailed studies that result in AE Zones because the BLE analysis does not incorporate the same level of information used in those models. BLE data was not created for Mississippi.

Visit the Estimated BFE Viewer (https://webapps.usgs.gov/infrm/estBFE/) application to learn the status of BLE in your area of interest or surrounding communities, to view the flood hazard data developed, or to utilize the tool's flood risk reporting features for a location where BLE has been made available.

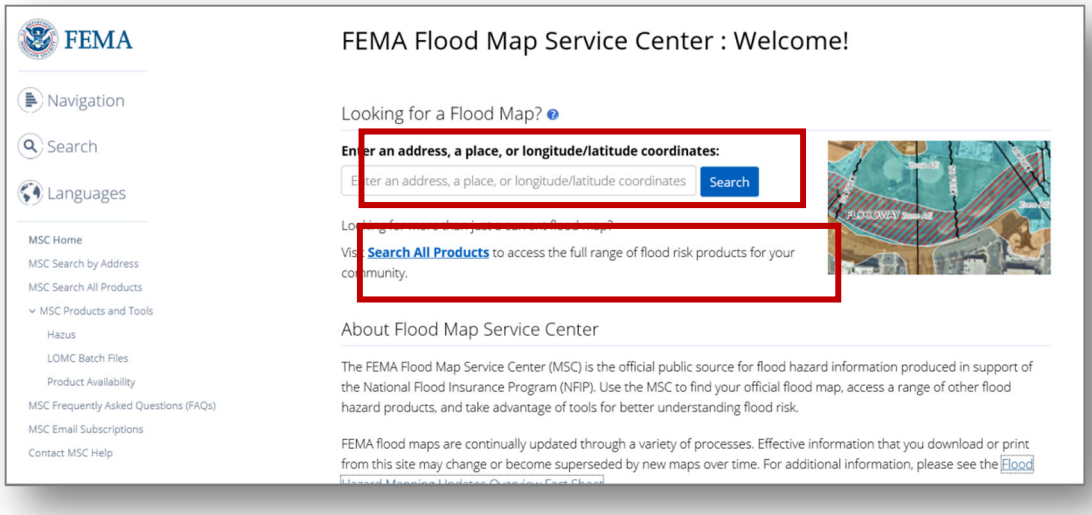
FEMA Flood Map Service Center (MSC)

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.

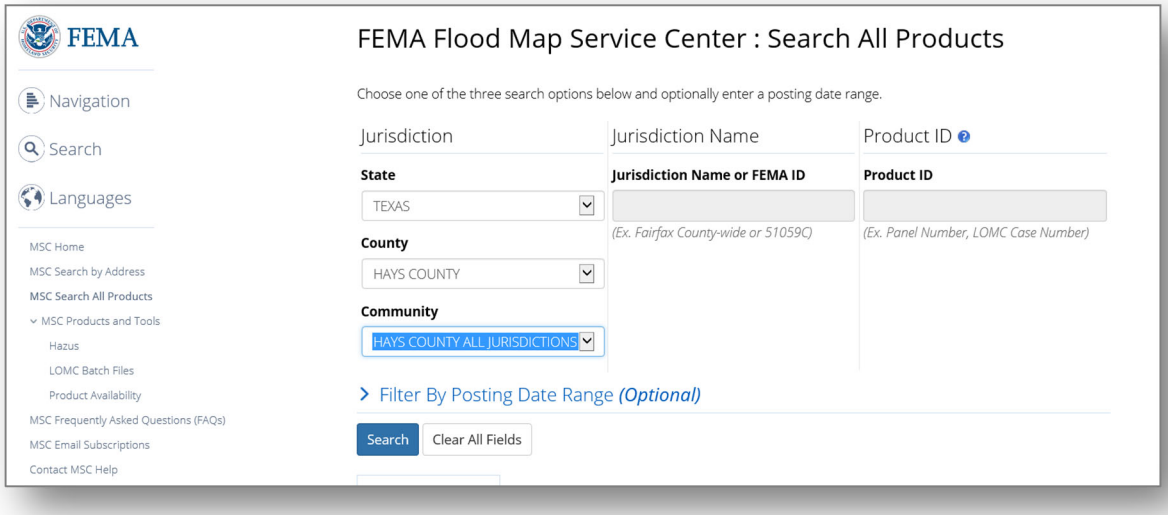
FEMA flood maps are continually updated through a variety of processes. Effective information that you download or print from this site may change or become superseded by new maps over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet.

At the MSC, 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 for the location.
2. Or Search All Products, which will provide access to the full range of flood risk information available.

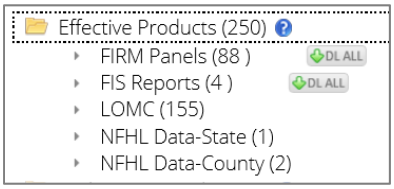


By using the more advanced search option, "Search All Products," users may access current, preliminary, pending and historic flood maps. Additionally, GIS data and flood risk products may be accessed through the site with these few steps



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 MSC will return all items in the area. There are five types of data available.

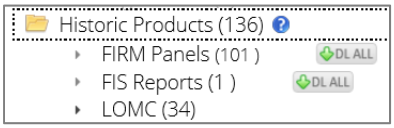
Effective Products. The current effective FIS, FIRM and DFIRM database (if available) is available through the MSC. If users click on the available effective products they are presented a breakdown of the available products. FIRM panels, FIS reports, Letters of Map Revision, Statewide NFHL and Countywide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



Preliminary Products. Once a project area has been issued preliminary, the FIRM panels, FIS reports 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 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 it has been compiled and completed. These products are made available after the flood study analysis and mapping has been reviewed and community comments can be incorporated.