



EXECUTIVE SUMMARY

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Photo courtesy of Lindsey Janies Photography
Delacroix, LA

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INTRODUCTION

BUILDING ON OUR COMMITMENT TO PROTECT AND RESTORE OUR COAST

Louisiana’s coast is a precious natural, economic, and cultural resource. It is an area rich in ecological abundance that supports world-class commercial and recreational fisheries and is home to an array of waterfowl, migratory birds, reptiles, and amphibians. It is an area that maintains five of the top 12 ports (by cargo volume) in the United States. It is a major energy supplier of our nation’s oil and natural gas. Above all, the Louisiana coast is home to more than 2 million people – nearly half of the state’s population. Our people have a deep and abiding love for their coast and a rich cultural heritage closely connected to the land and water.

This complex and fragile ecosystem is disappearing at an alarming rate. Between 1932 and 2010, Louisiana’s coast lost more than 1,800 square miles of land. From 2004 through 2008 alone, more than 300 square miles of marshland were lost to Hurricanes Katrina, Rita, Gustav, and Ike.¹ The major causes of this land loss include the effects of climate change, sea level rise, subsidence, hurricanes, storm surges, disconnection of the Mississippi River from coastal marshes, and human impacts.



Photo courtesy of Louisiana Sea Grant

The 2017 Coastal Master Plan sets an ambitious path to respond to the loss of our coastal land and the threats from storm surge events. The master plan, in its purest sense, is a list of projects that build or maintain land and reduce risk to our communities. Because the funding for all of those projects is not available now, the master plan identifies a long-term program of construction, operations and maintenance, and adaptive management that is guided by a robust and continuous planning process, to be implemented as funds become available, much like the Federal Highway or the Mississippi River and Tributaries Systems. For the 2017 Coastal Master Plan, we built on the commitment and knowledge gained from the previous master plans. We used the best available science and engineering to prioritize and sequence projects for implementation. We made it a priority to engage our coastal stakeholders and communities in the planning process, because, in the end, they are part of the solution and the most important reason for preserving this national treasure that is coastal Louisiana.

OUR TIE TO THE LAND

A father who remembers fishing in the local bayou wants to continue the tradition with his own children. A town that cherishes its history wants to continue being a place where people work and raise families. People who enjoy coastal Louisiana’s birding, hunting, and boating want those activities to remain vital parts of their lives. Such desires show a deep appreciation for the landscape and a recognition that the coast’s value goes beyond simple utility. This recognition is at the heart of our experience as coastal Louisianans, and it is this value we are called to sustain.

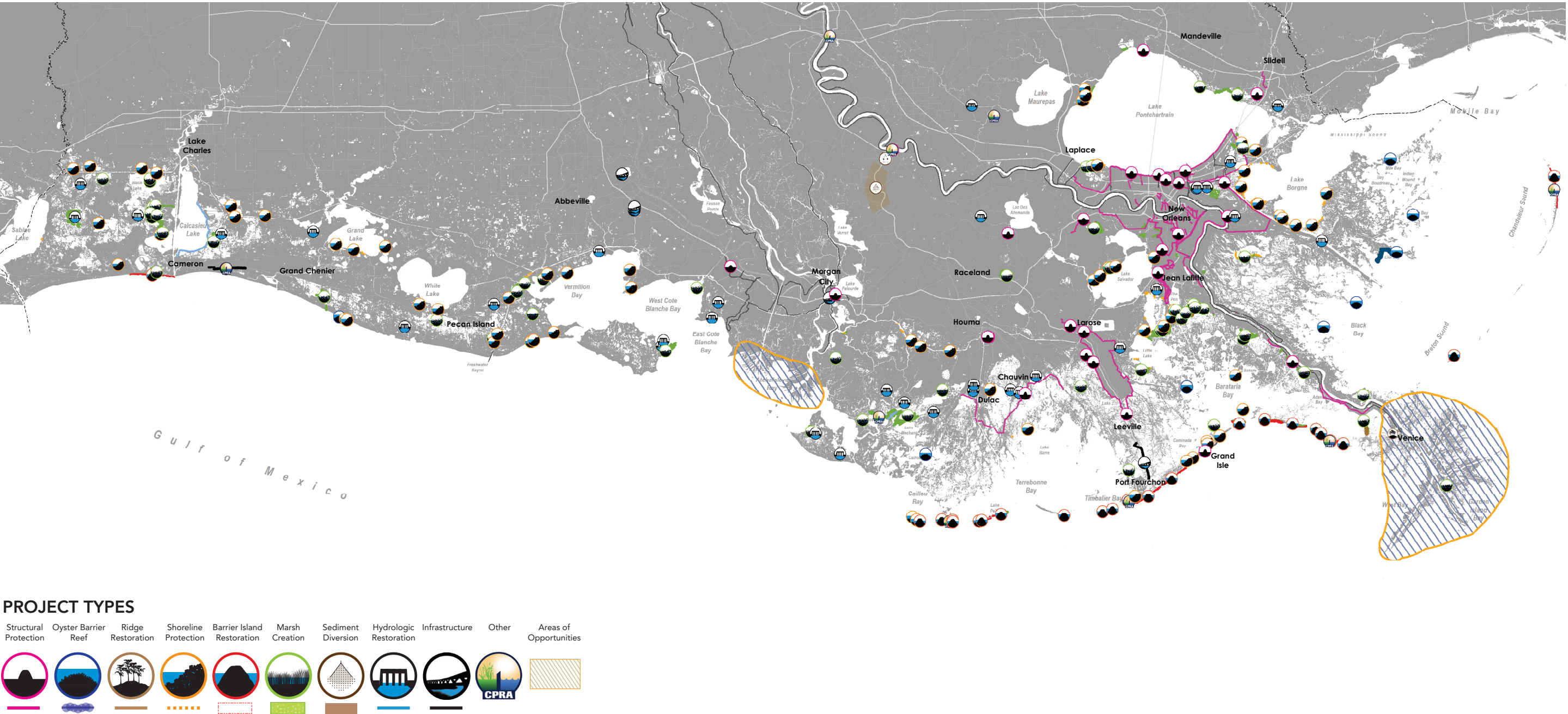


Photos courtesy of Louisiana Sea Grant
While coastal Louisiana provides the state, region, and nation with important natural resources, here the greatest assets are not oil and gas, fisheries, or sugar cane, but the people.

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PROGRESS ON THE GROUND

PROJECTS COMPLETED OR FUNDED FOR CONSTRUCTION



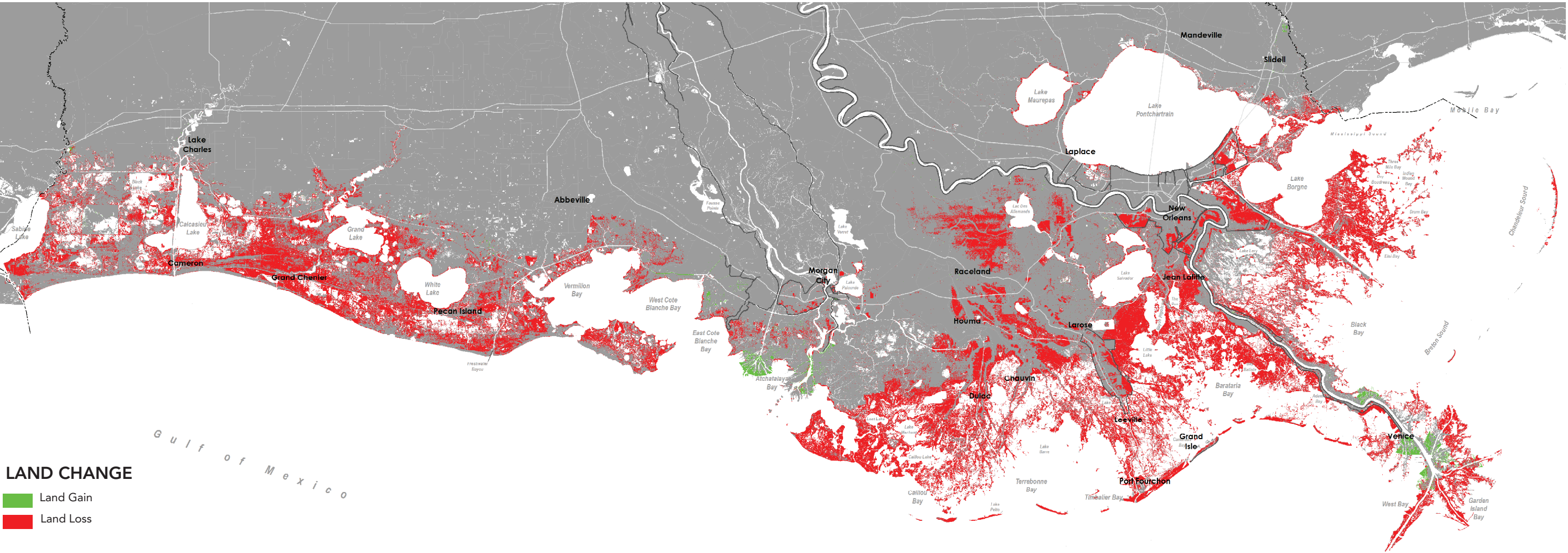
▲ FIGURE ES.1
Projects completed or funded for construction. Structural protection levee segments depicted here represent only those segments that have been built or are funded for construction. Land conservation and vegetative planting and bank stabilization projects are not depicted.

SINCE 2007, WE HAVE COMPLETED OR FUNDED FOR CONSTRUCTION A TOTAL OF 135 PROJECTS, RESULTING IN OVER 36,000 ACRES OF LAND BENEFITED, 282 MILES OF LEVEE IMPROVEMENTS, AND OVER 60 MILES OF BARRIER ISLANDS AND BERMS CONSTRUCTED OR UNDER CONSTRUCTION.

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A CHANGING LANDSCAPE

PREDICTED LAND CHANGE OVER THE NEXT 50 YEARS WITH NO ADDITIONAL ACTION



LOUISIANA'S COAST CONTINUES TO CHANGE

Louisiana continues to experience coastal land loss, triggered by both human and natural forces. Levees and flood control structures on the Mississippi River have successfully provided flood control and tremendous benefits to the nation. This approach to river management, however, has also fixed the channel of the Mississippi River and tributaries within its banks, depriving the broader coastal ecosystem of the freshwater, sediment, and nutrients it needs to survive and thrive. Dredging canals for energy exploration and pipelines provided our nation with critical energy supplies, but these activities also took a toll on the landscape, altering wetland

hydrology and leading to land loss. Navigation canals provided our nation with critical infrastructure but also allowed salt water to invade deeper into coastal basins.

Land loss reduces shorelines, marshes, and swamps that are a vital barrier and our first line of defense against storm surge and flooding. Coastal flooding has become an all too common occurrence due to powerful storm surges associated with tropical events made worse over the years by subsidence, sea level rise, and coastal land loss.

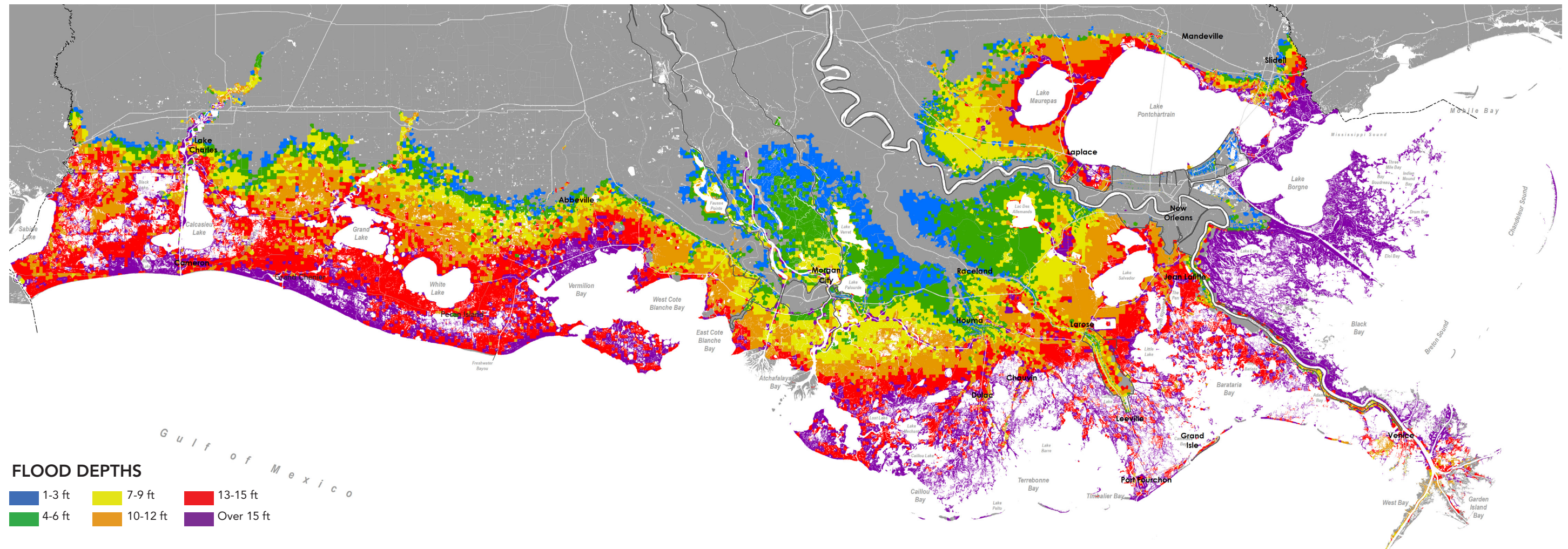
▲ **FIGURE ES.2**
Predicted land change along the Louisiana coast over the next 50 years under the Medium Environmental Scenario if we take no additional action. Red indicates areas predicted to be lost, and green indicates areas where land would be created.

2,250 SQUARE MILES COULD BE LOST IF WE TAKE NO ADDITIONAL ACTION OVER THE NEXT 50 YEARS.

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FLOOD RISK TO OUR COMMUNITIES

PREDICTED FUTURE RISK FROM A 100-YEAR FLOOD EVENT WITH NO ADDITIONAL ACTION



▲ **FIGURE ES.3**
Estimated flood depths for a 100-year flood 50 years from now under the Medium Environmental Scenario with a degraded landscape and no additional flood protection.

LOUISIANA IS DEVELOPING A BLUEPRINT FOR SUCCESS

In response to continued land loss and increasing flood risk and to improve the sustainability of our coastal landscape, communities, and economic future, Louisiana relies on the master plan process to identify and implement robust solutions to counter and address known and anticipated threats. Working in partnership with our local, state, regional, and federal partners, we are building our future together.

The intrinsic value of our coast as home to millions of people, critical infrastructure, and acres of vibrant natural habitats make our coast one of the nation's most unique and valuable landscapes. The challenges we have overcome and continue to face highlight the importance of funding and

implementing strategic measures to reduce and mitigate risk and to improve the sustainability of the coast. By doing so, we improve the resilience of our economies, increase protection for Louisiana homes and businesses, improve the health of our coastal ecosystem, and support the future of our unique culture and communities.

The master plan approach that was implemented with our first plan in 2007 and the technical tools we have developed can be used as a framework to assist other coastal regions, such as Miami, New York, and North Carolina's Outer Banks, that are working to develop and implement adaptation strategies.



Photo courtesy of Louisiana Sea Grant

OUR CHALLENGES

Every day, the lives and livelihoods of our residents are affected by the challenges and consequences of land loss in coastal areas. A family may be compelled to leave a community their family has called home for generations to move out of harm's way. A local business or individual may have trouble obtaining insurance, or an investment may lose value because of uncertainty about the future of our ever-changing landscape.

THE WORKING COAST

VALUING A NATIONAL TREASURE

COASTAL INVESTMENTS HAVE NATIONAL SIGNIFICANCE

There is a substantial amount of documentation describing what Louisiana’s coast provides the region and country through its ports, natural habitat for birds and other wildlife, and protection for oil and gas infrastructure.

What sets our statistics apart from other coastal areas? Experts have tried various ways to put a value on Louisiana’s coast, but it is likely that our numbers understate what coastal Louisiana offers the nation. We do not always have data that captures these benefits. In addition, when assessing the value of this highly managed, intensively used landscape, we need to examine everything from the economic output of oil and gas pipelines to the value of supporting more than 5 million migratory waterfowl.² Doing so is complicated and tends to undervalue the combined effect of having so many different assets compressed into a single region.

One of the ways researchers assign value to natural systems is by considering what are known as ecosystem services, meaning the benefits that the environment provides to people. In Louisiana, these benefits range from oyster and shrimp fisheries, to flood reduction, to nature-based tourism. In 2010, seven independent researchers examined the coast’s provision of ecosystem services. Their report stated that the Mississippi River Delta provides at least \$12 billion to \$47 billion in benefits to people each year. If this natural capital were treated like an economic asset, its total economic benefit to the nation would be \$330 billion to \$1.3 trillion per year. Over a 100-year period, the value of the coast’s ecological services alone would be between \$237 billion and \$4.7 trillion.³ The researchers note that many data gaps remain in our understanding of what Louisiana’s coast provides. As we learn more, our appreciation for the coast’s value will likely increase significantly.



Photo courtesy of Louisiana Sea Grant
Fishing for menhaden near Venice, LA

This is our home. Our actions over the next two decades will decide whether Louisiana’s coast survives. The decisions are not easy. They require us to change some of the things we do now, but these decisions are ours to make, together. We know the coast is changing in increasingly drastic ways. We have a choice to make. Can we embrace the need to change and adapt, despite the difficulty? Can we keep listening, talking, and learning from each other about the best way to proceed? The people of coastal Louisiana have been adapting for generations to the land, water, and resources available across our working coast. Their strength and fortitude is part of their cultural heritage, and their willingness to adapt now gives us great cause for hope.

In view of rising seas and the migration of people away from Louisiana’s southernmost parishes, some have asked, “Why not just give up on Louisiana’s coast?” The answer is simple: our combination of resources and geography is found nowhere else on earth. The delta of one of the world’s great rivers, vast resources, and wetland habitats – these things are all here in coastal Louisiana, and they are worth celebrating and protecting.

In fact, the region is growing and jobs are being created because the country needs what flows from Louisiana’s coast. Our transportation and energy hubs cannot be replicated anywhere else, nor can our world-renowned culture. Our efforts to protect these assets through science-based coastal planning has spurred new investment and innovation. As long as people need what our coast provides, we will be here in coastal Louisiana making the working coast our home.

OUR HOME, OUR FUTURE

AT THE FOREFRONT OF SCIENCE AND INNOVATION

The unprecedented investment in coastal restoration and risk reduction in the last 10 years has put Louisiana at the forefront of using science and innovation to plan a sustainable future for our coastal communities and our valuable ecosystem. Our master plan approach with its long-term view, consideration of climate change, and integration of natural systems and community resilience leads the nation in large-scale ecosystem restoration thinking. The modeling approach, designed specifically to address the needs of the planning process and provide quantitative comparisons of options for action, is viewed across the world as a model for science-based coastal decision making. The close working relationships we have formed among researchers and practitioners, scientists and design engineers, and agencies and academics, enables us to capitalize on years of study to move projects from concept to construction in a few years. This represents a significant workforce opportunity in coastal Louisiana, with employment in the water management sector projected to increase 23% over the next 10 years.⁴

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▲ **FIGURE ES.4**
Together, the Louisiana coast and the Mississippi River create billions in economic value.^{4,5,6,7,8,9}



Photo courtesy of Louisiana Sea Grant
Barge and ship traffic transporting export cargo on the Mississippi River in the Port of New Orleans, New Orleans, LA

Louisiana’s wetlands protect valuable infrastructure from storm surge and flooding. These assets include fisheries, oil and gas pipelines, petroleum reserves, and the Henry Hub (a national distribution point for natural gas). The Mississippi River and related ports and navigation channels provide the conduits for sending goods, such as bulk cargo and

petrochemical products, north to U.S. producers or south to international markets. In 2015, Louisiana had the highest commercial fishing landings in the lower 48 states (over 1 billion pounds).⁵ This abundance is only possible because our coastal wetlands provide habitats for these species at varying stages in their lives.

COASTAL LOUISIANA'S CONTRIBUTION TO THE NATION'S ECONOMY RUNS INTO THE HUNDREDS OF BILLIONS OF DOLLARS EACH YEAR, AND OUR COASTAL WETLANDS ARE CENTRAL TO THESE CONTRIBUTIONS. FROM AN ECONOMIC STANDPOINT ALONE, RESTORING THE WETLANDS MAKES SENSE. WHETHER YOU LOOK AT IT FROM THE VANTAGE POINT OF AN ECONOMIST, AN ECOLOGIST, OR A COASTAL RESIDENT, THE VALUE OF THE LANDSCAPE IS CLEAR.

A \$50 BILLION INVESTMENT DESIGNED TO BUILD AND MAINTAIN LAND, REDUCE FLOOD RISK TO COMMUNITIES, AND PROVIDE HABITATS TO SUPPORT ECOSYSTEMS



Structural Protection	Nonstructural Risk Reduction	Ridge Restoration	Shoreline Protection	Barrier Island Restoration	Marsh Creation	Sediment Diversion	Hydrologic Restoration
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Note: Small-scale hydrologic restoration and oyster reef/living shoreline projects are included programmatically in the 2017 Coastal Master Plan. Consistency of individual projects will be determined on a case by case basis.

The plan includes 124 projects that build or maintain more than 800 square miles of land and reduce expected damage by \$8.3 billion annually by year 50, which equates to more than \$150 billion over the next 50 years, and are expected to pay for themselves three times over the course of implementing the plan.

The diversity of projects reflects the need to use all tools available to us, and to construct projects that build land and reduce risk in the near term, while also investing in projects like sediment diversions and structural protection projects that provide long-term benefits.

▲ FIGURE ES.5

The 2017 Coastal Master Plan includes 79 restoration, 13 structural protection, and 32 nonstructural risk reduction projects that will be implemented throughout coastal Louisiana. Restoration projects build or maintain land and support productive habitat for commercially and recreationally important activities coast wide. Structural protection projects reduce flood risk by acting as physical barriers against storm surge. Nonstructural risk reduction projects elevate and floodproof buildings and help property owners prepare for flooding or move out of areas of high flood risk.

THE PLAN INCLUDES 124 PROJECTS THAT BUILD OR MAINTAIN MORE THAN 800 SQUARE MILES OF LAND AND REDUCE EXPECTED DAMAGE BY \$8.3 BILLION ANNUALLY BY YEAR 50, WHICH EQUATES TO MORE THAN \$150 BILLION OVER THE NEXT 50 YEARS.

WHAT THE PLAN DELIVERS

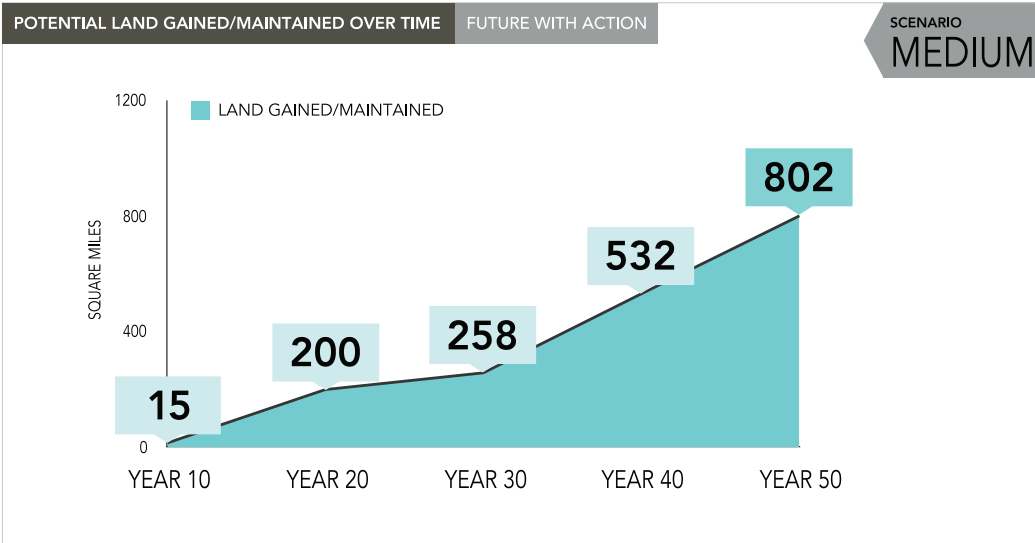
BUILDING AND MAINTAINING LAND AND REDUCING FLOOD RISK

- The plan dedicates nearly \$18 billion to marsh creation using dredged material, \$5 billion to sediment diversions, and more than \$2 billion to other types of restoration projects – providing land building benefits of more than 800 square miles, compared to a Future Without Action.
- The plan dedicates \$19 billion for structural protection and \$6 billion for nonstructural risk reduction; these projects will reduce expected annual damage by \$8.3 billion by year 50 as compared to Future Without Action and are expected to pay for themselves three times over the course of implementing the plan.
- We know our risk will increase into the future, but through a combination of structural and nonstructural risk reduction projects, we estimate that we can reduce the expected annual damage we would face from storm surge by more than 75% for the Houma, Slidell, Franklin and Charenton, Edgard, Kenner and Metairie, and Garyville regions, and by more than 90% for the Ama, Laplace and Reserve, Hahnville and Luling, Montz, Donaldsonville, Convent, Vacherie, Larose and Golden Meadow, Morgan City, Abbeville and Delcambre, and Iberia regions.
- The Flood Risk and Resilience Program focuses on proactive investments to make our communities more resilient. It recommends floodproofing more than 1,400 structures, elevating more than 22,400 structures, and the acquisition of approximately 2,400 structures in areas that are most at risk.

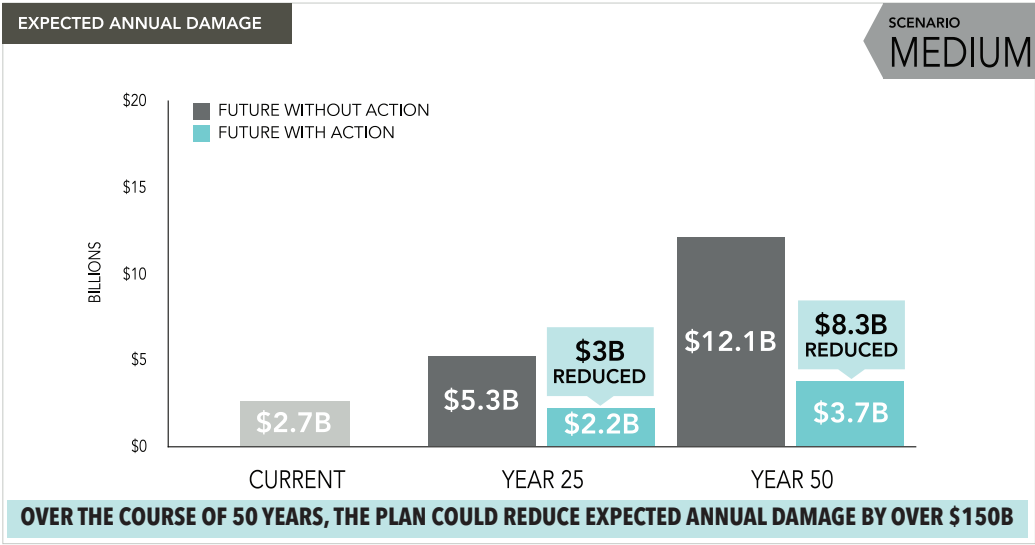


Photo courtesy of Lindsey Janies Photography

By increasing flood protection and building or maintaining land, the plan supports coastal industries, their infrastructure, and the workforce they depend on. Above: Bayou Dupont Sediment Delivery – Marsh Creation Increment 3



▲ **FIGURE ES.6**
By the end of 50 years, restoration projects in the 2017 Coastal Master Plan have the potential to create or maintain approximately 800 square miles of land under the Medium Environmental Scenario as compared to a Future Without Action. The land building benefits provided by many of the restoration projects will continue beyond 50 years. These long-term benefits will support the key issues affecting people in and around Louisiana’s coast for generations to come.

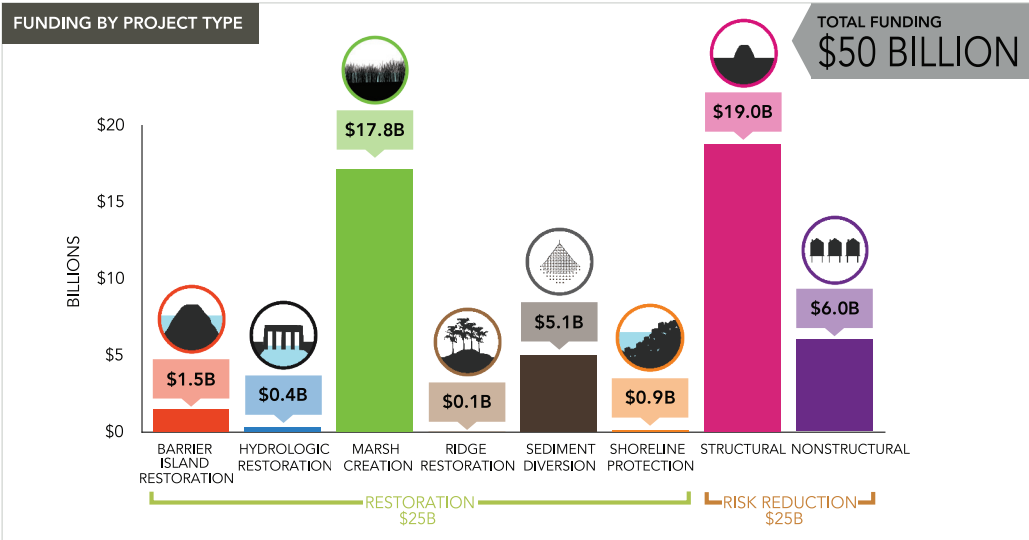


▲ **FIGURE ES.7**
Projects in the 2017 Coastal Master Plan will reduce expected annual damage from flooding by \$8.3 billion throughout Louisiana’s coast. Expected annual damage, expressed in dollars, represents the average direct economic damage projected to result from a storm surge flooding event in any given year, taking into account both the expected damage and the overall chance of a storm occurring.

PROTECTING AND RESTORING LOUISIANA'S COAST MAKES SENSE ON ITS OWN MERITS, BUT ACTION AT THE SCALE RECOMMENDED IN THE MASTER PLAN WILL DO MORE THAN DEFEND OUR WAY OF LIFE. BY REBUILDING WETLANDS AND PROTECTING COMMUNITIES FROM FLOODING, WE CAN CREATE NEW JOBS, SPUR SECTORS OF INNOVATION, AND STRENGTHEN OUR STATE AND NATIONAL ECONOMY.

Photo courtesy of Louisiana Sea Grant
Kayaking in cypress swamp

- The ecosystem benefits provided by the plan will support commercial and recreational fisheries and wildlife coast wide, along with other ecosystem outcomes that benefit our communities.
- The plan improves coast wide habitat for wild crawfish, largemouth bass, alligator, and mottled duck, as compared to Future Without Action conditions.
- The plan results in increased suitable habitat coast wide for species like adult bay anchovy and spotted seatrout, small juvenile white and brown shrimp, oyster, and green-winged teal, as compared to initial conditions, but reduced suitable habitat as compared to Future Without Action conditions at year 50.
- The plan results in similar coast wide suitable habitat for blue crabs, juvenile gulf menhaden, and gadwall at year 50 when compared to initial or Future Without Action conditions.
- The plan provides a blueprint for action that is consistent with and supportive of other efforts like the Mabus Report, the Gulf Coast Ecosystem Restoration Task Force's Regional Ecosystem Restoration Strategy, the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States (RESTORE) Act multi-year implementation plan, the Natural Resource Damage Assessment Programmatic Damage Assessment and Restoration Plan, and the mission of the National Fish and Wildlife Foundation. Additionally, the plan well positions Louisiana for continued state and federal investment.
- The plan provides tremendous economic development opportunities for Louisiana and its citizens. Our investment in coastal research has spurred the growth of related fields. For example, learning to live with water is central to our wetland restoration and flood risk reduction strategies. The state's interest in this subject has created a welcoming business climate for water managers who help communities reduce flooding and promote effective water management strategies.

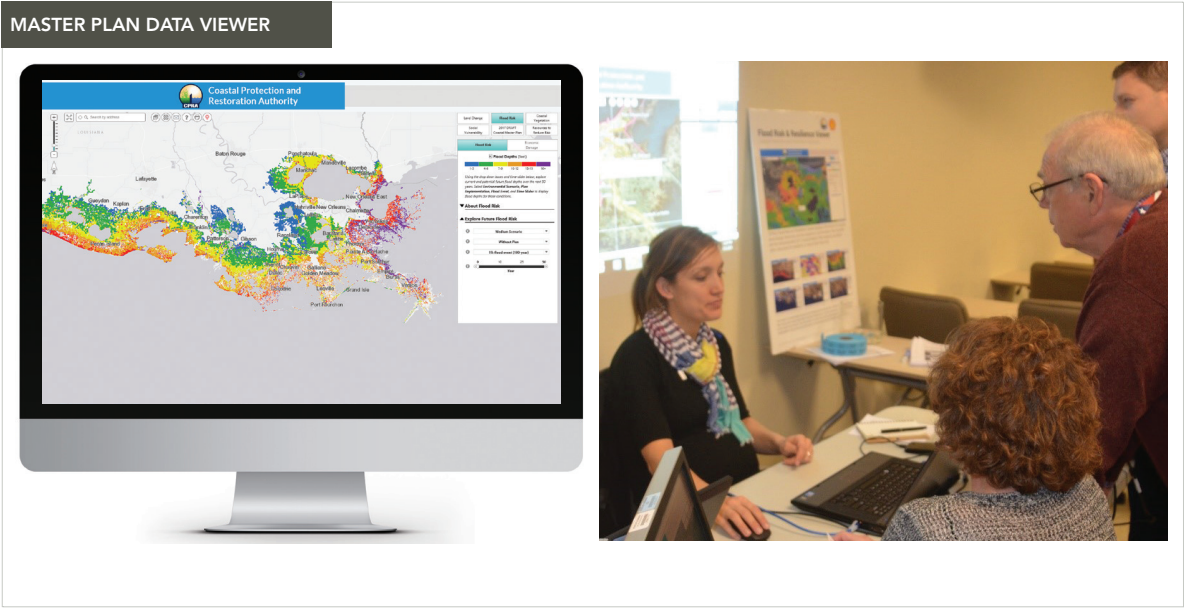


▲ FIGURE ES.8
The 2017 Coastal Master Plan includes the nation's largest investment in marsh creation using dredged material and sediment diversion projects, both of which will provide land building benefits for areas in dire need. The diversity of projects reflects the need to use all tools available to us, and to construct projects that build land and reduce risk in the near term while also investing in projects like sediment diversions and structural protection projects that provide long-term benefits.

MASTER PLAN DATA VIEWER

CONNECTING CITIZENS WITH INFORMATION AND MASTER PLAN PROJECTS

The Coastal Protection and Restoration Authority (CPRA) has made public access to information a priority and has provided access through its Master Plan Data Viewer. This interactive tool enables coastal Louisiana residents to view potential flood risk to their community or property over time as well as land loss projections and various socio-economic factors across the coast. The Master Plan Data Viewer also provides updated information on the implementation of projects to enable citizens to stay connected with our progress. The Master Plan Data Viewer encourages flood risk awareness and promotes access to resources that can help communities reduce their flood risk.



▲ FIGURE ES.9
Learn more about how flood risk impacts communities today and in the future, as well as how to make your community safer and more resilient. The Master Plan Data Viewer integrates and displays the results from the master plan along with additional coast wide data that allow for a broad examination of how flood risk impacts communities.



Visit the Master Plan Data Viewer at
<http://cims.coastal.louisiana.gov/masterplan/>



Community conversation photo courtesy of CPRA

TALK TO US

People want to know that their communities are being fully considered as decisions are made about projects and programs. Others worry that a particular project will adversely affect them. To all of these people we say, “talk to us.” We want to hear your thoughts, input, and concerns.

Our mission is to keep listening, learning, and having conversations with coastal residents. If you would like to learn more about the master plan or would like a CPRA staff member to speak with your citizen’s group, email us at masterplan@la.gov.