



Coastal Protection and Restoration Authority
150 Terrace Avenue, Baton Rouge, LA 70802 | coastal@la.gov | www.coastal.la.gov

2017 Coastal Master Plan

Appendix E: Flood Risk and Resilience Program Framework



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Prepared By: Coastal Protection and Restoration Authority

Coastal Protection and Restoration Authority

This document was prepared in support of the 2017 Coastal Master Plan being prepared by the Coastal Protection and Restoration Authority (CPRA). CPRA was established by the Louisiana Legislature in response to Hurricanes Katrina and Rita through Act 8 of the First Extraordinary Session of 2005. Act 8 of the First Extraordinary Session of 2005 expanded the membership, duties and responsibilities of CPRA and charged the new authority to develop and implement a comprehensive coastal protection plan, consisting of a master plan (revised every five years) and annual plans. CPRA's mandate is to develop, implement and enforce a comprehensive coastal protection and restoration master plan.

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- Coastal Protection and Restoration Authority (CPRA) of Louisiana – Melanie Saucier, Mandy Green, Andrea Galinski, and Ashley Cobb

The following people provided input to and/or review of the document:

- AECOM – Lawrence Frank, Donald Glondys, Adrienne Sheldon
- ARCADIS – Carly Foster, Joy Duperault, Alexa Andrews, and Aaron Henderson
- Hal Clarkson and Joanne Chamberlain
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Executive Summary

The development of the Flood Risk and Resilience Program is an important component of CPRA's objective to reduce storm surge based flood risk across coastal Louisiana. The program aims to reduce coastal flood risk through the development and implementation of nonstructural projects and related policies. Nonstructural projects are distinct from structural projects in that they reduce risk to the existing building inventory through means of floodproofing, elevating, or acquiring structures. The program focuses on conducting a refined coastal flood risk vulnerability analysis, defining nonstructural project areas, prioritizing projects, and facilitating the implementation of projects. The program also encourages flood risk awareness and supports state and local policies that promote greater resilience across the coast. This report outlines the framework of the program and includes the following primary components:

- Methodology for developing, analyzing, and prioritizing nonstructural projects
- Program implementation framework
- Overview of program and project policies and procedures
- Identification of potential funding sources for nonstructural projects
- Performance metrics for the Flood Risk and Resilience Program

This report also includes attachments that further detail Flood Risk and Resilience Program elements such as resilience policies and programmatic recommendations, profiles on the coastal parishes, summary of the nonstructural project modeling results, and an explanation of the nonstructural application process. Please see:

- Attachment E1: Flood Risk and Resilience Program Policy Recommendations
- Attachment E2: Parish Profiles
- Attachment E3: Nonstructural Model Results
- Attachment E4: Parish Applicant's Handbook
- Nonstructural Frequently Asked Questions

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List of Abbreviations

ADA	Americans with Disabilities Act
BFE	Base Flood Elevation
BOEM	Bureau of Ocean Energy Management
CDBG-DR	Community Development Block Grant - Disaster Recovery
CFR	Code of Federal Regulations
CIP	Capital Improvement Plan
CLARA	Coastal Louisiana Risk Assessment
CPRA	Coastal Protection and Restoration Authority
CRS	Community Rating System
DOTD	Louisiana Department of Transportation and Development
EAD	Expected Annual Damages
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
GOHSEP	Governors' Office of Homeland Security and Emergency Preparedness
GOMESA	Gulf of Mexico Energy Security Act
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HUD	United States Department of Housing and Urban Development
LA SAFE	Louisiana Strategic Adaptations for Future Environments
LCA	Louisiana Coastal Area
LMI	Low to Moderate Income
NDRC	National Disaster Resilience Competition
NFIP	National Flood Insurance Program
NGO	Non-Governmental Organization

NIBS	National Institute of Building Science
NMTC	New Market Tax Credits
NOFA	Notice of Funding Availability
OCD	Office of Community Development
OCS	Outer Continental Shelf
PA	FEMA Public Assistance
PACE	Property Assessed Clean Energy
PDM	Pre-Disaster Mitigation
RL	Repetitive Loss
SBA	Small Business Administration
SHMO	State Hazard Mitigation Officer
SRL	Severe Repetitive Loss
THIRA	Threat and Hazard Identification and Risk Assessment
TIF	Tax Increment Financing
USACE	United States Army Corps of Engineers
WRDA	Title VII Water Resource Development Act of 2007
WRRDA 2014	Water Resources Reform and Development Act of 2014

Glossary

Alternatives: Different groups of projects evaluated and compared for their effect on risk reduction or other metrics.

Base Flood Elevation (BFE): The computed elevation to which floodwater is anticipated to rise during the base flood (100-year or 1 percent annual chance of exceedance flood). Base Flood Elevations (BFEs) are shown on FEMA Flood Insurance Rate Maps (FIRMs) and on the flood profiles. The BFE is the regulatory requirement for the elevation or floodproofing of structures. The relationship between the BFE and a structure's elevation, in part, determines the flood insurance premium.

Basis Year: A particular year used to develop mitigation standards and nonstructural project variants. Basis years allow for comparison of flood depths occurring at specific time steps, including year 0, 10, 25, and 50.

Capacity: The combination of all the strengths, attributes, and resources available within a community, society, or organization that can be used to achieve certain goals. Capacity also may be described as capability. Capacity assessment is a term for the process by which the capacity of a group is reviewed against desired goals, and the capacity gaps are identified for further action.

Coastal Louisiana Risk Assessment (CLARA) Model: As part of the master plan analysis, CLARA is a computational model that estimates current and future flood depths and economic damage. The CLARA model translates storm surge into flood depths while taking into account levees and other structural protection features and then calculates the resultant damage to a wide array of coastal assets. Based on an array of different modeled storms, the CLARA model computes statistical flood risk metrics (such as EAD), which are then used to evaluate structural and nonstructural risk reduction projects.

Cost-Effectiveness: The reduction in direct economic damage to structures per investment dollar spent on structural or nonstructural risk reduction. Cost-effectiveness captures relative project benefits, as determined by the difference between the expected annual damage (EAD), for a given area with project and without the project for the 100-year flood event divided by the project cost. Cost-effectiveness analysis is distinct from cost benefit analysis (BCA), which is a specific technical analysis required by FEMA for federal grant projects. CPRA sets no minimum threshold for cost-effectiveness.

Economic Damage: Damage from coastal flooding that is measurable in dollars and includes damage to structures; damage to crops, roads, or other economic assets; loss of structure contents or business inventory; and lost wages, rents, and sales.

Environmental Scenario: Scenarios reflect different assumptions regarding future sea level rise, coastal land subsidence rates, and other key uncertainties that influence the coastal landscape.

Expected Annual Damage (EAD): A method of evaluating economic damage to coastal assets based on various possible storm surge events, expressed as dollars of damage per year. EAD represents the average amount of damage estimated to occur from a storm surge flood event in any given year, taking into account both the projected chance of a storm occurring and the damage that would result. While every community will not flood every year, these statistical

averages show a given community's expected flood risk and the damage that would be associated with that risk. Reduction in EAD serves as a way to compare structural and nonstructural projects' effects.

Freeboard: Freeboard is a factor of safety expressed in feet above the base flood elevation (typically the 100-year flood or 500-year flood) for purposes of floodplain management. Freeboard can compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for the base flood, such as wave action, urbanization of the watershed, and future sea level rise. CPRA includes two feet of freeboard for all recommended elevation projects.

Low to Moderate Income: Percent of the population who are 50-80% below the median income level as defined by the United States Department of Housing and Urban Development (HUD) Section 8 Housing Assistance Payments program. This can be determined using information found at the following link: https://www.huduser.gov/portal/datasets/il.html#2016_query.

Mitigation: The lessening or limiting of the adverse impacts of future hazards and disasters. The adverse impacts of hazards often cannot be prevented fully, but their scale or severity can be substantially lessened through various measures. Mitigation measures encompass engineering techniques and hazard-resistant construction such as home elevation or non-residential floodproofing.

Mitigation Standard: Defines CPRA's recommended nonstructural mitigation measures and corresponds to the CPRA 100-year flood depths that the nonstructural measures are designed to mitigate (plus two feet of required freeboard for elevation projects). Non-residential floodproofing is recommended in areas where flood depths are 1-3 feet; residential elevation is recommended in areas with flood depths 3-14 feet; residential voluntary acquisition is recommended in areas with flood depths greater than 14 feet. Mitigation standards were developed to compare different nonstructural project variants based on flood depths for different future conditions as defined by a given time step (year 0, 10, and 25) and environmental scenario (Low, Medium, and High).

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. CPRA considers a combination of mitigation measures including non-residential floodproofing, residential elevation, and residential voluntary acquisition for each nonstructural project.

Nonstructural Project Variants: Project options developed for each nonstructural project area based on different mitigation standards; seven nonstructural variants were considered in the 2017 Coastal Master Plan formulation process, and two variants were selected for inclusion in the plan.

Programmatic Measures: Any measure not involving physical construction that uses knowledge and practices to reduce risks and impacts, in particular through policies and laws, raising public awareness, training, and education. Common programmatic measures include building codes, land use planning laws and their enforcement, research and assessment, information resources, and public awareness programs.

Residual Risk: The risk that remains in unmanaged form, even when effective disaster risk reduction measures are in place, and for which emergency response and recovery capacity must be maintained. The presence of residual risk implies a continuing need to develop and

support effective capacities for emergency services, preparedness, response, and recovery together with socio-economic policies such as safety nets and risk transfer mechanisms.

Resilience: The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. Resilience means the ability to recover or “bounce back” from a shock. The resilience of a community with respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organizing itself both prior to and during times of need.

Risk: Broadly, risk is the combination of the threat, vulnerability, and consequences. More specifically, flood risk is calculated as the annual probability of a storm surge event occurring and the consequences of that event. CLARA calculates risk based on a weighted average of the flood damage from 60 synthetic storms ranging from 10-year to 2,000-year events.

Risk Assessment: A methodology to determine the nature and extent of risk by analyzing potential hazards and evaluating the conditions of vulnerability that, when taken together, could potentially harm exposed structures, property, and assets.

Return Interval: An estimate of the likelihood of an event. The reciprocal of the return interval is the percent chance of the event occurring in any given year. Therefore, an event with a 100-year return interval has a 1% chance of happening in any year. It is important to note that, in practice, the 100-year event has a 26% chance of occurring over a 30-year mortgage.

Risk Scenarios: A set of assumptions that reflect different factors that influence flood risk, including levee fragility and population growth/distribution.

Structural Measures: Major physical barriers constructed to reduce or avoid possible impacts of flooding, including earthen levees, concrete seawalls, pumps, and floodgates.

Systems Models: Predictive models developed for the coastal master plan to assess how the coast works as a system including eco-hydrology, barrier islands, wetland morphology, vegetation, ecosystem outcomes, storm surge/waves, and risk assessment models.

Vulnerability: The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard. There are many aspects of vulnerability arising from various physical, social, economic, and environmental factors. Examples may include geographic location, poor design and construction of buildings, inadequate protection of assets, socio-economic and racial disparities, lack of public information and awareness, and limited official recognition of risks and preparedness measures. Vulnerability varies significantly across the Louisiana coast, within a community, and over time.

1.0 Document Organization

This document outlines the steps CPRA has taken to advance the Flood Risk and Resilience Program, and to greatly refine the details that were presented in the 2012 Coastal Master Plan. The Flood Risk and Resilience Program is described in the following sections:

Section 2: Introduction

- Overview of the Flood Risk and Resilience Program partnerships and the state wide coordination for nonstructural planning.

Section 3: Methodology for Developing, Analyzing, and Prioritizing Nonstructural Risk Reduction Projects

- Initial identification, evaluation and prioritization of projects based on flood depths, percent low to moderate income households, percent of repetitive and severe repetitive loss properties, and cost-effectiveness.

Section 4: Program Implementation

- Overview of the Flood Risk and Resilience Program policies and procedures, including application process, programmatic assistance, funding options, and grants management.
- Overview of project specific policies and procedures for implementation of floodproofing, elevation, and acquisition projects.

Section 5: Description of Potential Funding Sources

- Descriptions of and requirements for potential funding sources available to CPRA from state and federal sources such as FEMA, HUD, and Small Business Administration (SBA).

Section 6: Performance Metrics for the Flood Risk and Resilience Program

- Overview of the Flood Risk and Resilience Program performance metrics that enable both near-term and long-term evaluation of how the program achieves goals and objectives.

Section 7: Challenges for the Program and Next Steps

The Flood Risk and Resilience Program's Appendix E also includes attachments, which provide additional information, technical analysis, and other details that support the program:

Attachment E1: Flood Risk and Resilience Program Policy Recommendations

- Summary of nonstructural policy recommendations to enhance resiliency efforts. In addition to facilitating the funding of nonstructural projects, CPRA hopes to build on the progress made by other state agencies and local entities that are instituting mitigation and resilience practices across coastal Louisiana.

Attachment E2: Parish Profiles

- Summary statistics about coastal parishes to better analyze their nonstructural needs, vulnerability, and capability. The profile data includes information such as parish size (area and population), FEMA mapped coastal flood zones, number of severe repetitive loss structures, and FEMA NFIP and CRS participation. These profiles also include descriptions of previous flood risk reduction efforts and participation in mitigation programs.

Attachment E3: Nonstructural Model Results

- Output from the Coastal Louisiana Risk Assessment (CLARA) model on the 32 recommended nonstructural project areas (for more information on the CLARA model, see Attachment C3-25: Storm Surge and Risk Assessment).

Attachment E4: Parish Applicant's Handbook

- Includes Phase I, Phase II, and Phase III application descriptions, instructions, details about program/project management, and program policies and procedures.

1.1 Relevant 2017 Coastal Master Plan Reports

The master plan reports referenced below provide additional detail on topics relevant to the development of the Flood Risk and Resilience Program.

Appendix A: Project Definition

- **Nonstructural Project Attributes:** Includes project information used by the Planning Tool during the project evaluation and selection process.
- **Nonstructural Risk Reduction Project Cost Estimates:** Includes planning level cost data by project type for floodproofing, elevation, and acquisition projects. These costs were updated from the 2012 Coastal Master Plan and are specific to coastal Louisiana.

For information on the nonstructural project development process and flood risk assessment, please see Attachment C3-25: Storm Surge and Risk Assessment.

Attachment C3-25: Storm Surge and Risk Assessment

- **CLARA Model:** Includes information on how the Coastal Louisiana Risk Assessment (CLARA) model was refined and asset classes were updated for the 2017 Coastal Master Plan analysis.
- **Nonstructural Project Areas:** Describes how the nonstructural project areas were refined using damage reduction cluster analysis and jurisdictional boundaries.
- **Population Growth Scenarios:** Discusses development of three population/asset growth scenarios considered, including historic, concentrated, and no growth scenarios.

For information on the nonstructural and structural project evaluation and selection process, please see Appendix D: Planning Tool.

Appendix D: Planning Tool

- **Implementation Periods:** Describes the implementation periods for risk reduction projects over the 50-year planning horizon.
- **Nonstructural Project Variants:** Discusses development of nonstructural project variants and mitigation standards.
- **Plan Formulation:** Describes how the risk reduction alternatives (groups of structural and nonstructural projects) were formulated.

For a broader overview of project definitions and the 2017 Coastal Master Plan development process, please see the **Nonstructural Frequently Asked Questions**.

All appendices and attachments are located at: <http://coastal.la.gov/our-plan/2017-coastal-master-plan/>

2.0 Introduction

The Coastal Protection and Restoration Authority's (CPRA's) mandate is to develop, implement, and enforce a comprehensive master plan for Louisiana. The master plan's primary objectives are to reduce storm surge based flood risk and to build and sustain land. Understanding that many communities face serious flood risks that will likely increase in the future, CPRA is pursuing a "multiple lines of defense" strategy that will invest in a combination of restoration, structural, and nonstructural risk reduction projects to reduce coastal storm surge event impacts. The agency recognizes that structural projects alone, such as levees, will not suffice. Nonstructural risk reduction projects offer additional options to decrease flood risk in a dynamic coastal environment.

In general, structural risk reduction reduces storm surge through the construction of physical barriers, such as earthen levees or concrete seawalls, as well as pumps and floodgates. Instead of blocking floodwaters, nonstructural risk reduction offers an alternative to structural protection by accommodating floodwaters and either removing structures from harm's way (through voluntary acquisition) or protecting buildings and infrastructure from flood damage through elevation and floodproofing. Nonstructural risk reduction projects are often beneficial in areas where structural risk reduction is not feasible, cost-effective, or would have negative impacts on the environment. Additionally, nonstructural risk reduction projects and policies can reduce risk to future building stock, and offer further protection in areas enclosed by levees. When implemented in a complementary and coordinated manner, both structural and nonstructural risk reduction measures will greatly reduce the risk of future flooding and economic damages for Louisiana's coastal communities.

The Flood Risk and Resilience Program is an important component of CPRA's objective to reduce storm surge based flood risk across coastal Louisiana. The Flood Risk and Resilience Program aims to reduce the economic damages from coastal flood risk through the development and implementation of nonstructural projects and related policies. Building off of the nonstructural recommendations from the 2012 Coastal Master Plan, the Flood Risk and Resilience Program developed for the 2017 Coastal Master Plan refines the coastal flood risk vulnerability analysis, refines nonstructural project areas, prioritizes projects, and develops a process for parish implementation of nonstructural risk reduction projects. The Flood Risk and Resilience Program addresses coordinating resources across state agencies, as well as expanding access to tools and information to help guide individual and local community decisions to reduce flood risk. The program also provides recommendations for other state and local policies that promote greater resilience across the coast.

The Flood Risk and Resilience Program is unique in three ways: 1) geographic size, funding, and state leadership; 2) robust technical analysis with a focus on higher mitigation standards and risk reduction over a 50-year time period; and 3) extensive engagement with a diverse group of stakeholders. First, CPRA seeks to coordinate a state-led nonstructural grant program across many coastal Louisiana parishes. The program will be one of the largest of its kind in the nation in terms of the number of structures recommended for mitigation, extensive analysis of vulnerabilities, consideration of synergies with structural and restoration projects, and engagement with stakeholders. Sustained state leadership and funding will encourage coastal parishes to invest more of their own resources to build local institutional capacity to implement nonstructural projects, as oftentimes the unpredictable nature of post-disaster funding limits advance strategic planning and available capacity after disaster events occur.

Secondly, the advanced technical risk assessment includes estimates of flood depths and economic damage for current conditions and future conditions over the next 50 years under various scenarios of landscape change, sea level rise, and other factors. Coastal communities vulnerable to storm surge based flood risk are identified, and then the relative benefits of structural and nonstructural risk reduction projects to reduce the damages due to flood risk are evaluated under different future scenarios. The results of this analysis promote higher nonstructural mitigation standards (CPRA 100-year flood depths plus two feet freeboard) that take into account dynamic coastal conditions (including future relative sea level rise) and increased future flood depths.

Lastly, the program is built upon extensive outreach efforts that integrate federal and state agency best practices while recognizing the local context of coastal communities and the knowledge of parishes that have implemented mitigation measures in order to support effective and locally appropriate solutions. The Flood Risk and Resilience Program emphasizes engaging local parishes throughout the development of the program's framework and nonstructural project implementation process. This close coordination is intended to promote coast wide risk reduction goals, while enabling coastal parishes to implement nonstructural projects with the flexibility that allows for the inclusion of local needs and objectives.

Thus, the Flood Risk and Resilience Program is based on a combination of state-of-the-art technical analysis, forward-thinking nonstructural mitigation standards, current policy and programmatic considerations, and strong outreach partnerships to develop locally appropriate nonstructural mitigation options.

2.1 Building on the Past, Looking to the Future

Nonstructural activities, such as elevating homes or locating development on higher ground, have been used to protect Louisiana properties from flood damage for generations and are generally accepted by coastal stakeholders. Nevertheless, these measures are now receiving increasing focus in state and local planning initiatives as coastal disasters have become more common. Louisiana is at the forefront of planning and preparing for disasters, and many coastal cities and parishes are proactively implementing nonstructural projects to increase their community resilience and reduce flood risk. In the last 10 years, Louisiana has faced several catastrophic hurricanes (Hurricanes Katrina and Rita in 2005, Gustav and Ike in 2008, and Isaac in 2012), which have propelled the state to become a national leader in the implementation of large-scale disaster recovery and nonstructural projects.

Since Hurricane Katrina in 2005, many coastal Louisiana parishes have been implementing nonstructural measures using post-disaster funding from FEMA and HUD. For example, a November 2014 Louisiana Katrina/Rita Road Home program monthly report stated that 32,409 applicants had received elevation disbursements (OCD, 2014). As an example of the effectiveness of these nonstructural techniques, the City of Mandeville had 437 flood insurance claims after Hurricane Katrina totaling \$26.6 million. In Mandeville, Hurricane Isaac had a high water level approximately 0.5 ft less than Katrina (high water marks in Mandeville were 8.25 ft for Isaac (Bourdeau et al., 2013) and 8.8 ft for Katrina (FEMA, 2006)). During the Hurricane Isaac recovery, FEMA conducted a Loss Avoidance Study in Mandeville (Bourdeau et al., 2013) for 14 structures that were elevated after Katrina using federal, state, and local funding. The results of this study showed a total savings of \$1,106,000 with an average savings of \$79,027 per structure; the total cost of this project was \$1,500,000. After just one event, the project received a 74% return on investment. It is expected that during future flood events, the project would continue to accrue additional savings.

While existing disaster mitigation programs are vital, they are limited and often only available after storm events have occurred. The Multihazard Mitigation Council, a council of the National Institute of Building Sciences (NIBS), reports that every \$1 spent on flood risk mitigation saves \$4 in flood damages (NIBS, 2005). As the costs of rebuilding after disasters mount, coastal communities need better resources to plan for future storms before they occur. The Flood Risk and Resilience Program will take a holistic and comprehensive approach to flood risk reduction and increased community resilience. The program will ensure that the most beneficial and effective coastal flood risk reduction investments are taken into consideration. In addition, the program will take into account both current and future flood risk, future uncertainties, and the social and economic factors that make communities vulnerable.

2.2 Flood Risk and Resilience Partnerships

The nonstructural risk reduction projects that result from the 2017 Coastal Master Plan will need to be implemented in partnership with other state agencies such as the Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP) and Office of Community Development (OCD), coastal parishes, and local property owners. The assistance of incorporated municipalities will also be needed (for example, to verify compliance with local flood ordinance regulations).

As CPRA's nonstructural risk reduction project recommendations move from planning to implementation, the prioritization, allocation, distribution of funds, and process of project management will need to be coordinated with other state agencies – primarily GOHSEP – as well as local parish and municipal governments. These partnerships will provide important oversight, technical knowledge, assistance in grant management and implementation, and integration into ongoing hazard mitigation programs.

In addition to promoting coordinated nonstructural risk reduction project implementation, state-level partnerships will help address broader resilience issues, such as:

- Encouraging state wide mitigation standards for comprehensive plans, which in turn will enhance building and infrastructure standards related to flood risk reduction.
- Working with parishes to explore incentives to locate new development outside the flood zone.
- Sharing mitigation best practices with the public.
- Identifying resources needed to fulfill the Flood Risk and Resilience Program's coast wide flood risk reduction goals.

Enhanced state-level collaboration will promote effective risk reduction through both the implementation of nonstructural risk reduction projects and development of programmatic initiatives and policy recommendations that make communities more resilient. In addition to promoting interagency coordination, CPRA has established a range of effective partnerships to further coastal planning efforts and continues to expand upon them to incorporate additional agencies and organizations that have expertise in planning, floodplain management, and hazard mitigation.

2.2.1 State Wide Coordination for Nonstructural Planning

The development and implementation of CPRA's Flood Risk and Resilience Program must be considered in the context of existing federal and state grant programs. Typically, funding for nonstructural or hazard mitigation efforts flows from the federal government through the states

to local governments for specific projects. Due to funding priorities and constraints, these programs may conflict or may not direct limited monies to the areas of most critical need. Lack of coordination of such funding can cause inefficiencies and lost opportunities to combine or leverage project funds to accomplish a greater goal.

As with most other states, a number of state and local agencies share the responsibility for floodplain management and hazard mitigation activities in Louisiana. In Louisiana, three agencies share the responsibility for the distribution of funding and implementation of hazard mitigation projects.

- **Governor's Office of Homeland Security and Emergency Preparedness (GOHSEP)** holds responsibility for the state wide coordination of hazard mitigation activities through the State Hazard Mitigation Officer (SHMO). The agency is responsible for formulating Louisiana's State Hazard Mitigation Plan, which is required by FEMA to receive any hazard mitigation grant funds. Additionally, GOHSEP assists each parish in the preparation, submission, and approval of their Hazard Mitigation Plans and updates. GOHSEP administers many of FEMA's grant programs including the Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grant Program (PDM), Flood Mitigation Assistance Program (FMA), and others. Some of these programs provide funding for nonstructural projects to proactively reduce risk before a flood event, and others provide the funds to recover after a disaster has occurred.
- **Office of Community Development (OCD)** administers grants that stem from HUD, including a variety of Community Development Block Grants (CDBG) and the HUD National Disaster Resilience Competition (NDRC). NDRC, in collaboration with the Rockefeller Foundation, used a competition framework to provide nearly \$1 billion in HUD Disaster Recovery funds for resources and support to areas that have unmet recovery needs to help them become more resilient. In addition, OCD is responsible for administration of the Road Home - Homeowner Assistance Program and Small Rental Property Program, the nation's largest CDBG Disaster Recovery grant program.
- **Department of Transportation and Development (DOTD)** acts as the State Coordinating Agency for the National Flood Insurance Program (NFIP) and supports local government compliance with NFIP to promote access to affordable flood insurance. Promoting flood risk reduction standards beyond the minimum mandated by NFIP, DOTD also assists communities with participation in the NFIP's Community Rating System (CRS). In addition, DOTD is responsible for the state's Floodplain Management Program. Lastly, DOTD administers Louisiana's state wide Flood Control Program, which assists in the construction of flood control infrastructure. The program provides funds to local governments, levee boards, and drainage districts to implement projects that reduce existing flood damages such as levees, canals, stormwater detention, floodproofing, relocation, or other structural or nonstructural measures.

To assure a common vision for Louisiana's coastal communities, nonstructural mitigation activities must be better coordinated between CPRA, GOHSEP, OCD, DOTD, and local parish, tribal, and/or municipal governments. The 2012 Coastal Master Plan cited the "need for increased communication and coordination" as one of the key obstacles to program implementation, and called for "an ongoing forum among a variety of stakeholders, including state and local agencies responsible for hazard mitigation and community resilience, for discussion and exchange of information related to nonstructural mitigation."

In order to advance this cross-agency dialogue, CPRA has established a common platform for the planning and implementation of a coast wide nonstructural mitigation program through the CPRA Board's Flood Risk and Resilience Subcommittee. With CPRA's legislative directive as the "single state entity with authority to articulate a clear statement of priorities and to focus development and implementation efforts to achieve comprehensive coastal protection for Louisiana," the Flood Risk and Resilience Subcommittee serves as an effective structure for coordinating all coastal hazard mitigation activities. The Subcommittee is comprised of several state agencies, levee boards, and parish entities whose agency missions pertain to hazard mitigation, economic development, infrastructure, environment, and flood risk reduction.

Table 1: Flood Risk and Resilience Subcommittee Members.

CPRA Board Flood Risk and Resilience Subcommittee	
State Agencies	Division of Administration
	Department of Environmental Quality
	Department of Insurance
	Department of Transportation and Development
	Department of Natural Resources
	Governor's Office of Homeland Security and Emergency Preparedness
	Louisiana Economic Development
Local Entities	Regional Representatives of the CPRA Board
	Levee District Representatives

The Subcommittee will help to pool funding resources in a coordinated manner that promotes coast wide risk reduction priorities instead of piecemeal, project-by-project allocations. Such coordination will enhance large-scale nonstructural risk reduction project implementation and assure that various funding sources are allocated in a strategic and efficient manner as to not duplicate efforts and to make the most progress towards comprehensive risk reduction goals. The Flood Risk and Resilience Subcommittee will meet bi-annually throughout the development of the Flood Risk and Resilience Program and the 2017 Coastal Master Plan. After the 2017 Coastal Master Plan is approved, the group will continue to meet to review potential parish grant applications and funding sources, and to coordinate on other state or federal mitigation projects.

2.2.2 Resilience Partnerships for the 2017 Coastal Master Plan

To further the advancement of the 2017 Coastal Master Plan, as well as the Flood Risk and Resilience Program in particular, CPRA expanded its network of collaborators to include several groups that provided additional insight into the development of resilience-related projects and policies.

- Framework Development Team** – This 30+ member stakeholder group is comprised of representatives from various federal, state, and local governments, as well as non-governmental organizations (NGOs), industry, and academia. Designed to promote long-term dialogue and conflict-resolution, the in-depth discussions between this group and the CPRA Master Plan Delivery Team allow members to better understand and provide input throughout the master plan development process. In addition, members build communication bridges back to their constituents and local communities not directly involved. The ongoing conversations among the diverse participants of this working group are critical to building greater transparency and public support for the 2017 Coastal Master Plan.

- **Community Focus Group** – As one of a broad range of issue-specific focus groups (including Landowners, Fisheries, Navigation, and Energy and Industry), the Community Focus Group addresses the many challenges faced by coastal communities and provides feedback on how the master plan may be able to better address communities' needs. Comprised of community advocates and organizers, faith-based groups, and tribal leaders, the Community Focus Group is charged with enhancing and expanding ongoing communications between the state and local coastal citizens. The focus group is intended to provide guidance to CPRA about the development and implementation of planning efforts, as well as to educate and inform other citizens about ongoing coastal protection and restoration activities.
- **Science and Engineering Board** – The Science and Engineering Board is made up of ten experts with national and international experience in a wide range of coastal disciplines. This group provides high level input and technical advice on the development of the 2017 Coastal Master Plan. These members' contributions have helped enhance the Flood Risk and Resilience Program as their specific academic and professional expertise includes the areas of coastal hazards, risk assessment, climate change impacts, flood risk decision making, comprehensive planning, federal resilience policy, and socio-economics.
- **Resiliency Technical Advisory Committee** – This group of professional and academic experts provides guidance and recommendations to improve the development of the 2017 Coastal Master Plan and Flood Risk and Resilience Program. The committee advances the planning process by offering input into how best to integrate socio-economic, resilience, and vulnerability metrics into the 2017 Coastal Master Plan. In addition, members offer insight on various programmatic and policy recommendations and provide guidance on the development and implementation of the Flood Risk and Resilience Program planning framework.
- **Parish Floodplain Manager's Group** – This group consists of local parish floodplain managers, grant administrators, state hazard mitigation staff, and parish planners. These professionals offer much insight into the implementation of nonstructural risk reduction projects, including expertise in grant applications, funding procurement, and project implementation. They also offer experience in broader planning efforts for reducing flood risk and promoting safer community development such as through the creation of local plans and ordinances, as well as local management of the NFIP's CRS program.
- **Other project specific workgroups** – CPRA convened additional working groups as needed to further other targeted initiatives. One such example is the Flood Risk and Resilience Viewer workgroup which was convened to provide input on the development of an online, interactive flood risk tool. (Please note, the Viewer has evolved to be the Master Plan Data Viewer.) This workgroup consisted of a variety of community advocates, faith-based groups and NGOs, as well as a range of flood risk and outreach/education practitioners. Members gave feedback on the viewer's data/informational content and user interface, as well as facilitated community meetings to promote the release of the viewer. Another example includes the Flood Risk and Resilience Stakeholder Group that consists of NGOs and other stakeholders. This group is convened periodically to provide updates and gather feedback on the Flood Risk and Resilience Program developments and anticipated path forward.

3.0 Methodology for Developing, Analyzing, and Prioritizing Nonstructural Risk Reduction Projects

The 2017 Coastal Master Plan includes a range of nonstructural risk reduction projects that, when combined with the structural risk reduction projects, most cost-effectively reduce storm surge flood risk. This process builds upon and expands the nonstructural risk reduction project development approach used for the 2012 Coastal Master Plan by including new mitigation standards and considering additional community characteristics, such as low to moderate income (LMI) households. These updates improve the mitigation standards and incorporate additional social vulnerability criteria when recommending projects across the coast. The 2017 Coastal Master Plan prioritizes nonstructural project areas and the mitigation measures recommended within these areas (floodproofing, elevation, and/or voluntary acquisition). In some coastal areas, only a low level of nonstructural mitigation will be appropriate. In other cases, more extensive nonstructural mitigation will be required to reduce risk in vulnerable communities. Additional nonstructural risk reduction project refinement will occur in partnership with parishes through the Flood Risk and Resilience application process, which is outlined in subsequent sections of this document and further described in the Attachment E4: Parish Applicant's Handbook.

Nonstructural project areas in the 2017 Coastal Master Plan include one or more of the following nonstructural mitigation measures, which are recommended according to flood depths and structure types. Each mitigation measure is based on the CPRA estimates of 100-year flood depths (plus two feet of freeboard for elevation projects) for either year 10 or year 25 expected future flood depth conditions.¹ Mitigation measures are defined as:

- **Floodproofing** of non-residential structures. Recommended in areas where the mitigation standard is less than 3 feet.²
- **Elevation** of residential structures. Recommended in areas that where the mitigation standard is between 3 and 14 feet.
- **Voluntary Acquisition** for residential structures. Recommended in areas where the mitigation standard is greater than 14 feet.

Thus, if an area experiences 6 feet of flooding, residential structures are proposed to be elevated to 8 feet in order to account for the required 2 feet of freeboard. Similarly, an area that experiences 13 feet of flooding would be eligible for voluntary acquisition, as structures would

¹ Nonstructural risk reduction projects proposed for the first two implementation periods (year 1-30) are defined by CPRA 100-year flood depths for year 10 under the High environmental scenario; nonstructural risk reduction projects proposed for the third implementation period (year 31-50) are defined by CPRA 100-year flood depths for year 25 under the High environmental scenario.

² Dry floodproofing is a viable mitigation option for non-residential buildings and large-scale multi-family structures such as apartments that are too large to be elevated. In areas where floodproofing is not feasible, a structural protection measure, such as constructing a small ring levee or floodwall, may be considered. For a full description of what dry floodproofing entails, see Appendix A: Project Definition.

need to be elevated greater than 14 feet in order to account for two feet of required freeboard.

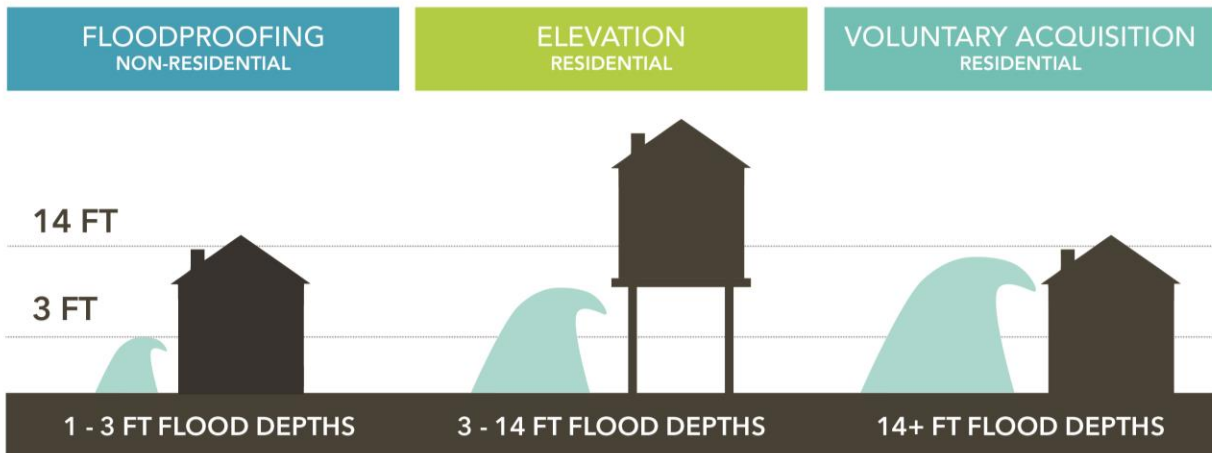


Figure 1: 2017 Nonstructural Risk Reduction Projects and Flood Depths.

It should be noted that while CPRA will determine the nonstructural risk reduction projects to be included in the 2017 Coastal Master Plan, it **does not** recommend specific structures to be mitigated. The 2017 nonstructural risk reduction projects are initial recommendations, and the ultimate structures to be mitigated will be determined by property owners and parishes in conjunction with CPRA.

In addition to recommending nonstructural risk reduction projects, the Flood Risk and Resilience Program makes policy recommendations such as incorporating land use planning, upgrades to building codes, and public education as key components of nonstructural efforts (see Attachment E1: Flood Risk and Resilience Program Policy Recommendations for details). These measures can have extensive city or parish wide benefits by guiding site development and redevelopment to safer and more resilient locations outside of high-risk locations. Similarly, outreach and educational efforts can encourage individual home and business owners to take steps to minimize the effects of flooding. These types of programmatic measures fall within the domain of local government and are not directly funded by the CPRA program, with the exception of specific capacity building measures that would increase the effectiveness of parishes in administering the program. However, CPRA will provide certain incentives, such as up to 100% cost share for nonstructural risk reduction projects, to encourage parishes to adopt these types of programmatic measures. More information regarding cost share opportunities is outlined in Section 4.3.1 below and in the Attachment E4: Parish Applicant's Handbook.

3.1 CLARA Model

The Coastal Louisiana Risk Assessment (CLARA) model is a quantitative simulation model that estimates economic damage resulting from storm surge based flooding. It was developed by RAND in 2011-2012 and updated in 2014-2015 to allow CPRA to systematically identify and evaluate potential structural and nonstructural risk reduction projects for inclusion in the 2017 Coastal Master Plan by estimating future risk reduction benefits. The following provides a high-level explanation of the CLARA model; for a more detailed description, please see Attachment C3-25: Storm Surge and Risk Assessment.

3.1.1 Estimating Future Flood Risk

To estimate flooding, 60 synthetic storms with different intensities, sizes, and landfall locations are modeled across coastal Louisiana to provide an estimate of storm surge based flooding. Utilizing this storm surge and wave data along with the relative likelihood of each storm occurring, the CLARA model translates the information into flood depths (defined as the height of the floodwaters or storm surge above ground level) and determines economic damage to assets in a given area for the current condition, as well as for 10, 25, and 50 years in the future. The CLARA model also takes into account the chance of levee and floodwall overtopping or failure in protected areas using different risk scenarios. The three failure modes of a levee or floodwall modeled by CLARA include seepage, slope stability, and overtopping. In coastal areas unprotected by levees, floodwalls, or other structures, flood depths are determined by the height of the storm surge plus the height of the highest waves. This does not include any flooding due to rainfall. In areas entirely enclosed by a levee, flooding includes both rainfall and storm surge inundation due to levee overtopping or breaching.

3.1.2 Estimating Economic Damage

Economic damage is determined by the value of assets in a given area and the depth of flooding to which the assets are subject. Assets include residential structures (single family homes, small/large multi-family homes, and manufactured homes), non-residential structures (commercial and public buildings), industrial facilities, critical infrastructure (power plants, refineries, ports, etc.), agriculture (structures and crops), transportation infrastructure (roadways, railroads, and bridges), and vehicles. Economic damage for a given area includes the value of assets directly damaged, as well as repair or replacement costs, and other direct economic impacts such as cost of evacuation, loss of sales, loss of income, and relocation costs.

For future conditions, assets are projected out over the next 50 years using assumptions about coast wide and local population change. Assets are generally assumed to track population proportionally over time, with the exception of agricultural crops and transportation infrastructure. The 2017 Coastal Master Plan considers three growth scenarios to reflect a range of plausible future conditions including historical growth, concentrated growth, and no growth. For more information on the population growth and risk scenarios, see Attachment C3-25: Storm Surge and Risk Assessment.

By evaluating the results of different modeled storms, statistical flood risk metrics including expected annual damage (EAD) are computed. EAD represents the average damage estimated to occur from a storm surge based flooding event in any given year, taking into account both the projected chance of a storm occurring and the damage that would result. Structural and nonstructural risk reduction projects are evaluated and compared based on their ability to reduce EAD in the near-term (year 25) and long-term (year 50) timeframes.

3.1.3 Model Improvements

Specific updates to the CLARA model used to evaluate projects for the 2017 Coastal Master Plan include the following:

- **Expanded model boundary** – the CLARA model's geographic boundaries were expanded northward to capture potential areas of future flooding. During the 2012 analysis, it was noted that flooding, particularly under future conditions including sea

level rise and coastal land subsidence, was occurring beyond the initial northern boundary. In addition, coastal communities were at times divided in unexpected ways. For instance, the town of Gueydan, located in the west-central portion of the state along the northern model boundary, was partially excluded from the original domain. This made it difficult to assess the potential risk reduction from a proposed ring levee surrounding this community. To address these issues, the spatial domain was expanded for the 2017 Coastal Master Plan analysis.

- **Increased spatial resolution of model grid** – Previously, the primary geospatial units of analysis were the 2000 U.S. census blocks. Flood depth calculations were made at the centroid of each block; counts of assets and risk and damage estimates were subsequently aggregated to the whole block. These results were useful to support the 2012 Coastal Master Plan, but they were not of sufficient resolution to allow for more detailed analysis of flood risk vulnerability or the effects of nonstructural measures within communities. This was particularly true in rural areas along the coast, where homes, businesses, and other economic assets were grouped across census blocks with a large geographic area. The CLARA model now uses updated 2010 U.S. census blocks as well as a new grid of regularly-spaced points to ensure a minimum spatial resolution of 1 km² for the entire coast. The grid has higher resolution in areas with census blocks smaller than 1 km², such as in more densely populated urban areas (See Figure 2 below). There are 90,373 grid points (centroids) in Louisiana used for analysis in CLARA, which is about a 150% increase over the 35,556 census block centroids evaluated in the previous version.
- **Improved the inventory of coastal assets at risk** – Previously, the inventory of assets at risk used in the CLARA model was based primarily on USACE planning data collected immediately prior to the devastating 2005 hurricane season, FEMA's Hazards-U.S. (Hazus), and the 2000 U.S. Census. It did not include critical infrastructure assets such as power plants, refineries, and ports. For the 2017 Coastal Master Plan, the CLARA model uses more robust and newer datasets, such as parcel-level building inventories from more recent USACE studies and a federal critical infrastructure dataset.
- **Incorporated future economic growth scenarios and social vulnerability** – To determine future vulnerabilities, population growth is used to estimate the future distribution of assets. In 2012, a coast wide growth rate was applied to all parishes in the study area, and a simple assumption about the distribution of the population in rural versus urban areas was made. Now, the CLARA model incorporates growth scenarios that vary across the coast based on future population change influenced by several factors including various rates of population growth/decline, changes in flood depths, and land loss over time. (For more information on how growth scenarios were developed, see Attachment C3-25: Storm Surge and Risk Assessment.) The CLARA model also captures additional community characteristics, such as LMI households, to better account for other elements affecting communities' vulnerability.
- **Additional improvements** – Other model improvements included incorporating recent levee system research into system fragility scenarios, incorporating parametric uncertainty into flood depth estimates, and comparing the CLARA model flood depth and damage estimates to those observed during Hurricane Isaac for verification purposes (for more information, see Attachment C3-25: Storm Surge and Risk Assessment).

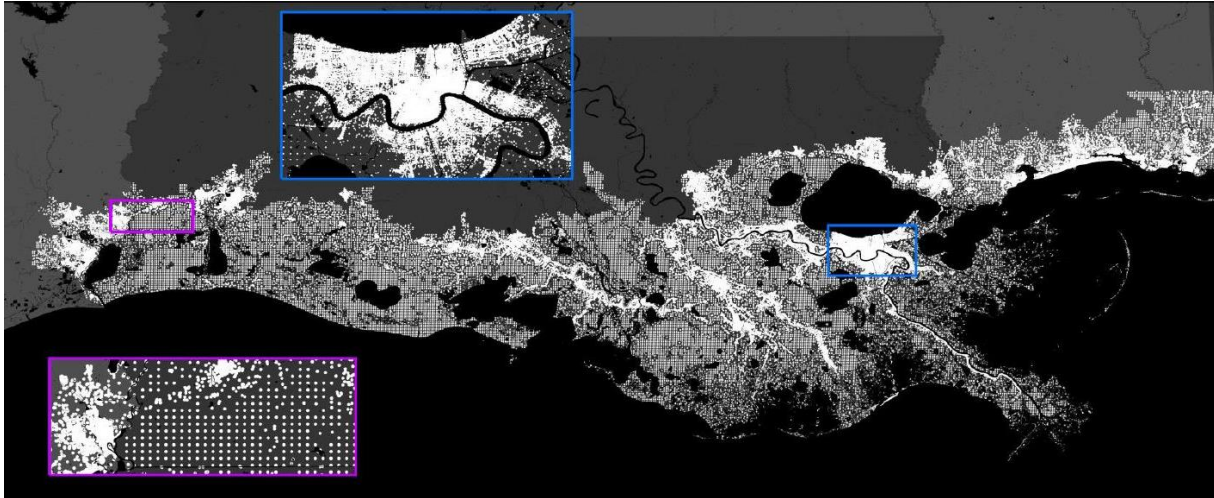


Figure 2: CLARA Model Study Area with 1 km² Grid Points and U.S. Census Block Centroids. Insets show New Orleans (blue) and Lake Charles vicinity (purple).

3.2 Nonstructural Risk Reduction Project Formulation for the 2017 Coastal Master Plan

For the 2017 Coastal Master Plan, nonstructural risk reduction project formulation occurs through several steps. First, 54 candidate nonstructural project areas were created using parish or municipal boundaries as well as current and/or proposed future protection systems. Second, within each nonstructural project area, several sets of project variations or mitigation options were developed. These project variations (termed “variants”) specify the nonstructural mitigation measures that correspond to different mitigation standards and community characteristics, such as LMI households within the project areas. These nonstructural project variants were compared to structural protection project candidates to identify the projects that provided the greatest total risk reduction. To support local decision making, CPRA will provide the parishes with the results of the 2017 Coastal Master Plan nonstructural risk reduction project evaluation, which contains information on current/future flood risk and identifies the number/type of structures recommended to be mitigated in each project area and the associated project cost estimate.

Step 1: Develop Nonstructural Project Areas

While the restoration and structural protection projects evaluated in the master plan are specific and discrete, the nonstructural risk reduction projects are a collection of mitigation measures that are applied to numerous structures in a specific project area. As described above, the CLARA model divides coastal Louisiana into over 90,000 grid points (Figure 2), although not all grid points contain structures that are at risk to flooding. Flood risk varies for each point, though grid points that are located in close proximity are likely to have similar levels of flood risk and mitigation cost-effectiveness. Nonstructural project areas were first determined by grouping grid points together based on similar geographic area, parish and municipal boundaries, and the centerlines of existing and proposed structural protection systems. For example, a project boundary may coincide with distinct areas either inside or outside structural protection systems such as the Greater New Orleans Hurricane and Storm Damage and Risk Reduction System (HSDRRS) or Larose to Golden Meadow. Figure 3 shows the geographic extent of each of the 54 candidate nonstructural project areas created for evaluation.

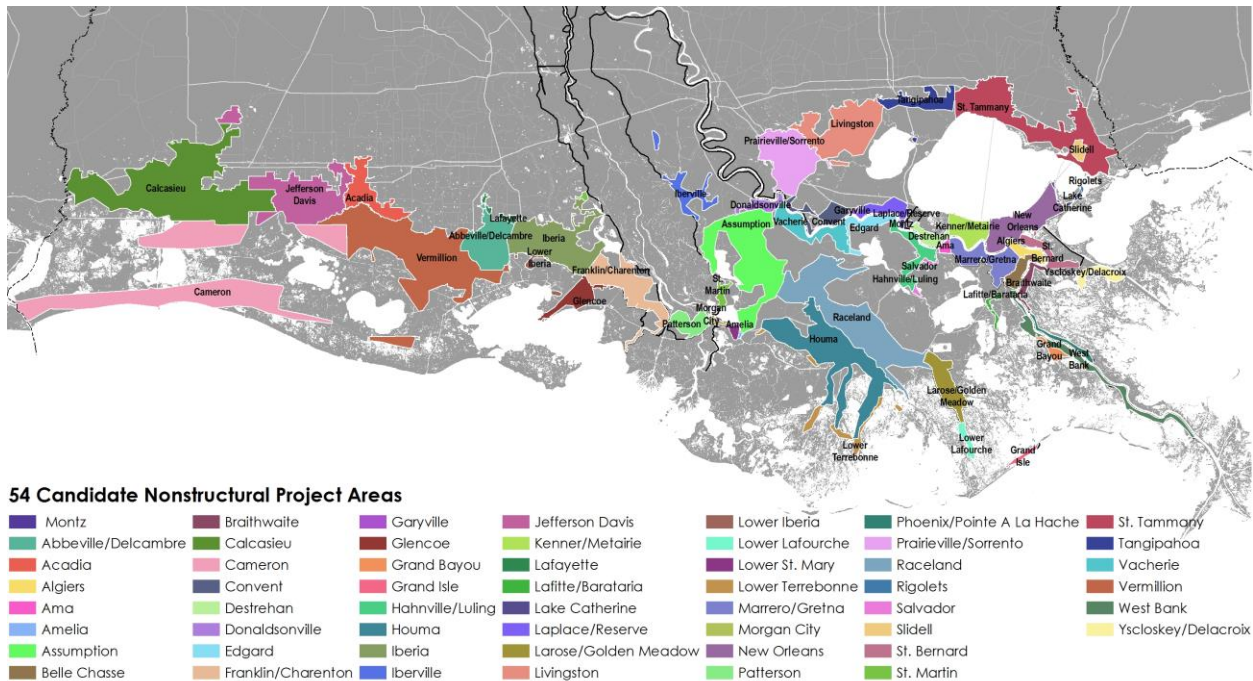


Figure 3: Candidate Nonstructural Project Areas. Project areas are divided by parish boundaries and existing or proposed levees.

Step 2: Develop Nonstructural Project Variants by Grid Point

Within each nonstructural project area, several project variants were developed to reflect different mitigation options. Project variants were created to explore and assess appropriate mitigation standards and level of nonstructural project investment across the coast. Each project variant is a combination of different mitigation measures (i.e., floodproofing, elevations, and voluntary acquisitions) for any given grid point within a nonstructural project area. In this step, project variants were developed using different mitigation standards that correspond to the CPRA 100-year flood depths (at each grid point) that the nonstructural measures are designed to mitigate. Mitigation standards were defined by a given basis year (initial condition, year 10, or year 25) and environmental scenario (Low, Medium, or High). For a description of environmental scenarios, see Section 2.2.4.1 in Appendix D: Planning Tool. For instance, a mitigation standard defined by a 100-year flood event under current conditions creates a set of nonstructural risk reduction projects that are very different than a mitigation standard defined by year 25 conditions and the High environmental scenario (see Table 2 below for a description of the various mitigation standards evaluated in more detail). It should be noted that the CLARA model flood elevation estimates in most areas are on par with or higher than FEMA's Base Flood Elevation (100-year flood depths).

Based on the different mitigation standards, and assuming an 80% participation rate, several sets of mitigation measures (or nonstructural project variants) were created for each grid point within the 54 nonstructural project areas. For each grid point and mitigation standard, the CLARA model calculated the number of structures mitigated (floodproofed, elevated, or acquired), the cost of mitigation, and the reduction in EAD from the nonstructural mitigation (at years 10, 25, and 50, and for each environmental scenario). This information, along with the specifications outlined in Step 3, was then passed to the Planning Tool for refinement by CPRA in the next step. Developing project variants is an important advancement of the 2017 Coastal Master Plan.

Since nonstructural project variants were based on flood depths at the 1 km² grid point level, mitigation measures are both specifically tailored to the local geographic area and account for future conditions and a dynamically changing landscape.

Step 3: Refine Nonstructural Project Variants with Additional Specifications

In order to better capture socio-economic considerations, the nonstructural project variants described above were refined for each project area by using the Planning Tool. In addition to the mitigation standard, the percentage of LMI households was also used to refine the nonstructural project variants. Thus, nonstructural project variants were defined using the following specifications:

- **Mitigation standard** – comprised of the basis year and environmental scenario that influence the 100-year flood depths
- **Percentage of LMI households mitigated** – requirement that grid points receiving nonstructural mitigation are located in areas where a certain percentage of the population is low to moderate income (LMI), or 50-80% below the median income level³

Depending on how each of these elements was applied to the variants, the number of structures floodproofed, elevated, and acquired for each grid point (and overall nonstructural project area) changes. In total, seven project variants were developed for each nonstructural project area (as shown in Table 2 below); variants were primarily determined by different mitigation standards as well as a requirement for mitigation in areas with a share of 30% LMI households. These seven project variants were submitted to the Planning Tool in order to determine which nonstructural risk reduction projects were ultimately selected for the 2017 Coastal Master Plan.

Table 2: Nonstructural Project Variants Defined by Mitigation Standard and LMI.

Variant	Mitigation Standard		Additional Constraint
	Time Period	Environmental Scenario	
1) Current Conditions	Current conditions	n/a	n/a
2) Year 10, Low	Year 10	Low	n/a
3) Year 10, Medium	Year 10	Medium	n/a
4) Year 10, High	Year 10	High	n/a
5) Year 10, Medium, LMI	Year 10	Medium	LMI > 30% of structures
6) Year 25, Medium	Year 25	Medium	n/a
7) Year 25, High	Year 25	High	n/a

³ Percent of the population who are 50-80% below the median income level as defined by the United States Department of Housing and Urban Development (HUD) Section 8 Housing Assistance Payments program (2014). For more information, visit: <https://www.huduser.gov/portal/datasets/il.html>.

Step 4: Evaluating Nonstructural Project Variants

For each project variant, the number and cost of mitigation actions is summarized in total and by structure type. As with structural risk reduction projects, each nonstructural project variant was evaluated for ability to reduce EAD at years 10, 25, and 50, as well as across different environmental and risk scenarios. These nonstructural project variants were compared to each other and to the structural risk reduction projects.

Step 5: Compare Individual Structural and Nonstructural Risk Reduction Projects

In the master plan development process, the Planning Tool was first used to compare individual projects to determine which projects best meet CPRA's goals of building land and reducing risk. In general, the Planning Tool selected the risk reduction projects that maximize near-term (year 25) and long-term (year 50) EAD reduction. In this step, the Planning Tool was used to **compare individual projects** where the Planning Team asked key questions such as:

- How do risk reduction projects rank with respect to near-term and long-term risk reduction cost-effectiveness?
- How do the rankings change under different scenarios?
- How do structural and nonstructural projects compare in terms of benefits?

To explore these questions, the Planning Tool ranked structural and nonstructural projects by their ability to reduce EAD. These rankings provided a representative comparison of different structural and nonstructural risk reduction projects of different sizes and locations. This helps stakeholders to understand which projects reduce the most risk across the coast, as well as which projects help achieve other related goals.

Step 6: Formulate and Evaluate Risk Reduction Alternatives

The Planning Tool develops alternatives (i.e., sets of projects) that are expected to best achieve CPRA goals, subject to implementation and performance constraints. The Planning Tool is designed to formulate many alternatives and summarize the key differences among them. Some alternatives varied key implementation constraints such as project funding. Others considered the effects on EAD outcomes. The Planning Tool is flexible and can be modified to respond to CPRA and stakeholder interests.

For the 2017 Coastal Master Plan, the alternative formulation and evaluation processes were conducted in an iterative fashion. The tool was used to identify a robust alternative that was designed to perform well across many plausible futures. In this step, the Planning Tool explored key questions such as:

- Which projects are always and never selected?
- How does project selection change across funding scenarios in which both the total available funding and the allocation between risk reduction project types changes?
- How much 50-year risk can be reduced under the environmental, risk, and funding scenarios?
- Can performance be improved for select metrics without sacrificing EAD reduction outcomes?

The Planning Tool formulated various alternatives that maximize EAD reduction for the different environmental, risk, and funding scenarios. Visualizations show the performance of these alternatives with respect to EAD and select other metrics. Comparisons of projects across the

alternatives were reviewed to identify low-regret risk reduction projects for the first implementation time period (years 1-30).

Step 7: Nonstructural Risk Reduction Project Selection Refinement

After review of initial project outcomes for the risk reduction alternatives, some additional refinement of the nonstructural risk reduction projects was undertaken for subsequent rounds of alternative formulation. For example, while all nonstructural risk reduction projects were evaluated for their ability to reduce EAD, in certain instances, the implementation of a structural project increased flood depths outside the levee system necessitating the implementation of a nonstructural risk reduction project to mitigate the area of induced flooding. Ten nonstructural risk reduction projects were identified as prerequisites for structural projects recommended in the master plan.

For more information on how the Planning Tool considers differences in structural and nonstructural risk reduction project implementation, project benefits for risk reduction, alternative formulation, and the plan development process, see Appendix D: Planning Tool.

Step 8: Incorporating Public Comment: Moving from Draft to Final Master Plan

Based on the nonstructural risk reduction project formulation process described above, 32 nonstructural risk reduction projects were selected for the 2017 Coastal Master Plan. These projects comprised the mitigation of approximately 26,233 structures for an estimated cost of \$6 billion.

Extensive public feedback collected during the series of public hearings held in January and February 2017 demonstrated public support for the nonstructural risk reduction project recommendations. The final plan included a suggested change to move project CAL.01N from the second implementation period (years 31-50) to the first implementation period (years 1-30). Additional public comments suggested adding more detail to the description of the parish prioritization process, which is part of the local refinement of nonstructural risk reduction projects and selection of specific structures to be mitigated. The final plan requires parishes to first prioritize mitigation of LMI within each nonstructural project area. See Section 4.2.2 Phase II: Initial Assessment for more details on the parish prioritization of LMI households.

Thus, the final master plan recommends:

- Mitigation of approximately 26,000 structures for \$6 billion over the next 50 years
- Approximately 1,400 structures recommended for non-residential floodproofing
- Approximately 22,400 structures recommended for residential elevation
- Approximately 2,400 structures recommended for residential voluntary acquisition

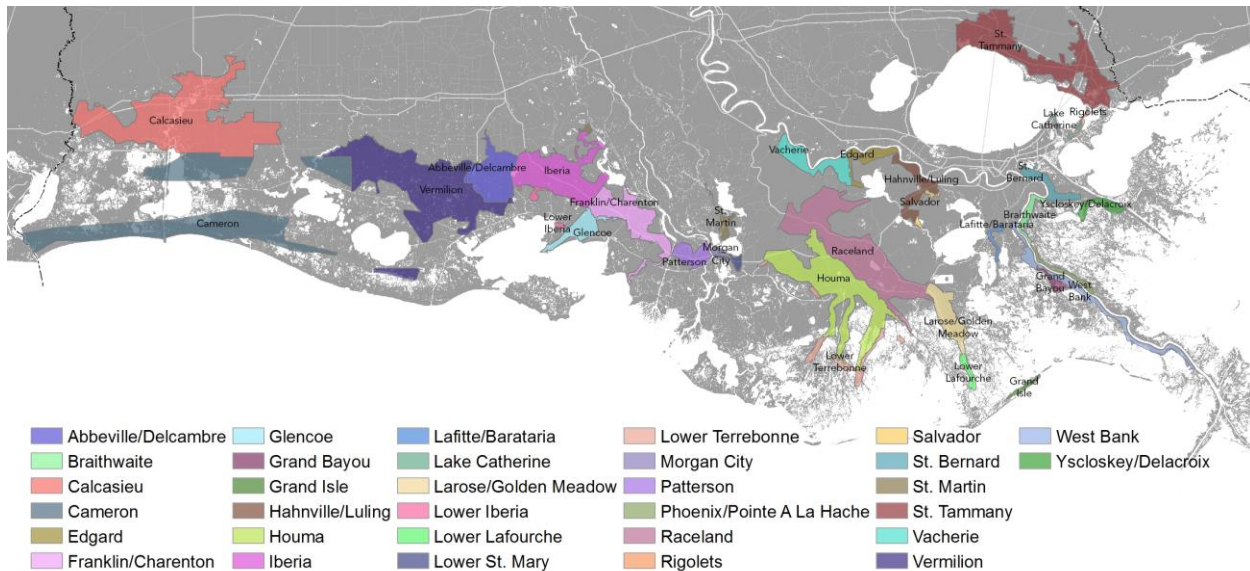


Figure 4: Final 2017 Coastal Master Plan Recommended Nonstructural Project Areas. Projects are recommended in 32 areas across the coast.

4.0 Program Implementation

CPRA's Flood Risk and Resilience Program is envisioned as a state-led, coast wide, nonstructural flood mitigation program for coastal Louisiana parishes. CPRA developed a risk reduction strategy that coordinates state resources and prioritizes areas of high risk, while parishes will play a lead role in implementing projects and selecting specific structures to be mitigated. The program is intended to take advantage of nonstructural project funding outside federal grant programs in order to maximize flexibility and speed the implementation of "shovel ready" projects that further comprehensive coastal risk reduction goals.

Implementing a coast wide nonstructural program is a challenging endeavor that entails broad coordination with ongoing resilience efforts and an innovative approach that complements other state and federal mitigation programs. CPRA recognizes that successful program implementation will require a heightened level of coordination across state agencies as well as enhanced state and local collaboration. Other state agencies and many local governments have made great strides to lower communities' flood risk by pursuing nonstructural strategies. CPRA understands that there may be constraints and limitations to existing elevation and mitigation programs and seeks to help fill these gaps and broaden access to funding opportunities by lowering local match requirements, providing resilience incentives, and supporting local capacity building. As part of the 2017 Coastal Master Plan, the Flood Risk and Resilience Program focuses on establishing a state-led nonstructural program and formalizing the collaborative partnerships needed to implement that program in the way that best meets the needs of coastal Louisiana communities.

State and federal agencies that fund mitigation projects have traditionally assumed the responsibility for verifying project eligibility and approving projects to ensure the appropriate use of public funds. It is therefore envisioned that CPRA will review and approve its own agency-

funded projects. CPRA will also continue to coordinate with GOHSEP throughout the nonstructural application process and any future project implementation.

The application process was developed specifically to streamline and simplify grants/project management, lower barriers to participation, reduce costs through large-scale project implementation, and incentivize homeowners and business owners to mitigate their flood risk. Where possible, the application process requirements align with federal programs in order to facilitate match, leverage funding, and support audit-sound practices. Additionally, CPRA has developed a detailed Nonstructural Application Package containing many tools and templates that are not usually available in a single, easy to access space (or sometimes even available at all) in other grant programs. This document package creates an efficient, streamlined, and user-friendly application process that enables the implementation of nonstructural risk reduction projects as soon as funding becomes available.

A brief overview of the application process is provided on the following pages. This application process has been reviewed by other state agencies, FEMA, and has been piloted within a parish to confirm and refine effectiveness. Attachment E4: Parish Applicant's Handbook contains more detailed guidance for parishes to facilitate the submittal of an application for funding of non-residential floodproofing, residential elevation, and/or voluntary residential acquisition projects.

4.1 State and Local Coordination for Nonstructural Implementation

Nonstructural risk reduction projects that are recommended in the 2017 Coastal Master Plan will require additional "hands-on" coordination between state agencies, coastal parishes, municipal governments, and local property owners. State-level partnerships will provide important oversight, technical knowledge, assistance in grant management and implementation, and integration into ongoing hazard mitigation programs. Coastal parishes will provide key site-specific details, such as the specific structures included in proposed nonstructural risk reduction projects, to allow for further refinement of the most viable project candidates. The assistance of incorporated municipalities will also be needed (e.g., to verify compliance with local flood ordinance regulations).

4.2 Parish Application Process

CPRA is using the best-available science and lessons learned from other mitigation programs to create a coast wide nonstructural program that effectively reduces flood risk and meets the needs of coastal residents. Given limited resources, CPRA seeks to prioritize implementation of nonstructural risk reduction projects in a way that best invests available funding. This process enables wise use of resources while trying to meet the needs of the communities most vulnerable to flood damage because they are either located in areas of high risk or they may not have the economic resources to prepare for or recover from a storm surge based flooding event. The program is also designed to adaptively respond to local needs by enabling parishes to further develop and refine nonstructural risk reduction projects through application phases. This program builds off ongoing mitigation successes to offer substantial benefits such as:

- Reducing cost share requirements as compared to federal programs: 90% CPRA funded with up to 100% full state funding when certain requirements are met.
- Encouraging the implementation of large-scale nonstructural risk reduction projects to take advantage of economy of scale and encourage contiguous planning, wherever possible.

- Supporting local decision making through parish prioritization of structures to be mitigated.
- Promoting higher standards of risk reduction by elevating residential structures to CPRA 100-year flood depths plus two feet of freeboard (under the High environmental scenario).
- Meeting the needs of economically vulnerable communities by prioritizing mitigation of structures with LMI households.

While the risk assessment modeling and vulnerability analysis provides the initial information needed to determine which projects will be included in the 2017 Coastal Master Plan, it **does not** recommend specific structures to be mitigated. Therefore, additional detailed information is needed from parishes to prioritize specific structures to be mitigated and to evaluate the suitability of these structures for proposed nonstructural mitigation measures. This additional information will also help refine elements such as project cost estimation, scope, and implementation timeframe.

Should funds become available in the future for the Flood Risk and Resilience Program, CPRA will work with the CPRA Board's Flood Risk and Resilience Subcommittee to review and approve project applications based on the criteria outlined in this document. Funding would be recommended on a 3-year cycle through allocations in CPRA's Annual Plan.

To ease the burden of this data collection, parishes will be asked to participate in a three-phased application process (see Figure 5). **Phase I – Programmatic Requirements** requires limited effort and will focus on determining whether the parish meets various programmatic requirements, as well as identifying necessary steps should the parish not have the resources or capacity to implement a nonstructural project at the scale recommended by the program. **Phase II – Initial Assessment** will involve the identification and prioritization of individual structures for funding, evaluation of structures' eligibility, collection of notices of voluntary interest and income information from participating households to determine LMI status, determination of estimated budget, and selection of a contractor(s). **Phase III – Detailed Assessment** will involve a more detailed structure assessment, evaluation of technical feasibility, final determination of project scope of work, as well as a formal request for project funding. The Phase III application also includes a professional engineering assessment, refined cost estimates, refined project implementation timeline, property owner voluntary participation form, as well as documentation requirements to substantiate LMI status.

To also address any substantial administrative challenges or lack of capacity, parishes are able to request funding from CPRA in order to complete Phase III of the application process. This funding will be made available by reimbursement with appropriate cost documentation.

It should be additionally noted that mitigation techniques other than those identified in the 2017 Coastal Master Plan may not be eligible for funding through the CPRA Flood Risk and Resilience Program. Potential projects should be carefully compared with the details of the 2017 Coastal Master Plan, and discussed with CPRA, prior to completing the Phase II application.

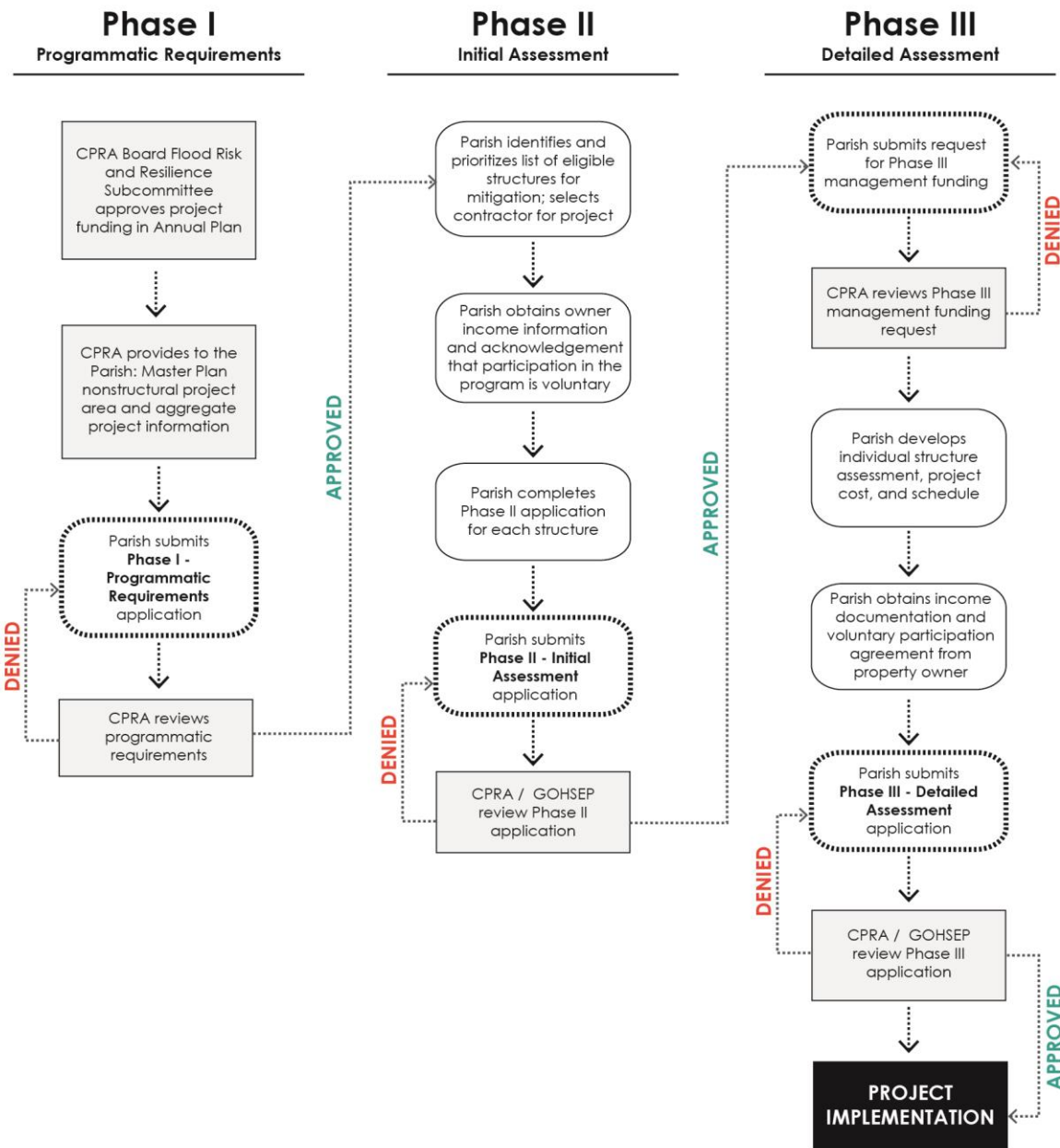


Figure 5: Overview of the Flood Risk and Resilience Application Process.

4.2.1 Phase I – Programmatic Requirements

Parishes will first need to meet certain planning requisites, provide details about past mitigation grant projects they have developed and implemented, as well as state their current institutional capacity to participate in CPRA's Flood Risk and Resilience Program.

- Planning Requisites.** As a condition of receipt of CPRA funds, local governments must have in place current FEMA-approved local hazard mitigation plans and local master

plan/comprehensive plans (where adoption is required) that are consistent with the State's master plan.

- **Past Track Record.** The parish should submit an overview of mitigation grants awarded over the last ten years and number of mitigations completed by the parish. The overview should include funding sources, types of projects completed, project period of performance, and the ability to manage the project, budget, and schedule. Any unplanned issues or problems that arose during the award, construction, and closeout phases of the project should be identified, and the approach for the problem's resolution should be described in the parish's written explanation. It should be noted that the completion of past mitigation projects is not a prerequisite for parish eligibility, but instead allows CPRA to gain a better understanding of the parish's capacity and grant management abilities.
- **Current Capabilities.** The application should include a description of the parish's current capabilities to implement CPRA recommended nonstructural risk reduction projects (keeping project scale in mind). Where there is a capacity gap, the parish should describe the resource(s) needed to close the gap. Information should include the name and title of the proposed project lead, the number of staff, their skills and background, and years of experience in their current position and/or previous local government experience in obtaining and implementing mitigation grants. If inexperienced with nonstructural measures and/or mitigation grants, the parish should describe its willingness to participate in workshops, mentoring programs, and other forms of training needed to increase capacity. Parishes interested in sharing their knowledge with other parishes should also indicate this willingness in Phase I.

In addition to the above, parishes wishing to lower their cost share requirement should submit additional documentation substantiating whether they qualify for cost share incentives during this phase of the application process. Details about what activities qualify for cost share incentives are found in Section 4.3.1. The applicant must satisfy the requirements of Phase I to move on to Phase II. Clearance to move on to Phase II will be provided at the sole discretion of CPRA. To demonstrate continued compliance with Phase I requirements, documentation will need to be re-certified every three years through the life of the program.

4.2.2 Phase II: Initial Assessment

The second phase of the Flood Risk and Resilience Program application focuses on developing project proposals that support the nonstructural risk reduction projects recommended by the 2017 Coastal Master Plan. The parish will provide the information needed to refine the nonstructural risk reduction project, including total number/type of structures to be included in the project, proposed nonstructural mitigation, overall project costs, and budget, as well as some preliminary structure documentation and initial contact with property owners. Preliminary project information to be developed consists of:

- Number and type of structures to be mitigated
- List of prioritized structures, including structure details and photos
- Maps of project area
- Type(s) of nonstructural mitigation measure(s) proposed
- Estimated budget (including material, labor, and fees)
- Any existing funding or match
- Percent of LMI households within the project area; determination of LMI is based on property owner income

- Statement of intent to request reimbursement for Phase III costs
- Property owner level of interest in participating in the program

To support local decision making, CPRA will provide the parishes with the results of the 2017 Coastal Master Plan nonstructural risk reduction project evaluation which contains information on current/future flood risk and identifies the number/type of structures recommended to be mitigated in each project area and the associated project cost estimates. It may be necessary to divide CPRA's nonstructural project areas into smaller subprojects to accommodate limits in available funding and implementation capacity. The parishes will need to determine which specific structures within the project area can be mitigated first with the available funding.

Parishes will need to prioritize properties in the following order of importance - structures benefitting low to moderate income households, properties that are owner occupied/primary residences, properties contiguous to one another (or that complete an area of contiguous mitigation), and properties with the highest flood depths. Parishes may also want to consider prioritizing based on repetitive or historical flood loss (with or without insurance). Should funding only be available for a portion of the project, CPRA will prioritize properties that meet those above criteria for mitigation. The parish may also include additional criteria that address parish-specific issues, but should keep in mind that percentage of households that qualify as low to moderate income is a required feature in CPRA's project prioritization process.

Prioritization of Funding to LMI Households

As part of CPRA's goal to provide a comprehensive approach to flood risk reduction, parishes are required to prioritize projects that specifically benefit LMI households. As such, the applicant must determine and communicate to CPRA the number of LMI households that will benefit from the project. Projects with the greatest share of benefits to LMI populations will be identified as higher priority for mitigation. In Phase II, applicants are asked to indicate the number of LMI households that will benefit from the project, as well as provide household affidavits related to income. In Phase III, CPRA requires documentation from each participating household to verify this information before the project can be fully implemented. More information on this process is provided in Attachment E4: Parish Applicant's Handbook.

In Phase II of the application process, a parish will also select the contractor(s) who will be responsible for realizing the project; mitigating multiple structures with a central contractor will maximize cost-effectiveness and streamline project implementation. CPRA will explore efforts with GOHSEP to maintain a list of qualified contractors with current and appropriate construction license, insurance, and bonding information as well as project references. The parish will also provide information needed to refine project costs, evaluate the specific properties to be mitigated, and validate the eligibility of each structure. Wherever possible, the parish should look to include as many contiguous properties as possible to create a more seamless project. For acquisition projects, this will result in a larger, continuous parcel of land that offers more open space benefits to recreation, conservation, or water management efforts. For elevation and floodproofing projects, this will result in a more uniform streetscape post-project. The following example data will be needed for each structure in the Phase II application:

- Street address
- Year built
- Total square footage of structure
- Structure type (e.g., residential, commercial, general public building, critical facility, school/faith-based institution, etc.)
- Construction type (e.g., concrete block, wood frame, metal frame, brick, etc.)

- Foundation type (e.g., slab, crawlspace, piling, pier, etc.)
- Property appraiser record
- Elevation Certificate (if available)
- Structure occupancy (owner-occupied or rental unit)
- Pictures of structure (show all four sides and general streetscape)
- Household income per structure (for LMI status)
- Submittal of a Property Owner Notice of Voluntary Interest – structure owners will be requested to state their interest (e.g., medium, high) in the mitigation measure proposed for their structure but will not be asked to fully commit to the project until detailed project cost estimates are developed during Phase III of the application process. At all stages of project implementation, participation is purely voluntary.

Information provided in the Phase II application will help CPRA:

- Confirm that the structures need to be mitigated and that they are suitable for the type of mitigation selected based on the preliminary structure analysis
- Determine if specific features of the structure, like foundation or construction type, may potentially modify the initial cost estimates (either increase or decrease)
- Confirm that the property owner is interested in participating and understands that participation is purely voluntary
- Validate appropriate contractor(s) to perform project(s) work
- Prioritize nonstructural risk reduction projects for funding

The applicant must satisfy the requirements of Phase II to move on to Phase III. Clearance to move on to Phase III will be provided at the sole discretion of CPRA; CPRA will work closely with applicants through the application process to the greatest extent practicable.

4.2.3 Phase III – Detailed Assessment

Under Phase III, the parishes will submit refined and more detailed applications to CPRA with a formal request for project funding, as well as a request for reimbursement to complete Phase III, if applicable. Many of the program requirements will be similar to the FEMA mitigation grant programs administered by GOHSEP, except for the benefit cost analysis, which has been completed by CPRA, and the requirement that LMI be a structure prioritization factor. The Phase III application process will generally begin when the parish submits a request for Phase III management funding, as this phase includes activities, such as elevation feasibility analyses, that may require professional technical services. Technical and programmatic assistance will be provided during this phase, as needed. CPRA will examine options for technical assistance, including mentoring by experienced parishes, pre-project workshops, and data sharing/analysis. Some of the potential technical assistance will be provided on an incentive basis (see Section 4.3.4 Capacity Building Measures and Leveraging Data Resources for more information). The parish will develop a detailed Phase III application, which will then be reviewed by CPRA, who will make the final decision on whether to approve the project.

The Phase III applications will include specific project information such as:

- Refined list of prioritized structures
- Refined scope of work that describes existing flood risk and details the proposed project with site plan/map, professional engineering assessment, and conceptual project design.
 - Detailed professional engineering assessment of current structure and foundation condition and suitability for elevation or floodproofing. This assessment may

include inspection of subflooring in crawl spaces, additions to the original structure, and review for damage.

- Refined project timeline and milestones (including permitting and required environmental, historic, and/or cultural resource review)
- Estimated total project cost and request for funding from CPRA
 - Total project budget and detailed cost estimates by a design professional/contractor for floodproofing, elevation, or acquisition for each structure in a project application based on materials, labor, and fees. This may include site-specific information not available in the initial Phase II evaluation such as preliminary construction plans, permitting and environmental, historic, and/or cultural resource review requirements (depending on funding source).
 - Phase III requests for reimbursement, as applicable
- Property owner's written voluntary participation form is required to move forward with mitigation, provided that funding is awarded. Additionally, property owners must submit documents pertaining to duplication of benefits and declaration of eligibility/liability release, as well as documentation to confirm income reported in Phase II. Information regarding any future maintenance requirements (e.g., commitment to maintain a floodproofing project) or statement of assurances (for voluntary acquisition projects) are needed as well.

Example information to be collected during the Phase III Detailed Assessment includes:

- Structure information, as well as any updated information from Phase II:
 - Structure type
 - Construction type
 - Foundation type
 - Soil type
 - Lot size (square footage)
 - Structure size (square footage)
 - Number stories
 - Year built
 - Condition of structure
 - Fair market value of structure and lot (based on property appraiser record)
 - Utilities/utility hookup configuration
 - Environmental considerations or zoning issues
 - Identification as historic property or eligible for a historic designation
 - Americans with Disabilities Act (ADA) considerations (e.g., need for elevators or ramps)
 - Structure occupancy (owner-occupied or rental unit)
 - LMI final determination documentation
- Flood hazard information:
 - NFIP flood zone and effective FEMA BFE
 - Finished flood elevation and/or elevation certificate
 - Local flood ordinance elevation requirements
 - Recommended CPRA elevation height
 - Flood claims and/or repetitive loss (RL) or severe repetitive loss (SRL) categorization

- Mitigation information:
 - Is structure suitable for mitigation?
 - Are there other mitigation projects in area that could potentially impact the project?
 - Is the property contiguous with another property in the application package?
 - Other notes that might affect project scope or cost (e.g., in the case of elevation projects, unusual shape of the structure)
- Property owner(s):
 - Willingness to participate
 - Completion of Notice of Voluntary Participation
 - Completion of Declaration of Eligibility and Release of Liability form from owners with signature authority
 - Completion of Duplication of Benefits form and confirmation that there is no duplication of funding from another mitigation grant (see Attachment E4: Parish Applicant's Handbook Section 3.2.4 Duplication with Other Funding Sources)

The Phase III evaluation factors used by CPRA for project approval include:

- Funding source restrictions, prerequisites, and availability
- Compliance with the Flood Risk and Resilience Program requirements
- Time required to implement the project (including design, permitting, and construction time)
- Detailed feasibility assessment for elevating or floodproofing the structure
- Property owner written Voluntary Participation form
- Property owner Duplication of Benefits form
- Factors that may increase costs over the original estimate
- Notes of any potential structural/permitting/title challenges or obstacles
- Historic structure review, environmental/cultural review and considerations
- Additional project-specific paperwork (such as a maintenance agreement for acquisitions or publicly owned property)
- Flood Risk and Resilience Program requirements for the parish prioritization process including:
 - Low to moderate income households
 - Owner occupied/primary residences
 - Contiguous properties/complete an area of contiguous mitigation
 - Highest flood depths
 - Other parish considerations, such as repetitive or historical flood loss (with or without insurance)

4.3 Overview of Program Policies and Procedures

Once a parish's proposed nonstructural risk reduction project has been selected for implementation through the Flood Risk and Resilience Program, it will need to follow program and project specific policies and procedures. In order to provide for efficient and effective program management and oversight, CPRA has established program policies and procedures to cover a variety of topics. These can be defined by four major areas of interest: 1) cost share and incentives; 2) funding policies and procedures; 3) project management and monitoring; and 4) capacity building measures and leveraging data resources.

4.3.1 Cost Share and Incentives

FEMA and state mitigation grant programs generally require a local match of funds, referred to as the non-federal cost share, to demonstrate commitment to the mitigation project. The standard FEMA mitigation grant cost share is a 75%/25% FEMA/non-federal source split, unless it is a Flood Mitigation Assistance (FMA) project with severe repetitive loss (SRL) which is typically fully funded by FEMA or repetitive loss (RL) which is 90%/10%. Disadvantaged communities may receive a 90%/10% cost share through the FEMA Pre-Disaster Mitigation (PDM) program. The non-federal “matching” funds are often provided by the local government or the structure owner, but this can present a financial hardship and sometimes prevent a project from going forward. This is especially true after a disaster, when scarce governmental funds are directed toward meeting cost share requirements for response and recovery programs.

The Flood Risk and Resilience Program's cost share will be 90% CPRA funds/10% local match. To advance flood risk reduction in Louisiana beyond the resources under CPRA jurisdiction, the Flood Risk and Resilience Program is structured to provide additional incentives to participating parishes to reduce this cost share responsibility. These incentives promote voluntary programmatic measures that demonstrate an even deeper commitment by the parish to advance flood risk reduction in their area.

Programmatic measures that reduce coastal flood risk are an important part of the Flood Risk and Resilience Program approach. These measures typically involve action by local elected officials to implement or modify codes, standards, and ordinances. Because the drafting, modification, and implementation of these measures are the domain of local governments, CPRA will reward actions taken by these bodies toward greater risk reduction. Parish applicants will be required to submit information and documentation substantiating how they meet these cost share requirements during Phase I of the application process. CPRA will offer a 5% reduction in cost share for each activity implemented below (up to a 100% CPRA funding):

- **Join or expand participation in NFIP's Community Rating System (CRS) to lower flood risk and reduce costs of flood insurance.** CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result of participation, flood insurance premium rates are discounted community wide (for those structures in the mapped special flood hazard area) to reflect the reduced flood risk resulting from the community actions that meet the three goals of CRS: 1) reduce flood damage to insurable property; 2) strengthen and support the insurance aspects of the NFIP; and 3) encourage a comprehensive approach to floodplain management (NFIP, 2013).
- **Adopt additional elevation height requirements (known as freeboard) above minimum standard in local flood ordinances to the FEMA BFE +2 ft or CPRA's recommended elevation height (100-year flood depths plus two feet of freeboard), whichever is higher, in order to add a wider safety margin for future flood risk.** Many parish ordinances do not currently include freeboard requirements and structures only have to be built to FEMA's 100-year BFE. However, many flood maps are outdated, and the BFE may not reflect the actual flood risk or the anticipated increased risk in the future. The adoption of a higher freeboard requirement will help protect future development and redevelopment against dynamic factors like changes in storm frequency and intensity, relative sea level rise, and other factors that contribute to land loss, and it will decrease flood insurance premiums for those structures elevated above the BFE.

- **Adopt local policies that focus infrastructure investment and development in areas outside of a flood zone, such as a property tax reduction or a higher density allowance. When facilities must be located in a flood zone, implement the following examples or similar measures:**
 - Require floodproofing of power generation facilities, water/sewage infrastructure, power transmission infrastructure, transportation infrastructure, or other critical facilities to a higher level of protection, such as the 500-year flood elevation (0.2 percent annual chance).
 - Siting and design of these facilities must take into consideration impacts from climate change, including increasing winds, storm surge, and sea level rise, to protect public and private investment and the welfare and safety of current and future populations.
 - Any new facilities must be built to the 500-year flood elevation to be consistent with the standard for critical actions in 44 CFR Part 9 (Floodplain Management and Protection of Wetlands) and in anticipation of the requirements of Executive Order 13690 (Federal Flood Risk Management Standard).

If a parish received credit for meeting one or more of these incentives, documentation will need to be re-certified every three years to demonstrate continued compliance with these incentive standards. Beyond cost share benefits, other incentives available from CPRA for parishes that implement the above measures could include:

- Parish staff support required to implement the nonstructural risk reduction projects that may be funded in their area.
- Use of CPRA funds to serve as non-federal match for FEMA mitigation grant projects that meet CPRA's master plan objectives. By using CPRA grant funds for the non-federal cost share, parishes may be able to implement projects that they could not otherwise undertake due to lack of a local match. Parishes which intend to use CPRA funds as match must indicate this during the application process.

Overall, these incentives can help increase the number of grant applications, eliminate or reduce the financial burden of cost share responsibilities, and encourage the implementation of projects which meet the master plan goals of reducing communities' flood risk more efficiently.

4.3.2 Funding Policies and Procedures

The Flood Risk and Resilience Program is structured similarly to other federal mitigation grant programs, where the local government is responsible for paying for any work completed and then must request reimbursement for the eligible activities.

In general, nonstructural risk reduction projects will be funded through reimbursements on a milestone-based funding cycle. After the inclusion of a nonstructural risk reduction project in CPRA's Annual Plan, CPRA recommends setting up a Cooperative Endeavor Agreement (CEA) with the parish to put into place a contracting mechanism. To expedite project implementation, the CEA will provide a means to distribute funding through CPRA to parishes for approved project and program management costs. Once the nonstructural application and project has been approved, the parish will make requests for reimbursement based on milestones established in the project schedule. Parishes may also elect to submit reimbursement requests for certain program activities, as opposed to specified time periods of activity. Payment requests can only cover costs associated with the approved scope of work for a particular milestone. Each request must be accompanied by sufficient documentation to support the request.

In addition to funds requested after the project has been approved, parishes can submit requests for reimbursement for work conducted to complete the Phase III application. The process to complete the Phase III application may be resource intensive and, as such, parishes may request funding for reimbursement of eligible technical or administrative expenses. For example, funding is available to develop the scope of work and procure professional assessment reports for all structures included within an application. Applicants should notify CPRA of the intent to request for reimbursement in Phase II and submit the formal request for reimbursement in Phase III of the application process. Reimbursement for Phase III costs will be awarded at the sole discretion of CPRA. If the Phase III cost request is approved and Phase III costs are eligible, the cost share for the reimbursement of these activities will be determined by CPRA based upon the cost share requirement determined in Phase I – Programmatic Requirements of the application process.

CPRA Flood Risk and Resilience Program funds must not be spent on activities outside the approved scope of work. Requested reimbursements will be reduced by any amount of funds spent on activities outside the approved scope of work. If the project is complete and all payments to the parish have been made, the parish will be responsible for fully reimbursing CPRA for any funds spent on activities determined to be outside the approved scope of work.

Parishes are also responsible for determining whether a participating property owner has received duplicative funding for the same mitigation measure through another funding source, such as federal flood insurance or FEMA/U.S. Department of Housing and Urban Development (HUD) mitigation grant programs. The Phase III application contains a duplication of benefits form that property owners must complete. If a duplication of funding is discovered at a later date, the parish is responsible for notifying CPRA in writing. If a homeowner/property owner is awarded federal mitigation funding through FEMA Hazard Mitigation Assistance (HMA) programs, that project will need to be funded through the federal program and not with state funds.

4.3.3 Program/Project Management and Monitoring

To effectively manage flood risk mitigation projects, parishes should assign a project lead, or case manager, to each floodproofing, elevation, and acquisition project. The project lead will be responsible for project implementation and oversight at the local level and for providing CPRA with project status updates.

Although local governments will have the primary responsibility for project oversight and monitoring, CPRA will consider reasonable assistance requests on a case by case basis and will provide programmatic assistance to the parishes on an as-needed basis, CPRA resources permitting. This assistance could include:

- Assistance for collecting required project data and scope changes
- Programmatic guidance for application preparation and problem resolution
- Guidance for project closeout responsibilities and procedures

As the grantor of the Flood Risk and Resilience Program, CPRA will assume program management responsibilities of financial monitoring to avoid cost overruns or projects that are not built to the approved conditions, as well as project auditing to verify compliance with program requirements and adherence to the approved project design.

See Section 3.3 Program and Project Management/Monitoring in the Attachment E4: Parish Applicant's Handbook for greater detail about the Flood Risk and Resilience Program's program/project management and monitoring requirements. The information presented in the Handbook clearly identifies resident, parish, state, and CPRA duties and responsibilities. In summary, the guidance pertains to the following elements of project management:

- Program management costs
- Project costs
- Project tracking
- Project closeout and compliance
- Timekeeping and cost documentation
- Contractor list
- Bid procedures
- Communication with property owner
- Confirmation of lawful status of participating property owners
- Historic preservation requirements
- Life safety and need to evacuate

4.3.4 Capacity Building Measures and Leveraging Data Resources

CPRA recognizes that capacity building is often one of the most challenging aspects for local governments as they take steps towards implementing nonstructural risk reduction projects, managing mitigation grant programs, or undertaking other actions to reduce local communities' flood risk. To assist with capacity building, CPRA will consider funding nonstructural grant application training workshops and encouraging experienced parishes to mentor other local governments needing additional advice or technical expertise. While the training workshops will convey critical information to attendees, the most effective capacity building is through sustained mentoring, where an experienced official can guide applicants through the project application development and project implementation process. The Louisiana Resiliency Assistance Program (<http://resiliency.lsu.edu>) is a compilation of local success stories and best practices which could also serve as a resource to assist parishes with resilience efforts.

Leveraging Data Resources for Other Planning Efforts

In addition to supporting capacity for grants management directly, CPRA produces a substantial amount of data and technical flood risk information that may be valuable to parishes for other flood risk reduction or resilience planning activities. This data is available through the Master Plan Data Viewer:

<http://cims.coastal.louisiana.gov/masterplan/>.

Data and information from the 2017 Coastal Master Plan's modeling effort could be useful to parishes that are updating their local Comprehensive Plans, Hazard Mitigation Plans, CRS Flood Mitigation Plans, and Threat and Hazard Identification and Risk Assessments (THIRA). In addition, CPRA's flood risk information could be included as parts of a hazard mitigation element for a comprehensive plan to better align state and local planning processes. For instance, CPRA's flood risk data was utilized by the Office of Community Development when developing Louisiana's Strategic Adaptations for Future Environments (LA SAFE) plan.

CPRA will continue to make the 2017 Coastal Master Plan modeling data and other relevant information available to parishes to assist with these types of efforts; encourage expanded use and application of master plan flood depth and damage data by local officials, planners, and residents for planning and decision making; provide education and technical support for data access and interpretation; and improve and better coordinate data sharing across agencies, which is likely to contribute to major cost savings for individuals, communities, states, and federal agencies.

4.4 Overview of Project Specific Policies and Procedures

This section includes project specific policies and procedures to guide effective implementation of CPRA funded projects. The policies and procedures take into account the specific elements of and requirements for the different nonstructural risk reduction project types, including non-residential floodproofing, residential elevation, and residential voluntary acquisition. These policies are designed to:

- Confirm nonstructural risk reduction projects meet master plan goals and objectives
- Facilitate effective implementation of nonstructural risk reduction projects
- Ensure proper stewardship of public funds
- Follow accepted industry standards

A brief summary of each nonstructural risk reduction project type is provided below, but for more detailed descriptions of specific policies and procedures and how they are applied to individual projects can be found in Attachment E4: Parish Applicant's Handbook.

4.4.1 Non-Residential Floodproofing Projects

Floodproofing projects are recommended for non-residential structures expected to experience flood depths below three feet, but greater than one foot, at the 100-year flood (1 percent annual chance of exceedance) as determined by the 2017 Coastal Master Plan and CLARA modeling effort. Policies and procedures regarding techniques for floodproofing, project costs, constructability, operation and maintenance issues, project management, and flood insurance

have been developed and are included in Section 4.1 Non-Residential Floodproofing Projects of Attachment E4: Parish Applicant's Handbook.

Example allowable expenses for non-residential floodproofing projects include the following:

- Initial structure evaluation and engineering/design
- Surveying and soil sampling
- Title search, legal and/or permitting fees
- Labor and materials including flood shields, floodproofing, flood-resistant materials, sewage backflow/internal drainage system, etc.
- Preparation of an emergency operations plan

Floodproofing of structures requires ongoing maintenance and, often, manual operation of floodproofing mechanisms. The following items must be addressed during planning, design, and/or construction of a floodproofing project:

- Local and state building codes
- Functional and operational factors related to long-term maintenance and operation
- Consideration of FEMA designated flood zone
- Maintenance agreements
- Development of an emergency operations plan related to floodproofing measure deployment
- Historic structure exception for residential structures
- Inspections

4.4.2 Residential Elevation Projects

Elevation projects are recommended for residential structures with flood depths between three and 14 feet as determined by the 2017 Coastal Master Plan and CLARA modeling effort. More specifically, homes recommended for elevation are located in areas where expected flood depths range between three and 14 feet for a 100-year storm surge flood event (including two feet of freeboard). Policies and procedures regarding method of elevation, project costs, constructability issues, project management, and flood insurance have been developed and included in Section 4.2 Residential Elevation Projects of Attachment E4: Parish Applicant's Handbook.

Example allowable expenses for residential elevation projects include the following:

- Property documentation costs (surveying and engineering services such as soil sampling, verifying elevation, evaluating structural feasibility; title search and permitting fees; completion of elevation certificate and final inspection)
- Project design costs (architectural/engineering plans and specifications, cost estimate preparation)
- Construction related costs (project administration, construction management, lifting/lowering structure, floor system, elevation of utility hookups, etc.)

Relevant policies pertaining to residential elevations include the following:

- Unallowable costs (i.e., repairs or improvements not related to the approved project, projects to correct code or NFIP violations, or aesthetic improvements)

- Compensation for deducted square footage
- Upgrades
- Constructability issues:
 - Structural feasibility
 - Foundation type/type of elevation
 - Wind protection
 - Code required changes
 - Historic preservation requirements
 - Accessibility/ADA requirements

4.4.3 Residential Voluntary Acquisition Projects

Voluntary acquisition projects are recommended for residential structures in areas with flood depths greater than 14 feet as determined by the 2017 Coastal Master Plan and CLARA modeling effort. More specifically, homes recommended for voluntary acquisition are in areas where recommended elevation would be in excess of 14 feet, or where flood depths are greater than 12 feet for a 100-year storm surge flood event (plus two feet of freeboard). Wherever possible, the parish should work with property owners to relocate within their community or parish while remaining outside of the 100-year floodplain. In certain circumstances, CPRA will also work with parishes and homeowners who desire to apply for voluntary acquisition in areas with flood depths lower than 12 feet.

Since acquisition projects involve real estate transactions, many of the acquisition policies and procedures are designed to follow generally accepted real estate practices. They address a range of issues from project development to implementation to long-term oversight of acquired property. Policies and procedures regarding method of acquisition, fees, costs and allowable expenses, property documentation, and project management have been developed and are included in Section 4.3 Residential Voluntary Acquisition Projects of Attachment E4: Parish Applicant's Handbook.

Example allowable expenses for residential voluntary acquisition projects include the following:

- Real estate transaction fees
- Legal fees and closing costs
- Deed recordation/deed restriction costs
- Demolition costs
- Site restoration costs
- Additional rehousing assistance
- Project management (see Attachment E4: Parish Applicant's Handbook Section 3.3 Program and Project Management/Monitoring)

Relevant documents and requirements pertaining to voluntary acquisition projects include the following:

- Appraisals
- Surveys
- Title search/title insurance
- Environmental site assessment and asbestos/lead-based paint inspection, abatement and/or removal
- Voluntary transaction agreements
- Historic preservation requirements
- Post-acquisition property use

- Vacant lots/permanent, restricted use easement preparation

4.4.4 Alternative Flood Risk and Resilience Projects

There are circumstances where floodproofing, elevation, and acquisition are not suitable options for structures at risk to coastal flooding. In these cases, other property protection measures like a neighborhood ring levee or a property perimeter floodwall surrounding a facility, such as a school or a business district critical to community function, can be explored. These may occur on an individual property basis for facilities or for a small neighborhood. The Flood Risk and Resilience Program does not allow a flood enclosure system large enough to protect an entire town or substantial population; these larger types of protection systems should be directed to CPRA for consideration in the master plan's New Project Development Process as a structural protection project.

All proposed alternative projects will be considered on a case by case basis and must be submitted to CPRA for written approval prior to full development of an application.

5.0 Description of Potential Funding Sources

CPRA's overall goal is to effectively utilize different funding sources as they become available to reduce risk, and to efficiently and effectively implement the nonstructural risk reduction projects identified in the 2017 Coastal Master Plan. The Flood Risk and Resilience Program will be funded on a 3-year cycle through allocations in CPRA's Annual Plan. While there is still significant uncertainty in the total funding amount and timing, this funding will likely come from several existing and potential future sources. This section describes potential nonstructural risk reduction project funding from a variety of sources, including FEMA and HUD, and the availability and constraints of these resources.

Future funding sources for implementation of Flood Risk and Resilience Program projects are projected based on estimates of existing funding sources and possible sources of new funding. Legislative and regulatory documents were reviewed to identify Federal and State acts that may provide mechanisms to fund coastal protection and restoration projects. The State has identified several sources of funding that may be available over the next 50 years to support implementation of future nonstructural risk reduction projects and could potentially be used to leverage CPRA funds (or vice versa), depending on the source.

Working closely with allied state agencies such as GOHSEP, this effort will maximize funding opportunities and find the best match projects based on the eligibility criteria of the funding source. One key element in making this determination is to find properties that are the best fit for FEMA mitigation grants because these grants are more restrictive than other federal or state agency grant criteria. For example, FEMA's FMA program is available annually and primarily funds mitigation of properties on FEMA's SRL property list. Therefore, SRL properties in nonstructural risk reduction project applications should be steered toward this funding source until the project amount exceeds available funding.

Below is a summary of the eligibility criteria and constraints of funding sources that can be used to implement nonstructural risk reduction projects and are likely to be available to Louisiana communities in the next 50 years. CPRA will also explore the use of multiple funding types and leveraging sources from existing and new programs and partnerships. Projects funded entirely

through the CPRA's Flood Risk and Resilience Program will only need to meet CPRA program's requirements. However, projects for which CPRA funds are used as match will also be required to meet the comprehensive requirements of all programs involved.

5.1 Existing Funding Sources

Funding for nonstructural flood mitigation is typically found in federal programs such as FEMA's HMA programs or HUD's CDBG - Disaster Recovery (CDBG-DR) program. There are other resources that can be applied to a local nonstructural mitigation program; known existing state and federal funding sources are included herein to help parishes with this effort. Table 3 provides a detailed breakdown of pertinent information related to identified funding sources.

CPRA's Annual Plan lists a variety of existing funding sources for near-term project implementation, some of which are expected to be available over the coming decades. However, some sources that currently provide funding for projects are either slated to cease by 2017 or are not considered sustainable sources of funding for new project implementation. Expiring or unsustainable funding sources are briefly discussed below followed by a discussion of the existing funding sources that may be available to fund future nonstructural risk reduction project implementation.

5.1.1 Existing Funding Sources that are Expiring or Not Available for Nonstructural Risk Reduction Project Implementation

5.1.1.1 Coastal Impact Assistance Program (CIAP)

The Federal Energy Policy Act of 2005 was authorized to help states offset the effects of offshore oil and gas production and is allocated according to offshore production. In Louisiana, all funding from this Act has been allocated toward projects and will be expended before 2017. No new funding is anticipated from this Act.

5.1.1.2 State Surplus

CPRA continues to fund near-term projects with state surpluses from 2007-2009. Predicting availability of future surplus allocations is highly uncertain. Accordingly, future funding based on anticipated state surpluses is not considered to be a sustainable or predictable source of project funding.

5.1.1.3 Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)

The CWPPRA ("Breaux Act") provides targeted funds to be used for planning, implementing, and monitoring projects that create, protect, restore, and enhance wetlands in coastal Louisiana. CWPPRA was originally passed in 1990, and is authorized until 2019. There is low uncertainty about reauthorization of the CWPPRA after 2019. CWPPRA projects compete for funding annually. The low estimate for annual CWPPRA funding beginning in 2014 is \$70 million, while the high estimate for funding from 2014 forward is \$90 million. The state cost share for CWPPRA projects is 15% of the total project cost. This funding source is only available for restoration projects and therefore is not a potential source of funding for nonstructural projects.

5.1.2 Potential Existing Funding Sources that could be used for Nonstructural Risk Reduction Project Implementation

Two existing funding sources were identified as being potential sources for sustainable future project funding.

5.1.2.1 Gulf of Mexico Energy Security Act (GOMESA)

The GOMESA of 2006 established a program to create a dedicated funding stream for coastal restoration and protection activities for the four Gulf States that permit outer continental shelf (OCS) exploration. GOMESA funds may be used for five authorized purposes: 1) projects and activities for coastal protection, restoration, or conservation; 2) mitigation of damage to fish, wildlife, or natural resources; 3) implementation of a federally-approved marine, coastal, or comprehensive conservation management plan; 4) mitigation of the impact of OCS activities by funding onshore infrastructure projects; and 5) planning assistance and administrative costs of compliance, not to exceed 3%. Louisiana has historically received 32-34% of the total funding available to states under GOMESA. By statute, Louisiana parishes and other coastal political subdivisions receive 20% of the total funding to Louisiana, and the State receives the remaining 80% share. Louisiana and its coastal subdivisions are expected to continue to receive a similar share of the total GOMESA funding available in the foreseeable future.

From fiscal year 2007, 37.5% of all qualified OCS revenues were shared among the four states, with 30% (80% of share) distributed to the states and 7.5% (20% of share) distributed to the coastal political subdivisions. Beginning in fiscal year 2017, the basis of GOMESA revenue sharing will expand to include new leases in the Gulf of Mexico. Louisiana is expected to receive the largest allotted portion among the states, however, specific estimates will vary based on which leases become available. In addition, from 2017 through 2055, there is a revenue sharing cap of \$500 million per year for the four Gulf States. Beginning in fiscal year 2056, the revenue sharing cap is removed and all OCS revenues will be distributed to the four Gulf States.

5.1.2.2 Title VII Water Resource Development Act (WRRDA)/Energy & Water Appropriation Act

The Water Resources Reform and Development Act (WRRDA) of 2014 was signed into law on June 10, 2014 and authorized 34 critical USACE projects. WRRDA is the primary legislation by which Congress authorizes USACE's key civil works missions, including navigation, flood risk management, and environmental restoration. One of the authorities in WRRDA is to reduce damage from future storm events. USACE will develop implementation guidance for the provisions of WRRDA 2014, which will provide the policies and procedures to be used in implementing the new law. All implementation guidance will be available publicly. WRRDA is strictly an authorizing legislation and does not include funding. The funding of WRRDA-authorized studies and projects will be accomplished separately as part of the annual appropriations process (HTIC, 2014).

Title VII of the 2007 Water Resources Development Act (WRDA) authorizes USACE to address the problem of coastal land loss in the Louisiana Coastal Area (LCA). WRDA defines the LCA as the area between the Sabine and Pearl Rivers, spanning approximately 20,000 square miles. Title VII authorizes USACE to take measures to restore coastal ecosystems and reestablish flood and storm surge protection for the local population.

Funding for WRDA projects through the Energy and Water Appropriation Act will largely depend on projects being approved by USACE's Chief Engineer, on the availability of federal funds, and on political support. WRDA of 2007 authorized \$23 billion in projects nationwide with \$7 billion

going toward projects in Louisiana. Title VII authorized additional funding for structural protection and nonstructural risk reduction projects to protect population centers.

USACE has prepared a draft implementation plan for a nonstructural program for the Southwest Coastal Feasibility Study, which generally proposes to provide nonstructural hurricane and storm surge damage risk reduction measures for a designated coastal area of Louisiana. The program study area involves a 4,700 square mile area located in Calcasieu, Cameron, and Vermilion Parishes in southwest Louisiana. The purpose of the project is to reduce the risk of flood damage caused by hurricane and storm surges. The draft implementation plan for this program is focused on several nonstructural measures, including non-residential floodproofing, residential elevation, and acquisition, to reduce potential damages from future coastal storms. The USACE plan estimates that over 3,900 at risk structures are potentially eligible for its program. Of these properties, approximately 87% are residential, 9% non-residential, and 4% industrial structures. The preliminary cost of the program is over \$675 million. CPRA will continue to follow the development of the draft implementation plan for consistency with the 2017 Coastal Master Plan and to determine where there may be overlap or potential funding opportunities (USACE, 2015). This is a potential funding source for nonstructural risk reduction projects in areas where USACE authorizes mitigation measures and appropriates funds for those measures.

5.2 New Funding Sources

New sources of potential funding for coastal protection and restoration are accompanied by higher uncertainty over the level and timing of their use. Three sources were identified that have a reasonable expectation of yielding some future funding for nonstructural risk reduction projects.

5.2.1.1 Disaster-Based Funding

Damage from recent hurricanes resulted in federal funds arriving from FEMA, HUD, and other agencies for coastal restoration and remediation. These include, for example, HMGP and CDBG. While disaster-based funding can be significant, it is not a predictable source of future funding. Furthermore, restrictions on applying for these funds limit their availability to the state for project planning purposes. Accordingly, future disaster-based funding is expected to be applied toward projects for nonstructural mitigation that remediate damage from the precipitating event. CPRA plans to coordinate closely with other state agencies to direct applicable future disaster funds toward implementation of nonstructural risk reduction projects identified in the 2017 Coastal Master Plan. States and tribal governments may also decide to offer their own mitigation funding assistance for disasters that do not result in a federal disaster declaration.

5.2.1.2 Louisiana Strategic Adaptations for Future Environments Framework (LA SAFE)

The U.S. Department of Housing and Urban Development's CDBG National Disaster Resilience Competition (CDBG-NDRC) is intended to promote innovation in preparing communities for natural disasters, improving rebuilding/recovery efforts, and addressing unmet recovery needs. CPRA partnered in the OCD-led consortium charged with completing the state's Phase 1 and Phase 2 NDRC applications and will continue to be involved in the implementation of the Louisiana Strategic Adaptations for Future Environments (LA SAFE) framework. As part of this partnership, CPRA assisted in a technical capacity by using the CLARA model to determine future flood depths and potential economic damages in proposed project areas. Announced in January 2016, the State of Louisiana was awarded \$92.6 million. Of these funds, \$40 million will be used to create and support the LA SAFE program. LA SAFE seeks to protect coastal wetlands in and around southeast Louisiana, retrofit communities to withstand increased flooding risk, and

reshape high-ground areas to maximize their use and safety. The remaining \$48 million NDRC funds will enable a tribal community on the Isle de Jean Charles, which has experienced a 98% loss of land since 1955, to relocate to a resilient and historically-contextual community.

5.2.1.3 Annual HUD CDBG funding

HUD's CDBG program exists to provide communities with resources to address a wide range of unique community development needs, including flood reduction measures that will increase neighborhood safety or invigorate the local economy. CDBG funds are flexible and may be used for activities that include acquisition of real property, relocation and demolition, rehabilitation of residential and non-residential structures, and construction of public facilities and improvements, such as water and sewer facilities, streets, and neighborhood centers. Annual CDBG funding may be used for eligible nonstructural risk reduction projects if these have been built into the eligible community's consolidated plan.

CDBG is comprised of two distinct programs: 1) the "Entitlement Program" which provides formula-allocated funding to metropolitan cities with populations over 50,000 and to qualified urban parishes/counties with non-metropolitan populations over 200,000, and 2) the "Non-entitlement" or "States and Small Cities Program" provides federal funds directly to states which, in turn, provide funds on a competitive and as-needed basis to small, non-metropolitan cities with populations less than 50,000 and to parishes/counties that are not eligible for entitlement status (i.e., parishes with a non-urban or unincorporated population of less than 200,000).

In Louisiana, the CDBG program is managed by OCD, which is responsible for developing a Consolidated Plan of Action for the planned use of CDBG and other funds. States are also responsible for designing the CDBG Program within statutory and regulatory parameters; setting priorities and deciding what activities to fund; distributing funding according to the method of distribution; establishing financial management, recordkeeping, reporting, monitoring, audit and closeout systems for their programs; and ensuring compliance by state grant recipients. For more information about Louisiana's CDBG program, visit <https://wwwprd.doa.louisiana.gov/cdbg/ProgramDescription.htm>.

5.2.2 Local Programs & Resources

A goal of the Flood Risk and Resilience Program is to build local capacity to achieve the flood risk reduction and resilience goals of the program. As CPRA funds are limited, CPRA has identified additional sources of funding that local parishes may pursue on their own in order to leverage CPRA funding or to fund individual projects in their entirety.

5.2.2.1 Tax Increment Financing and Other Bond Programs

Tax Increment Financing (TIF) is a way for a municipality to implement public projects that increase the value of property, and thus create new future tax revenues that can reduce the debt on the project loan. A tax district is designated based upon where improvements will take place and where increased property values are expected. State laws regulate TIF implementation at the local level, but TIF-funded projects can typically include: property acquisition; rehabilitation or renovation of existing public or private buildings; demolition and site preparation; studies, surveys and plans; and public works projects and improvements. Louisiana coastal communities can investigate the potential use of TIF bonds to finance neighborhood rehabilitation that could include nonstructural risk reduction projects. Many existing communities

make use of TIFs. In Louisiana, find out more information about this option by contacting the Louisiana Department of Revenue.

Social Impact Bonds (SIBs) are implemented through a contract with the public sector in which a commitment is made to pay for social improvements that will result in public sector savings. For example, a community may want to improve a section of their downtown corridor by constructing new stormwater infrastructure to revitalize the area's economy. The local government can enter into a bond agreement with an organization that will raise the capital needed and manage project implementation. Once project goals are realized and the community begins to save on costs such as emergency response, loss of function of public services, or reductions in public flood damages, these savings are then used to pay back bond investors. Social bonds are relatively new and may offer an alternative method to fund the Flood Risk and Resilience Program mitigation options. Massachusetts and New York are areas that have been using SIBs in recent years.

New Market Tax Credits (NMTC) incentivize community development and economic growth through the use of tax credits that attract private investment to distressed communities. The program helps economically distressed communities to attract private capital by providing investors with a Federal tax credit. Investments made through the NMTC Program are used to finance businesses, breathing new life into neglected, underserved, low income communities. It is possible that flood mitigation projects for commercial structures could be financed through such a program. Visit the U.S. Treasury Department's website at <https://www.cdfifund.gov/programs-training/Programs/new-markets-tax-credit/Pages/default.aspx> for more information.

5.2.2.2 Master Developer Agreements

Master Developer Agreements combine economic redevelopment with flood risk reduction by working with a Master Developer, who takes on some financial risk in order to profit as the area becomes economically independent. The City of Norfolk Virginia, for example, is using Master Developers to redevelop city blocks where long-term blight has occurred due to recurrent flooding. The developer will demolish the block and rebuild housing and retail spaces, using modern mixed-use designs and creating a new revitalized urban area that will bring profits to the developer and economic success to the community. Meanwhile, residents can enjoy new, higher quality housing at an affordable rate when mixed income rental units blend favorably in mixed use spaces. Flood risk reduction is achieved due to existing building codes that are stronger than those in place when the original structures were built.

5.2.2.3 PACE-Style Program

PACE stands for Property Assessed Clean Energy; these financing programs allow local governments to provide financing for energy efficiency, renewable energy, and water efficiency projects that building owners pay back through property tax assessments. PACE mitigation activities typically include measures in private homes to increase energy efficiency, retrofit for strength against wind storms, and construct flood mitigation projects.

In Florida, state legislation approved local governments to provide the up-front funds to cover the costs for qualifying energy efficiency or renewable energy projects for property owners. The Florida PACE Funding Agency, created for state wide residential and commercial PACE financing in 2010, received validation for up to \$2 billion in 2013 and earned \$200 million through its E | VEST Program in 2014.

5.2.2.4 Private Investment

The community can work to establish a local trust fund for whatever public purpose is necessary, such as stormwater infrastructure or flood risk reduction projects by working with the private sector and non-profit partners to create a fund for a sole purpose. Investors who stand to gain by this partnership will realize specific benefits when the work of the fund is implemented. Grants from businesses, industry, large corporations, and national philanthropic organizations are also a potential future funding source for nonstructural projects. Finally, if the property owner has equity in their structure, this could be used to mitigate the property, which would then experience an increase in value and a potential reduction in the annual flood insurance premium.

In addition to the funding sources described above, parishes and municipalities should consider that nonstructural mitigation projects make good investment and business sense when developing capital improvement plans (CIPs) and other capital budgeting activities. Public sector savings with regard to nonstructural flood mitigation have been long documented through return on investment (ROI) studies and loss avoidance assessments. A 2005 report produced by the Multihazard Mitigation Council of the National Institute of Building Sciences estimates that societal benefits from mitigation grants totaled \$14 billion, compared with the \$3.5 billion spent on project costs. These savings include reduced direct physical damages, direct business interruption loss, indirect business interruption loss, nonmarket damage, human losses, and cost of emergency response. In addition, studies have shown social and fiscal benefits of returning the floodplain to its natural state. The recreational and aesthetic benefits of green and recreational space have been shown to increase property values around them, potentially offsetting costs of maintenance and acquisition. Further, the perception of reduced flood risk has been shown to increase confidence and investment in a previously floodprone area.

5.3 Other Federal Mitigation Funding Sources

While CPRA will work to develop its own funding sources for program implementation, there are also several federal funding sources that could potentially be used for nonstructural risk reduction projects identified in the 2017 Coastal Master Plan. These federal sources include FEMA, HUD, and SBA.

The nonstructural risk reduction projects recommended in the 2017 Coastal Master Plan have already been analyzed through a suite of comprehensive models, assessed for their cost-effectiveness and EAD reduction, and have identified specific numbers of structures that need to be mitigated. While there are many factors that must be considered when implementing pre- and post-disaster grant programs, there may be opportunities to coordinate federal mitigation efforts across regions and coastal parishes before and after future disaster events.

5.3.1 Federal Emergency Management Agency

FEMA offers a range of grant types that include funding for elevating homes, floodproofing businesses, installing generators, or completing other types of building retrofits. Importantly, there are two broad distinctions in the availability of grant money depending on whether the funds are requested before or after a presidentially declared disaster. Thus, this section will discuss pre- and post-disaster mitigation grant programs. These generally include:

- **Pre-disaster grant programs-** FMA and Pre-Disaster Grant Program

- **Post-disaster grant programs-** HMGP, the Public Assistance (PA) program, and the Small Business Administration (SBA) program

Additionally, FEMA's HMA Unified Guidance applies to all of these grant programs and is discussed first.

5.3.1.1 Hazard Mitigation Assistance (HMA) Unified Guidance

The FEMA HMA Unified Guidance applies to both the annual PDM and FMA programs, as well as the post-disaster HMGP⁴ (see section below). The HMA Unified Guidance stipulates eligibility and program requirements. For the annual programs, FEMA determines funding levels and limits on the number and type of grant applications from eligible entities for each program. Nevertheless, each program is authorized by separate legislative action, and as such, differs slightly in scope and intent. The grant application cycles, legislatively-appropriated funding levels, and the maximum federal share per project type are announced annually for PDM and FMA, and post-disaster for HMGP, on the FEMA website: <http://www.fema.gov/grants>.

Entities interested in applying for grants should consult the current HMA Unified Guidance on the FEMA website to review specific eligibility and program requirements. (2015 HMA Guidance was released for current programs on February 27, 2015. See <https://www.fema.gov/media-library/assets/documents/103279>.) Questions may be directed to SHMO in the Hazard Mitigation Grants Section of GOHSEP at: <https://www.fema.gov/state-hazard-mitigation-officers> and the FEMA Region VI Mitigation Division at: <http://www.fema.gov/region-6-mitigation-division>. More information about each program can be found on the FEMA HMA website at: <https://www.fema.gov/hazard-mitigation-assistance>.

5.3.1.2 HMA Guidance and Cost Sharing

Under FEMA HMA programs (including PDM and FMA), the cost to implement a mitigation project is generally funded by a combination of federal (typically 75% of project cost) and non-federal (typically 25%) sources. Both sources must be used in direct support of the approved project activities. Contributions of cash, third-party in-kind services, materials, or any combination thereof, may be accepted as part of the non-federal cost share. The non-federal cost share requirement may not be met with funds from other federal agencies. Nevertheless, there are exceptions; authorizing statutes explicitly allow some federal funds to be used as a cost share for other federal grants (e.g., CDBG-DR funds). FMA projects with SRL properties can receive a 100% federal cost share, while FEMA projects with RL properties can receive a 90% federal cost share. Section 3.3.4 in Attachment E4: Parish Applicant's Handbook describes the potential availability of Global Match for FEMA HMGP grants where non-federally funded, pre-disaster mitigation projects implemented in roughly the same time as FEMA HMGP program funding availability may be eligible to meet the required HMGP non-federal match, with certain restrictions. Almost all projects submitted for funding consideration under HMA programs must be cost-effective through a benefit cost analysis (an example exception is planning grants). For more details, see the "FEMA Flood Mitigation Assistance (FMA) Grant Program" subsection.

⁴ In previous years, FEMA offered grants specifically for repetitive and severe repetitive loss structures. In July of 2013, federal legislation eliminated these programs, and mitigation of these high risk properties was rolled into the annual FMA program.

5.3.2 FEMA Pre-Disaster Mitigation Grant Programs

The pre-disaster mitigation programs accept mitigation project applications for all hazards (similar to the HMGP post-disaster program), including nonstructural flood risk reduction projects, though non-flood risk related projects are often prioritized. Pre-disaster mitigation program funds are generally available based on an annual allocation from the federal government and are not tied to a presidentially declared disaster by timing or location. Funding for non-disaster programs are typically announced each spring. The Notice of Funding Availability (NOFA) includes program priorities for that year, as well as specific instructions for numbers of applications and types of projects expected to be funded in each state. The Louisiana GOHSEP manages these grants and posts notification of FEMA NOFA releases on its website:

<http://gohsep.la.gov/GRANTS/RECOVERY-GRANTS/Hazard-Mitigation-Assistance/Hazard-Mitigation-Overview>.

A significant issue with pre-disaster funding is that the allocations can vary from year to year and may not be available every year. The allocation amounts may be smaller, the program restrictions more rigid, and the application period shorter than those for post-disaster mitigation grant programs. However, pre-disaster mitigation funds have been generally available through two primary programs each year including the FMA program and the PDM program. These programs provide a source of project funding when post-disaster funding is not available. Two other related pre-disaster programs, the SRL and Repetitive Flood Claims (RFC) programs are now more recently part of FMA.

The table below shows the funding allocations and number of applications received for the past several years:

Table 3: FMA and PDM Funding Allocations 2013 Through 2016.

Mitigation program	Fiscal year	NOFA release date	Allocation	Total federal \$ awarded	Subapplications received (#)/federal amount requested (\$)
PDM	2016	2-10-16	\$90 M	\$90	486 / \$240 M
FMA	2016	2-10-16	\$199 M	\$198	216 / \$380 M
PDM	2015	5-29-15	\$25 M	\$25 M	358 / \$83.6 M
FMA	2015	5-29-15	\$150 M	\$150 M	226 / \$307 M
PDM	2014	4-21-14	\$63 M	\$63 M	325 / \$76.7 M
FMA	2014	4-21-14	\$89 M	\$90.5 M	216 / \$232 M
PDM	2013	7-17-13	\$23.7 M	N/A	N/A
FMA	2013	7-17-13	\$120 M	N/A	N/A

Source: FEMA web pages and archives.

FEMA grant funds are awarded to an applicant, usually a state entity, which then distributes the funds to the subapplicant. In Louisiana, GOHSEP is the applicant for the FEMA grant programs, and the subapplicant is the local government that submits a subapplication to GOHSEP on behalf of residents and businesses. Other eligible subapplicants include private non-profits such as "educational, utility, emergency, medical, or custodial care facility, including a facility for older adults and people with disabilities, and other facilities providing essential governmental services to the general public, and such facilities on Indian reservations" (FEMA, 2015). When FEMA approves a mitigation grant subapplication, the applicant disburses the funding to the successful subapplicant once a grant agreement and contract are signed. An eligible

subapplicant can also be another state agency (e.g., Louisiana Department of Wildlife and Fisheries) or a tribal government.

The proposed measures must be cost-effective and are long-term, sustained actions designed to reduce injuries, loss of life, and damage and destruction of public and personal property. The overall aim is to reduce reliance on federal disaster assistance funding from future disasters.

5.3.2.1 Flood Mitigation Assistance (FMA) Grant Program

The FMA program provides funding to assist states, tribal governments, and communities with implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under NFIP with the goal of reducing or eliminating claims under NFIP. The National Flood Insurance Fund provides the funding for the FMA program. Communities that are suspended or on probation from NFIP are not eligible for FMA grants. Three types of FMA grants are available to applicants: 1) planning grants, 2) project grants, and 3) technical assistance grants. The FMA program also now includes FEMA's SRL and RFC programs.

Eligible flood mitigation project types include the following (see Table 4 for project eligibility comparisons between the HMA programs):

- Elevation of NFIP insured structures
- Acquisition of NFIP insured structures and real property
- Demolition of NFIP insured structures
- Dry floodproofing of NFIP insured non-residential structures
- Minor, localized structural projects that are not fundable by state programs or other federal programs that reduce flood risk to insured structures
- Beach nourishment activities that reduce flood risk to insured structures

Residential or non-residential properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal. Flood insurance must be maintained through completion of the mitigation activity and for the life of the structure. Projects prioritized for funding under FMA are those that directly benefit properties included on FEMA's SRL or RL lists. Projects with SRL properties can receive a 100% federal cost share, while FEMA projects with RL properties can receive a 90% federal cost share.

Consistent with the legislative changes made in the Bigger-Waters Act of 2012 and the Grimm-Waters-Richmond Act for 2014:

- A **Severe Repetitive Loss (SRL)** property is a structure that is covered under a contract for flood insurance made available under NFIP and has incurred flood-related damage:
 - For which four or more separate claims payments have been made under flood insurance coverage, with the amount of each such claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or
 - For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.
- A **Repetitive Loss (RL)** property is a structure that is covered under a contract for flood insurance made available under NFIP that:

- Has incurred flood-related damage on two occasions, in which the cost of the repair, on average, equaled or exceeded 25% of the market value of the structure at the time of each such flood event; and
- At the time of the second incident of flood-related damage, the contract for flood insurance included Increased Cost of Compliance coverage.

To be eligible for a higher federal cost share for FMA projects, a FEMA-approved State Hazard Mitigation Plan that includes a RL Strategy must be in effect at the time of the grant award, and the property that is being submitted for consideration must be a RL property. Guidance on funding mitigation for RL properties can be found in the State Hazard Mitigation Planning Guidance and in 44 CFR Section 201.4(c) (3) (v).

5.3.2.2 Pre-Disaster Mitigation (PDM) Grant Program

The PDM program provides funds on an annual basis to states, territories, federally recognized Indian tribal governments, communities, and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event. Funded projects are intended to reduce flood risk and reliance on monetary allocations after disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds. The federal government will provide up to 75% of funding for eligible projects, with the remaining 25% of funding provided by a non-federal source. However, small and impoverished communities (as defined in Section 203 of the Stafford Act) are eligible for a 90% federal cost share grant and a 10% non-federal cost share grant.

Eligible activities typically include:

- Structure elevation
- Dry floodproofing of historic residential structures
- Dry floodproofing of non-residential structures
- Structural retrofitting of existing buildings
- Nonstructural retrofitting of existing buildings
- Wind retrofit for one- and two-family residences
- Property acquisition and structure demolition/relocation
- Minor localized flood reduction projects
- Safe room construction
- Soil stabilization
- Generator and/or related equipment purchases (e.g., generator hook-ups) that are not stand-alone but part of a comprehensive project to reduce a natural hazard

5.3.3 FEMA Post-Disaster Programs

5.3.3.1 Hazard Mitigation Grant Program (HMGP)

FEMA's post-disaster mitigation grant program is HMGP, whose primary purpose is to reduce the risk of loss of life and property from future disasters. When authorized under a presidential major disaster declaration, HMGP is usually available state wide after a declared event, but some states may only allow it for parishes designated in the declaration. For HMGP, the State is the applicant, and the community is the subapplicant. Federally-recognized tribal governments may also submit a request for a major disaster declaration in their impacted area.

Many of the basic eligibility criteria of FEMA's HMGP are similar to PDM, with the exception that private non-profit organizations can be subapplicants under HMGP. One project type not funded by FEMA pre-disaster programs that is allowable under HMGP is post-disaster code enforcement costs for the increase in building inspections and Substantial Damage determinations needed after a disaster. The applicant must submit all HMGP subapplications to FEMA within 12 months of the disaster declaration date. For additional information, see 44 CFR Section 206.436. Additional time may be awarded based on meeting the criteria of the Stafford Act, Section 301.

Although individuals and businesses are not eligible to apply for HMGP funds, an eligible applicant or subapplicant may apply for funding on their behalf. Table 4 lists HMGP eligible activities along with PDM and FMA eligible activities for comparison purposes. Section 3.3.4 in Attachment E4: Parish Applicant's Handbook describes the potential availability of Global Match for FEMA HMGP grants where similar non-federally funded, pre-disaster mitigation projects implemented in roughly the same timeframe as FEMA HMGP projects may be eligible to meet the required HMGP non-federal match, with certain restrictions.

Table 4: Eligible Project Types for the EMA HMGP, PDM, and FMA Programs.

Eligible Activities	HMGP	PDM	FMA
Mitigation Projects	✓	✓	✓
Property acquisition and structure demolition	✓	✓	✓
Property acquisition	✓	✓	✓
Structure elevation	✓	✓	✓
Mitigation reconstruction	✓	✓	✓
Dry floodproofing of residential structures			
Dry floodproofing of historic residential structures	✓	✓	✓
Dry floodproofing of non-residential structures	✓	✓	✓
Minor localized flood reduction or drainage projects	✓	✓	✓
Structural retrofitting of existing buildings	✓	✓	
Nonstructural retrofitting of existing buildings and facilities	✓	✓	✓
Safe room construction	✓	✓	
Wind retrofit for one- and two-family residences	✓	✓	
Infrastructure retrofit	✓	✓	✓
Soil stabilization	✓	✓	✓

Eligible Activities	HMGP	PDM	FMA
Wildfire mitigation	✓	✓	
Post-disaster code enforcement	✓		
Generators	✓	✓	
5% initiative projects	✓		
Advance assistance	✓		
Hazard Mitigation Planning	✓	✓	✓
Management Costs	✓	✓	✓

5.3.3.2 Public Assistance (PA) 406 Funds for Floodproofing Public Facilities

The Robert T. Stafford Disaster Relief and Emergency Assistance Act authorizes FEMA to fund the restoration of eligible facilities that have sustained damage from a presidentially declared disaster. In addition to restoring a facility to its previous condition, the Act contains a provision to fund measures that go beyond simply repairing damage but also provide additional mitigation benefits. Such measures also go above and beyond those needed to comply with applicable codes and standards (although such compliance itself could be considered a form of mitigation).

When repairing or mitigating a facility that was damaged, two types of funding sources and associated programs are available depending on the nature of the activity:

- PA program/Section 406- funding is used to restore and mitigate a facility that was damaged during the event
- HMGP program/Section 404- funding can be used for structural or nonstructural projects; the facility does not need to have been damaged

While these are two separate funding programs, they may be combined within a parish to further nonstructural risk reduction project implementation.

5.3.4 U.S. Department of Housing and Urban Development Community Development Block Grant - Disaster Recovery Program

HUD provides flexible, post-disaster grant funding to assist parishes, cities, and states recover from presidentially declared disasters, especially in low income areas. Congress appropriates CDBG-DR funding on a disaster by disaster basis to rebuild impacted areas. The grants can be used to support six recovery support functions of the National Disaster Recovery Framework:

1. Housing
2. Community planning and capacity building
3. Economic development

4. Health and social services
5. Infrastructure
6. Natural and cultural resources

These CDBG-DR funds generally address unmet needs that otherwise would not be met by other available funding. CDBG-DR grants often supplement FEMA disaster programs such as PA and HMGP, SBA disaster assistance, and USACE disaster assistance. Recent examples of Congress making CDBG-DR funds available include after the Superstorm Sandy disaster declaration in New Jersey and New York, and after Hurricanes Katrina and Rita in Louisiana as part of the Road Home Program.

The eligible grantees for CDBG-DR funds are states, units of general local governments, federally recognized Indian tribes, and insular areas designated by the President as disaster areas. To be eligible, these potential grantees must include communities with significant unmet recovery needs. The grantees must also have the capacity to administer a disaster recovery program. Generally, grantees must use at least half of the CDBG-DR funds for activities that principally benefit low to moderate income persons. HUD funds are not provided directly to an individual or an organization, but an eligible grantee can apply on their behalf.

Eligible activities for CDBG-DR funds include recovery efforts in the impacted area that involve housing, economic development, infrastructure, and prevention of additional damage. The activities under the CDBG-DR funds cannot duplicate FEMA, SBA, and USACE funding.

Eligible activities must also meet at least one of the program's three national objectives:

1. Benefit persons of low and moderate income
2. Aid in the prevention or elimination of slums or blight
3. Other urgent community development needs because existing conditions pose a serious and immediate threat to the health and welfare of the community where other financial resources are not available

Examples of eligible CDBG-DR activities include:

- Buying damaged properties in a floodplain and relocating residents to safer areas
- Providing relocation payments for people and businesses displaced by the disaster
- Rehabilitating homes and buildings damaged by the disaster
- Enforcing post-disaster code
- Providing homeownership assistance such as down payment assistance, interest rate subsidies, and loan guarantees for disaster victims
- Buying, constructing, or rehabilitating public facilities such as streets, neighborhood centers, and water, sewer and drainage systems
- Providing public services
- Removing debris that is not covered by FEMA
- Helping businesses retain or create jobs in disaster impacted areas
- Providing planning and administration costs (limited to no more than 20% of the grant)

More information on the CDBG-DR program can be found at:
<https://www.hudexchange.info/cdbg-dr/> (HUD, 2014).

5.3.5 Small Business Administration (SBA) Disaster Loans

Although it is not a mitigation grant program, SBA can provide affordable, timely, and accessible financial assistance to homeowners, renters, and businesses located in declared disaster areas. As described below, the loan amount can be increased to fund projects that mitigate future disasters. Financial assistance is available in the form of low interest, long-term loans for losses that are not fully covered by insurance or other recovery programs.

Homeowners may apply for up to \$200,000 to repair their primary residence to its pre-disaster condition or replace it. While the SBA loan may not be used to upgrade the home or make additions (unless required to meet local codes and ordinances or address safety issues), it does allow for a loan increase to protect against similar future disasters. Loans may be increased up to 20% of the total amount of physical loss, as verified by SBA, to make improvements that lessen the risk of property damage by future disasters of the same kind.

In some cases, SBA may be able to refinance all or part of a previous mortgage (not to exceed \$200,000) when the applicant does not have credit elsewhere, has suffered substantial disaster damage not covered by insurance, and intends to repair the damage. SBA considers refinancing when processing each application. Secondary homes or vacation properties are not eligible for home disaster loans; however, qualified rental properties may be eligible for assistance under the business disaster loan program. More information can be found at: <https://www.sba.gov/content/fact-sheet-homeowners-and-renters> (SBA, 2014).

5.4 Guidance for Parishes to Determine Appropriate Funding Source

CPRA will coordinate (through the CPRA Board's Flood Risk and Resilience Subcommittee) with the appropriate state agencies to assist parishes in determining which of the available funding sources should be used for the nonstructural risk reduction projects under the Flood Risk and Resilience Program. Some of the proposed projects will be eligible under a single program while other projects may be eligible under multiple programs. The objective is to determine which mitigation types can be funded under the available programs and which programs may be the most accessible for local governments and CPRA due to reduced eligibility and application requirements.

For pre-disaster funds, any SRL properties should be steered toward the FMA program because it prioritizes these and Louisiana receives a substantial share of FMA funding each year. SRL properties also receive a 100% cost share under FMA. RL properties can also be considered for FMA funding but are a lower priority than SRL properties. In addition, SRL and RL properties should be considered for PDM and HMGP applications. Any other properties that flood during the 10-year flood event (or at even more frequent events) should be considered for PDM funds. Otherwise, the Flood Risk and Resilience Program may be the most appropriate option. All parishes should develop nonstructural risk reduction project proposals that include properties specific to the suitability and/or limitations of the particular funding source.

In the event of a major disaster declaration, both FEMA HMGP and HUD CDBG-DR funds may be available. At a minimum, HMGP funds will be available. If both HMGP and HUD CDBG-DR funds are available, the priority should be to maximize these two funding sources. The CDBG-DR funds may even be used to match HMGP. If only HMGP is available, then CPRA funds may be the logical source of the non-federal match if incentive criteria are met as described in Section 5.

Generally, the 25% non-federal match is one of the biggest obstacles to a parish or community being able to successfully apply and implement an HMGP project. This is especially true if the parish or community has been hit hard by the disaster and has spent much of its discretionary budget matching FEMA Response and Recovery programs. Flood Risk and Resilience Program funds could provide the non-federal match to ensure that the proposed nonstructural risk reduction projects, consistent with CPRA's Flood Risk and Resilience Program priorities, are funded.

In summary, CPRA is committed to working with other state agencies and parishes to identify the most applicable pre- and post-disaster funding sources for nonstructural risk reduction projects. The potential mitigation funding sources may include the CPRA Flood Risk and Resilience Program, other state agency or state-based programs (GOMESA) and programs administered by federal agencies such as FEMA, HUD, USACE, and SBA. The most applicable programs for a parish may be based on funding availability, which is more prevalent after a disaster (FEMA and HUD), programmatic requirements, applicability of the program project types, and the ability of the parish to apply for grants and implement awarded projects.

6.0 Performance Metrics for the Flood Risk and Resilience Program

CPRA's Flood Risk and Resilience Program has identified a number of nonstructural risk reduction projects that, when implemented, will build resilience among Louisiana's coastal communities and will achieve a number of other goals and objectives. Through non-residential floodproofing, residential elevation, and residential acquisition, the Flood Risk and Resilience Program supports the master plan objectives by implementing projects that:

- Reduce economic losses and disruption through minimizing damages to residential, public, and commercial buildings
- Increase the resilience of socially vulnerable populations and assist in the revitalization of these communities
- Coordinate with and leverage other state resources
- Build community capacity to better prepare for, respond to, and recover from storm surge based flooding events

Developing performance metrics is essential to monitoring the success of these nonstructural investments. Identifying performance metrics enables both near- and long-term program evaluation, which provides many benefits. It enables CPRA to assess and understand the effectiveness of individual projects at reducing economic damage and achieving other program goals and objectives. For example, tracking the number of LMI households that participate in the program can indicate how well the program is serving economically vulnerable populations. Understanding the number of structures mitigated or acquired can help to quantify loss avoidance from future flood events. Likewise, determining the parishes that adopt the recommended mitigation standards can indicate potential reduction in future economic losses.

Using metrics also supports evaluating the efficiency with which the program is meeting its stated goals and objectives. For example, is information being collected in an efficient manner and interpreted in ways that it can serve multiple benefits, projects, or leverage additional funding sources? Is information collected in one process usable elsewhere to minimize efforts in collecting and interpreting data? To develop metrics to assess the Flood Risk and Resilience

Program, a number of performance metrics that are being used in similar programs were explored, including those developed for the System Wide Assessment and Monitoring Program (SWAMP). From this group of metrics, seven have been refined to measure, monitor, and evaluate the performance and success of the Flood Risk and Resilience Program.

Table 5: Flood Risk and Resilience Program Performance Metrics.

Performance Metrics	Program Objective(s) Addressed	Tracking
Total number of structures or households mitigated	Reduce economic losses and disruption through minimizing damages to residential, public, and non-residential buildings.	This information will be collected yearly after the completion of the application process and project implementation.
Number of structures acquired	Reduce economic losses and disruption when structures are no longer in harm's way.	This information is collected during Phase III of the application process.
Number of existing structures elevated or floodproofed to new standards (BFE +2 feet)	Reduce economic losses and disruption through minimizing damages to residential, public, and non-residential buildings.	This information is collected during Phase III of the application process.
Number of coastal parishes that implement higher standards (BFE +2 feet) for all new development	Reduce future economic losses by minimizing damage to new development.	This information is collected during Phase I of the application process, where higher standards are described.
Number of RL and SRL properties mitigated relative to non-repetitive loss properties mitigated	Reduce economic losses and disruption by mitigating structures most costly and vulnerable to flood risk.	This information is collected during Phase III of the application process.
Number of LMI households served by a project	Increase the resilience of economically vulnerable populations.	LMI data is collected during Phase II and Phase III of the application process.
CRS class rating change	Build community capacity to better prepare for, respond to, and recover from storm surge based flooding. Reduce economic losses and disruption through minimizing damages to residential, public, and non-residential buildings.	This information is collected during Phase I of the application process, where CRS classification is described.

7.0 Moving the Program Forward: Challenges and Next Steps

The analysis completed for the 2017 Coastal Master Plan provides actionable information by showing areas of greatest coastal flood risk and proposing nonstructural risk reduction projects that will help to reduce future economic damages. However, the Flood Risk and Resilience Program will require a sustained source of funding to achieve Louisiana's resilience goals. Obtaining a dedicated source of funding will be challenging, but CPRA will continue to work with other federal agencies, state agencies, local parishes, businesses, industry, nonprofits, and other entities to secure funding.

In preparation for future funding streams, the program will continue to move forward and refine the nonstructural application process and funding distribution mechanism to efficiently and effectively implement nonstructural risk reduction projects with monies that may become available in coming years. A well-developed process will greatly improve the agency's ability to shorten the grants management process, reduce bureaucratic inefficiencies, and to quickly build projects that reduce risk for coastal Louisiana residents. Similarly, "test driving" the application process through the Parish Pilot Project (described more below) will allow CPRA to better coordinate and collaborate with local parishes and work together to develop a coast wide mitigation program.

In addition to serving the Flood Risk and Resilience Program, CPRA's nonstructural risk reduction project recommendations, nonstructural project areas, cost estimates, and other flood risk data have been utilized by other state agencies. This interagency data sharing has enabled other state offices to obtain federal funds and increase the availability of non-CPRA funding streams. For instance, CPRA's data and analysis were employed to obtain \$92 million for coastal Louisiana through the NDRC. As part of this award, the OCD used future flood risk data to win a \$48 million HUD grant for the Isle de Jean Charles community resettlement project. In addition, \$39 million of the award will go to the implementation of OCD's Louisiana's Strategic Adaptations for Future Environments (LA SAFE) plan, which is founded on CPRA's mitigation strategy laid forth in the 2017 Coastal Master Plan.

7.1 Other Program Challenges

CPRA understands that the success of this program will be based, in part, on overcoming the constraints of existing federal programs that can sometimes inadvertently impede parish and property owner participation. Some of these challenges include parish costs for application preparation and local match; the need for technical resources on complex projects; extensive coordination between local, state, and federal staff; and cost share requirements for property owners. Additional challenges include avoiding the complacency and shift in resources that may occur with long periods of time between major storm events as priorities move toward other issues. The Flood Risk and Resilience Program will require coordination with GOHSEP, OCD and other state agencies, engagement and partnerships with the parishes, and participation from property owners to succeed.

7.2 Parish Pilot Program

In order to advance the Flood Risk and Resilience Program, CPRA has developed a nonstructural application package that could be employed to administer nonstructural risk reduction project

funding from CPRA to local parishes. The application package provides more detailed guidance and associated forms for the Phase I-III applications. CPRA partnered with Jefferson Parish through the Parish Pilot Program to review Flood Risk and Resilience Program related documents and the application package. The pilot program was undertaken to ensure that the nonstructural application process took into consideration more detailed parish feedback. The parish's floodplain manager and staff provided recommendations that were incorporated to clarify the application materials and adjust the application process to better serve local parish needs. CPRA will continue to refine the nonstructural application process with feedback from other state agencies and parishes.

7.3 Next Steps

The next steps required to move forward and implement the CPRA Flood Risk and Resilience Program include:

1. Coordination with CPRA stakeholder groups such as the Flood Risk and Resilience Subcommittee of the CPRA Board, the State Steering Committee, the Framework Development Team, Floodplain Managers, the Resiliency Technical Advisory Committee, the Community Focus Group, and the Flood Risk and Resilience Stakeholder Group.
2. Expansion of outreach efforts to communicate the program framework and procedures, which is essential for the understanding and success of the new Flood Risk and Resilience Program. Outreach will involve use of the CPRA website, e-mail updates, and meetings for the release of new information and program ideas to facilitate an open dialogue and ongoing requests to parish officials.
3. Coordination with GOHSEP due to their lead role in the state on emergency management and hazard mitigation programs using federal funding. CPRA will explore the opportunity to leverage GOHSEP's institutional knowledge, program management experience, and mitigation expertise to facilitate improvements to the Flood Risk and Resilience Program. In addition, CPRA will explore the possibility of utilizing the funding system that GOHSEP uses to award grants to parishes.
4. Coordination with the USACE New Orleans District on its Southwest Coastal Louisiana Feasibility Study – National Ecosystem Restoration (NER) plan and National Economic Development (NED) plan funded by WRDA.
5. Exploration of funding sources to fund the development and implementation of nonstructural projects in the plan's first implementation period (years 1-30).

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