DISASTER MITIGATION INITIATIVE
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Allocations, Common Application, Waivers and Alternative Requirements for
Community Development Block Grant Mitigation Grantees
Further Additional Supplemental Appropriations for Disaster Relief Requirements Act, 2018
(Public Law 115-123)

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OFFICE OF COMMUNITY DEVELOPMENT
STATE OF LOUISIANA

MASTER ACTION PLAN FOR THE UTILIZATION OF COMMUNITY DEVELOPMENT BLOCK GRANT MITIGATION FUNDS (CDBG-MIT)

Public Comment Period: Oct. 16, 2019 until 5 p.m. Nov. 29, 2019
Public Hearings:

Sept. 19, 1:30 p.m.
City-Parish Council Chambers
Lafayette Consolidated Government
705 W. University Ave.
Lafayette, LA 70506

Sept. 25, 1:30 p.m.
House Committee Room 5
Louisiana State Capitol
900 N. Third St.
Baton Rouge, LA 70802

Oct. 24, 1:30 p.m.
Ouachita Parish Emergency Operation Center
Fire Department Training Center
1000 New Natchitoches Road
West Monroe, LA 71292

Oct. 29, 6 p.m.
Parish Council Chambers
St. Tammany Parish Government
21490 Koop Drive
Mandeville, LA 7047

Submitted to HUD: _____, 2019

Approved by HUD: _____, 2019

John Bel Edwards, Governor
Billy Nungesser, Lieutenant Governor
Jay Dardenne, Commissioner of Administration

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I. CRITICAL DEFINITIONS

Action Plan or AP: After HUD publishes the Federal Register Notice for a congressional appropriation, the grantee (eligible government) must develop and submit an Action Plan describing the needs, strategies and projected uses of the CDBG-MIT funds. HUD must approve the Action Plan before funds are available.

CDBG-MIT: Community Development Block Grant-Mitigation assistance is the term for the HUD funding stream that is allocated to eligible disaster recovery entities via congressional appropriations. HUD provides flexible CDBG-MIT grants to cities, counties and states to assist areas impacted by recent disasters. Grantees are empowered to carry out strategic and high-impact activities to mitigate disaster risks and reduce future losses, while at the same time transform State and local planning[1].

Covered Project: As per FR-6109-N-02, includes infrastructure projects having a total project cost of $100 million or more, with at least $50 million of CDBG funds (regardless of source (CDBG–DR, CDBG–NDR, CDBG–MIT, or CDBG)).

Federal Register or FR: The Federal Register is the official journal of the federal government of the United States that contains government agency rules, proposed rules and public notices. It is published daily, except on federal holidays. The final rules published in the Federal Register are ultimately reorganized by topic or subject matter and codified in the Code of Federal Regulations, which is updated annually.

Federal Register Notice or FRN: For each congressional appropriation, HUD publishes a Federal Register Notice that outlines the rules and regulations for the CDBG-MIT funding.

FEMA: The Federal Emergency Management Agency is an agency of the United States Department of Homeland Security, initially created by Presidential Reorganization Plan No. 3 of 1978 and implemented by two Executive Orders on April 1, 1979. The agency's primary purpose is to coordinate the response to a disaster that has occurred in the United States and that overwhelms the resources of local and state authorities. The governor of the state where the disaster occurs must declare a state of emergency and formally request from the president that FEMA and the federal government respond to the disaster.

FEMA IA: Federal Emergency Management Agency Individual Assistance programs provide financial or direct assistance to support the recovery of disaster survivors who have uninsured or underinsured necessary expenses and serious needs. This may include assistance for temporary housing and housing repairs, critical disaster related expenses, and the replacement of essential personal property. This assistance is not intended to restore your damaged property to its pre-disaster condition. Through its IA programs, FEMA may also provide funding to the state or tribal government to support programs that address crisis counseling, disaster case management, disaster legal services and disaster unemployment assistance.

FEMA PA: The President can make Federal Emergency Management Agency Public Assistance available to local, state and tribal governments, and certain types of private nonprofit organizations to remove debris, provide emergency protective measures, and restore equipment, buildings and other infrastructure damaged by the disaster. This is done on a cost-sharing basis.

FEMA HMGP: The FEMA Hazard Mitigation Grant Program helps communities implement hazard

[1] FR-6109-N-02. p3.

mitigation measures following a Presidential Major Disaster Declaration in the areas of the state, tribe, or territory requested by the Governor or Tribal Executive. The key purpose of this grant program is to enact mitigation measures that reduce the risk of loss of life and property from future disasters. HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Floodplain: Any area of land within a watershed that is susceptible to inundation by floodwaters from any source.

Floodplain Management: A decision-making process that aims to achieve the wise use of the nation's floodplains. It encompasses the choices made by owners of homes and businesses in the floodplain, decisions made by officials at all levels of government, plans made by land developers and contractors, and the judgment of the general public regarding future decisions to be made with regard to land use.

Louisiana Watershed Initiative or LWI: Gov. John Bel Edwards established the Council on Watershed Management, which serves as the coordinated, interagency structure at the state level for watershed-based flood risk reduction. In August 2018, the Council launched the LWI to serve as the programmatic arm under which all related efforts operate.

Major Disaster Declaration: The President can declare a Major Disaster Declaration for any natural event, including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought, or, regardless of cause, fire, flood, or explosion, that the President believes has caused damage of such severity that it is beyond the combined capabilities of state and local governments to respond. A major disaster declaration provides a wide range of federal assistance programs for individuals and public infrastructure, including funds for both emergency and permanent work. Louisiana's major disaster declarations for the March and August flooding events are as follows:

- Severe Flooding (Disaster 4277) declared on August 14, 2016
- Severe Flooding (Disaster 4263) declared on March 13, 2016

Mitigation activities: Those activities that increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters.

Multi-hazard risk assessment: A hazard identification and risk assessment provides the factual basis for activities proposed in the strategy portion of a hazard mitigation plan. An effective risk assessment informs proposed actions by focusing attention and resources on the greatest risks. The four basic components of a risk assessment are (1) hazard identification, (2) profiling of hazard events, (3) inventory of assets and (4) estimation of potential human and economic losses based on the exposure and vulnerability of people, buildings and infrastructure.[2]

Precipitation: Precipitation is water released from clouds in the form of rain, freezing rain, sleet, snow or hail. Most precipitation falls as rain and is the primary aspect of the water cycle that delivers atmospheric water to the Earth. For example, water vapor evaporates from oceans, lakes, forests, fields, animals and plants then condenses and returns to Earth as precipitation, thus replenishing reservoirs, lakes, rivers, underground aquifers and other sources of water that provide moisture needed by plants and animals.[3]

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[2] United States Federal Emergency Management Agency. *Hazard Identification and Risk Assessment.* 2019. Accessed on September 5, 2019. https://www.fema.gov/hazard-identification-and-risk-assessment.

[3] United States Geological Survey. *Rain: A Water Resource, USGS General Interest Publication.* 2019. Accessed on August 11, 2019. https://www.usgs.gov/special-topic/water-science-school/science/precipitation-and-water-cycle.

Provisional watershed regions: The LWI has established provisional watershed regions throughout the state. These regions aggregate HUC8-level watersheds into eight watershed regions for LWI management purposes. See Figure 20 and **Attachment G** for more detail.

U.S. Department of Housing and Urban Development or HUD: The US Department of Housing and Urban Development was established in 1965 by the Department of Housing and Urban Development Act. HUD is the principal federal agency responsible for programs concerned with the nation's housing needs, fair housing opportunities, and improvement and development of the nation's communities. HUD provides the main source of funding for Louisiana's recovery from hurricanes Katrina, Rita, Gustav, Ike and Isaac; and the March and August flooding events. HUD is the agency that administers the Community Development Block Grant-Disaster Mitigation, or CDBG-MIT, funds available to Louisiana from a congressional appropriation. HUD's allocation of this appropriation provides funding for this solicitation and program.

Watershed: A watershed is a geographic area within the boundary of a drainage divide. The USGS defines a watershed as follows: "A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. The word 'watershed' is sometimes used interchangeably with 'drainage basin' or 'catchment.' It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large watersheds, like the Mississippi River basin contain thousands of smaller watersheds.[4]

Additional definitions and common acronyms relevant to this AP are detailed in **Appendices A and B.**

[4] USGS. *Water Science Glossary of Terms.* 2019. Accessed on September 18, 2019. https://www.usgs.gov/special-topic/water-science-school/science/dictionary-water-terms?qt-science_center_objects=0#qt-science_center_objects.

II. EXECUTIVE SUMMARY

Beginning with Hurricane Katrina's landfall in August 2005, each of Louisiana's 64 parishes has been included in a federal major disaster declaration as a result of a named tropical event. Moreover, the Great Floods of 2016 – two rainfall events six months apart and affecting wide swaths of the state, caused severe flash and riverine floods and led to major disaster declarations in 56 parishes. These events have left an indelible mark on Louisiana and have exposed new challenges within the state's approach to flood risk reduction.

Since Hurricanes Katrina and Rita the state has adopted stricter building codes, safer flood levels, and formed of the Coastal Protection and Restoration Authority (CPRA), which relies on science and engineering to produce and regularly update the Coastal Master Plan. After Hurricane Isaac, with funds provided by HUD's National Disaster Resilience Competition, Louisiana created the Strategic Adaptations for Future Environments Program (LA SAFE) to create a model for engaging citizens in the planning of the long-term resilience of their communities.

The Great Floods of 2016 exposed another risk the State faces: how to better manage riverine and flash flooding as a result of extreme precipitation events. The state identified regional watershed-based flood risk management as a means to systematically address water management and avoid interventions that may unintentionally increase runoff or subsequent flooding on adjacent communities, upstream and downstream.

Soon after the state began its investigation of this new approach, per the Bipartisan Budget Act of 2018, Congress allocated $1,213,917,000 CDBG-MIT funds to the State of Louisiana for the specific purpose of mitigation activities as specified in Public Law 115-123 and FR-6109-N-02. The rules for expenditure of these funds require the submittal of an Action Plan or AP for approval by HUD. This Action Plan or AP provides a concise summary of the actions, activities, and resources necessary to address the State of Louisiana's priority mitigation needs and goals.

As the next step in Louisiana's response to its increasingly complex flood risk profile, the state completed its investigation of watershed management and Governor John Bel Edwards charged state agencies with coordinating statewide floodplain management efforts through a watershed-based approach, referred to as the Louisiana Watershed Initiative or LWI.

Building on the efforts and methodologies of both the Coastal Master Plan and LA SAFE, the LWI takes a statewide approach to watershed-based floodplain management to reduce flood risk vulnerabilities through pre-disaster mapping, modeling, and watershed management planning – backed by large-scale investments in projects and programs that directly mitigate risks.

The LWI combines the Coastal Master Plan's focus on data, science and engineering with the community engagement lessons learned through LA SAFE to work across all sectors of government and the state commits to working in partnership with local communities statewide toward an integrated, watershed-based approach to floodplain management that combines physical, biological, ecological, socioeconomic, and policy-based solutions emanating from a comprehensive scientific understanding of the state's hydrologic processes.

In administering this grant, the state and its various jurisdictions and political subdivisions will

coordinate expenditures and activities through the LWI to improve statewide floodplain management within watershed regions.

With regards to CDBG-MIT fund distribution, Public Law 115-123 limits fund expenditure to the most impacted and distressed or MID areas associated with the Great Floods of 2016. HUD has identified ten such areas and the state of Louisiana has identified 46 more. At least 50%, or $606,958,500 of the CDBG-MIT funds will be expended in or benefit HUD-identified MIDs or HUD MIDs. The remaining CDBG-MIT funds will be expended in or benefit LA-identified MID areas or LA MIDs, discussed in more detail in Section IV.

In accordance with the requirements of the federal register notice or FRN (FR-6109-N-02), the state conducted a mitigation needs assessment detailed in Section V to inform projects and programs with a focus on addressing risks to indispensable services, identifying and analyzing all significant current and future disaster risks, and providing a substantive basis for the activities described within this AP. The Assessment relies on stakeholder consultations, data, research, previous regional planning efforts, the State Hazard Mitigation Plan, the state Emergency Operations Plan, and available local hazard mitigation plans to inform, identify and prioritize urgent unmet mitigation needs.

Based on this assessment, the state finds that—whether by flash flooding, inland rivers, stormwater, or coastal storm surge—Louisiana is facing increased risk, in both magnitude and frequency, of flood events. This risk threatens our natural and built environment, and our way of life.[5] Specifically:

- Both HUD and LA MID areas share a collective risk profile that includes wind and flood hazards, which are compounded by the effects of subsidence and sea level rise. These trends are largely consistent within local HMPs outside of HUD and LA MIDs, demonstrating that overall disaster risks correlate statewide and consistently reinforce that flooding remains a difficult to predict state-wide risk.
- This difficulty is compounded when attempting to assemble future projections of risks because the state does not have the ability to accurately estimate the cost of long-term and repeated flood damage. As a result, future wind- and flood-related damages are largely underestimated.
- These risks will continue to escalate in a warming world, where the frequency and intensity of tropical cyclones and severe thunderstorms are anticipated to increase.
- Both state and local hazard plans consistently demonstrate that the entire State of Louisiana is at severe flood risk, and that the occurrence of future catastrophic flood events cannot be predicted solely by relying on the damage patterns of past events.
- To this effect, this AP and efforts associated with the LWI propose a proactive pre-disaster approach that accommodates—to a reasonable extent given the requirements of FRN-6109-N-02—the probability of future events occurring in any location in the state, while also specifically assessing risks to HUD and LA MID areas.

With regard to vulnerable populations, all of the HUD MIDs with available data have experienced a cumulative growth in their vulnerable population, most significantly within Tangipahoa (14%), Ascension (13%), Livingston (11%), and Washington (10%) parishes. The LA MIDs with available data have experienced an average two percent cumulative growth in their vulnerable population, most

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[5] State of Louisiana. Louisiana Watershed Coordinating Agencies. *Phase 1 Investigation: Louisiana Statewide Comprehensive Watershed Based Floodplain Management Program Development*. 2018. Accessed on September 18, 2019. https://watershed.la.gov/assets/docs/Phase-1-Full-Report-with-Appendices_compressed.pdf on 9/1/19. 11.

significantly within Beauregard (15%), Vernon (15%) and Richland (11%) parishes. In fulfillment of the requirements of FR-6109-N-02, the state proposes mitigation programs and projects in Section VII that prioritize the protection of low-and-moderate income (LMI) individuals and vulnerable populations.

With regard to citizen participation, the state has updated its current citizen participation plan and acknowledges that this AP is substantially informed by previous planning, outreach, and engagement efforts of the LWI. The planning process required to facilitate completion of this AP is one of many opportunities for the public to provide input regarding the state's ongoing CDBG-MIT activities.

In order to address the unmet mitigation needs specified in this AP, the state will allocate the CDBG-MIT funds as described in **Table 1**. This program will be implemented through the state Division of Administration (DOA), Office of Community Development (OCD), and the LWI.

Table 1. CDBG-MIT Program Budget

Programs		
Watershed (Local and Regional) Projects and Programs	$570,666,243	47%
State Projects and Programs	$327,757,590	27%
Non-Federal Cost Share Assistance	$96,988,107	8%
Watershed Monitoring, Mapping, and Modeling	$145,670,040	12%
Administrative Costs	$48,556,680	4%
Watershed Policy, Planning, and Local Capacity Assistance	$24,278,340	2%
Total Allocation	**$ 1,213,917,000**	**100%**

The state does not currently contemplate any individual projects that meet the definition of a Covered Project. Should the state choose to use CDBG-MIT funds on a Covered Project, use of these funds will be outlined in a future Substantial Action Plan Amendment.

With regard to programming CDBG-MIT funds, the state will continue to address unmet mitigation needs through its investment in the LWI. The LWI is the platform for the state to develop, institutionalize, and implement best practices in watershed management, including not only structural flood mitigation projects, but also long-term policies, practices, and programs that can become national best practices for large-scale, comprehensive flood-risk management (see **Section VII** for more detail). As such, the state's CDBG-MIT grant objectives include:

- Developing real time, high-quality hydrologic data and modeling as part of a statewide effort to establish and standardize a baseline understanding of flood risks;
- Utilizing best available flood risk and hydrologic modeling data to inform a statewide public education and outreach campaign, specific to the history and challenges associated with flood risk and resilience in Louisiana;
- Conducting large-scale regional and statewide floodplain management planning activities, utilizing a watershed management approach that incentivizes using the natural and beneficial functions of the watershed and its floodplains and builds on previous successful planning practices including the Coastal Master Plan and LA SAFE;
- Facilitating regional coordination within watershed boundaries to incentivize improvements in development decisions by anticipating upstream and downstream impacts within watersheds and at other spatial scales;
- Building capacity at statewide, regional, and local levels in support of a comprehensive approach to watershed management;
- Incentivizing statewide economic growth in the resilience economy by investing in research,

development, and implementation of tools that respond to global demand for flood mitigation techniques and new technologies; and

- Ensuring that these approaches and the gains associated with them remain the flood risk reduction standards for the state long after the CDBG-MIT funds from this allocation are expended.

As outlined in this AP, the state aims to use this one-time CDBG-MIT grant to fundamentally change Louisiana's approach to statewide flood mitigation activities including shifting development patterns, enhancing the public's knowledge of flood risk, and incentivizing activities that use the natural and beneficial functions of the watershed and associated floodplains; resulting in reduced need for future flood recovery and mitigation resources. The state recognizes that the perpetual cycle of disaster and recovery is not a socially, economically, environmentally or fiscally sustainable model.

III. AUTHORITY AND PURPOSE

On February 9, 2018, the President signed Public Law 115-123 that included an appropriation to the U.S. Department of Housing and Urban Development of $28 billion. HUD allocated $1,213,917,000 from this allocation in CDBG-MIT funds to the State of Louisiana for mitigation activities.

Governor John Bel Edwards has designated the state Division of Administration (DOA), Office of Community Development (OCD), as the administering agency for these CDBG-MIT funds. DOA will report directly to the Governor.

To fulfill the requirements of this allocation, the state must submit an AP for CDBG-MIT activities that identifies unmet mitigation needs to HUD. Specifically, these activities must increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters.

This AP provides a concise summary of the actions, activities, and resources used to address the State of Louisiana's priority mitigation needs and goals. It is designed to help the state of Louisiana, local jurisdictions, and their partners assess current and future mitigation needs and multi-hazard risk conditions; make data-driven mitigation investments; provide increased transparency relative to the use of public funds; and ensure sustainable and effective investment of mitigation funds.

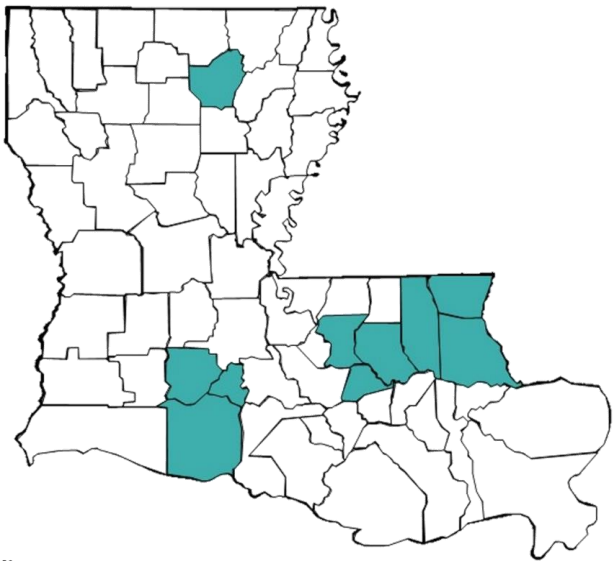
The process required to facilitate completion of this AP is one of many opportunities for the public to provide input regarding the state's ongoing CDBG-MIT projects and activities. This planning process is substantially informed by previous planning, outreach, and engagement efforts of the LWI and serves as the framework for a community-wide dialogue to identify mitigation and community development priorities that align and focus mitigation funding made available through the CDBG Program.

IV. FUND DISTRIBUTION

AREAS MOST IMPACTED AND DISTRESSED BY THE GREAT FLOODS OF 2016

Public Law 115-123 states that "prior to the obligation of funds a grantee shall submit a plan to the Secretary [of the Federal Housing and Urban Development Department] for approval detailing the proposed use of all funds…*in the most impacted and distressed areas*."

Figure 1. HUD-Identified MIDs or HUD MID



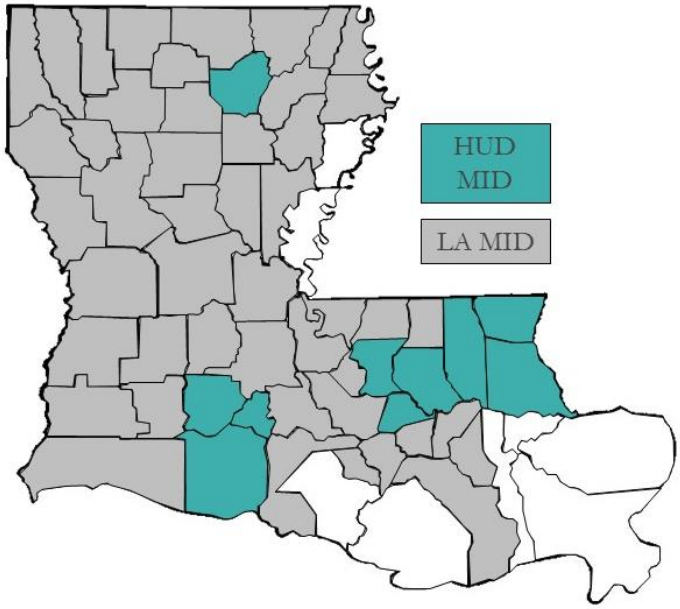
IV. A. HUD-IDENTIFIED MID AREAS OR HUD MIDS

Pursuant to FR-6109-N-02, HUD identified the following most impacted and distressed areas: East Baton Rouge, Livingston, Ascension, Tangipahoa, Ouachita, Lafayette, Vermilion, Acadia, Washington, and St. Tammany parishes **(Figure 1)**. As required by FR-6109-N-02, the state will spend at least 50% or $606,958,500 of the CDBG-MIT funds to benefit these HUD-identified MID areas or HUD MIDs.

IV. B. STATE-IDENTIFIED MID AREAS OR LA MIDS

FR-6109-N-02 states that "Grantees may determine where to use the remaining 50 percent of the CDBG–MIT grant (the grantee-identified MID areas), but that portion of the grant must be used for mitigation activities that address identified risks within those areas that the grantee determines are most impacted and distressed resulting from the major disasters identified by [DR-4263 and DR-4277]. The grantee-identified MID areas must be determined through the use of quantifiable and verifiable data." The state identifies the following 46 most impacted and distressed areas from the Great Floods of 2016, all of which received federal disaster declarations (IA or PA) resulting from either the March or August 2016 floods: *Allen, Assumption, Avoyelles, Beauregard, Bienville,*

Figure 2. MIDs Impacted by 2016 Floods

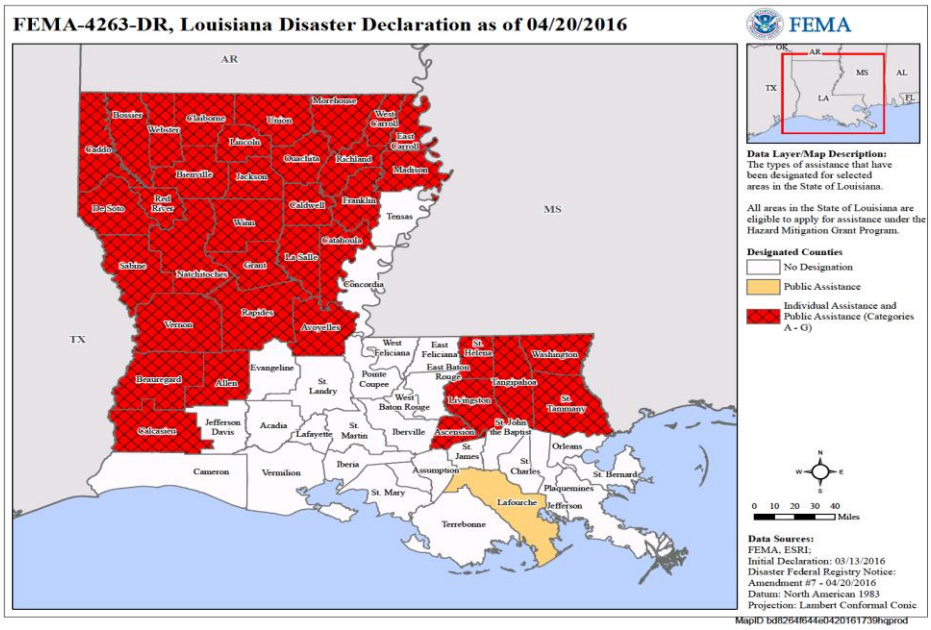


Bossier, Caddo, Calcasieu, Caldwell, Cameron, Catahoula, Claiborne, De Soto, East Carroll, East Feliciana, Evangeline, Franklin, Grant, Iberia, Iberville, Jackson, Jefferson Davis, LaSalle, Lafourche, Lincoln, Madison, Morehouse, Natchitoches, Pointe Coupee, Rapides, Red River, Richland, Sabine, St. Charles, St. Helena, St. James, St. John the Baptist, St. Landry, St. Martin, Union, Vernon, Webster, West Baton Rouge, West Carroll, West Feliciana, and Winn. The remaining CDBG-MIT funds will be expended in or benefit these grantee-identified or LA-identified MID areas. These areas and their corresponding disaster events are described below and will be hereinafter referred to as LA MIDs.

Disaster No. DR-4263 - *March Floods*

In March 2016 a storm system brought heavy thunderstorms from west to east across most of Louisiana. In addition to wind damage, record flooding occurred along the Bogue Falaya River in Covington and Bayou Dorcheat at Lake Bistineau. Governor Edwards declared a state of emergency for several parishes and sent the National Guard to help with search-and-rescue missions.

Figure 3. DR-4263 Declarations Overview



The State of Louisiana estimated that this storm caused damage to more than 21,684 residences, forced 13,000 evacuations and 2,780 rescues, damaged another 6,143 structures and caused numerous road closures. Road and bridge damage estimates totaled $20 million. Agricultural losses totaled approximately $15 million with long-term impacts to farmers estimated at $80 million. In addition, more than 40,000 citizens registered for FEMA Individual Assistance or IA.

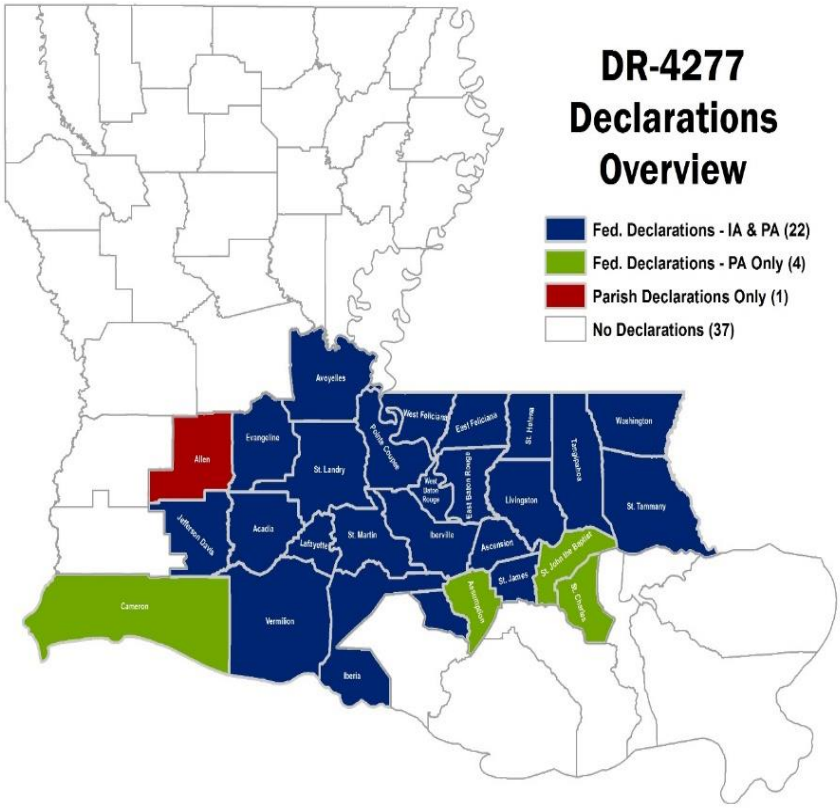
Thirty-seven Louisiana parishes were declared eligible for FEMA Assistance (Individual Assistance (IA) and/or and Public Assistance (PA)), (**Figure 3**): Allen, **Ascension,** Avoyelles, Beauregard, Bienville, Bossier, Caddo, Calcasieu, Caldwell, Catahoula, Claiborne, DeSoto, East Carroll, Franklin, Grant, Jackson, LaSalle, Lafourche, Lincoln, **Livingston,** Madison, Morehouse, Natchitoches, **Ouachita,** Rapides, Red River, Richland, Sabine, St. Helena, **St. Tammany, Tangipahoa,** Union, Vernon, **Washington**, Webster, West Carroll and Winn. Six of the 37 parishes (**bolded**) are HUD MIDs.

Ascension, Avoyelles, Livingston, St. Helena, St. Tammany, Tangipahoa and Washington—seven total—would flood again in August 2016.

Disaster No. 4277 – *August Floods*

In August 2016, a slow-moving storm impacted multiple South Louisiana parishes with sustained heavy rain. In what was a 1,000-year flood, within two days more than 24 inches of rain was measured in some areas, causing extensive surface and river flooding. Both the Amite and Comite rivers overtopped, as well as numerous bayous, lakes and canals located within these drainage basins or watersheds. Governor Edwards declared a state of emergency for several parishes and sent the National Guard to help with search-and-rescue missions.

Figure 4. DR-4277 Declarations Overview



An estimated 8,000 people were evacuated to emergency shelter sites. The American Red Cross, the state and faith-based organizations operated these sites. A state-operated medical site was established to serve individuals with medical needs. Roughly 30,000 search and rescues were performed, with 11,000 citizens sheltered at the peak of the flood.

Damage to infrastructure, businesses and homes across the southern region of the state was extensive. Large sections of state roads remained under water for extended periods. An estimated 30 state roads washed out and 1,400 bridges require inspection. Along with more than 200 highways that closed during the event, sections of Interstates 10 and 12 closed for multiple days due to floodwaters. Some stretches of I-10 remained closed for nearly a week, significantly interrupting interstate commerce.

More than 91,628 homes were documented with damage. An estimated 31% of homes in the declared parishes were impacted by flooding, with only 11% of households in these areas carrying flood insurance.

Immediately following this flood event, the Louisiana Department of Economic Development (LED) partnered with Louisiana State University (LSU) to conduct an assessment of economic losses resulting from the floods. Key details include:

1. At the peak of the August event, 19,900 Louisiana businesses or roughly 20% of all Louisiana businesses were disrupted by the flooding event. FEMA referred approximately 22,000 businesses to SBA for recovery assistance;

2. A disruption of 278,500 workers or 14% of the Louisiana workforce occurred at the peak of the flooding event;
3. An economic loss estimated at roughly $300 million in labor productivity and $836 million in terms of value added during the period immediately surrounding the flood;
4. Approximately 6,000 businesses experienced flooding; and
5. The LSU Agricultural Center estimated Louisiana agricultural losses of over $110 million.

Twenty-six Louisiana parishes were declared eligible for FEMA IA and/or PA (**Figures 4**): **Acadia**, **Ascension**, Assumption, Avoyelles, Cameron, **East** and West **Baton Rouge**, East Feliciana, Evangeline, Iberia, Iberville, Jefferson Davis, **Lafayette, Livingston,** Pointe Coupee, St. Charles, St. Helena, St. James, St. John the Baptist, St. Landry, St. Martin, **St. Tammany, Tangipahoa, Vermilion, Washington** and West Feliciana. Seven of these parishes previously flooded in March: Ascension, Avoyelles, Livingston, St. Helena, St. Tammany, Tangipahoa and Washington.

Combined, these disasters affected 56 of the state's 64 parishes, with 51 parishes declared eligible for FEMA IA and five parishes declared eligible for FEMA PA. HUD identified the 10 most impacted parishes from these two events as Acadia, Ascension, East Baton Rouge, Lafayette, Livingston, Ouachita, St. Tammany, Tangipahoa, Vermilion and Washington. The state contends that the remaining 46 parishes with federal disaster declarations were also most impacted and distressed, thus should be eligible to receive CDBG-MIT funds.

V. MITIGATION NEEDS ASSESSMENT

V. A. OUTLINE

The state consulted with the State Hazard Mitigation Officer (SHMO), local jurisdictions, the private sector, and other governmental agencies to provide a multi-hazard risk-based assessment for HUD and LA MIDs. This assessment informs and provides a substantive basis for projects and programs within this AP, with a focus on addressing and analyzing all significant current and future disaster risks.

To both ensure sufficient clarity of this AP and address current risks, future risks and unmet mitigation needs for the state, this Assessment:

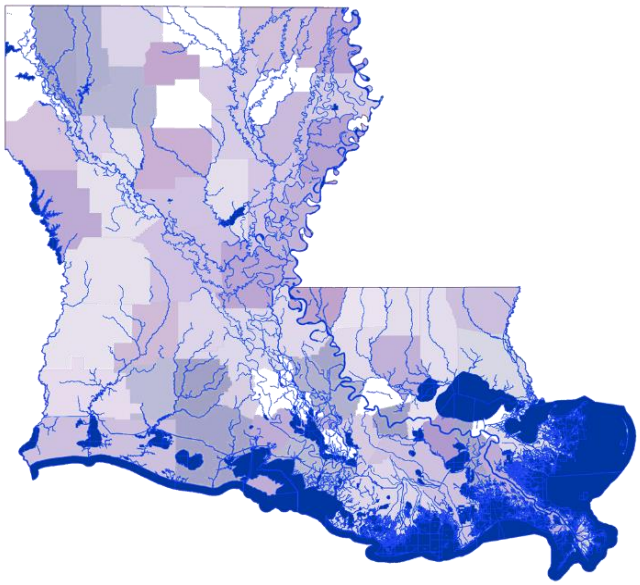
1. Provides context surrounding the unique characteristics of Louisiana's landscape;
2. Discusses historic damage patterns statewide;
3. Utilizes the State and local Hazard Mitigation Plans (HMP) to inform the risk analysis;
4. Assesses hazards in accordance with local and regional plans, research and data;
5. Assesses current and future risk to critical service areas or community life lines;
6. Assesses current and future risk to ecosystem integrity and watershed resilience; and
7. Addresses unmet mitigation needs in response to identified current and future risks.

All mitigation activities enabled by this Assessment will (1) increase resilience to disasters and reduce or eliminate the long-term risk of loss of life, injury, damage to and loss of property, and suffering and hardship, by lessening the impact of future disasters; (2) be CDBG-eligible activities under title I of the Housing and Community Development Act of 1974 or HCDA or otherwise eligible pursuant to a waiver or alternative requirement; and (3) meet a national objective, including additional criteria for mitigation activities and Covered Projects.

V. B. LOUISIANA'S LANDSCAPE

Because Louisiana encompasses the confluence of the Pearl River, Sabine River, Red River, Gulf of Mexico and the Mississippi River, built environments face challenges unlike any place on earth, including a relentless process of upland sedimentation, coastal land loss,[6] subsidence and sea level rise. With highly sensitive, expansive soils and low ground elevations, the State's major coastal and riverine systems create a constant and ever changing flood risk further accentuated by a vast network of smaller, interconnected rivers, canals and lakes. Illustrated in **Figure 5**, Louisiana state-claimed water bodies include 900 named bayous, 100 named rivers and 242 named lakes[7].

Figure 5. State-Claimed Water Bodies



Due to the state's flat topography (**Figure 6** indicates flatter areas in orange and red) and interconnected system of rivers, lakes, and streams (**Figure 5**); watersheds in the State of Louisiana are highly linked and actions in one location impact the flood risk of neighboring communities.

Capturing the state's unique landscape and its' associated flood risk profile, FEMA (through the NFIP)

Figure 6. Elevation and Hydrography

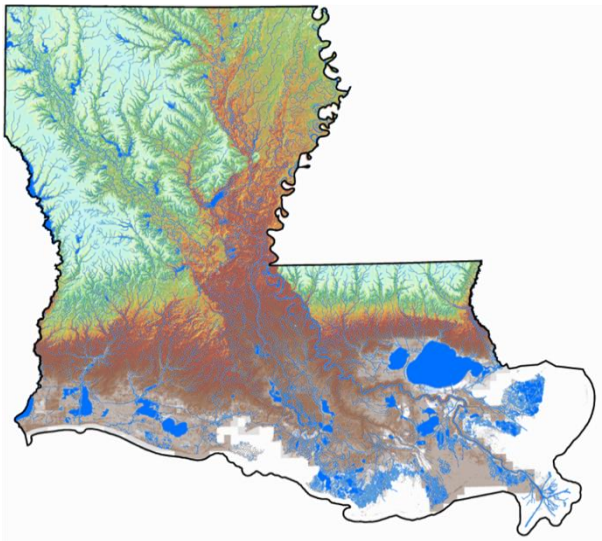
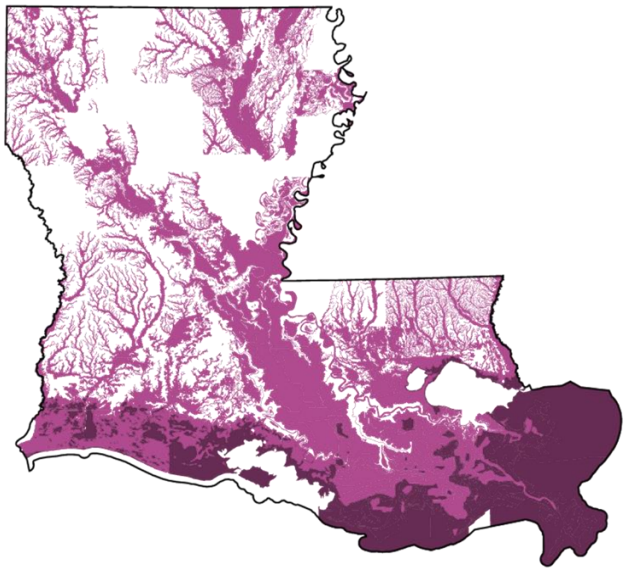


Figure 7. Special Flood Hazard Areas (SFHAs)



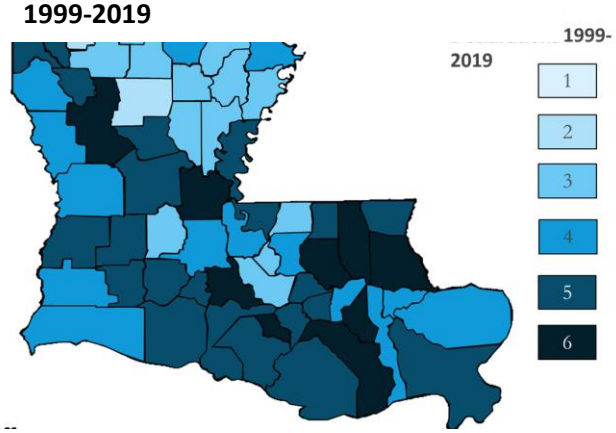
[6] State of Louisiana. Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP). *Louisiana Watershed Resiliency Study*. 2017.

[7] State of Louisiana. State Lands Office Department of Natural Resources. "Strategic Online Natural Resources Information System (SONRIS) Geodatabase." Accessed on September 18, 2019. http://www.sonris.com/

has designated over 27,000 square miles—more than half of the state (nearly 52%)—within the Special Flood Hazard Area[8] (**Figure 7**). As per the SHMP, Louisiana is subject to riverine, flash, ponding, backwater and urban flooding.

To maximize the impact of mitigation activities, avoid the unintentional shift of risk from one community to another, and to enhance watershed management statewide, the program described herein seeks to incentivize coordination across jurisdictional boundaries in order to make decisions that 'do no harm,' utilize natural and beneficial functions of the watershed, and provide regional benefits.

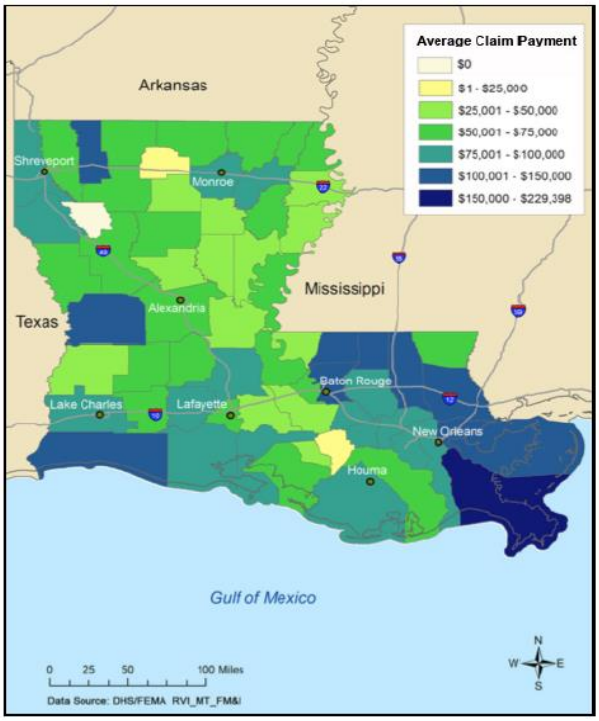
Figure 8. Number of Disaster Declarations 1999-2019



V. C. HISTORIC DAMAGE PATTERN

Over the past two decades, the State of Louisiana has experienced 16 declared flood and hurricane related disasters or emergencies. Every parish in the state has been impacted by one or more of these events, necessitating the expenditure of over seven billion dollars in IA and over 16 billion dollars in PA (see **Figure 8**). This has resulted in devastating loss of life and hardship to Louisiana residents, forcing many to relocate, exhaust their financial assets and undermine the security of living in their homes or investing in their properties or businesses[9]. This cycle of devastation caused by floods and hurricanes indicates an urgent need for a change in leaders', citizens', residents' and businesses' relationship with and understanding of water management in Louisiana. It is clear that the pace of flood risk mitigation in Louisiana is not keeping pace with the need of its citizens, as evidenced by the high number of repetitive loss properties (i.e. 33,993) and the quantity of homeowners struggling to pay flood insurance premiums while occupying structures not appropriately mitigated to withstand the next flood event.

Figure 9. NFIP Average Claim Payments



Repetitive and severe repetitive flood loss properties are particularly costly (**Figure 9**) with

[8] Ibid.

[9] JE Lamond, RD Joseph, and DG Proverbs. "An Exploration of Factors Affecting the Long Term Psychological Impact and Deterioration of Mental Health in Flooded Households." *Environmental Research*, July 2015; 140:325-34.

claims totaling over $2 billion in Louisiana since 1978. It is important to note that repetitive flood loss properties represent only 1.3% of all flood insurance policies, but historically account for nearly one-fourth of the claim payments[10]. Mitigating repetitive loss properties in Louisiana and preventing the future accrual of additional repetitive loss properties benefits not only the state of Louisiana, but the entire country, by contributing to the stability of the NFIP.

Beyond mitigating existing housing stock and structures, there is also a clear need for improvements to development patterns in order to prevent the need for repeated mitigation interventions in the future.

V. D. STATE AND LOCAL HAZARD MITIGATION PLANS, RESEARCH AND ANALYSIS

Louisiana's most recent state HMP was approved by FEMA on March 27, 2019 and highlights the state's commitment to "creating stronger, more resilient communities through hazard mitigation activities[11]." However, mitigation projects are not identified in state or local HMPs to address identified hazards. For this reason site-specific mitigation projects are not included in this AP and methods to identify, rigorously evaluate and select proposed projects and activities (including the state's current understanding of the use of CDBG-MIT funds geographically by type at the lowest level practicable) are addressed as an anticipatory activity in **Section VII**.

Unless otherwise provided, risks identified in this Section are identified in and informed by the SHMP with a special emphasis on Chapter 2, entitled Hazard Identification and Statewide Risk Assessment[12].

Cost of Future Risks

To assess future risk, the SHMP utilizes a planning time horizon of 25 years and projects potential impacts of natural hazards in the year 2043.

Table 2. SHMP 2043 Projected Annual Losses as a Result of Natural Hazard Impacts

Projected Average Annual Loss in 2043	Building Average Annual Loss	Crop Average Annual Loss	Total Average Annual Loss
Wind	**$642,927,351**	-	**$642,927,351**
Flood	**$451,389,758**	-	**$451,389,758-1% ACE**
Expansive Soil	**$92,869,675**	-	**$92,869,675**
Drought	-	$52,795,132	$52,795,132
Extreme Cold	$36,978,826	$1,155,889	$38,134,715
Tornado	$31,725,662	$281,804	$32,007,466
Wildfire	$5,876,211	-	$5,876,211
Lightning	$2,917,407	$3,483	$2,920,890
Hail	$1,976,212	$110,057	$2,086,269
Dam Failure	$1,011,414	-	$1,011,414
Extreme Heat	-	$744,345	$744,345
Sinkhole	$342,071	-	$342,071

[10] GOHSEP. "Repetitive Loss Strategy" (Appendix to the 2019 State of Louisiana Hazard Mitigation Guide). Accessed on September 18, 2019. https://gohsep.la.gov/MITIGATE/HM-PLANNING/State-Hazard-Mitigation-Plan
[11] GOHSEP. *State of Louisiana Hazard Mitigation Guide*. 2019. https://gohsep.la.gov/MITIGATE/HM-PLANNING/State-Hazard-Mitigation-Plan.
[12] Ibid.

Illustrated in **Table 2**, 2043 annual wind-related losses are the highest projected average in the state, equal to $642,927,351. Flood-related losses are ranked as the second highest projected annual loss, equal to $451,389,758 should a 1% annual exceedance probability flood event (AEP) occur. Expansive soils are identified as the third most costly projected annual loss, equal to $92,869,675.

Despite the state's extensive efforts to mitigate flood risks following hurricanes Katrina, Rita, Gustav, Ike, Isaac, and the Great Floods of 2016, as well as through long-term efforts like the Coastal Master Plan, losses attributable to a 1% AEP flood event account for more than one-third of all anticipated disaster losses in 2043[13]. Moreover, given the state's recent history of federally-declared disaster events attributable to a significant flood – many of which were measured to be well in excess of a 1% AEP event – this Assessment contends the SHMP loss estimate of $451,389,758 significantly undervalues the state's long-term flood damage risk.

To this effect, data from the Louisiana Office of Risk Management show 8,593 state-owned properties with a total building and contents replacement value of approximately $13 billion. Projecting out to 2043, the SHMP anticipates $9,138,278 in losses to state assets in a 1% AEP flood.

Future Risk to Vulnerable Jurisdictions

The SHMP also projects the most vulnerable jurisdictions in year 2043 for each hazard examined and ranks jurisdictions from one to five with one identified as most vulnerable to risk. Of the 21 vulnerable jurisdictions identified, four parishes fell outside of the HUD and LA MIDs (illustrated in red in **Table 3**): Orleans, Terrebonne, St. Mary and Plaquemines. Conversely, two HUD MID parishes—St. Tammany and East Baton Rouge—rank in the top five for flood risk and overall disaster risk, reinforcing that flooding is currently a difficult risk to project state-wide. It is notable that ***all*** of the most costly events (see **Table 2**) are projected to most likely occur in the state's coastal and transition zones, where 39% of the state's population resides and where it becomes increasingly difficult to predict the flow and absorption rate of floodwaters.

Table 3. SHMP 2043 Projected Vulnerable Jurisdictions

Identified Hazard	1	2	3	4	5
	<<<<<<<< *increasing vulnerability* <<<<<<<<				
Extreme Heat	Franklin	Richland	St. Landry	Tensas	Caddo
Drought	Vermilion	St. Landry	Franklin	Acadia	Richland
Wildfire	St. Tammany	Tangipahoa	Orleans	Livingston	East Baton Rouge
Extreme Cold	Ouachita	Caddo	St. Tammany	East Baton Rouge	Bossier
Wind	Orleans	Jefferson	St. Tammany	Lafayette	Terrebonne
Hail	Orleans	East Baton Rouge	Caddo	Bossier	St. Tammany
Lightning	Orleans	East Baton Rouge	Jefferson	St. Tammany	Lafayette
Tornado	Orleans	Lafayette	Jefferson	East Baton Rouge	Caddo
Flood	St. Tammany	Jefferson	Terrebonne	Orleans	East Baton Rouge
Dam Failure	Bossier	Rapides	Caddo	Natchitoches	Grant
Sinkhole	Calcasieu	St. Martin	Acadia	St. Mary	Plaquemines
Expansive Soil	Orleans	Jefferson	St. Tammany	East Baton Rouge	Lafayette
Total Losses	Orleans	Jefferson	St. Tammany	Terrebonne	East Baton Rouge

[13] Ibid.

These areas include Orleans, Jefferson, St. Tammany, Lafayette, Terrebonne, and East Baton Rouge parishes. This assessment contends that both state and local hazard plans consistently demonstrate that the entire State of Louisiana is at severe flood risk and flood-related risk, and that the occurrence of future catastrophic flood events cannot be predicted solely by relying on the damage patterns of past events. To this effect, this AP and subsequent efforts propose a proactive pre-disaster approach that accommodates—to a reasonable extent given the requirements of FRN-6109-N-02—the probability of future events occurring in any location in the state, while also specifically assessing risks to HUD and LA MID areas.

Local Hazard Mitigation Plans or HMPs

As part of the hazard identification and risk assessment process, the SHMP planning team reviewed all available parish hazard mitigation plans to identify hazards that were consistent with the State Hazard Mitigation Plan Committee's (SHMPC's) evaluation of the most serious natural hazard threats to the state. **Table 4** lists the hazards (or sub-hazards) profiled in HUD MIDs as part of the most recent SHMP plan update.

Table 4. SHMPC Identification of Hazards within HUD MID HMPs

	Parish	HAZARD																					
		Subsidence	Land Loss	Coastal Erosion	Drought	Earthquake	Flooding	Extreme Heat	Thunderstorms	Tornadoes	Tropical Cyclones	Wildfires	Winter Storms	Dam Failure	Levee Failure	Saltwater Intrusion	Sea Level Rise	Sinkholes	Storm Surge	Fog	Expansive Soil	Hail Storms	Hazardous Materials
1	Acadia				X		X		X	X	X		X										
2	Ascension	X					X		X	X	X		X		X								
3	East Baton Rouge	*	*		X	*	X		X	X	X	X	X	+	+								
4	Livingston	X	X		X		X		X	X	X											X	
5	St. Tammany		X		X	X	X		X	X	X	X		X	X					X			
6	Tangipahoa	X	X		X		X		X	X	X	X	X								X		
7	Vermilion		X				X			X	X							X					
8	Washington						X			X	X	X											
9	Lafayette	*information not available in SHMP*																					
10	Ouachita	*information not available in SHMP*																					

LEGEND

X - Hazard in a HUD-identified MID
X - Hazard Profiled
* - Hazard Profiled but Discounted
\+ - Hazard Profiled but Plan Cited a Data Deficiency

All of the HUD MIDs assessed by the SHMP planning team (i.e. eight out of 10) identified flooding, tornadoes and tropical cyclones as hazards. Six of the eight available HMPs also identified thunderstorms as hazards. Lafayette's local HMP identifies flooding, thunderstorms, high wind, tornadoes and tropical cyclones as significant hazards within the parish, and notes that, "Lafayette Parish has experienced significant flooding in its history and can expect more in the future. Many parts

of the parish are located in the 100-year floodplain[14]." Lafayette Parish and its incorporated areas estimate total losses of $761,149,000 associated with a 1% AEP flood event[15].

Table 5. SHMPC Identification of Hazards within LA MID HMPs

Parish	HAZARD																					
	Subsidence	Land Loss	Coastal Erosion	Drought	Earthquake	Flooding	Extreme Heat	Thunderstorms	Tornadoes	Tropical Cyclones	Wildfires	Winter Storms	Dam Failure	Levee Failure	Saltwater Intrusion	Sea Level Rise	Sinkholes	Storm Surge	Fog	Expansive Soil	Hail Storms	Hazardous Materials
Allen	*information not available*																					
Avoyelles	*information not available*																					
Assumption						X		X	X	X		X					X					
Beauregard				X		X	X	X	X	X	X						X					
Bienville	*information not available*																					
Bossier				X	*	X		X	X	X		X	+	+								
Caddo				X	*	X	X	X	X	X	X	X	+	+								
Calcasieu	*information not available*																					
Caldwell				X	*	X		X	X	X	X	X	+	+								
Cameron		X		X		X	X	X	X	X	X						X					
Catahoula				X		X		X	X	X		X										
Claiborne				X	*	X	X	X	X	X	X	X	+	+								
De Soto				X	*	X	X	X	X	X	X	X	*	*								
East Carroll				X	*	X		X	X	X	X	X	*	X								
East Feliciana	*information not available*																					
Evangeline				X		X		X	X	X		X	+				X					
Franklin				X		X	X	X	X	X		X	+	+			X					
Grant				X		X		X	X	X	X	X		X								
Iberia		X		X		X		X	X	X			X				X					
Iberville	*	*				X		X	X	X				+			X					
Jackson	*information not available*																					
Jefferson Davis				X		X		X	X	X	X	X		X								
LaSalle				X		X		X	X	X	X	X										
Lafourche	*information not available*																					
Lincoln				X	*	X	X	X	X	X	X	X	+									
Madison						X		X	X	X		X		+			X					
Morehouse				X		X	X	X	X	X	X	X	+	+								
Natchitoches				X		X		X	X	X	X	X										
Pointe Coupee				X		X		X	X	X		X	+	+								
Rapides	*	*		X		X		X	X	X	X	X										
Red River				X	*	X	X	X	X	X	X	X	+	+						*		
Richland				X		X		X	X	X		X	+	+								
Sabine				X		X		X	X	X	X	X	+									
St. Charles		X	X							X		X		X	X							X
St. Helena						X		X	X	X												
St. James	X			X		X		X	X	X	X	X					X			X		
St. John the Baptist				X		X	*	X	X	X		X								X		
St. Landry	*	*		X		X		X	X	X	X	X										
St. Martin	X			X		X			X	X				X						X	X	
Union	*information not available*																					
Vernon				X	*	X	X	X	X	X	X	X	+	+								
Webster				X	*	X	X	X	X	X	X	X	+	*			X					
West Baton Rouge	*	*		X	*	X	*	X	X	X	X	X					X					
West Carroll				X		X		X	X	X		X										
Winn				X		X		X	X	X	X						X					

LEGEND

- X - Hazard in a LA-identified MID
- X - Hazard Profiled
- * - Hazard Profiled but Discounted
- + - Hazard Profiled but Plan Cited a Data Deficiency

[14] Lafayette Parish, LA. *Parish Hazard Mitigation Plan.* 2016. Accessed on September 18, 2019. http://www.lafayettela.gov/PZD/Codes/SiteAssets /Files/LafayetteParishHMPlanFINAL5-16-16.pd

[15] Ibid.

Ouachita's local HMP similarly identifies flooding, thunderstorms, tornadoes and tropical cyclones as significant hazards within the parish, and cites 83 events between 1990 and 2015 incurring significant flooding[16]. Ouachita Parish and its incorporated areas estimate total losses of $492,781,000 in the event of a 1% AEP flood event[17].

This trend toward flood and wind related hazards emerges again within LA-identified MID HMPs (**Table 5**) assessed by the SHMP planning team: all identified flooding, tornadoes and tropical cyclones as hazards. Further, 37 of the available 39 LA MID HMPs also identified thunderstorms. These trends are largely consistent within local HMPs outside of HUD and LA MIDs (**Table 6**).

Also of note, the inclusion of Hazus Level 1 analyses is consistent across all local HMPs reviewed, meaning Level 1 flood, wind, and combined wind and flood model results are incorporated into this analysis. Thus, the risk assessments for these prevalent hazards are consistent among the parish and state plans.

Table 6. SHMPC Identification of Hazards outside HUD and LA MID HMPs

Parish	HAZARD																					
	Subsidence	Land Loss	Coastal Erosion	Drought	Earthquake	Flooding	Extreme Heat	Thunderstorms	Tornadoes	Tropical Cyclones	Wildfires	Winter Storms	Dam Failure	Levee Failure	Saltwater Intrusion	Sea Level Rise	Sinkholes	Storm Surge	Fog	Expansive Soil	Hail Storms	Hazardous Materials
Concordia				X	*	X	X	X	X	X	X	X	+	+								
Jefferson	X		X	X	X	X			X	X	X	X						X			X	
Orleans	X		X	X		X	X		X	X		X	X	X				X				
Plaquemines	X					X			X	X				X	X	X	X					
St. Bernard	X					X		X	X	X					X		X					
St. Mary			X			X			X	X				X								
Tensas				X	*	X	X	X	X	X	X	X		X			X					
Terrebonne	X		X	X		X		X	X	X			X	X	X							

LEGEND
X - Hazard Profiled in an area outside a MID
X - Hazard Profiled
* - Hazard Profiled but Discounted
\+ - Hazard Profiled but Plan Cited a Data Deficiency

Existing Efforts, Studies and Plans

CONSIDERED RESOURCES

DOA OCD certifies that, in responding to this AP requirement and presenting the required information, the agency has reviewed and considered a number of sources including, but not limited to:

- FEMA Local Mitigation Planning Handbook: https://www.fema.gov/media-library-

[16] Ouachita Parish, LA. *Parish Hazard Mitigation Plan.* 2016. Accessed on September 18, 2019. https://hmplans.sdmi.lsu.edu/api/Parishes/377
[17] Ibid.

data/20130726-1910-25045-9160/fema_local_mitigation_handbook.pdf;

- DHS Office of Infrastructure Protection: https://www.dhs.gov/sites/default/files/publications/ip-fact-sheet-508.pdf;
- National Association of Counties, Improving Lifelines (2014): https://www.naco.org/sites/default/files/documents/NACo_ResilientCounties_Lifelines_Nov2014.pdf;
- The U.S. Forest Service's resources around wildland fire: https://www.fs.fed.us/managing-land/fire;
- The National Interagency Coordination Center (NICC) for coordinating the mobilization of resources for wildland fire: https://www.nifc.gov/nicc/;
- HUD's CPD Mapping tool: https://egis.hud.gov/cpdmaps/;
- The Louisiana Hazard Mitigation Plan; and
- All available parish Hazard Mitigation Plans within the State of Louisiana.

COASTAL MASTER PLAN AND LA SAFE

Louisiana's approach to flood risk reduction has been evolving since Hurricanes Katrina and Rita hit the state in 2005. The 2005 storms prompted stricter building codes, adoption of safer flood levels and the formation of the CPRA, which uses science and engineering to produce and update the Coastal Master Plan. After Hurricane Isaac, using funding provided by HUD's National Disaster Resilience Competition, Louisiana launched the Strategic Adaptations for Future Environments Program, or LA SAFE, to engage citizens in the planning of the long-term resilience of their communities.

The Coastal Master Plan—a $50 billion, 50-year coastal restoration and flood risk reduction effort—is Louisiana's cornerstone response to coastal (storm-surge based) flooding and land loss. Even with its full implementation, however, the state will experience a net loss of land – and be faced with the increased coastal flood risk that comes from the loss of critical coastal wetlands – over the next 50 years. At least in some communities, conditions are likely to get worse before they get better. For some, relocation may be the only viable option.

While implementation of the Coastal Master Plan is vital to Louisiana's future, the state is highly flood prone even in areas north of the coastal zone, and its flood risks extend to all three types of flooding – coastal (surge and tidal), fluvial (riverine) and pluvial (intense rain causing surface flooding). While structural interventions like levees, pumps and floodgates are vital to reducing flood risks, adaptation to this new flood risk reality is also necessary. Adaptation includes structural risk reduction systems and ecological restoration efforts, but it must also include a large-scale rethinking of Louisiana's relationship with water.

LA SAFE takes a holistic approach to flood risk of all types, as well as the myriad human, economic and environmental impacts both experienced following past floods, as well as those anticipated in the future. The LA SAFE program crowdsourced information and ideas to harness the experience and ingenuity of local citizens and develop aspirational – yet realistic – visions of tomorrow's communities across a six-parish region.

SCR 39 AND SR 172

In 2013, the Louisiana Legislature, via Senate Concurrent Resolution 39, or SCR 39, requested a comprehensive study and evaluation of Louisiana's levee districts and water resource boards, with the

recognition that water resource management processes at the time took place in a fragmented jurisdictional framework, and that "water responds to geological, bathymetrical, and hydrological boundaries rather than political boundaries or subdivisions…[18]". The resulting report in answer to this request indicated a range of capacity and financial resources across these jurisdictions, and urged a watershed-based collaborative approach to addressing the challenges of watershed management presented by Louisiana's unique environment[19].

Similarly, Senate Resolution 172, or SR 172, adopted by the Louisiana Legislature in 2017, directed the creation of a report analyzing certain interventions to conveyance channels using a watershed-based paradigm and considering the upstream and downstream impacts of a given intervention on neighboring jurisdictions[20]. The report in response to SR 172 specifically supported the work of the LWI in developing watershed-based coalitions and regional watershed planning processes in order to enable true inter-jurisdictional coordination around watershed decision-making[21]. Both bills and their resulting reports indicate a broad awareness of a problem in Louisiana – namely the need for increased coordination among agencies and jurisdictions conducting watershed and floodplain management. The efforts of the LWI stem in part from these legislative initiatives, and aim to enable the very coordination identified as a need in both reports.

FEMA WATERSHED RESILIENCY STUDY

The Great Floods of 2016 floods spurred a flurry of watershed planning activity in Louisiana, because these floods differed so significantly in scale and location from past precipitation and flood events. The Louisiana Watershed Resiliency Study was one such planning activity that attempted to place this disaster in context and future federal and local floodplain management interventions based on lessons learned from these events. As part of this study, FEMA detailed the ways that actions in a watershed and characteristics of the watershed impact stakeholders within the region, and identified specific areas of repetitive loss and mitigation opportunities within the state, resulting in watershed-specific flood risk analyses. This study also noted the importance of cross-jurisdictional watershed-based collaboration, and FEMA and regional partners coordinated a number of events among impacted watersheds that enabled local leaders to begin to embark on collaborative efforts and coalition building[22]. Finally, FEMA utilized a web application to enable robust local feedback on flood risk, impacts and interventions that allowed local leaders and staff to more fully understand their projects and challenges in the context of shared watersheds.

THE WATERSHED INITIATIVE: PHASE I INVESTIGATION

In response to the state's current floodplain management challenges, the Governor directed state agencies to coordinate their efforts to develop a new approach toward flood risk reduction throughout Louisiana based on watersheds as opposed to the political and jurisdictional boundaries. To stimulate this effort, he created the Council on Watershed Management, or Watershed Council, composed of the

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[18] Louisiana Legislature. Senate. *Senate Concurrent Resolution 39*. 2013 regular session.
[19] State of Louisiana. Coastal Protection and Restoration Authority (CPRA) and Department of Transportation and Development (DOTD). *Senate Concurrent Resolution 39 response: Phase I Study – Exploring the Reorganization of Levee Districts and Other State-Created Entities with Flood Control Responsibilities.* 2014.
[20] Louisiana Legislature. Senate. *Senate Resolution 172*. 2017 regular session.
[21] DOTD. *Senate Resolution 172 Response.* 2019.
[22] GOHSEP. *Louisiana Watershed Resiliency Study.* 2017.

OCD, the CPRA, the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP), the Department of Transportation and Development (DOTD), and the Louisiana Department of Wildlife and Fisheries (LDWF). These agencies— through interviews and meetings with a broad swath of stakeholders, subject matter experts, other Louisiana state agencies, and other states and regions in the country—investigated a path forward summarized in a Phase I Investigation: Louisiana Statewide Comprehensive Watershed Based Floodplain Management Program Development.

Two notable challenges arose as part of this investigation: (1) that floodplain issues are managed within political jurisdictions, often without the mechanisms to consider the effects on other jurisdictions or the watershed on the whole and (2) current development practices in many areas lead to drastically increased runoff. This investigation proposes that effective floodplain management requires a paradigm shift from independent jurisdictional boundaries to management within watershed boundaries. If improved water and land management is not addressed, existing practices can lead to increased flood risk, both in magnitude and extent of flooding, on adjacent properties and downstream of the development. This will likely result in areas considered to have low flood risk in prior years finding themselves flooding frequently due to land use practices outside of their jurisdiction.

The LWI is aligning state agencies and programs to encourage the coordination and collaboration of local jurisdictions charged with floodplain risk management, to manage floodplain activities consistently and to a higher standard within their shared watershed. Furthermore, it is through a comprehensive watershed-based floodplain management program that the state and its various jurisdictions and political subdivisions will be enabled to coordinate at a watershed level and manage floodplains consistently using best practices.

V. E. GREATEST RISK: WIND AND FLOOD HAZARDS

The Louisiana GOHSEP Hazard Identification and Risk Assessment (2018 HIRA) ranks local flood as the highest risk to the state based on consideration of consequence, vulnerability, threat and risk factors. This threat is followed closely by severe thunderstorms, wide-area floods, tornados and hurricanes[23]. The fact that the five highest threats to Louisiana are flood or wind events indicates a high overall magnitude of flood and wind threats to the state. Based on the SHMP and local hazard plans, both HUD and LA MID areas share a collective greatest risk profile that includes wind and flood hazards, which are compounded by the effects of subsidence and sea level rise. This section addresses quantitative and qualitative descriptions of these hazards and their projected current and future risk to MID areas and the State of Louisiana.

Figure 10. Disaster Declarations since 2015 SHMP Update

Declaration Number	Description	Incident Period
DR-4345	Louisiana Tropical Storm Harvey	Aug. 28, 2017 / Sept. 10, 2017
DR-4300	Louisiana Severe Storms, Tornadoes and Straight-line Winds	February 7, 2017
DR-4277	Louisiana Severe Storms and Flooding	Aug. 11, 2016 / Aug. 31, 2016
DR-4263	Louisiana Severe Storms and Flooding	Mar. 8 2016 / April 8, 2016
DR-4228	Louisiana Severe Storms and Flooding	May 18, 2015 / June 20, 2015

[23] GOHSEP. *Hazard Identification and Risk Assessment (HIRA)*. 2018.

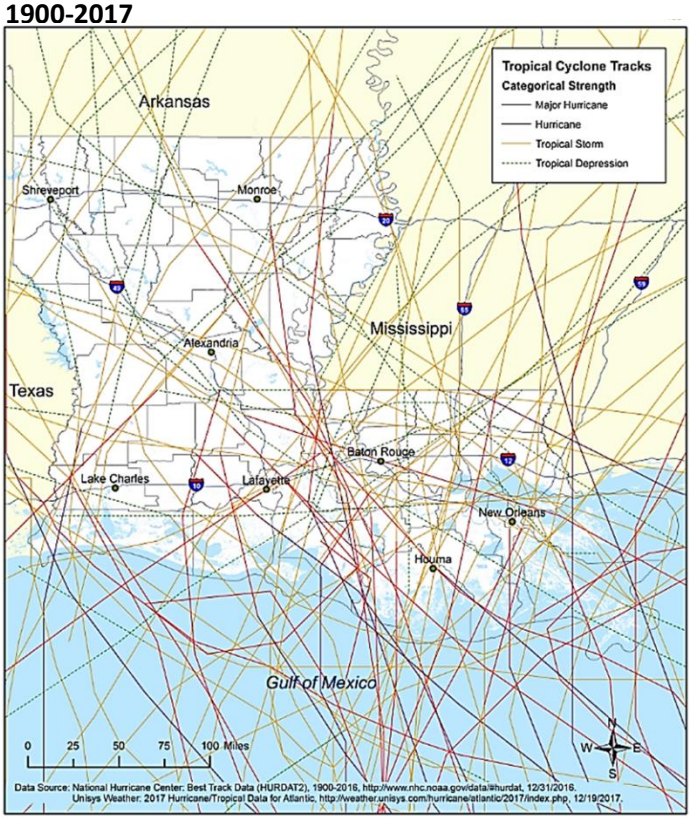
Wind and flood hazards in Louisiana include tropical cyclones, high wind, hailstorms, lightning, tornadoes, flooding (coastal and riverine), dam failure and levee failure. There have been five major disaster declarations since the 2014 SHMP Update (see **Figure 10**) – all for wind and flood hazards.

Tropical Cyclones

Tropical cyclones are spinning, low-pressure storms that draw surface low-latitude air into their centers and attain strength, ranging from weak tropical waves to the most intense hurricanes. Often, these storms begin as clusters of oceanic thunderstorms off the western coast of Africa, moving westward in the trade wind flow. These thunderstorms acquire a rotational component when a small "buckle" forms in the east-to-west trade wind, caused by the Earth's spin. This west-moving, counterclockwise-spinning collection of storms—now called a tropical disturbance—may then gather strength as it draws humid air toward its low-pressure center, forming a tropical depression (defined when the circulation is completely developed but maximum sustained surface wind speed is 38 mph or less), then a tropical storm (when the maximum sustained surface wind speed ranges from 39 mph to 73 mph) and finally a hurricane (when the maximum sustained surface wind speeds exceed 73 mph). Major hurricanes are classified as Category 3 to 5 based on the Saffir-Simpson Hurricane Wind Scale.

Data from 1900 to 2017 (**Figure 11**) show that the entire state has been impacted by tropical cyclones, often significantly. As an example, Hurricane Katrina in 2005 remains the costliest tropical cyclone in U.S. history.

Figure 11. Tropical Cyclone Tracks across Louisiana 1900-2017



Future vulnerability to tropical cyclones has been a topic of intense scrutiny in the scholarly literature of the last decade. Warmer conditions, as predicted by future climate scenarios, are linked to stronger and more frequent storms. For example, warming would increase the geographic extent at which water temperatures are high enough to provide the energy required to support or enhance a tropical cyclone and/or lead to a longer period in the year when tropical cyclones may occur. Also, because the Earth's surface is anticipated to warm at a greater rate than the upper-level atmosphere, thermal turbulence and atmospheric instability would be enhanced, possibly leading to more evaporation from the surface. Atmospheric water vapor capacity would also increase under warmer conditions. Furthermore, a warming world could also be likely to cause a poleward retreat in the west-to-east-moving subtropical and polar front jet stream, both of which separate tropical air from much colder air. Because the jet streams shear the tops off of developing tropical cyclones, their migration poleward would provide a more favorable environment for growth of tropical systems, unimpeded by the shear that might weaken them or carry them eastward

across the Atlantic Ocean, away from Louisiana. These concerns are exacerbated by research that suggests a tight linkage between global temperature and tropical cyclone activity via feedbacks related to ocean mixing and transport[24].

The most recent research on the topic generally seems to confirm the conclusions of previous studies, indicating additional dangers associated with the increased intensity of tropical cyclones under a warming global climate. For example, Moore et al. concurred with the previous conclusions, while also anticipating a decrease in the periodicity of the El Niño/Southern Oscillation, which is known to suppress Gulf-Caribbean-Atlantic tropical cyclone activity[25]. The resulting increased interannual variability could leave people uncertain of the trend of the hazard. Walsh et al. projected increases in tropical cyclone precipitation intensities in addition to the changes previously discussed. Such precipitation could increase even farther inland than today[26]. Sun et al. noted that the area of the tropical cyclone-induced high winds will increase under global warming scenarios[27]. And Appendini et al. warned that the wave activity associated with tropical cyclones will likely increase in the northern Gulf of Mexico under global warming scenarios[28]. The Fourth National Climate Assessment provides an ominous reminder that atmospheric scientists tend to be converging toward a conclusion on the matter:

> *"Both theory and numerical modeling simulations generally indicate an increase in tropical cyclone (TC) intensity in a warmer world, and the models generally show an increase in the number of very intense TCs. For Atlantic and eastern North Pacific hurricanes and western North Pacific typhoons, increases are projected in precipitation rates (high confidence) and intensity (medium confidence).[29]"*

Scholars have also estimated the future impacts resulting from such a consensus of increases in intensity and/or frequency of the most intense tropical cyclones. While emphasizing the inherent uncertainty and difficulty with projecting the future tropical cyclone hazard, Knutson et al. cautiously projected no major macro-scale changes in tropical cyclone genesis location, tracks, duration, or areas of impact, but cautioned that the future vulnerability to tropical-cyclone-induced storm surge-related flooding will increase due to sea level rise and coastal development[30]. Ranson et al. used ensemble models to project a 63% increase in tropical cyclone damage in the North Atlantic basin – the highest increase of any basin

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[24] R.L. Sriver. "Climate change: tropical cyclones in the mix." *Nature* 463, 7284 (2010): 1032–1033.
[25] T.R. Moore, H.D. Matthews, C. Simmons, and M. Leduc. "Quantifying changes in extreme weather events in response to warmer global temperatures." *Atmosphere-Ocean* 53 (2015): 412–425.
[26] K.J.E Walsh, J.L. McBride, P.J. Klotzbach, S. Balachandran, S.J. Camargo, G. Holland, T.R. Knutson, J.P. Kossin, T.-c. Lee, A. Sobel, and M. Sugi. "Tropical cyclones and climate change." *Wiley Interdisciplinary Reviews-Climate Change* 7 (2016): 65–89.
[27] Y. Sun, Z. Zhong, T. Li, L. Yi, Y.J. Hu, H.C. Wan, H.S. Chen, Q.F. Liao, C. Ma, and Q.H. Li. "Impact of ocean warming on tropical cyclone size and its destructiveness." *Scientific Reports* 7, Art. No. 8154 (2017).
[28] C.M. Appendini, A. Pedrozo-Acuña, R. Meza-Padilla, A. Torres-Freyermuth, R. Cerezo-Mota, J. López-González, and P. Ruiz-Salcines. "On the role of climate change on wind waves generated by tropical cyclones in the Gulf of Mexico." *Coastal Engineering Journal* 59,2 (2017): Art No. 1740001.
[29] J.P. Kossin, T. Hall, T. Knutson, K.E. Kunkel, R.J. Trapp, D.E. Waliser, and M.F. Wehner. "Extreme storms. In:" *Climate Science Special Report: Fourth National Climate Assessment, Volume I* [Wuebbles, D.J., D.W. Fahey, K.A. Hibbard, D.J. Dokken, B.C. Stewart, and T.K. Maycock (eds.)]. (Washington, DC: U.S. Global Change Research Program) pp. 257–276, doi: 10.7930/J07S7KXX.
[30] T.R. Knutson, J.L. McBride, J. Chan, K. Emanuel, G. Holland, C. Landsea, I. Held, J.P. Kossin, A.K. Srivastava, and M. Sugi. "Tropical cyclones and climate change." *Nature Geoscience* 3 (2010):157–163.

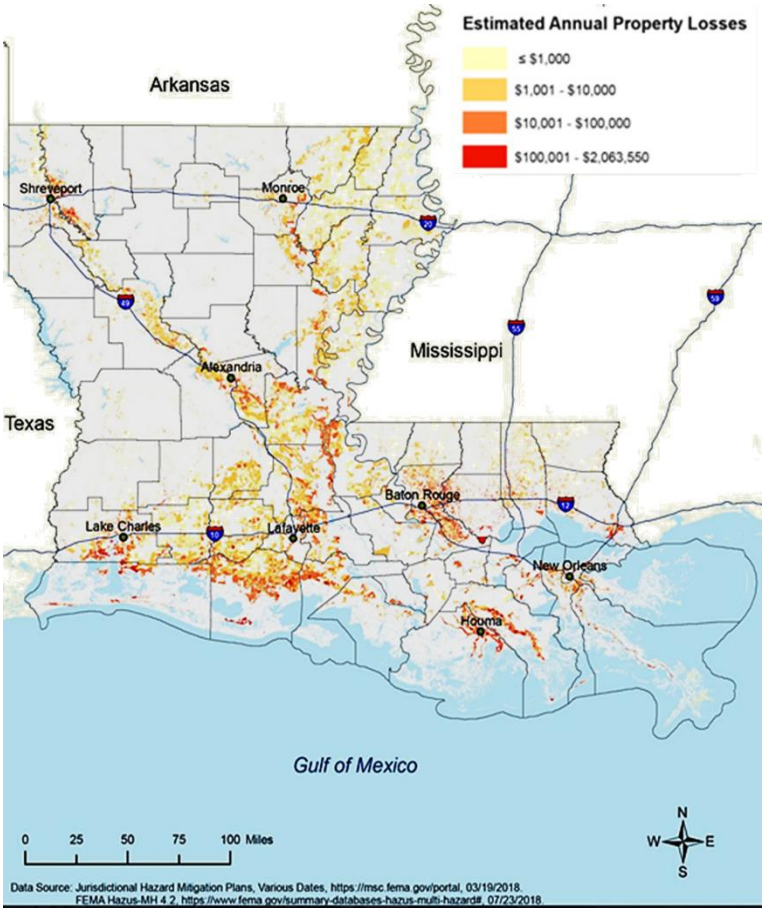
in the world[31].

Regardless of projections of the impact of global warming on regional tropical cyclone activity, Louisiana will always be in a geographic position where tropical cyclones are likely to occur. Any increased intensities in the future, even with decreased frequencies, are likely to exacerbate Louisiana's future vulnerability, given that intense storms have enormous potential to devastate the physical, urban, agricultural, economic, and sociocultural infrastructure of our state. The SHMP projects a 25% increase in the future vulnerability to tropical cyclones, with a near-certain expectation that Louisiana will experience another major tropical cyclone before mid-century.

Floods

A *flood* is the overflow of water onto land that is typically not inundated. Excess precipitation, produced from thunderstorms or hurricanes, is often the major initiating condition for flooding, and Louisiana can have high rainfall totals at any time of the day or year. The SHMP indicates five specific types of floods that are of main concern: riverine, flash, ponding, backwater and urban. The 1% AEP flood is used as the basis for regulatory standards, such as building codes and flood insurance requirements, and represents the baseline for the SHMP evaluation.

Figure 12. Losses Associated with 1% AEP Flood by Census Block



Over the period 1959 to 2005, Louisiana ranked 18th among the states in flood fatalities (excluding those related to Katrina), but third in flood-related injuries and in total flood casualties. Recent significant floods include the August 11-31, 2016 flood affecting southeast Louisiana (DR-4277), the March 8-April 8, 2016 flood affecting northern Louisiana (DR4263), and the May 18-June 20, 2015 flood along the Red River in northwest Louisiana (DR-4228).

The *flood hazard area* is defined as the land area that has a 1% chance of flooding per year; however, this is not a complete picture of flood risk because flood inundation boundaries delineating other flood-

[31] M. Ranson, C. Kousky, M. Ruth, L. Jantarasami, A. Crimmins, and L. Tarquinio. "Tropical and extratropical cyclone damages under climate change." *Climatic Change* 127 (2014): 227–241.

related risks are not systematically defined. While no changes are projected for riverine flooding due to lack of data, the CPRA predicts increases in coastal flooding illustrated in **Figure 12**, which captures FEMA's estimates of losses associated with a 1% AEP flood by census block.

As noted in NCA4 (2017), projection of the flood hazard to 2050 is a complex multivariate problem, as human activities such as deforestation, urban and floodplain development, construction of dams, flood mitigation measures and changes in agricultural practices impact future flood statistics. In addition, Louisiana's geography superimposes a highly responsive local-to-regional-scale on similar changes upstream over a significant portion of the nation, and these changes are superimposed on climatic changes and eustatic sea level rise.

Despite the fact that these complications invite caution in the interpretation of results, it is safe to conclude that flood is likely to remain HUD and LA MID's and the entire state's costliest, most ubiquitous and most life-threatening hazard. This is because floods are the by-product of several other hazards profiled earlier in this report, including thunderstorms, tropical cyclones, coastal hazards, dam failure and levee failure. **Table 7** summarizes projected changes in vulnerability for floods and flood-related sub hazards, finding consistency with studies that project increases in precipitation rates and intensity over time.

Table 7. Estimated Change in Vulnerability to Future Hazards

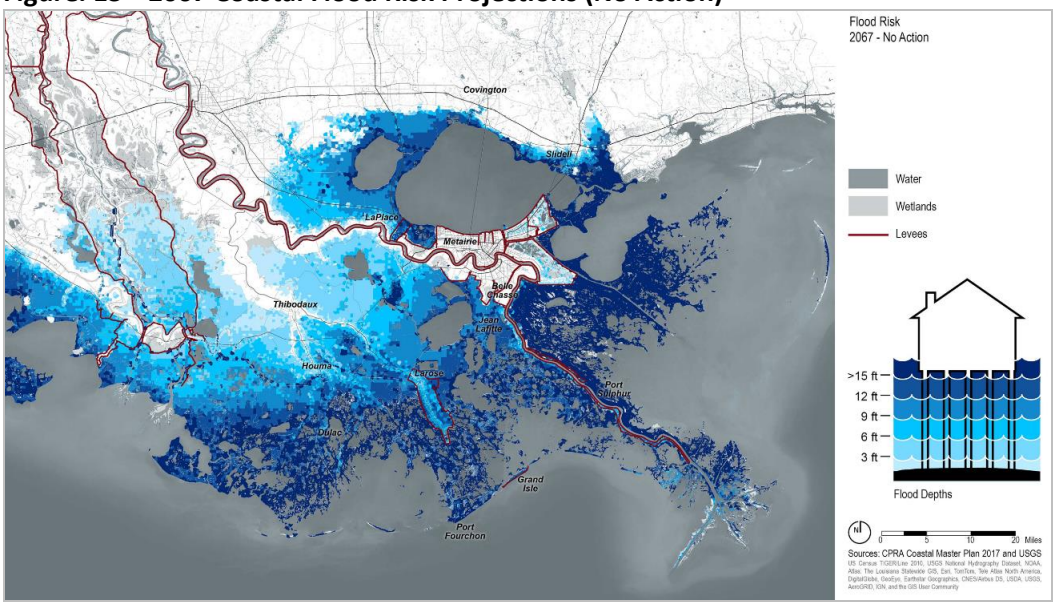
Hazard	Estimated Change in Future Vulnerability by 2050 (%)
Severe thunderstorms	10
Tropical cyclones	25
Coastal hazards	"High"
Dam failure	0
Levee failure	0

Sea Level Rise

Due to a variety of factors including eustatic sea level rise, subsidence and coastal land loss, Louisiana has one of the highest sea level rise rates in the world[32]. This steadily-increasing threat further exacerbates flood risk within the state, as it multiplies the potential impacts of any isolated flood event and contributes to an ever-worsening baseline state of flood risk exposure[33]. As sea level rise impacts the coastal areas of Louisiana, it also weakens the existing network of wetlands, barrier islands and brackish estuaries that provide critical storm protection and flood retention natural functions to more inland portions of the state. **Figure 13** below indicates potential flood risk as a result of sea level rise projected in 2067 if the state were to take no action.

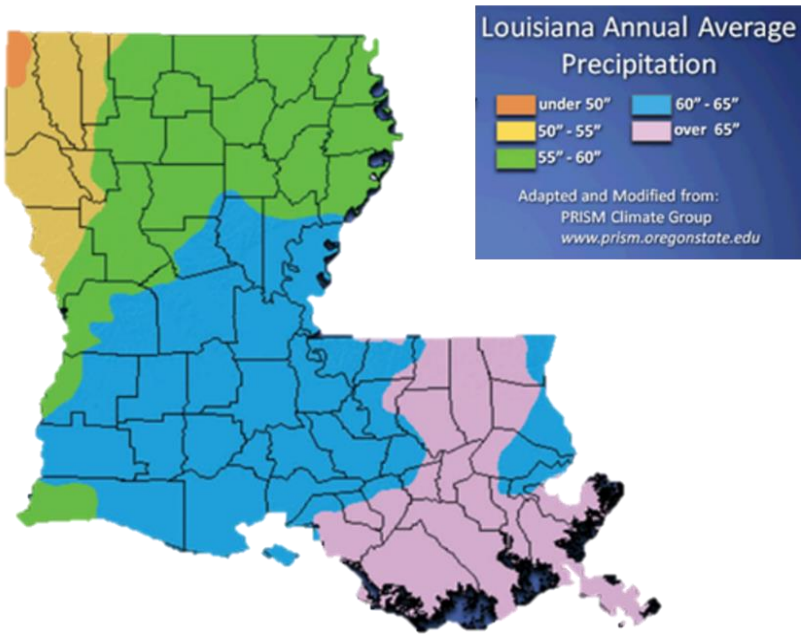
[32] LA GOHSEP, 2019. "Repetitive Loss Strategy" – Appendix to the 2019 State of Louisiana Hazard Mitigation Plan Update. https://gohsep.la.gov/MITIGATE/HM-PLANNING/State-Hazard-Mitigation-Plan
[33] LA GOHSEP, 2018. Hazard Identification and Risk Assessment.

Figure. 13[34] 2067 Coastal Flood Risk Projections (No Action)



Some of Louisiana's recent mitigation efforts (namely LA SAFE and actions of the CPRA) have identified inland migration and the restoration of coastal areas as methods to address the insidious threat of sea level rise; however, increasing sea level rise will continue to present a threat to Louisiana, especially as it exacerbates flood risk.

Figure 14. Louisiana Average Annual Rainfall Distribution



Extreme Precipitation

Extreme precipitation precedes flash flooding, which is a critical component of Louisiana's risk profile[35] and can occur with little warning, exhausting municipal resources and causing repeated property damage and business interruption. Louisiana experiences some of the highest rainfall rates in the country on an average statewide basis, with a high degree of spatial

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[34] CPRA. Coastal Master Plan 2017 and USGS data featured in State of Louisiana. Office of Community Development, Disaster Recovery Unit. *Louisiana's Strategic Adaptation for Future Environments.* Accessed on September 18, 2019. https://www.doa.la.gov/OCDDRU/NDRC/LASAFE_Report_Final.pdf.

[35] GOHSEP. *State of Louisiana Hazard Mitigation Guide.* 2019. https://gohsep.la.gov/MITIGATE/HM-PLANNING/State-Hazard-Mitigation-Plan.

variability[36], with some areas in the state reaching as high as 70-inches of mean annual rainfall (**Figure 14**). Even in drought or La Nina conditions, Louisiana is often subject to high-water levels in its major riverine systems, due to flooding conditions upstream in the Midwest[37] that can pose an elevated threat when combined with extreme precipitation or wind events. Because of its flat landscape and interconnected waterways, the impact of a rainfall event in one part of the state can be greatly felt far beyond the boundaries of where the rain falls.

Although Louisiana has experienced a number of historic storms and rainfall events with high damage levels in the past two decades, these events are not outliers from a historical perspective, in fact such events may speak to existing trends in rainfall data and flood risk[38]. Since 1958, the amount of precipitation falling during heavy rainstorms has increased by 27% in the southeast, and the trend toward increasingly heavy and frequent rainstorms, including a significant increase in extreme precipitation events, is projected to continue with high confidence[39]. Moreover, the amount of rainfall in the Midwest is also likely to increase, which could worsen flooding in Louisiana, as most of the Midwest drains into the Mississippi River. Recent years have witnessed several extreme rainfall events, including the Great Floods of 2016. If added to the historical record, such storms could eventually change the rainfall frequency values currently used in infrastructure design[40] and thus redefine what qualifies as a 100 or 1000-year events, including implications to floodplain management and building regulations.

V. F. CRITICAL SERVICE AREAS OR COMMUNITY LIFELINES

Critical service areas or *community lifelines* refer to indispensable services that enable continuous operation of critical business and government functions in the wake of a disaster event, and are essential to human health and safety, or economic security. In order to best address unmet mitigation needs impacting emergency response and critical service areas, a quantitative analysis of significant potential impacts and risks of hazards affecting the following seven critical service areas listed below.

1. Safety and security
2. Food, water, shelter
3. Health/medical
4. Energy
5. Communications
6. Transportation
7. Hazardous material

The state's current Emergency Operations Plan (EOP) indicates both natural and technological hazards

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[36] Linda Benedict and John M. 'Jay' Grimes, III. "Precipitation Patterns Over the Bayou State." 11/30/2011. https://www.lsuagcenter.com/portals/communications/publications/agmag/archive/2011/fall/precipitation-patterns-over-the-bayou-state.

[37] R. Frankson, K. Kunkel, and S. Champion. *Louisiana State Climate Summary*. NOAA Technical Report NESDIS 149-LA, 4 (2017) https://statesummaries.ncics.org/la

[38] Cameron Wobus, Ethan Gutmann, Russell Jones, Matthew Rissing, Naoki Mizukami, Mark Lorie, Hardee Mahoney, Andrew W. Wood, David Mills, and Jeremy Martinich. "Climate Change Impacts on Flood Risk and Asset Damages within Mapped 100-Year Floodplains of the Contiguous United States." *Natural Hazards & Earth System Sciences*. Vol. 17, Issue 12 (2017): p. 2199-2211.

[39] United States Global Change Research Program. *Climate Science Special Report: Fourth National Climate Assessment, Volume I*. Washington, DC: U.S. Global Change Research Program (2017). "Chapter 7: Precipitation Change in the United States." Accessed on March 9, 2018. https://science2017.globalchange.gov/chapter/7/.

[40] H. Eldardiry, E. Habib, and Y. Zhang. "On the use of radar-based quantitative precipitation estimates for precipitation frequency analysis." *Journal of Hydrology*. 531 (2015): 441–453.

anticipated to impact critical service areas, including anticipated severity. Among the natural hazards assessed in **Figure 15**, flood risk presents a monumental threat to critical service areas in the HUD and LA MIDs, as well as throughout the State of Louisiana. This threat is further complicated by the co-location of industry centers in flood-prone areas, the presence of vulnerable populations in flood-prone areas and the variability in flood severity factors (ex: operation levels of municipal drainage infrastructure, ground saturation, river levels, floodway impediments, etc.). The state's EOP lists coastal erosion, flood, hurricanes, severe storms and storm surge among its most serious and likely natural hazards impacting critical lifelines including safety and security, communications, provisions and shelter capability, transportation, public health and medical response, hazardous materials management and energy resources[41].

Figure 15. Natural Hazards and Estimated Severity

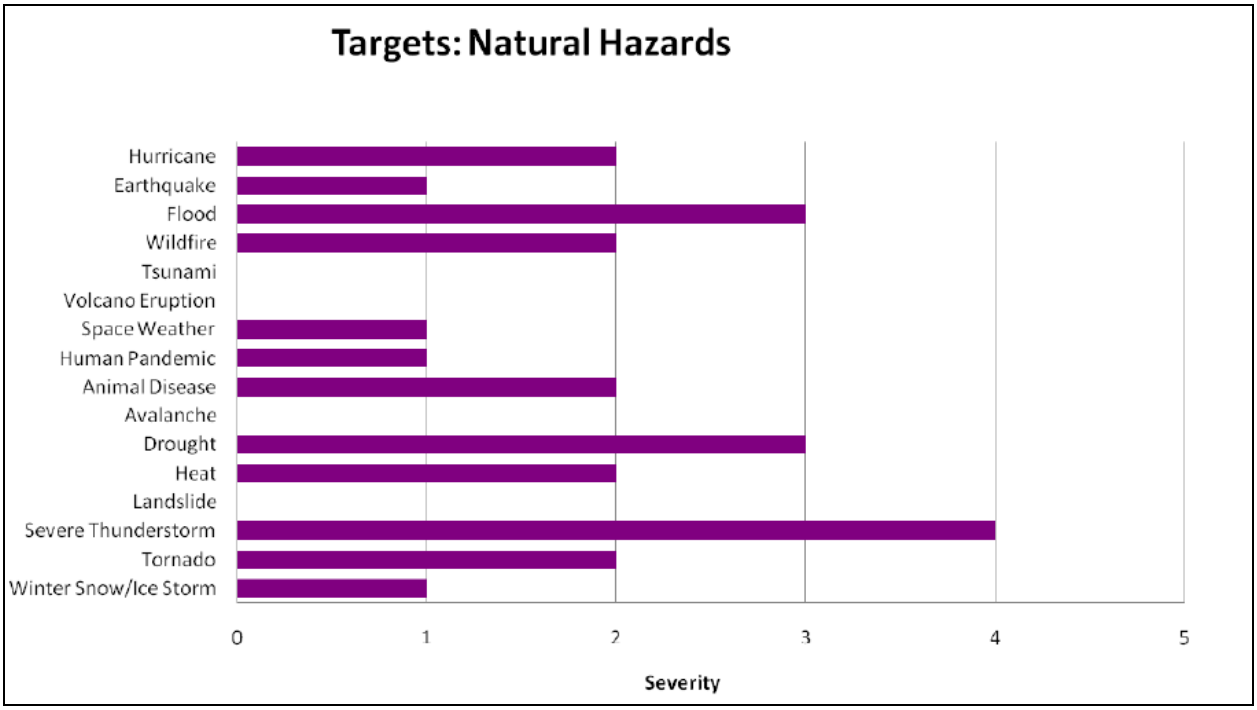

Figure 16 indicates technological hazards anticipated to impact these critical lifelines, including their anticipated severity. The EOP lists both dam and levee failure among its most serious and likely technological hazards impacting critical lifelines including safety and security, communications, provisions and shelter capability, transportation, public health and medical response, hazardous materials management, and energy resources[42].

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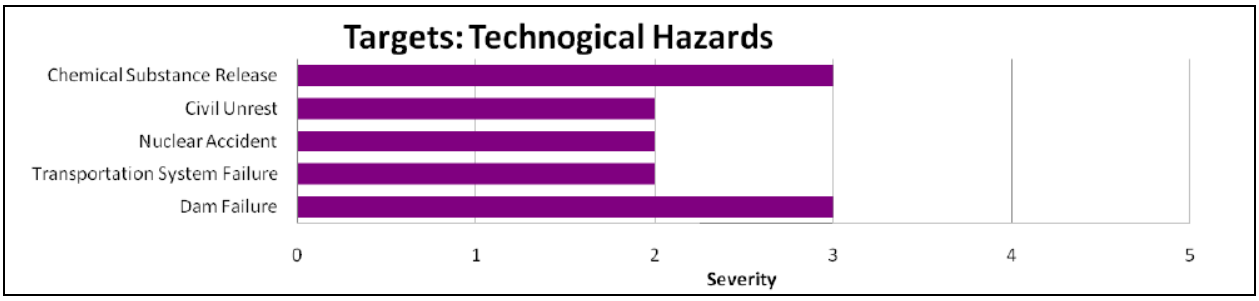
[41] GOHSEP. *State of Louisiana Emergency Operations Plan.* 2014.
[42] Ibid.

Figure 16. Technological Hazards and Estimated Severity



Critical Service Area No. 1: Safety and Security

GOHSEP identifies flood events as a critical risk to the provision of on-scene safety, security, protection and law enforcement services. Even limited impact or short duration flood events can place enormous strain on the ability of states and municipalities to maintain robust response to safety and security needs and can prevent emergency responders from attending to immediate needs due to road inaccessibility. For example, during the Great Floods of 2016 emergency responders rescued approximately 30,000 residents[43]. Further, staffing needs for both state and local emergency response personnel increase before, during, and after a flood event[44], and many jurisdictions[45] have implemented curfews[46], road restrictions, and/or evacuation orders in recent years in response to flood events[47]. Implementation of mitigation programs throughout the state will stabilize safety and security and reduce the need for law enforcement, search and rescue, first responders and government services during and immediately after a disaster event.

Critical Service Area No. 2: Communications

As evidenced by Hurricane Katrina in 2005, lack of resilience in communication infrastructure can present a substantial impediment to disaster response and recovery[48]. In recent years, many agencies

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[43] Emily Shapiro. "Over 2,600 People in Shelters in Louisiana: The Latest on Flood Recover, By The Numbers." ABC News, August 23, 2016. https://abcnews.go.com/US/2600-people-shelters-louisiana-latest-flood-recovery-numbers/story?id=41590075

[44] National Alliance for Public Safety GIS (NAPSG) Foundation. "National Flood Preparedness Guideline." June 2017. https://www.napsgfoundation.org/wp-content/uploads/2015/10/National_Flood_Preparedness_Guideline_2017.pdf

[45] Orlando Flores, Jr. "For Hurricane Barry, here's a list of curfews implemented in Baton Rouge area." The Advocate, July 13, 2019. https://www.theadvocate.com/baton_rouge/news/weather_traffic/article_01376314-a5ab-11e9-b933-83406a787540.html

[46] Ashley White and Andrew Capps, Lafayette Daily Advertiser. "'It's Coming': Robideaux announces curfew as Tropical Storm Barry threatens flooding." The Daily Advertiser, July 13, 2019. https://www.theadvertiser.com/story/news/2019/07/13/parish-wide-curfew-issued-lafayette-includes-all-municipalities/1726130001/

[47] Kelsey Davis. "Residents, first responders hit with extreme flooding along Tangipahoa-St. Tammany Parish Line Friday." WDSU News, March 11, 2016. https://www.wdsu.com/article/residents-first-responders-hit-with-extreme-flooding-along-tangipahoa-st-tammany-parish-line-friday/3385266

[48] Louise K. Comfort and Thomas W. Haase. "Communication, Coherence, and Collective Action: The Impact of Hurricane Katrina on Communications Infrastructure." *Public Works Management & Policy*. Vol. 11, No. 1, July 2006 1-16. Sage Publications. https://www.cdm.pitt.edu/Portals/2/PDF/Publications/Communication_Coherence_and_Collective_Action-

and local jurisdictions have placed an emphasis on diversifying and hardening their communications infrastructure, and the state implemented a new interoperable communications network, however further build-out of this system is critical. This includes using multiple means of consistent communication and warning networks regarding flood risk and other hazards and is evidenced by the fact that 29 parishes in Louisiana are currently designated "Storm Ready Communities," i.e. they employ specific warning and emergency management techniques as endorsed by the National Weather Service's StormReady program[49]. As flood risk increases for the State, communication capacity will be challenged to maintain message penetration to citizens and to urge vigilance in response to diverse and multi-faceted flood events. Finally, as indicated in the Hazard Identification and Risk Assessment for Louisiana, no-warning events or events with short warning periods, such as tornadoes and flash flooding, present a unique communication challenge of warning residents for immediate response and present a threat to above-ground communication infrastructure and the energy supply necessary to operate such infrastructure[50].

Communicating and synthesizing the results of flood modeling and scenario-analyses presents a special challenge for state and local officials. Statistical probabilities and the magnitude of risk can be difficult concepts to convey to a wide audience[51], and parish or municipal leaders may draw different conclusions from environmental scenarios, leading to uncoordinated emergency response decision-making[52].

Critical Service Area No. 3: Food, Water and Sheltering

Flood events place significant strain on the State's ability to maintain supply chains of food, its provision of potable water, and its ability to provide shelter to residents. Increased projected flood risk compounds this challenge and accrues significant yearly costs to provide for these aspects of critical services.

Hurricane Katrina is the starkest recent example of flood and wind damage to drinking water infrastructure in Louisiana, with a cost of $2.25 billion in damages to the potable water infrastructure due to standing water, wind impacts, and power outages in the impacted area[53]. Some estimates indicate that over 1,200 drinking water systems in the impacted states were damaged in Hurricane Katrina. Recovery from this event has taken decades, and even today Louisiana's water infrastructure is

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Katrina.pdf

[49] United States National Weather Service. "StormReady." Accessed on September 18, 2019. https://www.weather.gov/stormready/la-sr

[50] GOHSEP. *Hazard Identification and Risk Assessment (HIRA).* 2018.

[51] David P. Eisenman, Kristina M. Cordasco, Steve Asch, Joya F. Golden, and Deborah Glik. "Disaster Planning and Risk Communication With Vulnerable Communities: Lessons From Hurricane Katrina" *American Journal of Public Health.* 97, S109_S115 (2007). https://doi.org/10.2105/AJPH.2005.084335

[52] B. Merz, Thieken A., Gocht M. "Flood Risk Mapping At The Local Scale: Concepts and Challenges." In: Begum S., Stive M.J.F., Hall J.W. (eds) *Flood Risk Management in Europe. Advances in Natural and Technological Hazards Research*, vol 25. Dordrecht: Springer (2017).

[53] "AWWA Estimates Katrina Damage at $2.25 Billion." *WaterWorld.* November 1, 2015. Accessed on 9/10/19. https://www.waterworld.com/municipal/drinking-water/infrastructure-funding/article/16190220/awwa-estimates-katrina-damage-at-225-billion

threatened not only by storms and flood events[54], but also by coastal threats and threats to groundwater quality, including saltwater intrusion[55]. Resilient water infrastructure systems are necessary to ensure that the state of Louisiana continues to thrive. Implementing water infrastructure mitigation programs is a vital component of this AP.

The state's ability to provide shelter is similarly challenged in a flood or hurricane event, a challenge that is further exacerbated by social vulnerability and by events with shorter notice periods[56]. The 2016 floods resulted in a need for sheltering services for approximately 2,600 residents[57], many of which were displaced from their homes, schools, and communities for many months prior to an extended recovery period. Aside from the immediate need to provide shelter to humans, flood events place a high demand on emergency and shelter services for pets. During the Great Floods of 2016, over 3,300 pets were rescued and placed high strains on animal services[58].

Critical Service Area No. 4: Transportation

Louisiana has experienced multiple events in recent history that impacted the transportation system, including the failure of evacuation routes. For example, in 2005, Hurricanes Katrina and Rita caused extensive structural damage to the I-10 Twin Span Bridge and wide-spread road inundation[59] that left some residents reliant on ferry boats or other means of transportation[60].

Aside from the catastrophic transportation disruptions that Louisiana has experienced, the State has experienced a high frequency of flood events that have caused incremental or temporary damage to transportation systems. In an analysis of flood risk to roadways, the CPRA identified approximately 4,100 miles of road in coastal Louisiana that would be subject to damage from the 1% AEP, resulting in approximately $1.2 billion dollars of damage[61]. This risk was shown to increase approximately 109 to 150% in a 50-year future projection without substantial coastal and flood risk reduction interventions, leading to damage estimates of $2.5 - 3 billion for the 1% AEP event. This study, only representing a portion of the state, indicates the severe threat that flood events present to the state's transportation system. **Figure 17** indicates anticipated miles of flooded roads in the coastal area under the 1% AEP scenario.

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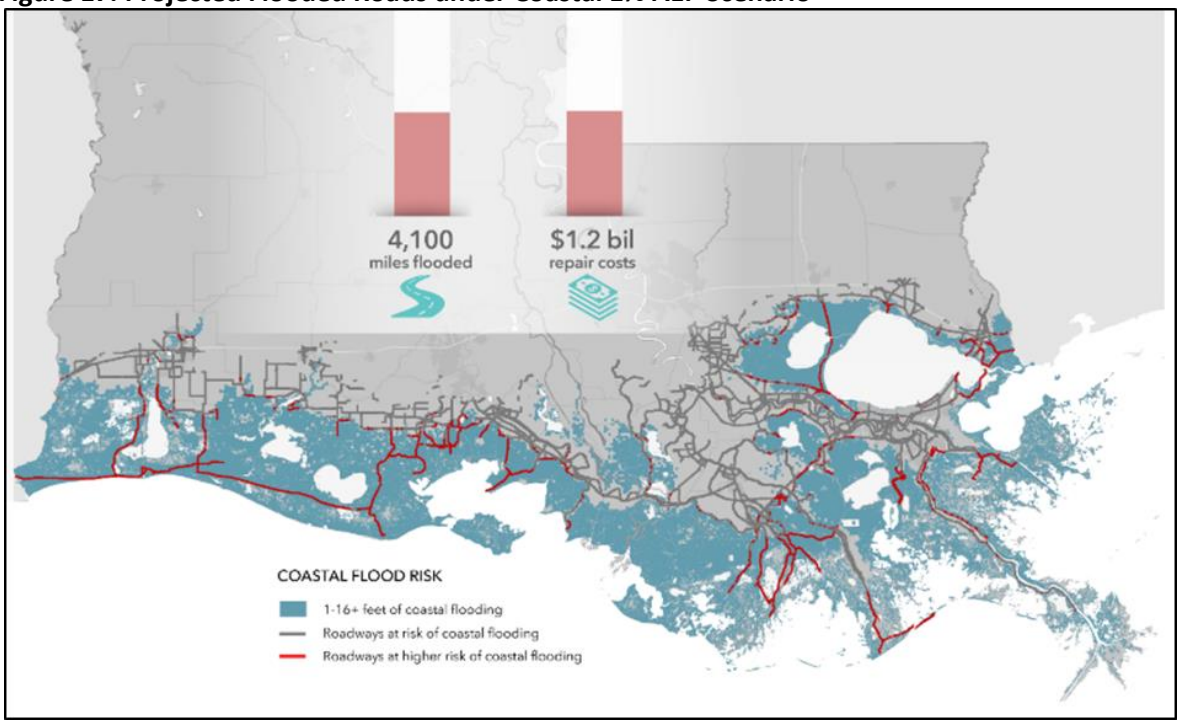
[54] Ben Chou. "Water and Wastewater Systems are Still At-Risk 10 Years After Katrina." Natural Resources Defense Council, August 27, 2015. Accessed on September 18, 2019. https://www.nrdc.org/experts/ben-chou/water-and-wastewater-systems-are-still-risk-10-years-after-katrina.
[55] GOHSEP. *Hazard Identification and Risk Assessment (HIRA).* 2018.
[56] Ibid.
[57] Emily Shapiro. "Over 2,600 People in Shelters in Louisiana: The Latest on Flood Recover, By The Numbers." ABC News. August 13, 2016. https://abcnews.go.com/US/2600-people-shelters-louisiana-latest-flood-recovery-numbers/story?id=41590075
[58] Ibid.
[59] United States Department of Transportation, Federal Highway Administration. "Louisiana's Recovery." *Public Roads Magazine.* https://www.fhwa.dot.gov/publications/publicroads/index.cfm
[60] CPRA. "Coastal Flood Risk and Resilience." Accessed on September 18, 2019. http://coastal.la.gov/wp-content/themes/cpra/storymaps/transportation/index.html
[61] Ibid.

Figure 17. Projected Flooded Roads under Coastal 1% AEP Scenario



Critical Service Area No. 5: Health and Medical

Due to its history of catastrophic storm and flood events, Louisiana bears long-lasting impacts to its public health system. For example, the largest public hospital in the region was damaged and the number of primary care facilities was reduced following Hurricane Katrina – the region has yet to fully recover from these impacts[62][63].

Aside from the catastrophic impacts of large-scale flood events, an average of 91 Louisiana residents have died per year in flood-related events[64], and even nuisance or small-scale flood events have left patients without access to critical medications, supplies and treatment facilities[65]. An analysis by CPRA indicated that, over a 50-year future projection without substantial coastal and flood risk reduction interventions, 15% of hospitals in coastal Louisiana could be impacted by flooding in a 1% AEP event.

This analysis, constrained to the coastal area of the state, illustrates just a portion of the severe, regional impacts that health and medical services may experience during future floods if Louisiana's long-term

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[62] Ibid.

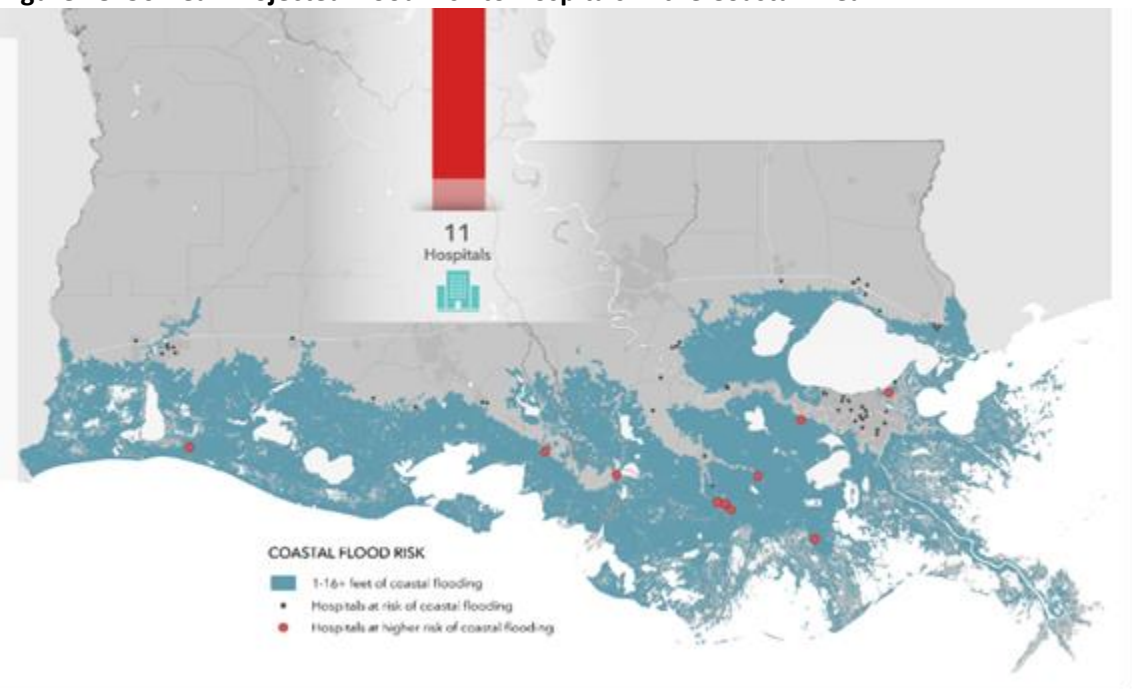
[63] The Henry J. Kaiser Family Foundation. *Policy Brief: Addressing the Health Care Impact of Hurricane Katrina*. August 31, 2005. https://www.kff.org/medicaid/issue-brief/addressing-the-health-care-impact-of-hurricane/.

[64] Office of Climate, Water, and Weather Services of the National Weather Service (NWS) and National Climactic Data Center, featured in CPRA. "Coastal Flood Risk and Resilience." Accessed on September 18, 2019. https://www.kff.org/medicaid/issue-brief/addressing-the-health-care-impact-of-hurricane/

[65] The Henry J. Kaiser Family Foundation. *Policy Brief: Addressing the Health Care Impact of Hurricane Katrina*. August 31, 2005. https://www.kff.org/medicaid/issue-brief/addressing-the-health-care-impact-of-hurricane/.

risk is not addressed. **Figure 18** indicates medical hospitals at risk in a future flood and coastal land loss scenario within the coastal area.

Figure 18. 50-Year Projected Flood Risk to Hospitals in the Coastal Area



Beyond the acute impacts of a singular event on the buildings and infrastructure needed to provide medical services, Louisiana residents are experiencing a mental health crisis linked to repeated traumatic events such as floods and hurricanes. These repeated experiences threaten to weaken social resilience and place further demand on the health and medical network, especially with regard to mental health and housing security.

Critical Service Area No. 6: Hazardous Material (Management)

Louisiana faces a unique challenge with regards to hazardous materials management due to the co-location of industry within the "working coast" in flood-prone areas. Louisiana is home to 100 chemical plants and 17 oil refineries[66], and its coast features 88% of the country's offshore oil rigs. The state also hosts a vast network of multimodal transportation and an extensive pipeline network[67]. As evidenced by multiple instances of oil spills caused by Hurricane Katrina[68], the combination of natural flood hazards with technological hazards can result in long-term impacts to residents and property. Both hazardous materials management and flood hazards demand extensive emergency response operations, however the combination of these risks in the state leads to a unique need for vigilance regarding both threats.

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[66] Susan Buchanan. "Chemical Plants are Flocking to LA." Louisiana Weekly. 2012. http://www.louisianaweekly.com/chemical-plants-are-flocking-to-la/

[67] Greater New Orleans Inc. "Industry Sectors – Energy/Petrochemicals/Plastics." 2019. https://gnoinc.org/industry-sectors/energypetrochemicalsplastics/

[68] Sue Sturgis. "The Katrina Oil Spill Disaster: A Harbinger for the Atlantic Coast?" Facing South. https://www.facingsouth.org/2015/08/the-katrina-oil-spill-disaster-a-harbinger-for-the.html

Implementing programs that will mitigate Louisiana's flood risk will reduce the dangers associated with impacts to facilities containing hazardous materials as well as the risk of exposure to hazardous debris, pollutants and contaminates associated with flooding.

Critical Service Area No. 7: Energy (Power and Fuel)

Louisiana contains a vast network of power generation and distribution infrastructure to serve its citizens. Louisiana also plays a critical role in national power generation and fuel security, due to its port exporting capabilities, its gas production and reserves, oil refinery infrastructure located in the state and the presence of storage sites that serve a critical function in the U.S. Strategic Petroleum Reserve[69]. For example, Louisiana is one of the top five natural gas-producing states. It accounts for 7% of U.S. total gas production and has about 8% of the nation's gas reserves. Similarly, Louisiana's 17 oil refineries account for nearly one-fifth of the nation's refining capacity and are capable of processing 3.3 million barrels of crude oil per day[70]. Floods and natural hazards present a special threat to Louisiana and, by extension, to the country's energy and fuel security.

V. G. ECOSYSTEM INTEGRITY AND WATERSHED RESILIENCE

Multiple state agencies and technical experts participating in the LWI have identified ecosystem integrity and the preservation of natural resources as critical dimensions of resilience that must be preserved and enhanced by flood risk reduction projects. Such enhancements include the incorporation of nature-based solutions and natural or green infrastructure in the selection and/or design of CDBG-MIT projects.

Resilient watersheds and healthy ecosystems, including forested and vegetated wetlands, have the ability to recover promptly from flooding events[71] and, in fact, experience beneficial inundation annually as part of the natural flood cycle. Such floodplains perform a vital function—water retention—during periods of heavy rainfall. Louisiana's vast network of natural ecosystems protects and enhances the state's resilience to floods and natural hazards. The state relies on the robust functioning of forests, grasslands, wetlands, floodplains, and other natural areas to absorb and detain flood waters, enhance water quality, and buffer the impact of coastal storms and wind events. These ecosystems also support a vast array of commercially, culturally and recreationally important fish, wildlife and plant species that sustain many critical industries in Louisiana and provide critical ecological diversity. Unfortunately, there are many risks to the integrity of Louisiana's varied habitats and the ecosystem services and flood mitigation functions they provide. These risks include sedimentation, erosion, and subsidence, as well as aspects of development practices such as the addition of impervious surfaces to the floodplain, disruption of watershed connectivity or the alteration of natural hydrology.

Louisiana's coastal wetlands are at specific risk of degradation and land loss. Saltwater intrusion and subsidence resulting from a complex multitude of man-made and natural sources are currently causing vast areas of coastal wetlands to convert to open water. Due to excessive inundation and higher salinities, large tracts of cypress swamp have been and will continue to be lost. Our degraded coastal

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[69] United States Energy Information Administration. Louisiana State Profile and Energy Estimates. 2019 https://www.eia.gov/state/?sid=LA.
[70] Ibid.
[71] United States Department of Agriculture. "Resilient Landscapes." 2019. https://www.fs.fed.us/managing-land/fire/resilient-landscapes

systems can no longer provide the attenuation of storm surge and tidal flooding they once did. Further, sea level rise and urbanization may limit the ability of tidal saline wetlands (TSW) to migrate landward and continue providing ecosystem services[72]. They may be limited by either naturally occurring or human-created barriers.

In their natural state, our state's streams provide a host of valuable functions, from connecting flood flows to undeveloped floodplains where floodwaters can be stored and absorbed, to physicochemical processes that regulate temperature, oxygen, nutrients and other water quality parameters. Some flood control interventions; however, may have secondary impacts that can reduce the functions of streams and cause downstream flooding or damage to habitat[73]. The LWI has and will continue to collaborate with experts in the field of resource management to verify that projects funded through this grant maintain the appropriate flows and flow patterns required to sustain natural processes and minimize impacts to critical habitats, species composition and biodiversity. Further, the LWI will consider natural infrastructure during the CDBG-MIT project selection and program development process.

V. H. UNMET MITIGATION NEEDS

The impact of flood risk on critical service areas, ecosystem integrity and watershed resilience indicates gaps and opportunities for improvement to the overall resilience of Louisiana, specifically by addressing the following unmet mitigation needs. Programs that address the unmet mitigation needs below are detailed in **Section VII**.

Unmet Mitigation Need: Flood-Resilient Development Patterns

Current development patterns in Louisiana reflect a status-quo of drainage managed at the site or community level, but do not adequately consider the cumulative effect of increased impervious surfaces and fill on community- and region-level drainage capacity. In some instances, current development practices also fail to appropriately consider impacts to water quality or aquatic habitat possibly leading to unintended impacts to local economic development. This results in steadily increasing flood risk to life and property across the Louisiana landscape, and directly results in a need for increased provision of food, water, and shelter provisions in response to flood disasters, as well as extensive recovery efforts following floods. Louisiana residents find themselves asking, "Why am I flooding now when I have never flooded before?", and—in some cases—development practices spanning the past decades are responsible.

Our current development patterns also rely on surface transportation that is subject to flood inundation in a severe flood event, potentially leaving residents stranded or in danger of rising water and taxing emergency responders' ability to provide critical safety and security services. This AP outlines multiple strategies to enable more resilient development patterns in the state, including:

1. The implementation of a *Regional Watershed Management strategy* including a framework for municipal governments to coordinate their watershed management policies, resulting in higher development standards implemented at the local level; and
2. The provision of *Technical Assistance and Capacity-Building Programs* to enhance municipal watershed management practices, including development review practices; and

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[72] Written correspondence with LDWF representatives Matthew Weigel and Raynie Harlan, September 6, 2019.
[73] Ibid.

3. *Critical Facilities and Infrastructure*: A program to implement infrastructure improvements and development designs that reduce flood impacts to critical facilities, such as hospitals, fire stations or critical infrastructure, including municipal drainage systems or roads used as evacuation routes; and
4. Buyout programs to enable residents in high-risk flood zones to relocate out of harm's way; and
5. *Flood-Ready Jobs*: A program to increase the number of building professionals with training in resilient building methods; and
6. *Resilience Gap Financing*: A program to incentivize the use of resilient building methods beyond these programs.

Unmet Mitigation Need: Watershed Data and Modeling

One of the most significant challenges we face in appropriately providing state-wide flood risk reduction is a lack of high-quality up-to-date data and the ability to appropriately plan and prioritize activities related to flood impacts based on potential future scenarios. GOHSEP has identified a distinct need for predictive floodplain modeling and collaborative data use in their risk assessment for the state[74], and multiple agencies' processes would be greatly enhanced with this tool. The production of high-quality watershed data and modeling will enable the following enhancements to the provision of critical lifelines and long-term resilience:

1. Enable strategic decision-making in flood or disaster preparation and response scenarios based on projected water elevation and inundation. Examples of this include using the H&H models to plan evacuation routes, evacuation or closure of hospitals and medical facilities, and estimate shelter needs based on a given flood scenario;
2. Enable the analysis and prioritization of structural and nonstructural flood control projects;
3. Illustrate the benefits of implementing policy changes to foster more resilient development;
4. Enable resilient infrastructure design;
5. Enable businesses and industrial facilities to implement flood-proofing or resilient site design;
6. Empower homeowners and residents to understand their flood risk profile under different weather and climate scenarios; and
7. Predict runoff and/or drainage impacts to avoid ecosystem disruption by flood control projects or other types of projects.

Unmet Mitigation Need: Cross-Jurisdictional Coordination

There is no regional water management framework in place with adequate resources to fully understand and solve mounting water risks statewide. In addition, local and regional leaders, as well as stakeholders, lack the support or resources necessary to participate in such a framework if it were to exist. As a result, Louisiana has historically managed flood risk through an isolated approach, often without the mechanisms in place to consider the effects of planning and projects on neighboring communities.

There is a clear need for further enhancements to cross-jurisdictional coordination. Such programs reduce risk to all hazards because they add institutional capacity to respond to- and mitigate for- a range of disaster scenarios. Enabling more comprehensive coordination among jurisdictions can boost critical

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[74] GOHSEP. *Louisiana Threat and Hazards Identification and Risk Assessment Database.* 2019.

measures of disaster resilience, such as the ability to provide food, water and sheltering provisions via enacting CEAs to assist in disaster response, better coordination for evacuation procedures, and more streamlined provision of supplies and/or equipment among neighboring jurisdictions.

More extensive collaboration among jurisdictions also enables more effective communication with citizens and residents regarding flood risk and how to prepare for hazards. Projects and programs that address regional watershed planning, regional mitigation activities, and incentivization of regional collaboration are needed to facilitate much-needed cross-jurisdictional coordination.

Unmet Mitigation Need: Flood Control Projects

Maintaining current levels of flood risk in Louisiana is unsustainable and threatens the state's ability to provide critical services, preserve critical service areas and maintain long-term community and ecosystem viability and resilience. To this end, flood risk reduction projects are critical and must be implemented as quickly and effectively as possible. This grant award must serve as a catalyst to enable risk reduction and spur more resilient development and policies in the future via the allocation of funds toward regional- and state-flood control projects.

Flood risk reduction projects aim to reduce the frequency and extent of flood disaster events, which in turn reduces the need for emergency response provision of critical services, protects life and property, and provides safety and security to residents. Of the programs described in this AP, all are focused on substantive flood risk reduction. While some programs will reduce this risk through education, citizen engagement, and technical capacity within the workforce, the following programs will directly implement decreases in flood elevation levels based on predictive data and modeling of watershed characteristics:

1. Competitively awarded regional flood risk reduction projects; and
2. State-identified regional retention/detention and infrastructure projects.

VI. RISK DISTRIBUTION AMONG LMI OR OTHERWISE VULNERABLE COMMUNITIES

It has long been recognized that flood-related risk often corresponds with a high level of social vulnerability, compounding the impact of flood events with the challenges of poverty for many victims. Louisiana features extensive social vulnerability across the state, as well as extreme exposure to flood, storm and coastal hazards (**Figure 19**[75] [76]). Further, many Louisiana residents have experienced multiple flood events, and therefore have repeatedly been subjected to interruptions in work and have had to rebuild or relocate, which has long-term negative impacts on household wealth, mental health and community cohesion[77]. For these reasons, the SHMP assessment of vulnerable populations is included

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[75] Oxfam America Inc. "Coping with Disaster: A Vital Region at Risk and a Moment of Opportunity, Social Vulnerability and Climate Hazards in the Gulf Coast." 2012.

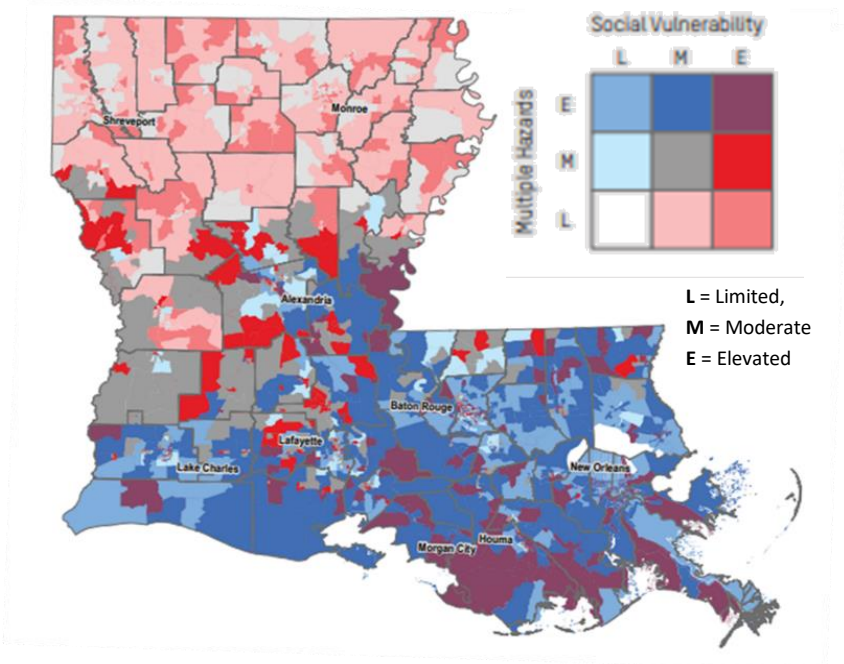
[76] Pina AA, Villalta IK, Ortiz CD, Gottschall AC, Costa NM, Weems CF. "Social support, discrimination, and coping as predictors of posttraumatic stress reactions in youth survivors of Hurricane Katrina." *Journal of Clinical Child and Adolescent Psychology*. 37,3 (2008):564-574.

[77] Carla Stanke, et al. "The effects of flooding on mental health: Outcomes and recommendations from a review of the literature" *PLoS* currents vol. 4 e4f9f1fa9c3cae. (2012): doi:10.1371/4f9f1fa9c3cae.

herein to better inform mitigation programs and projects described in **Section VII**, which prioritize the protection of LMI individuals and vulnerable populations.

Vulnerable populations are quantified in the SHMP, as follows:

Figure 19. Social vulnerability and hazard exposure



Age demographics: Population estimations for young (<20 years old) and aging (>64 years old) populations were calculated at the parish level of each Louisiana parish for the year of 2043. Annual American Community Survey (ACS) 5-year estimates of the Age and Sex File (S0101) from 2010 to 2016 were obtained from United States Census Bureau American Fact Finder for each parish. The file consists of yearly population estimates (P_{year}) for each parish from 2010 to 2016. These population estimates were used to calculate how the population changed in recent history until 2016 for each parish. The overall average rate (r) of vulnerable population change was calculated based off the six annual population changes determined for each parish (Equation 1).

Average population vulnerable population change from 2010 to 2016:

$$r = \left(\frac{(P_{11} - P_{10})}{P_{10}} + \frac{(P_{12} - P_{11})}{P_{11}} + \frac{(P_{13} - P_{12})}{P_{12}} + \frac{(P_{14} - P_{13})}{P_{13}} + \frac{(P_{15} - P_{14})}{P_{14}} + \frac{(P_{16} - P_{15})}{P_{15}} \right) / 6 \quad \text{(Equation 1)}$$

Positive rates of change indicate parishes that have experienced increases in vulnerable populations over the past six years. Negative rates of change indicate parishes that have experienced overall average decreases in vulnerable populations over the past six years. Using the same growth rate model, the following rates of change of vulnerable populations were evaluated.

Disability demographics: Annual ACS 5-year estimates of Disability Characteristics (S1810) data were obtained from United States Census Bureau American Fact Finder for each parish from 2012 to 2016.

Poverty demographics: Annual ACS 5-year estimates of Poverty Status in the Past 12 Months (B17001) data were obtained from United States Census Bureau American Fact Finder for each parish from 2012 to 2016.

Manufactured home estimates: Annual ACS 5-year estimates of Units in Structure (B25024) data were obtained from United States Census Bureau American Fact Finder for each parish from 2010 to 2016.

Tables 8 and **9** provide parish level average annual growth rates for each of the identified vulnerable populations located within a HUD MID (**Table 8**) and LA MID (**Table 9**).

These values are summed by parish to provide an overarching indication of the direction of change for each parish across populations, where higher positive numbers indicate increased vulnerability, and higher negative numbers indicate decreased vulnerability. Rates closer to zero indicate less change from the current populations.

According to the SHMP, on average across the state, change in demographic vulnerability is modest in a positive or negative direction. By contrast, many parishes have significant increases in vulnerable populations. Statewide, all parishes have a positive growth rate for aging populations, defined as older than 64 years old. Beauregard, Vernon, Tangipahoa, Ascension, Plaquemines, and Terrebonne parishes have the highest sum of vulnerable population growth rates statewide, indicating a greater likelihood of future increase in demographic vulnerability.

As illustrated in **Table 8**, the HUD MID parishes with the highest LMI or vulnerable population growth rates are bolded and include Tangipahoa - disabilities (5%); Washington and Acadia - poverty (6%), Washington – living in manufactured housing (3%); and Ascension – older than 64 (6%). All 10 of the HUD MIDs have experienced a cumulative growth in their vulnerable population, most significantly within Tangipahoa (14%), Ascension (13%), Livingston (11%) and Washington (10%) parishes.

Table 8. HUD MID Vulnerable Populations Average Annual Growth Rates

Parish	Younger than 20	Older than 64	Population with disabilities	Population living in poverty	Population living in manufactured housing	Sum of vulnerable population growth rates
Tangipahoa	0%	4%	**5%**	2%	2%	**14%**
Ascension	2%	6%	2%	2%	2%	**13%**
Livingston	1%	5%	3%	2%	0%	**11%**
Washington	-1%	2%	0%	**6%**	**3%**	**10%**
Acadia	-1%	2%	0%	**6%**	1%	8%
Vermilion	0%	1%	3%	2%	1%	8%
Lafayette	0%	3%	1%	2%	1%	7%
St. Tammany	0%	**5%**	3%	-1%	-1%	7%
East Baton Rouge	-1%	3%	3%	1%	0%	6%
Ouachita	0%	2%	1%	2%	-1%	4%
Average	0%	3%	2%	2%	1%	9%

As illustrated in **Table 9** on the following page, the LA MID parishes with the highest LMI or vulnerable population growth rates are boxed, bolded and include Allen and Beauregard - disabilities (6% each); Vernon - poverty (11%), Red River (7%) – living in manufactured housing; and West Feliciana – older than 64 (6%). On average, the 46 LA MIDs have experienced a two percent cumulative growth in their

vulnerable population, most significantly within Beauregard (15%), Vernon (15%) and Richland (11%) parishes.

Table 9. LA MID Vulnerable Populations Average Annual Growth Rates

	Parish	Younger than 20	Older than 64	Population with disabilities	Population living in poverty	Population living in manufactured housing	Sum of vulnerable population growth rates
LA-Identified MIDs	Allen	-2%	1%	**6%**	3%	2%	10%
	Assumption	-2%	3%	0%	6%	0%	7%
	Avoyelles	-1%	1%	-6%	2%	1%	-3%
	Beauregard	0%	3%	**6%**	7%	0%	**15%**
	Bienville	-2%	0%	-4%	0%	4%	-2%
	Bossier	1%	3%	2%	2%	2%	10%
	Caddo	-1%	2%	1%	0%	-1%	1%
	Calcasieu	0%	2%	1%	1%	0%	5%
	Caldwell	-2%	2%	-5%	0%	1%	-3%
	Cameron	-2%	2%	-1%	2%	0%	1%
	Catahoula	-1%	2%	-10%	4%	4%	-2%
	Claiborne	-1%	1%	1%	0%	1%	3%
	DeSoto	-1%	3%	0%	2%	1%	6%
	East Carroll	-3%	0%	-3%	-5%	4%	-6%
	East Feliciana	-2%	4%	-5%	-4%	0%	-7%
	Evangeline	-1%	1%	5%	-5%	1%	2%
	Franklin	-1%	1%	-3%	0%	4%	1%
	Grant	-2%	3%	-3%	-2%	5%	2%
	Iberia	-1%	2%	2%	3%	2%	8%
	Iberville	-2%	3%	4%	-1%	2%	6%
	Jackson	-1%	2%	0%	8%	-2%	6%
	Jefferson Davis	-1%	1%	-2%	2%	1%	1%
	LaSalle	-1%	2%	0%	2%	5%	9%
	Lafourche	-1%	2%	2%	1%	1%	6%
	Lincoln	-1%	2%	0%	4%	2%	8%
	Madison	-2%	1%	-6%	0%	-1%	-8%
	Morehouse	-2%	1%	-3%	2%	0%	-2%
	Natchitoches	-1%	3%	0%	-1%	1%	1%
	Pointe Coupee	-1%	3%	2%	1%	1%	5%
	Rapides	0%	2%	-2%	3%	2%	5%
	Red River	-2%	1%	-3%	1%	**7%**	4%
	Richland	0%	1%	1%	5%	3%	**11%**
	Sabine	-1%	2%	-6%	2%	1%	-2%
	St. Charles	-1%	2%	-5%	2%	0%	-2%
	St. Helena	-3%	3%	1%	1%	1%	2%
	St. James	-2%	3%	2%	1%	0%	4%
	St. John the Baptist	-3%	3%	-1%	0%	1%	0%
	St. Landry	-1%	1%	-2%	4%	1%	3%
	St. Martin	-1%	3%	2%	2%	2%	8%
	Union	-1%	2%	-3%	-2%	4%	0%
	Vernon	0%	2%	1%	**11%**	1%	**15%**
	Webster	-1%	1%	-1%	-1%	1%	-1%
	West Baton Rouge	1%	3%	3%	1%	0%	8%
	West Carroll	-1%	1%	-5%	0%	1%	-4%
	West Feliciana	3%	**6%**	-5%	0%	2%	5%
	Winn	-2%	1%	-5%	0%	0%	-5%
	Average	-1%	2%	0%	1%	1%	2%

VII. APPROACHES TO ADDRESS MITIGATION NEEDS

VII. A. CONNECTION BETWEEN MITIGATION NEEDS AND ALLOCATION OF FUNDS

The Great Floods of 2016 represent the latest stark example that Louisiana needs to evolve in how it considers its flood risks. The two events in 2016 caused an estimated $10 billion in damages and impacted more than 145,000 homes — many of which were not located within a SFHA. Moreover, the events themselves resulted from a historic rainfall event, putting a spotlight on riverine and flash flood risk in a state that had previously directed most of its attention toward tropical, surge flood risks.

As indicated in this AP's Mitigation Needs Assessment, incremental municipal and parish-level flood control interventions are insufficient, and sometimes counterproductive, in addressing Louisiana's myriad flood risks. A watershed approach to floodplain management recognizes that policies and actions anywhere in a watershed can have impacts throughout the watershed. Increasing the amount of impermeable surface in the upper parts of a watershed can increase flooding throughout the watershed. Immediate economic needs must be balanced with long-term resilience strategies in order to attain an acceptable level of flood risk that does not subject citizens to the cycle of repeated disaster and recovery. Watershed management is most effective when done at the systems scale, and the implementation of regional flood control projects can provide benefits to a large geographic area while leveraging funds from multiple sources to accomplish immediate and sustainable mitigation goals. A statewide approach to data, modeling, planning, project investment, and development is the only way that the residents and leaders of Louisiana can make truly informed decisions about how to best manage flood risk in the state.

Although the HUD and LA MIDs do not represent all of the parishes in the state, watersheds cross political boundaries. In many cases, areas designated as MID are within watersheds extending far beyond MID boundaries. Similarly, much of the 2016 flooding that occurred inside the designated MID areas was directly related to precipitation and flooding that occurred outside the MID areas. Therefore, in order to adequately mitigate flood risk within MID areas, potential projects enumerated in this AP may be located outside of a MID while providing regional mitigation benefits to an area including those designated as MID. Therefore, planning, modeling, evaluation, and mitigation must occur in a holistic manner that addresses the entire state and recognizes the interconnected nature of watersheds.

Predictive watershed modeling may also indicate that future extreme flood risk does not align with the impacted areas from the Great Floods of 2016, indicating a demand for proactive mitigation investments outside of MID areas designed to address the next potential disaster. Finally, post-disaster migration patterns and development demand may shift population concentrations to previously undeveloped areas of the state, thereby increasing potential devastation if a future event impacts these newly developed areas. A statewide approach to watershed management will allow the state to balance the needs of all residents and to allocate funds most effectively considering development patterns and flood risk levels.

VII. B. ALLOCATION OF FUNDS

The state allocates resources towards two programmatic arms (1) the LWI and (2) Non-Federal Cost Share Assistance. Associated program areas and costs are described in **Table 10**.

Table 10. CDBG-MIT Program Budget

Programs		
Watershed (Local and Regional) Projects and Programs	$570,666,243	47%
State Projects and Programs	$327,757,590	27%
Non-Federal Cost Share Assistance	$96,988,107	8%
Watershed Monitoring, Mapping, and Modeling	$145,670,040	12%
Administrative Costs	$48,556,680	4%
Watershed Policy, Planning, and Local Capacity Assistance	$24,278,340	2%
Total Allocation	**$ 1,213,917,000**	**100%**

It is important to note that FR-6109-N-02 defines a "covered project" as an infrastructure project having a total project cost of $100 million or more, with at least $50 million of CDBG funds (regardless of source (CDBG–DR, CDBG–NDR, CDBG–MIT, or CDBG)). The state does not currently contemplate any individual projects that meet the definition of a Covered Project. Should the state choose to use CDBG-MIT funds on a Covered Project, use of these funds will be outlined in a future Substantial Action Plan Amendment.

VII. C. THE LOUISIANA WATERSHED INITIATIVE

The LWI is the state's most recent effort to shift toward a more sustainable, proactive, and holistic approach in how it considers its complicated relationship with water. The Coastal Master Plan has led the way in developing a science-based approach to consider coastal surge flood risk. More recently, LA SAFE used the Coastal Master Plan's forward-thinking, 50-year approach to flood risk, while also integrating FEMA Flood Insurance Rate Map (FIRM) data to visualize flood risk holistically, to work directly with coastal communities to envision future land uses and development patterns based on expected risks. The LWI builds on the progress made within both programs, taking a statewide approach to watershed-based floodplain management that will reduce flood risk vulnerabilities through pre-disaster mapping, modeling, and watershed management planning – backed by large-scale implementation of projects and programs that directly mitigate identified risks.

The LWI's approach relies on a multi-faceted process (1) develop a data-driven understanding of how water naturally moves throughout the state, and how that natural movement of water correlates with the state's riverine, flash flood, and surge risks; (2) use best available science as an educational and coalition-building tool leading to the development of watershed management plans locally, regionally, and statewide, redefining how Louisiana uses flood risk data to inform development decisions through both capital investments as well as new policy and programmatic initiatives; and (3) provide incentives and resources promoting shared responsibility amongst local, regional, and state-level decision-makers through direct investment in projects, policies, and programs informed by the LWI's approach to watershed management.

The LWI science-based approach is rooted in the production of statewide dynamic watershed models that will form the foundation of watershed management plans and strategies. The LWI also focuses on collaborative decision-making in order to enable local leaders within a watershed to most effectively manage flood risk beyond the limits of political jurisdictions. As evidenced by the Great Floods of 2016, water knows no boundaries, and decisions made in one jurisdiction inevitably impact other jurisdictions within a shared watershed.

The projects and programs enumerated in this AP and implemented through the LWI will serve as a

catalyst to enable Louisiana's communities to mobilize a massive strategic effort to reduce flood risk and advance long term resilience. Efforts of the LWI will continue beyond the expenditure of these funds and represent a multi-agency and multi-jurisdictional collective endeavor to align efforts toward flood control and improve development patterns to avoid future flood losses.

The LWI's approach is consistent with best practices in regional floodplain management and the EPA's Watershed Approach Framework to reduce flood risk. Further, the LWI's approach will prioritize collaboration between technical experts and decision-makers representing different facets of state and local government and utilize a diverse array of subject matter experts to most effectively leverage efforts. Finally, the LWI has employed a unified management structure operating through a Council on Watershed Management charged with goal setting and developing measurable criteria to examine program impacts, as well as oversight of the effort. This approach enables consistent execution throughout all of the LWI's efforts.

The Council on Watershed Management (Council)

In May 2018, Governor John Bel Edwards issued Executive Order JBE 18-16, which directed the Secretaries and Executive Directors of the OCD, DOTD, CPRA, GOHSEP, and LDWF to operate in collaboration as the Council on Watershed Management. The Council's goals include:

1. Promoting a unified effort, built on a solid foundation of scientific and engineering principles, to address flooding issues across the state;
2. Identifying and working with or seeking input from additional local, state and federal agencies and other stakeholders including not-for-profit research institutions, university research institutions, state agencies, federal agencies, drainage or levee boards and other local districts, and private sector experts to develop, implement and evaluate the necessary components of a Louisiana Watershed-based Floodplain Management Program;
3. Expanding, developing and using in-state skill, knowledge, technology and talent to develop and implement the program, promoting Louisiana resources through collaboration, communication, and cooperation among governmental, non-governmental, for-profit, non-profit and university entities;
4. Increasing state and local resilience to flooding by working to reduce the incidence of flooding, reduce damages from flooding, improve response to flooding, and reduce the amount of time needed to recover from flooding;
5. Promoting actions, including legislative, administrative, and regulatory, where appropriate, to enhance watershed and floodplain management in Louisiana;
6. Identifying, prioritizing, acquiring and establishing funding mechanisms to enhance the Louisiana Watershed-based Floodplain Management Program;
7. Facilitating watershed-based floodplain management by working to create watershed-bounded entities across the state; and
8. Developing an approach to watershed-based floodplain management that is recognized as a model for others nationally and internationally.

Regional Steering Committees and Coalitions

Commensurate with the LWI's outreach, engagement and planning goals, regional (parish and local) stakeholders are working to establish Regional Steering Committees that will provide input in the development and implementation of longer-term regional watershed governance structures (i.e. coalitions), watershed management plans, and the implementation of projects, programs, and policies

emanating from those planning efforts.

Regional involvement, consistent approaches to mitigation activities, and collaboration is a driving principle of the LWI. To that end, the LWI will include technical assistance to municipal and regional entities, watershed mapping and modeling, the formulation of regional watershed management plans, and the organization of regional coalitions driven by regional steering committees (in the near-term) and formal management boards or coalitions long-term. The goal of the regional component of the LWI is to enhance the ability of regions to collaborate to consistently (and collectively) raise development standards and mitigate unforeseen negative impacts of potential flood control interventions to neighboring regions. Further, the formation of regional steering committees and coalitions will provide a more sustainable institutional basis to improve flood resilience in an ongoing effort that will outlast specific event-related funding allocations.

The establishment of these regional steering committees benefits from a robust outreach process, wherein the Council solicited the consultation of local governments in impacted areas in order to guide the composition of the steering committees. Consulted local stakeholders and consulted experts' feedback emphasized the importance of membership on these committees that includes a mix of watershed professionals (engineers, floodplain managers, soil and conservation board members, etc.). This input also contended that steering committees must include community representatives, including citizen participants with backgrounds in diverse fields such as nonprofits, business, or social services or with strong ties to social institutions within the region. Finally, guidance on the establishment of these steering committees specifies that the makeup of the committees should reflect the demographic diversity and a spectrum of interests within the region.

Timeline

The state's efforts towards a coordinated approach to flood risk management is summarized below:

1. In 2014, the Louisiana Legislature embarked on an investigation into the alignment of flood protection authorities within watershed boundaries[78]. This initiated a legislative dialogue regarding the need for comprehensive floodplain management, which has been emphasized by legislators[79] [80];
2. The Great Floods of 2016 further emphasized an urgent need for watershed-based collaboration. Shortly following this event, the State of Louisiana initiated a number of coordinating efforts among state agencies and regional stakeholders to address this need;
3. In 2017, the state began to undertake initial watershed modeling efforts and initiated a Phase I – Investigation to determine a process to develop a statewide watershed-based floodplain management program. Additional information on the LWI's Phase I Report can be found at https://watershed.la.gov/resources;
4. In May of 2018, Governor Edwards signed Executive Order JBE 18-16, which created the Louisiana Council on Watershed Management. Following this, the Council initiated Phase II – Implementation of the LWI and engaged with technical experts to inform such efforts.
5. In late 2018 and early 2019, the Council conducted a series of outreach and engagement events, including a "Statewide Listening Tour," a "Best Practices Interstate Summit," and attendance at numerous speaking engagements;

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[78] Louisiana Legislature. Senate. *Senate Concurrent Resolution 39*. 2013 regular session.
[79] Louisiana Legislature. Senate. *Senate Resolution 172*. 2017 regular session
[80] Louisiana Legislature. House of Representatives. *Louisiana House Bill 614*. 2018 regular session.

6. In August 2019, as a result of extensive outreach and engagement efforts, the Council recognized statewide provisional watershed regions to enable successful implementation and coordination of LWI program activities (**Figure 20**). More information on watershed region boundaries and how they were determined can be found online at watershed.la.gov and **Appendix E** of this AP.
7. The state agencies will continue implementing a statewide outreach and engagement strategy to inform policy and program development not only for the funding within this AP, but for programs and projects across the state implemented by participating LWI agencies.

Figure 20. LWI Provisional Watershed Regions

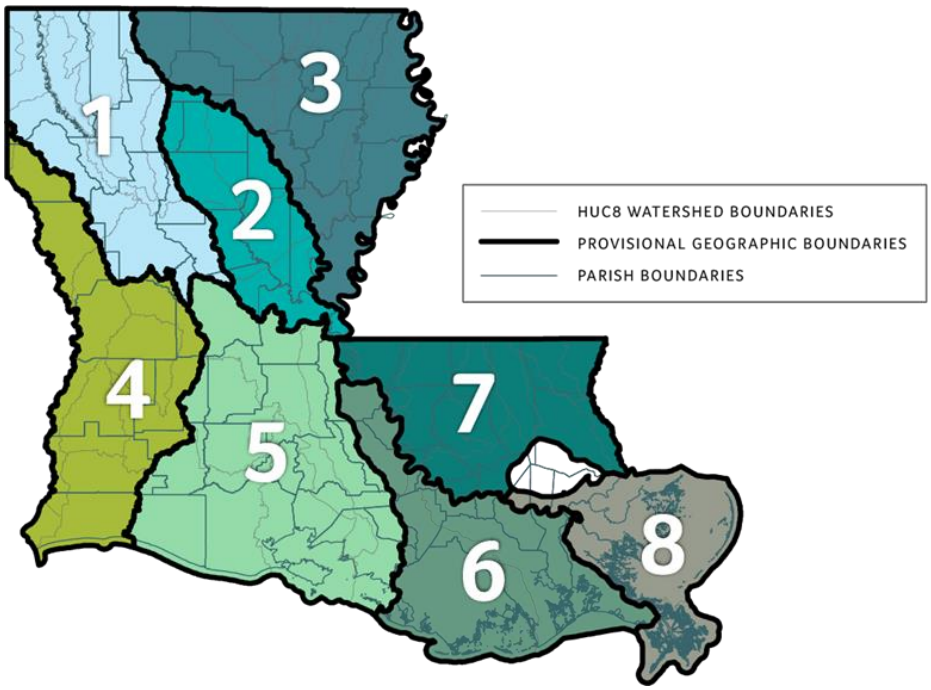
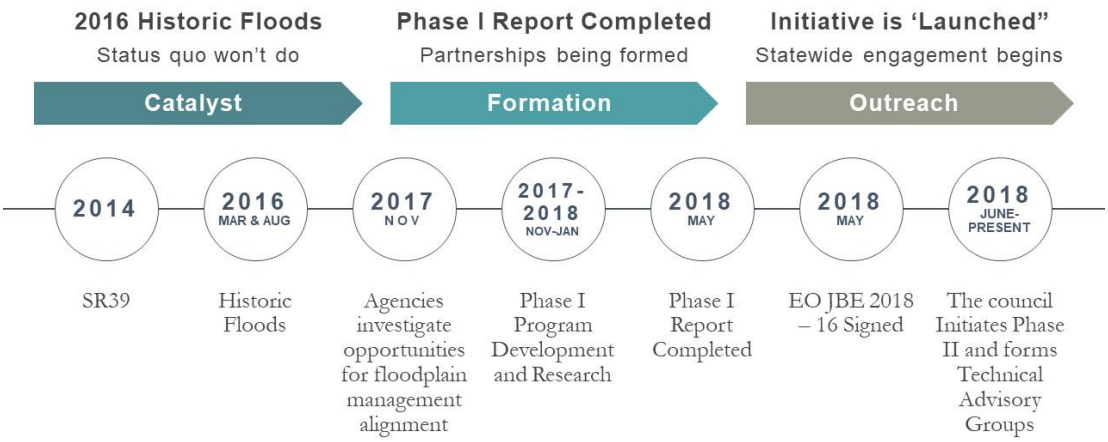


Figure 21. LWI Timeline



VII. D. LWI PROGRAM AREAS

The respective LWI program areas under this CDBG-MIT grant include:

1. Watershed (Local and Regional) Projects and Programs;
2. State Projects and Programs;
3. Watershed Monitoring, Mapping and Modeling; and
4. Watershed Policy, Planning and Local Capacity Assistance.

Program Area No. 1: Watershed (Local and Regional) Projects and Programs

Program Area	Allocation	% of Grant
Watershed (Local and Regional) Projects and Programs	$570,666,243	47%

Eligible Activities:	All eligible activities defined in HCDA 105(a) 1-25
National Objectives:	LMI and Urgent Need Mitigation

SUMMARY & USE OF FUNDS

As local, regional and state governments and organizations work through the LWI toward regional, watershed-based coordination and as the LWI develops datasets and modeling tools to inform watershed management policy and project mitigation activities (see Program Areas 3 and 4 in this Section for more detail), the LWI will provide funding and assistance to local and regional organizations to implement identified projects and programs with demonstrable and quantifiable mitigation outcomes. These projects and programs may include, but are not limited to, direct physical improvements to the watershed, ecological and waterway restoration projects, code enforcement activities, floodplain/floodway easements, and strategic land acquisitions and other projects that demonstrably enhance the storage and ecosystem capacity of the land and water systems within the state's respective watersheds.

The program will primarily provide funding on a regional (watershed) basis for local governments or legally authorized regional governments to apply on a regional competitive, state-wide competitive, and/or regional allocation-based grant for planning, acquisition, infrastructure, code enforcement, public services, buyouts and housing activities related to resettlement, economic development and/or other public facilities projects that increase resilience to floods on a watershed level. Local governments, working with their regional partners through the framework of watershed management entities, will be responsible for identifying and prioritizing the programs and projects to submit for funding opportunities that result in demonstrable flood mitigation. Some examples of programs or projects may include, but are not limited to:

1. Watershed restoration and preservation, flood mitigation of critical facilities and infrastructure, nonstructural mitigation, stormwater management, and other innovative/replicable flood control activities;
2. Elevation, buyout or acquisition of floodplain easements in strategically located flood abatement areas or existing developments located in repetitive loss areas;
3. Voluntary relocation projects enabling residents to move out of high flood risk areas;
4. Major capital projects that improve resilience to flooding, provide regional stormwater detention, or other flood protection measures;
5. Capacity building toward implementation of resilient development standards and floodplain management regulations;
6. Housing developments using sound, resilient construction practices to mitigate long-term flood risk;
7. Training and certification in resilient building methods;
8. Training and apprenticeship programs to educate elementary, secondary, and post-secondary students in watershed data collection, modeling, and resilient best practices; and

9. Any other relevant projects and programs developed through the LWI's watershed modeling, statewide planning, and regional planning efforts.

GEOGRAPHIC ELIGIBILITY

Watershed regions including any LA or HUD MID as defined in this AP.

ELIGIBLE APPLICANTS

This program is designed for implementation through units of local government and/or local and regional coalitions. However, specific program elements may require different methods of distribution via subrecipient and other agreements between units of local government and/or local and regional coalitions and other entities carrying out program elements. Therefore, the following entities may be eligible for a grant award as part of this program:

1. State of Louisiana government agencies;
2. Units of local or regional government;
3. Institutions of higher education;
4. Private non-profit organizations;
5. Private land owners (for buyout and/or nonstructural mitigation activities); and/or
6. Other entities serving as subrecipients to the state.

METHOD OF DISTRIBUTION

This program is to be implemented in three distinct "rounds". Round I will provide an initial allocation of resources to units of local government and/or units of local government who have formed local and regional coalitions in alignment with watershed boundaries. This initial pool of Round I funds is designed to incentivize units of local government to develop and implement programs and projects that actively consider flood risks through a watershed-based approach and to incentivize units of local government to organize as local and regional coalitions, with the dual goals of (1) developing and implementing high impact demonstration projects that benefit watersheds across traditional jurisdictional lines and (2) developing long-term strategies that utilize a watershed-based approach to reduce identified flood risks. The state anticipates that regional coalitions and local governments or local public entities will act as partners in the implementation of this program. These strategies are to be informed by the development of a statewide watershed plan, as well as information made available through the *Watershed Modeling, Mapping and Monitoring Program*.

Rounds II and III of the Local and Regional Program are designed to be implemented after units of local government have formed coalitions and have completed regional planning activities. Round II will make strategic investments on a competitive or noncompetitive basis to implement programs and projects described in regional watershed strategies and are demonstrated to have maximal beneficial impacts to watersheds and watershed regions, with a specific emphasis placed on flood-risk reduction activities as evidenced by watershed models as they are available. Rounds II and III will enable project enhancements based on watershed model output. Round III will award the remaining program funding on a competitive basis to implement flood-risk reduction projects justified by fully completed watershed models and will incentivize the adoption of resilient policies on a regional basis. These three rounds are described in **Table 11**.

Table 11. Watershed (Local and Regional) Projects and Programs Funding Rounds

Round	Approx. Launch Date	Funding Level
I	Upon Receipt of Grant	$100,000,000
II	2022 or Earlier	$200,000,000
III	2024 or Later	$270,666,243

Projects and programs will be awarded through one or more competitive notices of funding availability or NOFAs for regional competitive, state-wide competitive and/or regional allocation-based grant opportunities. Selection criteria and procedures will be outlined within the program's policies and procedures. Criteria may include, but are not limited to, cross-jurisdictional collaboration, demonstration of best flood-risk mitigation practices, cost effectiveness, number of households benefitted (showing anticipated 1% AEP impact decreased), use of green and blue-green infrastructure technologies and techniques, use of passive and/or low-maintenance interventions, use of the natural and beneficial functions of a watershed, benefit to critical services and infrastructure, and benefits to vulnerable populations, including LMI populations.

Awards from Rounds II and III will benefit from the outputs of the *Watershed Monitoring, Mapping and Modeling* program, specifically that of predictive watershed modeling tools and enhanced data collection capabilities. Awards made through this program must also be consistent with statewide and regional watershed management plans developed through the *Watershed Policy, Planning and Local Capacity Assistance* initiative and will benefit from technical assistance and capacity building opportunities within this program area.

MAXIMUM AWARD AMOUNTS

Specific criteria regarding maximum awards – including exceptions criteria – will be incorporated in the program's policies and procedures. The state will adopt policies and procedures governing maximum award amounts, describe how it will communicate the maximum amounts and any exceptions, how it will analyze the circumstances when an exception is needed and how it will demonstrate that cost of providing assistance is necessary and reasonable. The state will also make exceptions to the maximum award amounts when necessary to comply with federal accessibility standards or to reasonably accommodate a person with disabilities.

Program Area No. 2: State Projects and Programs

Program Area	Allocation	% of Grant
State Projects and Programs	$327,757,590	27%

Eligible Activities:	All eligible activities defined in HCDA 105(a) 1-25
National Objectives:	LMI and Urgent Need Mitigation

SUMMARY & USE OF FUNDS

Following the Great Floods of 2016, the state identified numerous projects and/or programs that are necessary for immediate implementation of a more comprehensive flood mitigation strategy. In these cases, the state – through the LWI – will award projects, as selected through a non-competitive process for immediate implementation. These projects and programs must align with the LWI's approach to

comprehensive statewide and regional watershed management focused on four dimensions: (1) evidence-backed flood control projects, (2) innovative floodplain management, (3) public education and (4) changing development patterns. The seven general program and/or project types are discussed and presented in more detail below:

Program Area	Allocation	% of State Identified Projects and Programs Funding
Regional Retention/Detention, Large-Area Buyouts and Traditional Nonstructural Mitigation, Resilient Affordable Housing, Remote Lands Purchase and Critical Facilities and Infrastructure Projects	$312,757,590	95%
Flood-Ready Jobs and Resilience Gap Financing Programs	$15,000,000	5%

1. **Regional Retention/Detention Projects**
   Increasingly, Louisiana experiences high-intensity rainfall events leading to localized flash and riverine flooding. In response, the state will use predictive watershed modeling to identify areas with maximum potential to detain and retain water capacity, as well as to identify strategically located, critical sites that provide beneficial natural functions or are otherwise in need of preservation. These projects may include the creation or restoration of wetland functions, the improvement or enhancement of components of the states' water conveyance infrastructure, and/or the preservation of certain areas. In selecting regional retention/detention projects, the state will emphasize best practices in flood control and techniques with a documented history of effectiveness. In many instances, the installation of a regional retention/detention project or the preservation of a critical area or habitat can also serve a public education purpose, allowing the public to observe how retention, detention, and/or wetland areas function to reduce flood impacts.

2. **Large-Area Buyouts and Traditional Nonstructural Mitigation**
   The state will conduct large-area buyouts (on the block or neighborhood scale) for families within repetitive loss areas, areas subject to moderate or high flood risk and/or within FEMA designated floodways. Such buyout programs will include provisions for community-oriented assistance to homeowners in order to facilitate a successful transition to a location of lower flood risk outside of SFHAs. Where feasible, relocations will be outside of 0.2% AEP flood event areas or mitigated to the 0.2% AEP flood standard. Property acquired through program buyouts will be restored to natural floodplain conditions and may be further enhanced through the use of blue and green infrastructure. In order to preserve communities that, for reasons of geography or natural resource dependence, cannot relocate to <0.2% AEP flood event areas and maintain important social and cultural standards, the state may also administer residential elevations or other traditional nonstructural flood risk mitigation activities. The state will administer residential elevations justified by cost-benefit and cost reasonable analyses relative to other mitigation measures and the results of watershed modeling. This program will prioritize project funding that benefits low- to moderate-income residents and uses predictive watershed modeling to produce measurable reductions in residents' exposure to flood risk.

3. **Resilient Affordable Housing Program**
   Many Louisiana parishes face a vulnerability crisis, wherein low- and very low-income residents are located in detached housing or public housing units subject to significant flood risk. These residents may also be at increased risk during a flood event due to limited options and means to enable their evacuation and recovery. This program would allocate funding to Public Housing Authorities or allocate funding in combination with other leveraged funding sources to developers in eligible areas to construct new housing units that are constructed to withstand the 500-year (0.2% AEP) flood event or are in areas outside of the 500-year floodplain (0.2% AEP risk), thereby enabling affordable housing supply to meet the demands of the low- and very low-income residents in the area subject to significant flood risk. This program will prioritize project funding that benefits LMI residents and reduces the need for the provision of critical services in emergency response and recovery operations.

4. **Remote Lands Purchase Program**
   Many parishes and municipalities have "paper subdivisions" or land that was subdivided or platted with the intent to develop a residential subdivision, but such development has not occurred to-date and is unlikely to occur in the future. In many instances, these sites are owned separately by many owners that further prevents future development of the land. Similarly, many parishes contain sites that lack direct access to an improved street, municipal water infrastructure and/or a municipal sewer system and would be prohibitively expensive to improve (identified herein as "remote lands"). Both "paper subdivisions" and "remote lands" pose a challenge to municipal government and their owners, as they are difficult to maintain and incur limited property tax income. Further, these lots may feature clouded titles or may be transferred without the future owner having full understanding of their limited potential for development.

   The state will offer technical assistance to parishes in order to identify and purchase "paper subdivisions" and "remote lands" that serve as retention areas or are at substantial flood risk. The state will collaborate with the parishes to produce clear titles of such sites and arrange a voluntary acquisition of the land, transferring its ownership to the parish. An optional aspect of this program would be to fund minimal improvements to such sites in order to enhance the sites' natural retention functions and to install green infrastructure or natural riparian vegetative features in order to enable cost-effective long-term maintenance.

5. **Critical Facilities and Infrastructure Program**
   Critical facilities such as hospitals, nursing homes or assisted living facilities, fire stations, police stations, emergency shelters, evacuation routes and infrastructure providing water, sanitation, and power services must be able to withstand higher-magnitude events beyond 1% AEP floods. Many existing critical facilities serving Louisiana residents are currently at significant flood risk, thereby inhibiting emergency management procedures and delaying service continuity following a flood event. Using models created through the LWI, the state will analyze the impacts of potential sustained rainfall and multi-day tropical cyclone events and use such predictive data to (1) update state and local emergency response plans and (2) construct, retrofit and mitigate critical facilities to a minimum standard accounting for 0.2% AEP floods, thereby enabling continued functionality of infrastructure providing critical services under a range of scenarios.

   Projects funded under this program may present opportunities to reduce the potential for future flood damage through retrofits that conserve, restore or enhance their systems and/or that incorporate natural systems and proven flood mitigation techniques into developed areas to

manage stormwater on-site. This program will utilize evidence-based techniques, watershed modeling and green infrastructure concepts to improve flood resilience at each site. Further, where practicable, these projects will provide a public education function as they illustrate best practices in stormwater and floodplain management techniques.

6. **Flood-Ready Jobs**

   There is an opportunity within Louisiana to enhance the skill set of various professional disciplines to enable more resilient building practices. Training and certification programs in pier/piling foundation installation, home elevation, V-zone or coastal construction methods, green infrastructure design/installation/maintenance, riparian conservation, retention pond construction methods, dry-floodproofing methods would enable developers, building/site designers, contractors or builders to offer a larger portfolio of resilient construction techniques. Training and certification programs in flood risk analysis, GIS, and land use issues could also enhance the technical expertise of real-estate, surveying/mapping, and engineering professionals. Further, few primary and secondary schools offer a curriculum that prepares students to enter resilience-based careers or that equips students with the skills necessary to navigate the real estate market in a flood-prone region. The cultivation of these resilient skills among the workforce in Louisiana is critical to enabling more resilient development patterns and reducing risk to future homeowners.

   Through this initiative, the LWI will create a workforce education program to provide training, licensing, business-incubation, business loans, and apprenticeship programs to developer, construction, real-estate, surveying/mapping and engineering professionals in order to produce the next generation of resilience professionals. This program will also provide scholarships for higher education in resilience programs and funding for the development of curricula in primary and secondary schools on resilience and water-management topics. This program aims to shift development patterns in Louisiana toward a more resilient standard by training professionals to use resilient methods and to use data to assist homebuyers and land owners in making better decisions with respect to resilience.

7. **Resilience Gap Financing**

   Many land development professionals cite increased cost as an impediment to constructing buildings and developments using flood-resilient methods and—when implemented—often pass these costs onto future homeowners, which reduces affordability of existing and future resilient housing stock. As a result of this consideration, housing stock currently constructed in Louisiana is generally not constructed to mitigate for future flood risk or is priced too high for LMI populations. This is an urgent challenge, as new structures developed without flood-resilient methods may put residents at risk in the future and may incur substantial flood damage costs if development practices within the state are not substantially improved. Similarly, higher costs associated with resilient housing stock may perpetuate social inequity, wherein LMI populations must choose to live where it is affordable, which is often within housing not resilient to flood risk and located in a SFHA.

   Through this initiative, the LWI will launch a resilience gap financing program providing grants and loans to developers in the amount equivalent to the gap between typical construction methods and resilient construction methods (such as those utilizing freeboard, elevation, green infrastructure, permeable pavement, open-pier foundation styles, zero fill, and/or mitigation to the 0.2% AEP flood standard) and thereby enable the construction of affordable single- and multi-family housing stock within the state using flood-resilient methods.

GEOGRAPHIC ELIGIBILITY

Any watershed region containing a LA or HUD MID as defined in this AP.

ELIGIBLE APPLICANTS

This program is designed for implementation through various state agencies. However, specific program elements may require different methods of distribution via subrecipient and other agreements between state agencies and other entities carrying out program elements. Therefore, the following entities may be eligible for a grant award as part of this program:

1. State of Louisiana government agencies;
2. Units of local or regional government;
3. Institutions of higher education;
4. Private non-profit organizations;
5. Private land owners (for buyout and/or nonstructural mitigation activities); and/or
6. Other entities serving as subrecipients to the state.

METHOD OF DISTRIBUTION

Projects will be selected based on criteria and procedures will be outlined within the program's policies and procedures. Criteria may include, but is not limited to, demonstration of best flood-risk mitigation practices, use of green and blue-green infrastructure technologies and techniques, impacts positively benefitting the natural functions of a watershed, and benefits to vulnerable populations, including low- and moderate-income populations.

MAXIMUM AWARD AMOUNTS

Specific criteria regarding maximum awards – including exceptions criteria – will be incorporated in the program's policies and procedures. The state will adopt policies and procedures governing maximum award amounts, describe how it will communicate the maximum amounts and any exceptions, how it will analyze the circumstances when an exception is needed and how it will demonstrate that cost of providing assistance is necessary and reasonable. The state will also make exceptions to the maximum award amounts when necessary to comply with federal accessibility standards or to reasonably accommodate a person with disabilities.

Program Area No. 3: Watershed Monitoring, Mapping and Modeling

Program Area	Allocation	% of Grant
Watershed Monitoring, Mapping and Modeling	$145,670,040	12%

Eligible Activities:	HCDA Section 105(a)1-2, 8-9, 11, 12, 21
National Objectives:	LMI, Urgent Need Mitigation, and/or N/A (Planning)

SUMMARY & USE OF FUNDS

This program addresses the unmet mitigation need for watershed data and modeling, and will enable long-term flood resilience, more targeted flood control project selection and regional coordination along watershed boundaries. This program can also be anticipated to reduce the need for disaster response and enhance such response efforts when deployed, aid in the provision of critical lifelines and enable a demonstrable reduction in flood risk within Louisiana, in the following ways:

1. Enable strategic decision-making in flood or disaster preparation and response scenarios based on projected water elevation and inundation. Examples of this include using the H&H models to plan evacuation routes, evacuation or closure of hospitals and medical facilities, and estimate shelter needs based on a given flood scenario;
2. Enable the analysis and prioritization of structural and nonstructural flood control projects;
3. Illustrate the benefits of implementing policy changes to foster more resilient development;
4. Enable resilient infrastructure design;
5. Enable businesses and industrial facilities to implement flood-proofing or resilient site design;
6. Enable local leaders within a given watershed to work from the same set of hydrologic assumptions, thereby enabling consensus;
7. Empower homeowners and residents to understand their flood risk profile under different weather and climate scenarios; and
8. Predict runoff and/or drainage impacts to avoid ecosystem disruption by flood control projects or other types of projects.

Through the LWI, the state is committed to working with local, state, and federal agencies and stakeholders to develop and implement a statewide, watershed-based approach to floodplain management that builds on existing or planned local, state, and federal capital investment in data collection and modeling. At the heart of this approach is informed decision-making that requires best available scientific data. Consequently, it is imperative for there to be detailed, accurate, dynamic, upgradable, accessible and consistent mapping and modeling that allows the state, regional and local governments and private industry to make smart immediate, intermediate, and long-term decisions related to development, investment in structural and nonstructural infrastructure, land-use decisions, and other public and private mechanisms for investment.

Under this program, funding will be provided to state, regional and/or local entities for those activities associated with the acquisition and/or monitoring of data necessary for obtaining a comprehensive set of hydraulic and hydrologic models for all watersheds that fall within Louisiana, to include those watersheds whose borders extend into the neighboring states. As described within this AP's risk assessment, Louisiana's watersheds are integrally connected, irrespective of political boundaries. In order for these models to work as useful tools for decision-making and project design and in order to ensure projects implemented in one jurisdiction do not have adverse effects elsewhere, it is critical to develop a consistent set of statewide models. Examples of such activities include, but may not be limited to:

1. Acquisition, installation and/or monitoring of river gauges in those currently under-monitored and unmonitored areas, as well as the time and effort related to the operation, monitoring, collection and review of data from the gauges;
2. Activities necessary for obtaining updated LIDAR, conducting surveys of waterway crossings and/or other data collection activities necessary for the development of useful mapping and modeling;
3. Acquisition of easements and/or rights of way may be required in order to establish and monitor the data points;
4. Development of hydraulic and hydrologic modeling across the state and potentially in neighboring states, to include modeling in those parishes and/or counties where activities have a direct impact on flood risk in one or more of the LA or HUD MIDs for the purpose of this AP;
5. Website and public data portal development, launch and interim maintenance until transitioned to final agency(ies) responsible for maintaining dataset(s);
6. Modernization and/or collection of parish or municipal data for use in modeling or flood risk

reduction data purposes, such as property assessment data, structure survey data, or land survey/title data;
7. Wetlands, natural functions, and habitat mapping; and
8. In conjunction with the development of the models, provision of technical assistance and training to various technical levels of end user.

As the state works with local, state and federal partners to carry out the activities described above, the state may identify other data and/or information gaps necessary for the generation of watershed-based plans, modeling and/or mapping.

GEOGRAPHIC ELIGIBILITY

Watersheds inclusive of or directly impacting flood risk in one or more of the LA or HUD MID parishes defined within this AP.

METHOD OF DISTRIBUTION

Through the LWI, the state will conduct a coordinated review and recommendation process, working with a variety of stakeholder groups, including federal, state, regional, and local governments, non-governmental organizations and academic institutions and their applied sciences professionals to identify entities best positioned to carry out assigned tasks, as well as entities with the expertise and capacity to retain and maintain datasets and findings developed through this program.

Subrecipients for these funds will be selected based on their technical expertise and the considerations of the watershed region(s) they serve, based on a framework wherein parish and municipal leaders and regional stakeholders participate in the collective management of a watershed region.

Professional services to complete different pieces of data aggregation, review and/or modeling will be competitively procured by the state or its subrecipients, with whom the state will enter into Cooperative Endeavor Agreements (CEAs). Subrecipient agreements and budgets will be determined through a combination of project scoping, competitive procurement processes, and demonstrations of actual costs to ensure cost reasonableness requirements are met.

MAXIMUM AWARD AMOUNTS

No person, household or business will be eligible to receive direct benefits through this program.

Program Area No. 4: Watershed Policy, Planning and Local Capacity Assistance

Program Area	Allocation	% of Grant
Watershed Policy, Planning and Local Capacity Assistance	$24,278,340	2%

Eligible Activities:	HCDA Section 105(a) 8-9, 12, 21 Administration Costs, defined at 24 CFR 570.205 and 570.206 and any applicable waivers or alternative requirements
National Objectives:	LMI, Urgent Need Mitigation, and N/A (Planning and Administration)

SUMMARY & USE OF FUNDS

While different levels of capacity and integration exist in various agencies and regions of the state, these entities are not currently coordinated on a regional watershed basis and their activities and authorities are often circumscribed within the boundaries of a single parish or municipality. State and local agencies, communities, and stakeholders must collaborate, organize, and make decisions on a watershed basis in order to plan for and manage water and flood events effectively.

Through this program, the state will partner with federal, state, local agencies and experts, as well as private industry, to complete an assessment of state, regional, and local programs, as well as to offer technical assistance, educational and capacity building support services to state agencies, local governments, non-profit organizations, planning and development organizations, chambers of commerce, and other public-serving agencies and organizations in order to encourage the alignment of effort across watersheds to promote the LWI's approach to watershed management. This technical assistance will also facilitate the establishment of coalitions among parishes and municipal governments – based on watersheds – to implement regional policies and projects funded through other programs within this grant.

Many existing state, regional and local organizations have limited experience or capacity related to watershed-specific issues, such as floodplain policy development and implementation, or related to analyzing impacts of floodplain policies on local and regional economies, natural and built environments, and wildlife and fisheries. Under this program, the LWI will coordinate extensive public engagement, training, and research, and ultimately, will develop informed and collaborative policies and planning tools. This program area includes three specific elements: technical assistance, development of statewide and regional watershed management plans, and administration. Each element is briefly described below.

TECHNICAL ASSISTANCE: FLOOD INSURANCE AFFORDABILITY AND POLICY IMPLEMENTATION

Rising flood insurance costs threaten the cohesiveness of many Louisiana communities as residents are "priced out" of their homes where flood insurance coverage is required as a condition of their mortgage. On a broader scale, rising NFIP premiums pose a threat to local economies and real-estate markets, as properties gradually lose their resale value as flood risks become more pronounced. Participation in the Community Rating System (CRS), including the implementation of higher regulatory floodplain standards, is an effective tool to mitigate the impact of rising flood insurance costs. However, many flood-prone communities do not participate in CRS due to the significant administrative capacity required to manage the program.

To lessen this financial burden on residents or buy down the cost of flood risk, this program will leverage land use planning and/or hazard mitigation planning activities to support the adoption and implementation of modernized building codes and policies at local, regional, and state scales. These activities mitigate the cost of current and future flood risk by accumulating discounts on existing flood insurance policies for CRS participating communities, while also lessening the impacts of future disasters on new construction built in accordance with higher standards.

Building on prior state efforts to identify potential opportunities to increase parish and municipalities' participation in the CRS program, this initiative will fund technical assistance to parishes and municipalities for staffing, training, and inspection/enforcement activities to most effectively administer

local participation in NFIP and fully participate in the CRS program. This program will also provide funding and assistance to design, track, and implement CRS strategies on a regional basis (examples of this would be regional open-space mapping, digitizing of elevation and compliance records, and public outreach). Finally, this program will provide assistance to parishes or municipalities who do not currently participate in CRS to incentivize participation.

TECHNICAL ASSISTANCE: OUTREACH AND ENGAGEMENT, PROGRAM ASSESSMENT AND RESEARCH

This program element will enhance situational awareness and develop skills necessary for units of local government to create and implement regional watershed management plans and decision-making processes. The LWI will engage state agencies and units of local government, and other stakeholder groups as needed, to assess current policies and practices and to incorporate watershed-based decision-making into existing programs and practices, to identify redundancies and conflicting policies and practices, and to develop strategies for maximizing resources.

In order to achieve this, the LWI will coordinate research and data collection necessary for understanding the impacts of current policies, as well as potential impacts from proposed policies and practices on local, state, and national economies, built and natural environments, society and culture, and other critical environmental, social, political and/or economic factors. This may include but is not limited to training activities specific to implementation of best watershed management practices, assistance with implementation of mitigation strategies (including those eligible for credit within the CRS program, program evaluation, and ongoing monitoring of projects and programs.

In addition to assistance on a local or regional administrative level, this program will feature outreach and engagement to residents and students of all education levels to enhance public understanding of flood risk and resilience concepts, with the intent to nurture the next generation of resilience professionals and foster long-term support for sound development practices and consumer decisions.

DEVELOPMENT OF STATEWIDE & REGIONAL WATERSHED MANAGEMENT PLANS

Drawing on lessons learned from past planning and implementation processes, including the Coastal Master Plan and LA SAFE, the LWI will lead the development of statewide and regional watershed management plans or strategies. This effort will emphasize the incorporation of a variety of perspectives from all levels of people, industry, and communities impacted by plans or policies related to watershed management practices. These perspectives will be incorporated into statewide and regional products that can be used and implemented by units of local government and practitioners in coordination with the implementation of hazard mitigation, floodplain management and emergency response.

GEOGRAPHIC ELIGIBILITY

Watersheds and watershed regions including a LA or HUD MIDs as defined in this AP.

ELIGIBLE RECIPIENTS

The following entities may be eligible for a grant award as part of this program:

1. State of Louisiana government agencies;
2. Units of local or regional government;
3. Institutions of higher education;
4. Private non-profit organizations; and/or

5. Other entities serving as subrecipients to the state.

METHOD OF DISTRIBUTION

Application procedures and maximum awards for technical assistance and planning activities will be further detailed in program policies and procedures.
Subrecipients for these funds will be selected based on the considerations of the watershed region(s) they serve, based on a framework wherein parish and municipal leaders and regional stakeholders participate in the collective management of a watershed region.

Professional services to complete technical assistance and planning activities on behalf of the LWI will be competitively procured by the state or its subrecipients, with whom the state will enter into CEAs. Subrecipient agreements and vendor budgets will be determined through a combination of project scoping, competitive procurement processes, and demonstrations of actual costs to ensure cost reasonableness requirements are met.

MAXIMUM AWARD AMOUNTS

No person, household or business will receive direct benefits through this program.

VII. E. ADMINISTRATIVE COSTS

Program Area	Allocation	% of Grant
Administrative Costs	$48,556,680	4%

Eligible Activities:	HCDA Section 105(a) 8, 12, 21 Administration Costs, defined at 24 CFR 570.205 and 570.206 and any applicable waivers or alternative requirements
National Objectives:	LMI, Urgent Need Mitigation, and N/A (Planning and Administration)

SUMMARY & USE OF FUNDS

Costs necessary for the general administration of the LWI, to include but not be limited to the state's and subrecipients' time administering programs, compliance and monitoring of the state's subrecipients, vendors and other recipients of funding and other costs specified as eligible administrative expenses in 24 CFR 570.206.

GEOGRAPHIC ELIGIBILITY

Watersheds and watershed regions including a LA or HUD MIDs as defined in this AP.

ELIGIBLE RECIPIENTS

The following entities may be eligible for a grant award as part of this program:

1. State of Louisiana government agencies;
2. Units of local or regional government;
3. Institutions of higher education;
4. Private non-profit organizations; and/or

5. Other entities serving as subrecipients to the state.

METHOD OF DISTRIBUTION

The aggregated assistance for administration expenses for the state and all subrecipients will not exceed 4% of the total grant allocation.

Professional services to complete administrative duties on behalf of the LWI will be competitively procured by the state or its subrecipients, with whom the state will enter into CEAs. Subrecipient agreements and budgets will be determined through a combination of project scoping, competitive procurement processes, and demonstrations of actual costs to ensure cost reasonableness requirements are met.

MAXIMUM AWARD AMOUNTS

No person, household or business will receive direct benefits through this program.

VII. F. NON-FEDERAL COST SHARE ASSISTANCE

Program Area	Allocation	% of Grant
Non-Federal Cost Share Assistance	$96,988,107	8%

Eligible Activities:	HCDA 105(a) 9
National Objectives:	LMI, Urgent Need Mitigation, and N/A (Planning)

SUMMARY & USE OF FUNDS

Communities across the state have worked with state and federal agencies to identify projects that will increase their resilience to flooding. Many of these projects are funded with federal programs requiring a local or state match. The state understands this match requirement can pose an insurmountable barrier for local governments as they undertake mitigation projects. The state will support local communities by providing non-federal cost share assistance for eligible programs including, but not limited to:

1. FEMA's Hazard Mitigation Grant Program (25% non-federal cost share);
2. FEMA's Severe Repetitive Loss Program (SRL);
3. USDA's National Resources Conservation Service (NRCS) grant programs; and/or
4. Any other federal programs requiring a non-federal cost share, as applicable.

The Hazard Mitigation Grant Program (HMGP) is a critical to increasing resilience to flooding in both rebuilding and protecting housing stock and vital infrastructure. These grant funds are calculated at 15% of the total FEMA IA and PA allocations attributable to DR-4263 and DR-4277. The state's obligation for both DR-4263 and DR-4277 has been established as not less than 25% of eligible project costs. Therefore, the state's match requirements are:

	HM Award	***Cost Share***
DR-4263 (March 2016)	$28,992,576	$9,664,192
DR-4277 (August 2016)	$261,971,744	$87,323,915
Total	**$290,964,320**	**$96,988,107**

GEOGRAPHIC ELIGIBILITY

Any of the 56 federally declared parishes as a result of the Great Floods of 2016 and previously rendered eligible for CDBG-DR assistance under Public Law 114-223.

ELIGIBLE RECIPIENTS

The following entities may be eligible for a grant award as part of this program:

1. State of Louisiana government agencies;
2. Units of local or regional government;
3. Institutions of higher education;
4. Private non-profit organizations;
5. Private land owners (for buyout and/or nonstructural mitigation activities); and/or
6. Other entities serving as subrecipients to the state.

METHOD OF DISTRIBUTION

Funds will be provided as payment to state agencies, eligible organizations, local governments and/or other local entities for activities approved within programs requiring a non-federal cost share, including reimbursement of eligible activities. If the state is unable to fund all match requirements, then the state will develop a prioritization or proration methodology for disbursing funds to state agencies, local governments and local nonprofit organizations.

MAXIMUM AWARD AMOUNTS

The maximum award will not exceed the match amount for each project funded through this program. The state will make exceptions to the maximum award amounts when necessary to comply with federal accessibility standards or to reasonably accommodate a person with disabilities.

VII. G. LEVERAGING FUNDS

To maximize the impact of CDBG-MIT funds, and as part of a continuous effort to prevent duplication of benefits, there will be an ongoing commitment to identify and leverage other federal and non-federal funding sources. Further, the state will utilize existing relationships and strive to create new partnerships with other federal, state, regional and local agencies, private corporations, foundations, nonprofits and other stakeholders to leverage all viable sources of funding.

Specifically, as part of the LWI, the state is working toward aligning all state agency programs to implement, enforce and incentivize improved watershed management practices. This is a multi-year, potentially multi-generational process that will require systemic changes and an alignment of complex federal and state funding sources, subject to a variety of goals, deliverables and beneficiaries, as well as different regulations, programmatic rules and practices.

Most immediately, the state agencies operating within the LWI are leveraging the following resources and/or are working to align the following programs efforts:

1. HMGP and mitigation funding via collaboration between GOHSEP and OCD;
2. Updates to statewide LiDAR data as part of statewide modeling efforts made possible through contributions from DOTD and CPRA;
3. Staff support time to the LWI from FEMA, NOAA, USACE, DEQ, DNR, LDWF, DOTD and other

state and/or federal agencies;
4. Information, planning work and processes established through LA SAFE;
5. Information, planning work and processes established through the CPRA Coastal Master Plan;
6. Watershed model data combined with habitat and wetland data to identify and prioritize projects and interventions that improve watershed health and function along multiple dimensions, such as water quality, habitat and ecological functions and wetland preservation and quality made available through partnerships with USGS, DEQ, LDWF and nonprofits;
7. Existing legislative and statewide water code development made available through partnerships with local universities; and
8. Existing best practices in the coastal resilience industry made available through collaboration and alignment with a multitude of nonprofit, academic, and governmental entities.

DOTD and LiDAR

The programs described in this AP benefit from LiDAR data provided by DOTD in conjunction with other state and federal agencies. This resource, costing an estimated $9.8 million between 2017 and 2020, will constitute the initial series of high quality elevation and land cover data for the LWI's modeling effort. Further, the LiDAR data collected by DOTD is supplemented by LiDAR collected by CPRA, the Natural Resources Conservation Service (NRCS) and the U.S. Geological Survey (USGS), further leveraging funds and resources across state and federal agencies to most effectively produce the data needed for watershed modeling.

Coastal Modeling Efforts

In order to develop the Coastal Master Plan, CPRA initiated a landscape modeling and surge and risk modeling process for the state's coastal zone. This effort utilized $14.3 million of funding from surplus, trust fund and community development funding to implement a 2012 and 2017 modeling effort. The approach used in the 2017 Coastal Master Plan builds on that developed for the 2012 Coastal Master Plan[81]. Such modeling efforts addressed landscape and ecosystem characteristics including topography, bathymetry and vegetation cover, as well as the location of structural protection components, used in ADCIRC and SWAN models to produce water levels associated with storm surges and waves. The water level information is then passed to the Coastal Louisiana Risk Assessment (CLARA) model, which calculates expected flood depths and economic damage, and will be used in watershed modeling within coastal areas. The LWI will leverage this effort, output, and experience in both the building of H&H models and designing its modeling program.

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[81] N. Peyronnin, M. Green, C. Richards Parsons, A. Owens, D. Reed, D. Groves, J. Chamberlain, K Rhinehart, and K. Belhadjali, "Louisiana's 2012 Coastal Master Plan: overview of a science based and publicly-informed decision making process." *Journal of Coastal Research*, Special Issue, No. 67. (2013): pp. 1–15.
Z. Cobell, H. Zhao, H.J. Roberts, F.R. Clark, and S. Zou. "Surge and Wave Modeling for the Louisiana 2012 Coastal Master Plan." *Journal of Coastal Research*: Special Issue 67 – Louisiana's 2012 Coastal Master Plan Technical Analysis (2013): pp. 88-108.
D.R. Johnson, J.R. Fischbach, and D.S. Ortiz. "Estimating Surge-Based Flood Risk with the Coastal Louisiana Risk Assessment Model." *Journal of Coastal Research*, (Special Issue 67 -Louisiana's 2012 Coastal Master Plan Technical Analysis). (2013): 109-126. doi: 10.2112/SI_67_8

VIII. COORDINATION AND ALIGNMENT

The state has historically experienced flooding, coastal erosion, subsidence and wetland erosion with a significant portion of the southern half of the state only slightly above sea level, and the constant threat of tropical storms and hurricanes. Since the flooding and damage associated with Hurricanes Katrina and Rita in 2005, followed by Hurricanes Gustav and Ike in 2008, Hurricane Isaac in 2012, and the Great Floods of 2016, the state has been proactive in undertaking measures that address resilience and sustainability, as well as educating the public to minimize risk for communities and individuals. Louisiana articulated its vision for a recovery that is "Safer, Stronger and Smarter" translated into the following actions:

1. Oversight for ensuring impacted parishes developed Long Term Recovery Plans as required under FEMA's ESF-14 in 2006;
2. State adoption of the National Building Code Standards in 2006; and
3. Proactively ensuring parish adoption of the Advisory Base Flood Elevations (ABFEs) with concurrent adjustments in permits issued for new construction and height or elevation requirements issued after the respective adoptions.

CONSISTENCY WITH PREVIOUS PLANNING EFFORTS AND ALIGNMENT OF PROGRAMS

As members of the Council, OCD, GOHSEP, CPRA, DOTD, LDWF will work through the LWI to ensure its coordination and alignment with the following programs and activities:

Louisiana Speaks – a major regional initiative for all of south Louisiana reflecting visions and strategies for resilience and sustainable growth practices (May 2007). More than 27,000 citizens, a historical first in the United States, participated in developing this plan. The 94-page document in hardcopy and disc and two subsequent publications: "Louisiana Speaks: Planning Toolkit" and "Louisiana Speaks: Pattern Book" were widely distributed to planners, government entities, local nonprofits and associations and citizens;

The Comprehensive Resiliency Pilot Program – implemented in 2010 from funding made available through Hurricanes Gustav and Ike, this is a proactive program to develop and facilitate local planning that incorporates sustainability and resilience into land use plans, zoning and floodplain management. Program funds were made available to local governments and non-profit entities in parishes impacted by Hurricanes Gustav and Ike through a competitive application process. Twenty-nine communities were awarded grants through the competitive program;

2017 Coastal Master Plan – includes specific projects within coastal parishes designed for protection of the coast and communities. CPRA collaborates extensively with a wide range of other federal, state and local agencies and has developed an interdisciplinary planning process that engages diverse groups of coastal stakeholders, focus groups, and national and international experts in order to capture the wide range of perspectives and expertise necessary in developing a holistic coastal planning effort for the 2017 CMP;

Louisiana's Strategic Adaptations for Future Environments (LA SAFE) – provides a holistic approach to flood risk of all types as well as the myriad of human, economic, and environmental impacts experienced following past floods and those anticipated in the future. To develop aspirational—yet realistic—visions of tomorrow's communities, LA SAFE led a grassroots effort across six-parishes to

gather information and ideas while harnessing the experience and ingenuity of local citizens. It includes a planning process of more than 70 outreach and engagement events, more than $41 million in project investments designed by residents and stakeholders, and seven strategy documents highlighting takeaways and recommended actions;

State Hazard Mitigation Plan (Revised in 2019) – in its effort to maintain and update the SHMP, GOHSEP strives to continue to improve Louisiana's preparation for, response to and recovery from the next emergency. Focused on emergency response capabilities, the protection of life, property and the environment; the plan assesses the state's capabilities to execute and sustain safe and timely recovery from emergencies and disasters. All of GOHSEP's existing programs support these goals and are essential to the state's efforts to protect its citizens and to create a resilient infrastructure. The SHMP is updated every five years (aligned with as local HMP updates) and is used by the state to remain eligible for FEMA Hazard Mitigation Assistance (HMA) and PA funding.

In response to the Great Floods of 2016, the **Long-Term Recovery Subcommittee (LTRS)** was created as a subcommittee under the Unified Command Group (UCG) in August 2018 as part of the authority of the *Louisiana Homeland Security and Emergency Assistance and Disaster Act (Louisiana Disaster Act) – Louisiana Revised Statute 29:725.6(v).* The UCG is the state's strategic decision-making body for emergency and disaster response and is comprised of members appointed by the Governor.

The subcommittee is dedicated to long-term recovery and sustainability and will be a key mechanism in implementing the SHMP. The subcommittee is aligned with the ESF 14 State of Louisiana Disaster Recovery Framework and FEMA's National Disaster Recovery Framework. During EOC activation, the LTRS is convened alongside the UCG to access recovery needs following a disaster, activate Recovery Support Functions (RSF)'s for complex recovery issues and develop post-disaster recovery strategies.

The subcommittee, as appointed by the Governor, is co-chaired by GOHSEP and OCD and includes key state agencies and local emergency management subject matter experts listed below:

- The director of GOHSEP (or designee);
- The executive director of OCD (or designee);
- The commissioner of the Louisiana Department of Agriculture and Forestry (or designee);
- The secretary of the LDWF (or designee);
- The lieutenant governor (or designee);
- The secretary of the Louisiana Department of Children and Family Services (or designee);
- The secretary of the Louisiana Department of Health (or designee);
- The state superintendent of the Louisiana Department of Education (or designee);
- The secretary of the DOTD (or designee);
- The executive director of the Louisiana Housing Corporation (or designee);
- The secretary of LED (or designee);
- The chairman of the CPRA (or designee); and
- The chairman of the regional parish office of emergency preparedness parish directors subcommittee.

The subcommittee works to improve regulatory items set by state and federal legislation, recommend codified changes that will enhance recovery efforts, and effectively prepare for recovery. Developing a resilient Louisiana means that planning and policy must be measured against all hazards and throughout the entire emergency management cycle. The LWI will work in tandem with and inform the LTRS, and will be a key component of the long term, all hazards resilience efforts of the LTRS.

The Dredge Fill Program (Habitat Section) - administered by LDWF, this program licenses those who remove sediment from below the mean low water level of a state designated water bottom and transport said sediment to other locations. Commercial uses include the sale of sand from various waterbodies, predominantly the Mississippi River, Red River, Atchafalaya River and Calcasieu River. Other commercial uses include cleaning dock and barge areas that silt in over time, and backfilling of commercial bulkheads. Residential uses include land reclamation for residential properties along rivers through the back filling of bulkheads and other forms of erosion control. Beneficial uses include marsh creation, which includes the activity of removing sediment and transporting it to areas where marshes have eroded in order to build them back up, often in an attempt to restore coastal areas.

Waterbody Management Plan series – a continually updated series of reports documenting reservoir, lake and river histories, as well as management issues and future concerns for all waterbodies managed or monitored by LDWF. These reports include facts important to the work of the LWI about reservoir pool stage, watershed to detention area ratios, control structure and spillway design, and water level drawdown descriptions to avoid loss of natural resources and property. The plan series also assesses (1) biological data (recreational and commercial fisheries, fish communities, and invasive species issues and control), (2) observations of biological responses to management strategies, (3) any agency (Commission, Police Jury, etc.) that exercises authority over waterbodies, and (3) shoreline development trends that may be impacted by changes in lake and/or river water levels. Of particular importance to the Louisiana Watershed Initiative are details provided regarding historic flooding, hydrologic changes, and specific water or habitat management strategies that have been implemented on the waterbodies across the state.

Louisiana State Wildlife Action Plan (SWAP) – one of few federal programs administered through LDWF that specifically targets recovery of both game and nongame species of wildlife and their associated habitats. In order to be eligible for this vital funding source, Louisiana is required to submit state wildlife action plans that address conservation needs for at-risk game and nongame species and their habitats. The SWAP identifies statewide Conservation Opportunity Areas (COA) defined by factors including presence of at-risk species and habitats, projected urbanization, connectivity to existing conservation lands and inclusion of scenic streams. The SWAP also models and projects how a changing climate—in particular sea level rise and changes in precipitation—may increase risk and vulnerability, and reduce the resilience of habitat critical to the survival of wildlife and fish within the state.

Louisiana Scenic Rivers System - In 1970, the state legislature created the Louisiana Natural and Scenic Rivers System for the purpose of preserving, protecting, developing, reclaiming, and enhancing the wilderness qualities, scenic beauties, and ecological regimes of certain free-flowing Louisiana streams. Today, there are approximately 3000 miles of state designated natural and scenic rivers within this system. Scenic river permits are required for all activities that may detrimentally impact the ecological integrity, scenic beauty or wilderness qualities of those rivers. Similarly, certain activities are prohibited on designated natural and scenic rivers due to their detrimental ecological impacts on the streams.

Finally, the state's template for the development of proposals to use CDBG-MIT funds will incorporate the following considerations:

- Local ABFEs and Flood Insurance Rate Maps (FIRMs);
- Coordination with administration of LDWF programs;
- Assessments of local land use plans, zoning and floodplain management ordinances permit requirements;
- Consistency with Watershed Management Models and Plans developed through the LWI; and

- Enhanced regional coordination.

IX. CITIZEN PARTICIPATION

The state updated its Citizen Participation Plan (Plan) for disaster recovery activities associated with Public Law 114-223 and in compliance with CDBG-MIT regulations and all applicable waivers. The state intends to use the updated Plan, which includes citizen participation requirements both for the state and units of local government and other entities that may implement activities under this grant. The state's full Plan is included as **Appendix C** of this document.

Citizens and other stakeholders will be given an opportunity for reasonable and timely access to information and a period for submitting comments relating to this CDBG-MIT AP and any ensuing substantial amendments. Publication of the AP, public comment and substantial amendment criteria is located on the OCD website.

The state is committed to providing access to the AP and programs detailed within to all its citizens. These efforts include special consideration for those with limited English proficiency (LEP) and persons with disabilities. The AP and substantial amendments will be translated into Spanish to reach the LEP populations within grant-eligible areas. Citizens with disabilities or those who need technical assistance can contact the OCD office for assistance:

- Telephone, voice 225-219-9600 or LA Relay Service 711;
- Email at ocd@la.gov; or
- Mail to:
  Office of Community Development
  Post Office Box 94095
  Baton Rouge, LA, 70804-9095

OCD's website (http://www.doa.la.gov/Pages/OCD/Index.aspx) will contain direct links to the AP, amendments, reports and recovery programs and will be updated to provide additional information.

IX. A. CITIZEN INPUT

As described above, the state has been in ongoing communications with local government leaders, regional organizations, residents, building professionals, data and environmental scientists, universities, state legislators and other stakeholders in communities impacted from the Great Floods of 2016 as part of LWI ongoing efforts. This continuous outreach has helped identify the needs and priorities of impacted and eligible communities and informs the programs set forth in this AP.

IX. B. REQUIRED CONSULTATIONS

Affected Units of Local Government

HUD AND LA MIDs

The state has undergone a robust and ongoing dialogue across the state and in consultation with the 10 HUD MIDs including East Baton Rouge, Livingston, Ascension, Tangipahoa, Ouachita, Washington, Acadia, Vermilion, St. Tammany and Lafayette parishes. This consultation includes input on proposed AP programs. Specific citizen participation efforts within these areas are summarized and **bolded** in the

following sections.

The state will host four public hearings in different locations across the HUD MIDs to provide reasonable opportunity, geographic balance and maximum accessibility for citizen comment and on-going citizen access to the use of grant funds. The first two of these public hearings occurred prior to this AP's publication for public comment on the state's website. These meetings are open to the public and have been well attended by a diverse group of stakeholders, members of the academic community, nonprofit and issue-related groups and watershed professionals.

State-Mandated Public Hearings in the MIDs Meeting Dates and Locations:

- Sept. 19, 2019 – **Lafayette**, LA
- Sept. 25, 2019 – **Baton Rouge**, LA
- Oct. 24, 2019 – **Ouachita**, LA
- Oct. 29, 2018 – **St. Tammany**, LA

INDIAN TRIBES

Stakeholder Conference Call
10 a.m. – 11:30 a.m. on Thurs., Sept. 12, 2019
Chitimacha, Coushatta, and Tunica-Biloxi Federal Tribes

Native American Commission Meeting
9:30 a.m. – 3:00 p.m. on Mon. Sept. 16, 2018

PUBLIC HOUSING AUTHORITIES

Stakeholder Conference Call
1 p.m. – 2:30 p.m. on Thurs., Sept. 12, 2019

IX. C. LWI PUBLIC ENGAGEMENT

The Watershed Council has focused considerable efforts on engagement strategies to enable the establishment of broad and transparent inputs into state program and policy development, as well as governance options related to regional water management aligned with watershed boundaries. In this furtherance of this effort, the LWI has undertaken the following public engagement initiatives.

COUNCIL ON WATERSHED MANAGEMENT MEETINGS

The Louisiana Council on Watershed Management holds bi-monthly meetings to review information on the LWI's progress and to recommend on issues and next steps. These meetings are open to the public and have been well attended by a diverse group of stakeholders, members of the academic community, nonprofit and issue-related groups, and watershed professionals. The scheduling of Council meetings may adjust as different program needs arise.

Council on Watershed Management Meeting Dates and Locations:

- Sept. 25, 2019 — **Baton Rouge**, LA
- Aug. 8, 2019 – **Baton Rouge**, LA
- May 30, 2019 – **Baton Rouge**, LA
- March 28, 2019 – **Baton Rouge**, LA
- Jan. 30, 2019 – **Baton Rouge**, LA

- Nov. 8, 2018 – **Baton Rouge**, LA
- Sept. 25, 2018 – Monroe, **Ouachita,** LA

STATEWIDE LISTENING TOUR

The LWI held a series of statewide one-day conferences focused on gathering input from local and regional stakeholders, with a focus on utilizing sessions to inform early efforts of the LWI. This "statewide listening tour" included more than 30 individual sessions held in eight distinct regions of the state and more than 550 attendees, representing diverse stakeholders such as local engineers, planners, floodplain administrators, public works staff, emergency responders, code enforcement staff, elected officials and more. Each session was structured to inform how statewide investments in modeling flood risk would be most effectively directed, while gathering input (via meeting discussions and a written survey) about local considerations related to building smarter, more effective solutions for flood risk reduction in Louisiana.

Statewide Listening Tour Dates, Topics and Locations:

- November 15, 2018 – **Baton Rouge**, LA; Topic: Modeling approach - Amite River basin model case study
- November 14, 2018 – **Tangipahoa,** LA; Topic: Conveyance and hydraulic structures
- November 7, 2018 – Lake Charles, LA; Topic: Modeling approaches - Transition zones
- October 23, 2018 – Houma, LA; Topic: Ecological and biological responses
- October 18, 2018 – Shreveport, LA; Topic: River and rain gauges
- October 17, 2018 – Alexandria, LA; Topic: Water quality data, salinity, dissolved oxygen, point source discharges/OSDS
- October 16, 2018 – **Ouachita,** LA; Topic: Historical flood data
- October 8, 2018 – **Lafayette,** LA; Topic: National Hydrography Dataset, Watershed Boundary Dataset, LiDAR

PARISH LEADERSHIP MEETINGS

LWI staff and agency leaders held a series of meetings in Spring and Summer 2019 to provide parish and municipal leaders with an update on the LWI, as well as to gain feedback on issues such as potential methods to most effectively enable regional coordination and input, including direct feedback on proposed watershed region boundaries and CDBG-MIT programs. These meetings were targeted to parish presidents, mayors, and their relevant technical staff including drainage department staff, building officials, land use and development administrators and floodplain managers. These meetings were instrumental in the development of this AP and in the Watershed Council's recognition of provisional watershed regions in August 2019, as they successfully enabled LWI staff to receive both verbal and written (via surveys) input from local leadership statewide.

Parish Leadership Meeting Dates, Attendees and Locations:

- July 8, 2019 – New Orleans, LA; Attendees from Orleans, Jefferson, St. Bernard and Plaquemines parishes
- June 27, 2019 – St. James, LA; Attendees from Assumption, Lafourche, St. Charles, St. James, St. John the Baptist, St. Mary and Terrebonne parishes
- June 24, 2019 – New Iberia, LA; Attendees from Iberia, St. Martin and St. Mary parishes
- June 24, 2019 – West Baton Rouge, LA; Attendees from Pointe Coupee and West Baton Rouge parishes
- June 18, 2019 – Marksville, LA; Attendees from Avoyelles parish and Tunica Biloxi Tribe

- June 18, 2019 – Vidalia, LA; Attendees from Concordia parish
- June 13, 2019 – Natchitoches, LA; Attendees from DeSoto, Natchitoches, Red River and Sabine parishes
- June 13, 2019 – Arcadia, LA; Attendees from Bienville, Claiborne, Lincoln and Webster parishes
- June 11, 2019 – Winnfield, LA; Attendees from Grant, Jackson, LaSalle and Winn parishes
- May 29, 2019 – Amite, LA; Attendees from St. Helena, **Tangipahoa** and **Washington parishes**
- May 20, 2019 – Abbeville, LA; Attendees from Cameron and **Vermilion parishes**
- May 16, 2019 – Mandeville, LA; Attendees from **St. Tammany parish**
- May 10, 2019 – Houma, LA; Attendees from St. John the Baptist, St. James, St. Charles, Assumption, St. Mary, and Terrebonne parishes
- May 9, 2019 – Denham Springs, LA; Attendees from **Livingston parish**
- May 9, 2019 – Baton Rouge, LA; Attendees from **East Baton Rouge parish**
- May 8, 2019 – Monroe, LA; Attendees from **Ouachita parish**
- May 6, 2019 – Clinton, LA; Attendees from East Feliciana and West Feliciana parishes
- May 3, 2019 – Ville Platte, LA; Attendees from Allen and Evangeline parishes
- May 2, 2019 – Lafayette, LA; Attendees from **Lafayette parish**
- May 1, 2019 – Alexandria, LA; Attendees from Rapides and St. Landry parishes
- April 30, 2019 – Jennings, LA; Attendees from Jefferson Davis and **Acadia parishes**
- April 29, 2019 – Plaquemine, LA; Attendees from Iberville parish
- April 29, 2019 – Lake Charles, LA; Attendees from Calcasieu parish
- April 18, 2019 – Ruston, LA; Attendees from Lincoln and Claiborne parishes
- April 17, 2019 – Monroe, LA; Attendees from Morehouse, West Carroll, East Carroll, Franklin, Madison, Tensas, Union and West Carroll parishes
- April 16, 2019 – Livingston, LA; Attendees from **Livingston parish**
- April 11, 2019 – Gonzales, LA; Attendees from **Ascension parish**
- April 10, 2019 – Ruston, LA; Attendees from Lincoln and Union parishes
- April 9, 2019 – Columbia, LA; Attendees from Caldwell and Catahoula parishes
- April 9, 2019 – Monroe, LA; Attendees from **Ouachita** and Richland parishes
- April 9, 2019 – St. Joseph, LA; Attendees from Tensas parish
- April 9, 2019 – Winnsboro, LA; Attendees from Franklin and Madison parishes
- April 8, 2019 – Bastrop, LA; Attendees from Morehouse, West Carroll and East Carroll parishes
- April 8, 2019 – Rayville, LA; Attendees from **Ouachita** and Richland parishes

SUMMITS AND WORKSHOPS

The LWI hosted a series of events aimed to foster shared learning and best practices from other states and countries. These events included:

- February 19, 2019 – "Building the Foundation: Sharing Lessons Learned & Collaborating on Challenges Specific to Louisiana," a summit in **Lafayette**, LA featuring watershed experts from Colorado, Minnesota, and Texas, as well as local watershed experts sharing their best practices in watershed governance and coordination.
- May 24, 2019 – "International Best Practices Workshop," a workshop in **East Baton Rouge**, LA featuring Henk Ovink, Special Envoy for International Water Affairs for the Kingdom of the Netherlands and a nationally acclaimed risk reduction and watershed expert.
- June 12, 2019 – "Inaugural Interstate Summit," a summit in Bossier City, LA focused on collaboration among state and regional counterparts in Louisiana, Texas, Arkansas and Mississippi to identify shared water management challenges that cross state lines.

PROFESSIONAL EVENTS AND CONFERENCES

LWI staff and agency leaders have presented information on the Initiative at a number of professional events and conferences in order to most effectively engage with stakeholders in a range of disciplines. These events include, but are not limited to:

- May 23-24, 2019 – Thibodeaux, LA; Meeting of the Louisiana Chapter of the American Fisheries Society
- May 22, 2019 – Pittsburgh, PA; World Environmental & Water Resources Congress
- May 21, 2019 – Cleveland, OH; 2019 Association of State Floodplain Managers Annual Conference
- May 15, 2019 – Lake Charles, LA; Louisiana Governor's Office of Homeland Security and Emergency Preparedness Director's Conference
- May 2, 2019 – **Baton Rouge**, LA; Association of Levee Boards of Louisiana Workshop
- April 24, 2019 – **Baton Rouge**, LA; The Nature Conservancy Conference
- April 22, 2019 – New Orleans, LA; 2019 National Hurricane Conference
- April 15-16, 2019 – **Baton Rouge**, LA; Louisiana Water Resources Research Institute 13th Annual Water Conference
- April 3, 2019 – Kenner, LA; Louisiana Floodplain Managers Association Annual Conference
- March 20, 2019 – New Orleans, LA; Land Trust for Louisiana Annual Meeting
- March 19, 2019 – **Lafayette,** LA; Annual Louisiana Remote Sensing & GIS Workshop
- March 7, 2019 – Breaux Bridge, LA; Joint **Lafayette** & St. Martin Soil & Water Conservation District Meeting
- March 7, 2019 – Alexandria, LA; Louisiana Rural Water Association Source Water Protection Program Planning Workshop
- February 21, 2019 – Shreveport, LA; Red River Valley Director's Conference
- February 14, 2019 – Lake Charles, LA; Police Jury Association of Louisiana Convention
- February 13, 2019 – New Orleans, LA; New Orleans Regional Leadership Institute Meeting
- January 14, 2019 – **Baton Rouge**, LA; American Council of Engineering Companies Luncheon

IX. D. CITIZEN COMPLAINTS

The state has established procedures for responding to citizens' complaints regarding activities carried out utilizing these CDBG-MIT funds. The state also requires subrecipients to have procedures in place for responding and tracking citizens' complaints regarding such activities. The Citizen Participation Plan located in **Appendix C** provides more detail. Citizens will be provided with an appropriate address, telephone number and times when they may submit such complaints. The state and subrecipients will provide a written response to each complaint within 15 days of receiving a complaint, as practicable.

IX. E. RECEIPT OF COMMENTS

This AP was posted for public comment Oct. 16 – Nov. 29, 2019. The AP was posted online in English and Spanish. Public notices were published in eight newspapers including *The Advocate*, the state's journal of record and a press release was distributed. Public comments have been recorded at the two public hearings held prior to the beginning of the AP's 45-day public comment period, as well as at two public hearing held during the public comment period. A summary of these hearings follows below.

Public Hearing No. 1: Lafayette

Date: Thurs., Sept. 19, 2019

Time: 1:00 p.m. – 3:00 p.m.
Location: Lafayette Parish Council Chambers
705 West University Avenue
Lafayette, Louisiana 70506

Public Hearing No. 2: East Baton Rouge

Date: Wed., Sept. 25, 2019
Time: 1:30 p.m. – 3:30 p.m.
Location: Louisiana State Capitol, House Committee Room 5
900 North 3rd Street
East Baton Rouge, Louisiana 70802

Public Hearing No. 3: Ouachita

Date: Thurs., Oct. 24, 2019
Time: 1:30 p.m. – 3:00 p.m.
Location: Ouachita Parish Emergency Operation Center
Fire Department Training Center
1000 New Natchitoches Rd
West Monroe, LA 71292

Public Hearing No. 4: St. Tammany

Date: Tues., Oct. 29, 2019
Time: 6:00 p.m. – 8:00 p.m.
Location: St. Tammany Parish Council Chambers
21490 Koop Drive
Mandeville, LA 70471

IX. F. AMENDMENTS TO THE ACTION PLAN

Substantial Amendments

Substantial amendments are defined as meeting any one of the following criteria:

- The addition of a CDBG-MIT Covered Project;
- A change in program benefit or eligibility criteria;
- The addition or deletion of an activity; and/or
- The allocation or reallocation of funds greater than $25 million dollars or a change constituting more than 20% of a program's budget.

Only those amendments that meet the definition of a substantial amendment are subject to the citizen participation process, including the provision of a 30-day public comment period.

Nonsubstantial Amendments

Any amendment to the AP not meeting the criteria for Substantial Amendments (above) will be treated as a Nonsubstantial Amendment. Regarding these amendments, HUD will be notified at least five business days before the amendment becomes effective. Moreover, these amendments will be numbered sequentially, posted on OCD's website and incorporated into this AP.

X. ADDITIONAL REQUIREMENTS AND CONSIDERATIONS

X. A. CERTIFICATION OF CONTROLS, PROCESSES AND PROCEDURES

As directed, the State of Louisiana, Division of Administration certified and submitted to HUD on _____ that OCD has in place the following:

- Proficient financial controls and procurement processes;
- Adequate procedures to prevent any duplication of benefits;
- Processes to ensure timely expenditure of funds;
- Ability to maintain comprehensive website(s) regarding all disaster recovery activities assisted with CDBG-MIT funds; and
- Adequate measures to detect and prevent waste, fraud and abuse of funds.

X. B. IMPLEMENTATION PLAN AND CAPACITY ASSESSMENT

As directed, the state submitted to HUD in conjunction with this AP its Implementation Plan. The Implementation Plan outlines the following:

- Procedures to collect timely information on application status;
- A capacity assessment;
- Staffing plan;
- Procedures ensuring internal and interagency coordination;
- Procedures to provide technical assistance; and
- Accountability procedures.

X. C. PROJECTION OF EXPENDITURES AND OUTCOMES

As directed, the state submitted to HUD in conjunction with this AP a projection of expenditures and anticipated outcomes, broken down on a quarterly basis. These projections include measures to ensure compliance with the following:

- Requirement to expend at least 50% of funds to the benefit of low- and moderate-income persons;
- Requirement to expend at least 50% of funds to the benefit of HUD MIDs; and
- Requirement to expend 50% of CDBG-MIT funds within six years of HUD's execution of the grant agreement and 100% of CDBG-MIT funds within 12 years of HUD's execution of the grant agreement.

X. D. PROGRAM INCOME

The state understands that when implementing certain activities with CDBG-MIT funds, there is potential for generating program income. When implementing activities that could generate program income, the state will develop and adopt program income policies and procedures for the specific program. The state does not anticipate program income from the administration of the projects and programs in this AP, however any program income generated by CDBG-MIT funds under this grant will be returned to OCD, unless otherwise specified in program policies and procedures.

Program income may be retained by local government subgrantees for the repair, operation, and maintenance of publicly owned and operated projects with CDBG-MIT funds, provided that (1) the

agency that owns and operates the project has entered into a written agreement with the grantee that commits the agency to providing not less than 50% of funds necessary for the annual repair, operating and maintenance costs of the project; and (2) the grantee adopts policies and procedures to provide for the grantee's regular, on-site inspection of the project in order to ensure its proper repair, operation and maintenance. As a state grantee, OCD retains the right to request a waiver from HUD at a later date for the use of program income for this purpose.

X. E. PLANS TO MINIMIZE DISPLACEMENT AND ENSURE ACCESSIBILITY

The state will minimize displacement of persons or entities as a result of the implementation of CDBG-MIT projects by ensuring that all programs are administered in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) of 1970, as amended (49 CFR Part 24) and Section 104(d) of the Housing and Community Development Act of 1974 and the implementing regulations at 24 CFR Part 570.496(a), subject to any waivers or alternative requirements provided by HUD. While nonstructural mitigation (e.g. elevations, buyout and/or acquisition) programs may be necessary to achieve flood risk mitigation goals and may cause displacement, the majority of the programs detailed in this AP will be implemented with the goal of minimizing displacement of families from their homes, whether rental or owned. Moreover, in the event displacement does occur, OCD will take into consideration the functional needs of the displaced persons in accordance with guidance outlined in Chapter 3 of HUD's Relocation Handbook.

X. F. PROTECTION OF PEOPLE AND PROPERTY AND CONSTRUCTION METHODS

The state intends to promote high quality, durable, sustainable, mold resistant and energy efficient construction methods for all activities funded with CDBG-MIT resources as applicable. All newly constructed buildings must meet all locally adopted building codes, standards and ordinances. In the absence of locally adopted and enforced building codes, the requirements of the Louisiana State Uniform Building Code will apply.

As applicable, the state will—at a minimum—adhere to the advanced elevation requirements established in section V.B. l.D. of the FRN, subtitled "Elevation standards for new construction, repair of substantial damage, or substantial improvement." To this effect, future property damage will be minimized by requiring that any rebuilding be done according to the best available science for that area with respect to base flood elevations.

As applicable and within its policies and procedures on a program-by-program basis, the state or its subgrantees will document decisions to elevate structures. This documentation will address how projects will be evaluated and how elevation costs will be reasonably determined relative to other alternatives or strategies, such as the demolition of substantially-damaged structures with reconstruction of an elevated structure on the same site, property buyouts or infrastructure improvements to reduce the risk of loss of life and property.

X. G. NATURAL OR GREEN INFRASTRUCTURE STANDARDS

The state recognizes that natural or green infrastructure methods provide drainage functions to reduce stormwater runoff while offering low-cost and attractive site design options. All commercial or institutional construction or retrofitting funded through programs within this AP must utilize one of the

following green infrastructure strategies to reduce runoff, retain water and improve water quality on the subject site:

- Retaining or planting native vegetation;
- Removing existing impervious surface area or utilizing pervious pavement;
- Installing bioswales or other retention areas;
- Collecting rainwater for nonpotable uses; or
- Installing green roofs.

X. H. GREEN BUILDING STANDARDS

All new construction of residential buildings or replacement and/or reconstruction of substantially damaged buildings must incorporate Green Building Standards and rehabilitation of non-substantially damaged residential buildings must follow guidelines in the HUD CPD Green Building Retrofit Checklist. Any construction subject to the Green Building Standards must meet an industry-recognized standard and achieve certification under at least one of the following programs:

- ENERGYSTAR;
- Enterprise Green Communities;
- LEED;
- ICC-700 National Building Standard;
- EPA Indoor AirPlus; or
- Any other equivalent comprehensive green building program deemed acceptable to HUD and approved by OCD.

For construction projects completed, under construction or under contract prior to the date that assistance is approved for the project, adherence to the applicable standards to the extent feasible is encouraged, but not required.

All state-administered programs may use a third party inspection service to ensure that Green Building Standards are met using standardized checklists developed from the above listed programs.

X. I. OPERATION AND MAINTENANCE PLANS

FRN-6109-N-02 allows for flexibility in the use of program income to address on-going operations and maintenance of mitigation projects. Such eligible uses include repair, operation, and maintenance of publicly owned projects financed with CDBG–MIT funds. The state will request an appropriate waiver in order to avail itself of this flexibility for itself and subgrantees as appropriate. The LWI's mission includes the identification and allocation of sustainable funding sources to maintain sound flood risk management practices, programs, and projects across the state, and acknowledges that existing sources can be stretched and leveraged more efficiently if put toward a common goal. Through its implementation of CDBG-MIT programs, the LWI will plan for the long-term operation and maintenance of infrastructure and public facilities funded with CDBG-MIT funds.

The LWI Phase I investigation revealed multiple findings relevant to funding for flood risk reduction related activities. It is clear that long-term funding needs exist, and will be more thoroughly defined through the development of watershed-based plans and regional coordination activities supported by this grant, but it is also clear that cooperating agencies, local governments, and regional entities do currently and will continue to have significant impact with the dollars available to them. The impact of these dollars could be increased, possibly significantly, through alignment of objectives, reduced duplication, and collective action where possible.

Because site-specific mitigation projects are not included in this AP and are addressed as an anticipatory activity in **Section VI**, and in furtherance of the LWI's mission and in accordance with federal requirements, the state will address the following requirements within its policies and procedures on a program-by-program basis, including specific benchmarks instituted to ensure operations and maintenance requirements are met:

(1) State or local resources must be identified for the operation and maintenance costs of projects assisted with CDBG-MIT funds;
(2) If operations and maintenance plans are reliant on any proposed changes to existing taxation policies or tax collection practices, those changes and relevant milestones must be expressly addressed; and
(3) Any public infrastructure or facilities funded with CDBG-MIT resources must illustrate their ability to account for long-term operation and maintenance needs beyond an initial investment of CDBG-MIT funds.

X. J. COST VERIFICATION PROCEDURES

All construction activities that utilize CDBG-MIT funds must be reasonable and consistent with market costs at the time and place of construction. To comply with this requirement, the state will utilize and document independent cost estimates (ICEs) within each of its programs. Specific parameters regarding ICE requirements will be outlined within policies and procedures on a program-by-program basis. More detailed cost verification requirements for Covered Projects will be provided by the state in accordance with Section V.A.2.H. of the FRN, as applicable.

APPENDIX A: ADDITIONAL DEFINITIONS

Action plan amendment: As the grantee continues to finalize its long-term mitigation goals, or as mitigation needs change, the grantee must submit an action plan amendment to HUD that updates its needs assessment, modifies or creates new activities and/or re-programs funds, as necessary. There are two types of action plan amendments: substantial and non-substantial. See **Section IX. F**. of this AP for more detail.

Basin: The drainage area of the designated body of water and its tributaries.[82]

CDBG-DR: Community Development Block Grant-Disaster Recovery assistance is the term for the HUD funding stream that is allocated to eligible disaster recovery entities via congressional appropriations. HUD provides flexible CDBG-DR grants to cities, counties and states to help them recover from presidentially declared disasters, especially in low-income areas. This funding provides crucial seed money to begin the recovery process and rebuild in disaster-affected areas. Since CDBG-DR assistance funds a broad range of recovery activities, such as housing, infrastructure and economic development, HUD can help communities and neighborhoods that may not otherwise recover because of limited resources.

CFR: The Code of Federal Regulations is the annual collection of general and permanent rules and regulations (sometimes called administrative law) that were published in the Federal Register by executive departments and agencies of the federal government. The CFR is divided into 50 titles that represent broad areas subject to federal regulation.

Coastal area: The Louisiana coastal zone and contiguous areas subject to storm or tidal surge and the area comprising the Louisiana Coastal Ecosystem as defined in Section 7001 of P.L. 110-114 Coastal Flooding.[83]

Coastal Louisiana Risk Assessment or CLARA: A flood modeling tool developed by the CPRA. CLARA is used to evaluate potential coastal flooding damage due to storm surge, represented as physical property damage, aggregating flood damage results from a wide range of potential storm events to calculate the chance of flooding or damage at any given level.[84]

Coastal Master Plan: The currently applicable version of the Louisiana Comprehensive Master Plan for a Sustainable Coast, developed by CPRA and approved by the Louisiana Legislature in accordance with R.S. 49:214.5.3.[85]

Data collection: Gathering, extracting, or measuring scattered and widespread data that are used to support hydrologic and hydraulic analysis and flood risk assessment.

Data management: Effective management of observational and analytical data related to flood risk assessment and risk mitigation.

Decision-making support: The capacity to understand the potential short- and long-term as well as the upstream and downstream effects of development, maintenance, and project activities on flood risk,

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[82] La. Admin. Code 33: IX.107
[83] La. R.S. 49:214.2(4).
[84] LA SAFE Program Guidelines Operational Version 1 p.49
[85] La Admin. Code 43:XXXI.107

equitable benefit, and the natural and beneficial functions of the environment anywhere within a watershed.

Developers: Private individuals and entities, including profit making and nonprofit organizations, typically formed for the purpose of undertaking projects involving the development of rental or homebuyer housing developments.[86]

Drainage basin: A drainage basin is an area or region of land that catches precipitation and funnels it into creeks, streams, rivers and smaller bodies of water until the water drains into an ocean, gulf or sea. Drainage basins come in all shapes and sizes with some covering a few acres while others are thousands of square miles across. Artificial boundaries, such as county/parish, state and international borders do not affect drainage basins. Watershed is another term for drainage basin.[87]

Drainage divide: A drainage divide is the division between adjacent drainage basins. Just as a creek or stream drains into a larger river, a drainage basin is nearly always part of a larger drainage basin.[88]

Financial and grant management capabilities: Tools and capabilities to manage funds, contracts, and grants associated with floodplain management and watershed-based initiatives.

Flash flooding: Flash flooding occurs when a locally intense precipitation inundates an area in a short amount of time, resulting in local streamflow and drainage capacity being overwhelmed.[89]

Flood: An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean. [90]

Flood mapping: Geographic flood hazard information that support decision-making and provides stakeholders with high-resolution flood risk data, including flood elevation and risk assessment.

Flood risk assessment: Estimations of flood losses and damages at a given depth of flooding, which are calculated at the structure level or aggregated at the census block level. Risk assessment will require cross reference with the latest predictions concerning the future change of climatic and physical conditions (e.g. predictions of sea level rise, land loss rates) as well as anthropogenic conditions (e.g. predicted land use and development patterns) over the coming decades.

Green Infrastructure: Green infrastructure is the interconnected systems of natural areas and open spaces that are protected and managed for the ecological benefits they provide to people and environment. With green infrastructure, green space is considered a form of infrastructure in the same fashion as roads, water lines and sewers. It includes large metropolitan parks, neighborhood parks, riparian buffers, linear parks and greenways, trees and forests, farms, residential landscapes and urban gardens. It uses stormwater storage areas, water conveyance areas and other natural flooded areas as part of the community infrastructure for stormwater management and flood damage reduction, as well

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[86] LA SAFE Program Guidelines Operational Version 1 p.49

[87] U.S. Department of the Interior, U.S. Geological Survey. General United States HUC Information adapted from Seaber, P.R., Kapinos, F.P., and Knapp, G.L., 1987, Hydrologic Unit Maps: U.S. Geological Survey Water-Supply Paper 2294, 63 p. Retrieved on 8/11/19 from: https://water.usgs.gov/GIS/huc.html.

[88] Ibid.

[89] State of Louisiana Hazard Mitigation Plan p.2-28

[90] USGS Water Science Glossary of Terms.

as for parks, trails and other recreation areas.[91]

Hazus: A nationally applicable standardized methodology developed and freely distributed by FEMA that contains models for estimating potential losses from earthquakes, floods, hurricanes and tsunamis.

Hydraulics: Hydraulics refers to the science of the flow of water in a channel or man-made conveyance structure.[92]

Hydrologic unit code: Hydrologic unit codes, or HUCs, identify all the drainage basins in the United States in a nested arrangement, ranging from the largest (regions) to the smallest (cataloging units).[93] According to the U.S. Geological Survey, "The United States is divided and sub-divided into successively smaller hydrologic units, which are classified into four levels: regions, sub-regions, accounting units and cataloging units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system[94]."

Hydrology: Hydrology is the science of the occurrence, distribution, movement and properties of the waters of the Earth and their relationship to the environment during each phase of the hydrologic cycle. The water cycle, or hydrologic cycle, purifies water by a continuous process of evaporation and transpiration from the Earth's surface, including the oceans, to the atmosphere, and back to the land and oceans. Hydrologists are interested in the physical, chemical and biological processes involving water as it travels through the atmosphere, over and beneath the Earth's surface, and through growing plants.[95]

Hydrologic and hydraulic modeling: Hydrologic and hydraulic (G&H) modeling refers to the combination of hydrology and hydraulics to provide a simulation of rainfall and runoff patterns to anticipate the movement of water[96] and flood risk within a watershed.[97]

Natural floodplain functions: The functions associated with the natural or relatively undisturbed floodplain that moderate flooding, maintain water quality, recharge groundwater, reduce erosion, redistribute sand and sediment, and provide fish and wildlife habitat.[98]

Nonstructural mitigation measures: Nonstructural measures offer a flood mitigation alternative to structural measures by accommodating floodwaters and either removing structures from harm's way or reducing risk to existing buildings and infrastructure[99]. Examples of nonstructural mitigation measures include home elevations or acquisitions or "buy-outs."

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[91] NAI How-to Guide for Infrastructure. p. 19

[92] County of Marin Department of Public Works. *Resources: Projects*. Retrieved on 8/12/19 from: www.marinwatersheds.org.

[93] U.S. Department of the Interior, U.S. Geological Survey. General United States HUC Information adapted from Seaber, P.R., Kapinos, F.P., and Knapp, G.L., 1987, Hydrologic Unit Maps: U.S. Geological Survey Water-Supply Paper 2294, 63 p. Retrieved on 8/11/19 from: https://water.usgs.gov/GIS/huc.html.

[94] United States Geological Survey, 2019. "Hydrologic Unit Maps." https://water.usgs.gov/GIS/huc.html accessed on 18 July, 2019.

[95] USGS. *Hydrology: The Study of Water and Water Problems A Challenge for Today and Tomorrow*, a publication of the Universities Council on Water Resources. Retrieved on 8/11/19 from: www.usgs.gov.

[96] FEMA. Hydrologic and Hydraulic (H&H) Study Quick Guide. Retrieved on 8/12/19 from www.sog.unc.edu

[97] County of Marin Department of Public Works. *Resources: Projects*. Retrieved on 8/12/19 from: www.marinwatersheds.org.

[98] NAI How-to Guide for Infrastructure. p.6

[99] Sam Martin, CPRA via written communication on 9/10/19.

Resilience: The ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions. Such disruptions may include, for example, a flooding event, a precipitous economic change, effects of long-term environmental degradation, short-term or intermittent failure or under-performance of infrastructure such as the electrical grid. Resilience describes an area's capacity to prepare for, withstand, and recover from unpredictable shocks - minimizing impacts on people, infrastructure, environments, and economies. In practice, resilience provides a framework for guiding planning, investment, and actions in order to reduce vulnerabilities.[100]

Riverine flooding: Riverine flooding occurs along a river or smaller stream. It is the result of runoff from heavy rainfall or intensive snow or ice melt. The speed that riverine flood levels rise and fall depends not only on the amount of rainfall, but even more on the capacity of the river itself and the shape and land cover of its drainage basin. The smaller the river, the faster water levels rise and fall.[101]

Project planning technical capabilities: Technical resources required and used to enact appropriate planning processes.

Structural protection: Structural Protection projects reduce flood risk by acting as physical barriers against storm surge. These systems can include earthen levees, floodwalls, floodgates, and pumping stations.[102]

Subsidence: A dropping of the land surface as a result of groundwater being pumped. Cracks and fissures can appear in the land. Subsidence is virtually an irreversible process.[103]

V-Zone: Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply[104].

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[100] LA SAFE Program Guidelines Operational Version 1. p.51
[101] State of Louisiana Hazard Mitigation Plan. p.2-27
[102] Coastal Master Plan. p.67
[103] USGS Water Science Glossary of Terms
[104] FEMA, 2019. "Zone V." https://www.fema.gov/zone-v

APPENDIX B: COMMON ACRONYMS

ABFE Advisory Base Flood Elevation
AP Action Plan
BCA Benefit Cost Analysis
BFE Base Flood Elevation
CEA Cooperative Endeavor Agreement
CRS Community Rating System
CDBG Community Development Block Grant
CFR Code of Federal Regulations
CPRA Coastal Protection and Restoration Authority
DEQ Department of Environmental Quality
DFIRM Digital Flood Insurance Rate Map
DOA Division of Administration
DOTD Department of Transportation and Development
DR Disaster Recovery
DRU Disaster Recovery Unit
EDA Economic Development Administration
FEMA Federal Emergency Management Agency
FIRM Flood Insurance Rate Maps
FRRP Flood Risk Resilience Program
GIS Geographic Information System
GOHSEP Governor's Office of Homeland Security and Emergency Preparedness
H&H Hydraulics and Hydrology
HMGP Hazard Mitigation Grant Program
HMP Hazard Mitigation Plan
HU Hydrologic Unit
HUC Hydrologic Unit Code
HUD U.S. Department of Housing and Urban Development
LaDOTD Louisiana Department of Transportation & Development
LED Louisiana Economic Development
LiDAR Light Detection and Ranging
LDEQ Louisiana Department of Environmental Quality
LDWF Louisiana Department of Wildlife and Fisheries
LRAP Louisiana Resiliency Assistance Program
LSU Louisiana State University
LSUCC Louisiana State Uniform Construction Code
LSUCCC Louisiana State Uniform Construction Code Council
NFIP National Flood Insurance Program
NOFA Notice of Funding Availability
NRDC National Disaster Resilience Competition
OCD Office of Community Development
OCD - DRU Office of Community Development - Disaster Recovery Unit
PA Public Assistance
PAS Planning Assistance to States
PDM Pre-Disaster Mitigation Program
RFP Request for Proposal
RL Repetitive Loss
RS Revised Statute
SBA Small Business Administration
SCR Senate Concurrent Resolution
SFHA Special Flood Hazard Area
SHMO State Hazard Mitigation Officer
SHMP State Hazard Mitigation Plan
SLR Sea Level Rise
SR Senate Resolution
SRL Severe Repetitive Loss
USACE U.S. Army Corps of Engineers
USC United States Code
USDA U.S. Department of Agriculture
USEPA U.S. Environmental Protection Agency
USFWS U.S. Fish and Wildlife Service
USGCRP U.S. Global Change Research Program
USGS U.S. Geological Survey

APPENDIX C: CITIZEN PARTICIPATION PLAN

STATE OF LOUISIANA
CITIZEN PARTICIPATION PLAN
DISASTER RECOVERY UNIT – CDBG MITIGATION FUNDS

The State of Louisiana Office of Community Development (OCD), in anticipation of the receipt of Community Development Block Grant (CDBG) Mitigation Funds (MIT) and in compliance with the requirements of U. S. Department of Housing and Urban Development (HUD) "Allocations, Common Application, Waivers, and Alternative Requirements for Community Development Block Grant Mitigation Grantees" Notice, has established the following policies and procedures for citizen participation (referred to as the Citizen Participation Plan) and will abide by this plan.

The Citizen Participation Plan will be distributed at public hearings being held in the HUD-identified most impacted and distressed (MID) areas and is available on OCD's website. The Citizen Participation Plan will be made accessible to persons with disabilities upon request by telephone or written request to the following address:

Office of Community Development - Disaster Recovery Unit
Post Office Box 94095
Baton Rouge, Louisiana 70804-9095
Telephone (voice) – 225-219-9600
Telephone (fax) – 225-219-9605
LA Relay Service – 711
Email – ocd@la.gov

Required Consultations

In accordance with the published HUD Federal Notice, the state will consult with the following:

- Local governments within Acadia, Ascension, East Baton Rouge, Lafayette, Livingston, Ouachita, St. Tammany, Tangipahoa, Vermilion and Washington parishes.
- Indian Tribes with interest in HUD-identified MID areas.
- Public housing authorities in HUD-identified MID areas.

Encouragement of Citizen and Stakeholder Participation

In order to facilitate affected citizen and stakeholder participation, the state will use various methods of notification of public hearings and availability of program documents for review through various methods such as electronic mailings, press releases, statements by public officials, media advertisements, public service announcements, and/or contacts with neighborhood organizations. The state will publicize all pertinent information for all public hearings a minimum of seven calendar days prior to the public hearing. The state will specifically encourage persons of low- and moderate-income to participate in the public hearings and to comment.

To assess the needs of and ensure meaningful access to participation by non-English speaking persons, the state maintains a Language Access Plan (LAP) that provides for appropriate action to be taken to ensure meaningful communication when a need is identified. The LAP is available on the state website and is updated on an annual basis to ensure continued responsiveness to community needs. As Spanish is the most prominent language among non-English speaking persons in the state at 1.69% of the total population, all published citizen participation advertisements will include a statement in Spanish indicating that materials are available in Spanish upon request.

See the section below entitled "Public Hearings" for a summary of efforts that will be taken to broaden public participation and/or outreach to minorities and non-English speaking persons, as well as persons with disabilities.

Public Hearings

As required in the published HUD Federal Notice, the state will conduct four public hearings held in various locations throughout the HUD MID areas. At least two of the public hearings will be held prior to the publication of the state's MIT Action Plan or AP on the state's website. The hearings will be held in different locations within the MID areas in locations that ensure geographic balance and maximum accessibility. All public hearings will be held at a time and location convenient to potential and actual beneficiaries in a building that is accessible to persons with physical disabilities. Accommodations for non-English speaking persons and persons with other disabilities will be provided as necessary with a minimum notification of five working days to ensure a proper response for those needs. If the state is notified that a significant number of non-English speaking persons plan to attend a public hearing, the state will make every effort to have an interpreter available at the hearing. The state will record the public hearings and make the recording available on the state's website. Also, the state will livestream the public hearings on the state's Louisiana Watershed Initiative or LWI Facebook page.

Development of the CDBG Mitigation Funds Action Plan (AP)

Prior to the publication of the AP, at least two of the four required public hearings will be conducted. At these public hearings, the state will make the following available to the affected citizens, local governments, Indian tribes, and public housing authorities:

- The amount of assistance expected to be received for mitigation activities.
- Information regarding potential CDBG-MIT programs.
- Information regarding eligibility of applicants for potential CDBG-MIT programs.
- Anticipated timeline for submission of AP to HUD.
- Plans to minimize displacement and assist any persons displaced.
- State's CDBG Mitigation Citizen Participation Plan

The state will consider any comments or views received in writing or expressed orally at all public hearings conducted.

The state will publish the proposed AP on the state's website and make copies available upon request. The state will accept comments for a minimum of 45 days after the publication of AP for public review.

Comments may be submitted in writing through mail or electronically through mail, fax or email. For more information, refer to the beginning section of this plan.

The state will conduct the remaining two public hearings in the HUD MID area as required. These two public hearings will be held during the 45 day comment period. A summary of all comments and responses will be included in the AP submission to HUD for review. The approved AP will be placed on the state's website.

Amendments to the Action Plan

The state will amend the AP under the following circumstances:

- A change in the allocation priorities or a change in the method of distribution of funds is needed.
- To carry out an activity using funds from any program covered by the AP (including program income) not previously described in the AP.
- To change the purpose, scope, location, eligibility or beneficiaries of a program or activity.
- The addition of a CDBG-MIT Covered Project.
- A change of more than 25% of the allocation of funds in any one program category or activity.

Only those amendments that meet the definition of a substantial amendment are subject to public notification procedures. Substantial amendments are defined as those that change the distribution of funds by eliminating or adding a program category or activity, excluding a previously defined geographical area, or involving a change of more than 25% of the allocation of funds in any one program category or activity.

The state will publish the proposed substantial amendment on the state's website and make copies available upon request. The state will accept comments for a minimum of 30 days after the publication of the substantial amendment for public review. Comments may be submitted in writing through mail or electronically through mail, fax, or email. For more information, refer to the beginning section of this plan.

A summary of all comments and responses will be included in the substantial amendment submission to HUD for review.

Availability to the Public

The state's AP, substantial amendments, policies and procedures, citizen participation plan and quarterly performance reports will be available to the public, including the availability of materials in a form accessible to persons with disabilities, on the state's website and upon request. All quarterly performance reports will be posted on the state's website within three days of submission to HUD for review. If HUD requires revisions to any documents for approval, revised documents will be posted on the state's website as well. This will include detailed information about the activities/programs included in the AP, a list of all executed contracts that are funded with CDBG-MIT funds and the status of services/goods currently being procured.

When the state seeks to competitively award CDBG-MIT funds, eligibility requirements for such funding, all criteria to be used in selection of applications for funding (including the relative importance of each criterion) and the time frame for consideration of applications will be posted on the state's website.

The state will provide applicants timely information regarding the status of their application for assistance through multiple means of communication, such as the state's website, phone calls, letters, etc.

Citizen Advisory Groups

Following HUD approval of the AP, the state shall form a citizen advisory group that shall meet in an open forum not less than twice annually to solicit and respond to public comment and input regarding the state's mitigation activities and to serve as an on-going public forum to continuously inform the state's mitigation programs.

The state has been in ongoing communications with local government leaders, regional organizations, citizens, building professionals, data and environmental scientists, universities, state legislators and other stakeholders that have an interest in the HUD MID areas through the LWI.

Access to Records

The state will provide citizens, public agencies and other interested parties with reasonable and timely access to information and records relating to the state's AP and assistance provided under the implementation of the AP.

Complaints

The state shall respond to complaints from citizens related to the AP, amendments and quarterly performance reports. Written complaints must be directed to the OCD at the mailing or email address listed in this plan. Please send complaints to the attention of the OCD Executive Director. The state will provide a timely, substantive written response to the complainant within 15 working days of the receipt of the complaint, where practicable.

Citizen Participation Requirements for Local Governments Participating in the State's CDBG Mitigation Funds Program

Guidelines for recipients of CDBG-MIT funds can be found in the OCD-DRU CDBG-DR Grantee Administrative Manual, which is available on the state's website.

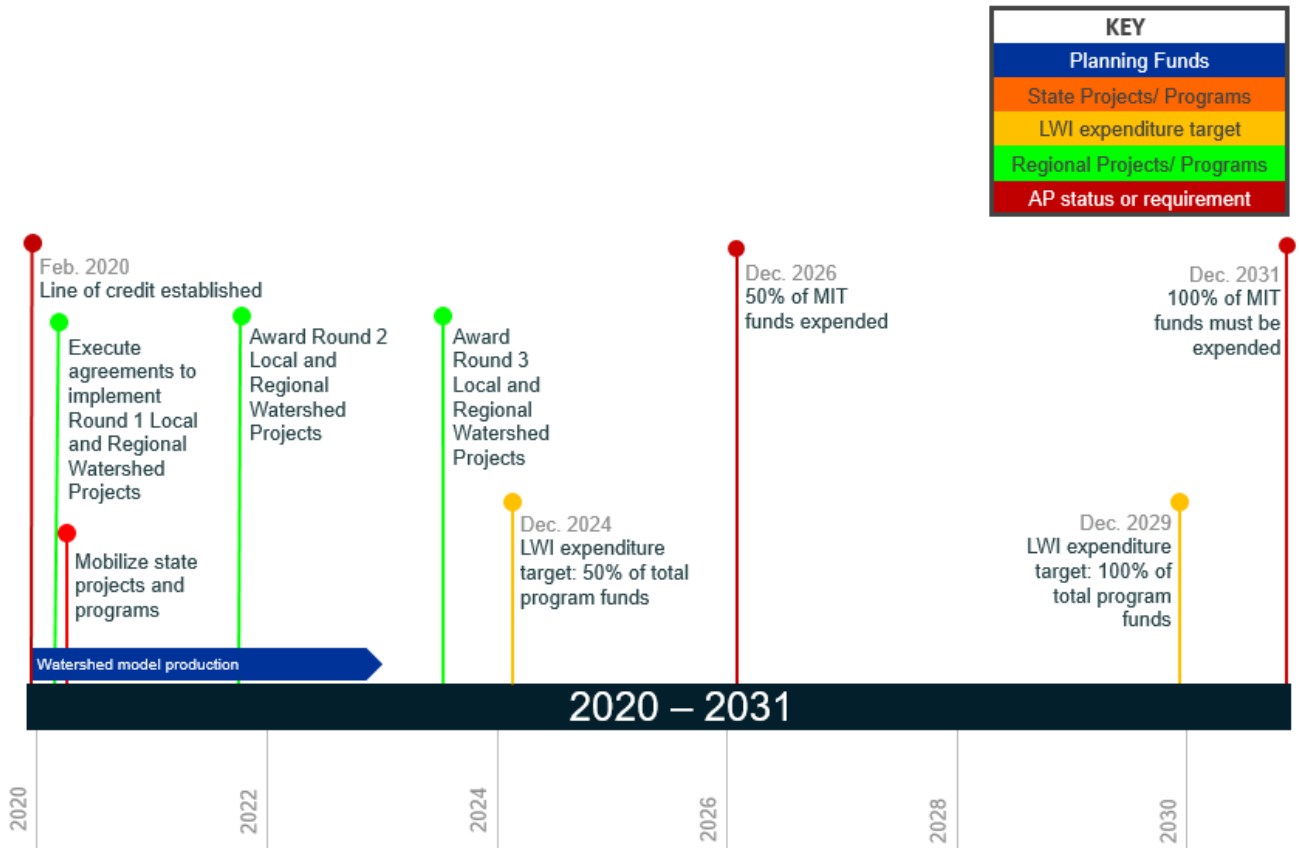
APPENDIX D: PROJECTION OF EXPENDITURES AND OUTCOMES (“SPENDING PLAN”)

The state anticipates spending funds outlined in this AP through a transparent, efficient and time-sensitive process. To this end, in order to guarantee the timely expenditure of the subject funding, and with the goal of expending 50% of CDGB-MIT funds by program year five and 100% of program funds by year 10, OCD will observe the following status targets by program year five with respect to program mobilization (please see **Figure 22**. below for illustration):

- **Target:** Significant expenditure (approximately $138,670,040) of watershed modeling funds;
- **Target:** Full expenditure (approximately $24,278,340) of watershed policy, planning and local capacity assistance funds;
- **Target:** Expenditure of over $200,000,000 of Watershed (Local and Regional) Projects and Programs funds, including full expenditure of Round I funding and substantial expenditure of Round II funding; and
- **Target:** Expenditure of over $200,000,000 of State Projects and Programs funds.

A significant proportion of the projects described herein will be prioritized and selected based on the output of watershed models, which will not be fully operational until approximately mid-program (program year four or five). Therefore, some projects will necessitate a delayed selection and implementation schedule in order to most fully benefit from the provision of watershed models.

Figure 22. Louisiana Watershed Initiative CDBG-MIT Expenditure Timeline



The programs delineated in this AP aim to:

1. Objectively quantify flood risk;
2. Mitigate the immediate-term exposure of residents and critical assets to flood hazards;
3. Enable the construction of flood resilient communities and developments within the state; and
4. Implement planning and policy interventions to reduce long-term flood risk exposure through a variety of project, program, and planning activities.

To these ends, the state aims to achieve the following program outcome goals:

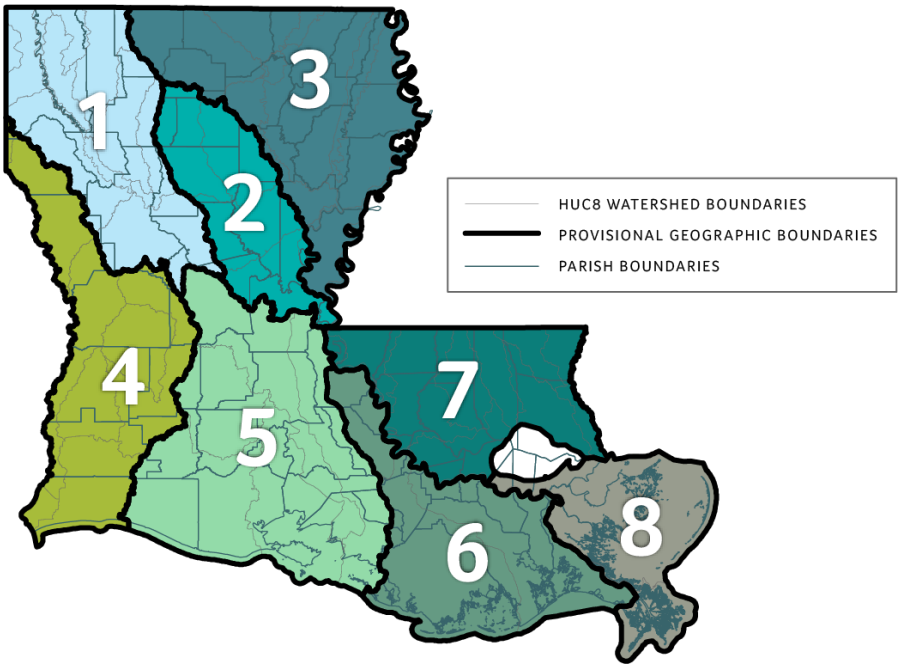
- **Goal:** Maximize (by square acre) the amount of area reserved or enhanced to function as regional water retention and/or detention sites.
- **Goal:** Reduce to the highest degree practicable the anticipated damage or losses to structures subject to flood risk.
- **Goal:** Maximize the number of mitigated (via buyout or elevation) residential structures.
- **Goal:** Maximize the number of critical facilities, sites or infrastructure components mitigated to the 500-year (0.2% AEP) flood standard.
- **Goal:** Maximize the number of affordable housing units that are mitigated to or above the 500-year (0.2% AEP) standard or are constructed outside of the 500-year floodplain.
- **Goal:** Maximize the number of participants who have received training and/or certifications in green building design and flood-resilient design and construction practices.
- **Goal:** Maximize the number of new developments constructed in a method consistent with the mitigation standards set forth in the resilience gap financing program.

APPENDIX E: LWI PROVISIONAL WATERSHED BOUNDARIES

PROVISIONAL WATERSHED REGIONS

Council on Watershed Management

Accepted Aug. 8, 2019



Louisiana Watershed Initiative state agencies, assembled in response to Gov. John Bel Edwards' executive order, recognize the depicted delineation of provisional watershed regions to enable successful implementation and coordination of Louisiana Watershed Initiative program activities. These provisional watershed regions will immediately provide the following:

- A **'point of beginning'** to address the geographic scale and boundary for watershed-based planning, modeling and management in Louisiana;
- A **framework for regional and local stakeholder input** (regional steering committees) to determine more fixed, long-term watershed regional boundaries and organizational structures (coalitions) throughout 2020;
- **Regional and local support and resources** for short- and long-term watershed management in the form of the LWI Regional Capacity Building Grant Program; and
- Watershed boundaries to **facilitate distribution of program funds.**

Further, regional steering committees will review existing research and provide meaningful input into the provisional geographic scale and boundaries, as well as associated decision-making processes. The LWI will design a **living watershed boundary** that can be amended through the coordinated support of both regional and state watershed entities. These boundaries will acknowledge the changing environment each is designed to manage and may be amended to reflect changing risk profiles clarified by the LWI modeling effort and resulting from project impacts, climate change, land development standards and more.