



2023

Louisiana's Comprehensive **Master Plan** for a Sustainable Coast

EXECUTIVE SUMMARY

4TH EDITION

State of Louisiana
The Honorable John Bel Edwards

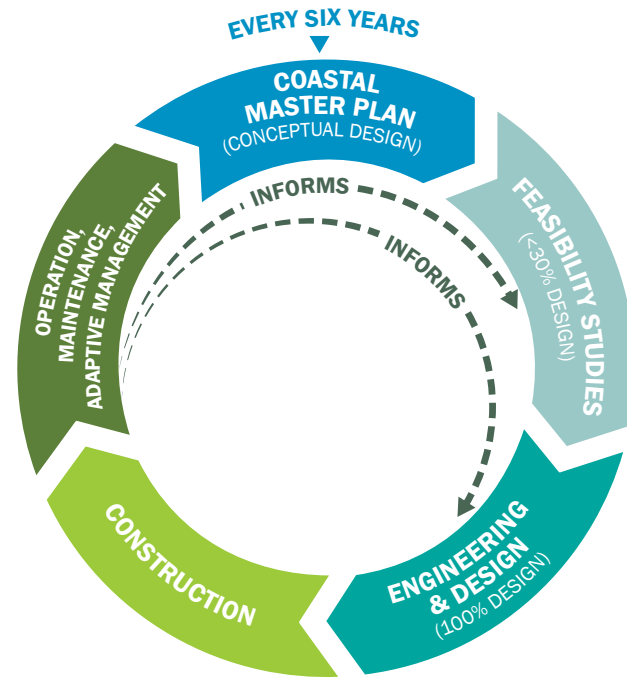


A changing coast

The 2023 Coastal Master Plan aims to preserve coastal Louisiana's rich culture, ecosystems, and natural resources threatened by ongoing land loss and flood risk. It is part of a larger, ongoing effort led by the Coastal Protection and Restoration Authority (CPRA) to adapt Louisiana's coast in the face of future environmental change.

The 2023 Coastal Master Plan is the fourth plan developed by the state to achieve comprehensive coastal restoration and risk reduction goals. Once approved by the Louisiana Legislature, this plan directs the state's coastal activities. It guides billions of dollars of investment in the design, implementation, and operation of large-scale restoration and risk reduction projects.

These projects represent a commitment to Louisianans, to the coast's unique cultural heritage, and to maintaining a productive working coast. It further aims to empower people and communities to make informed decisions by illustrating how they may experience coastal change. Building this resilient coast is a much larger effort than the plan itself. It depends on the decisions of individuals, communities, local governments, and businesses, as well as fellow state and federal agencies.



A 6 YEAR CYCLE FOR A LIVING PLAN

Updating the plan every six years ensures that the latest science, data, and stakeholder considerations are incorporated to continuously improve the master plan's impact and make the case for additional funding.

PLAN GOALS



LAND LOSS REDUCTION

Candidate restoration projects are evaluated based upon how much land they create and maintain over 50 years compared to a future without the master plan.



STORM SURGE RISK REDUCTION

Candidate risk reduction projects are evaluated based on how well they reduce expected annual damage by storm surge-based flooding compared to a future without the master plan.

PLAN OBJECTIVES



FLOOD PROTECTION



NATURAL PROCESSES



COASTAL HABITATS

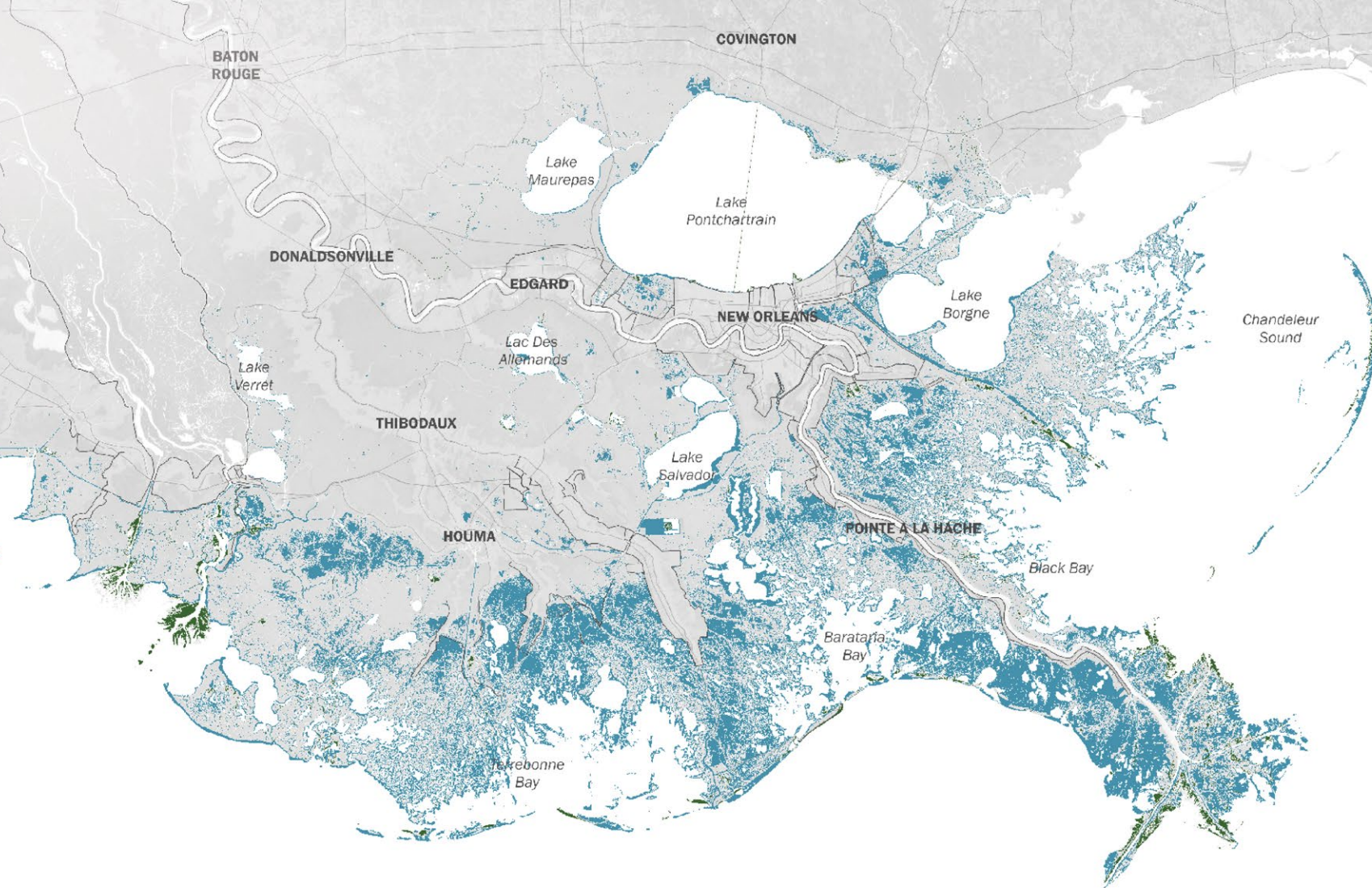
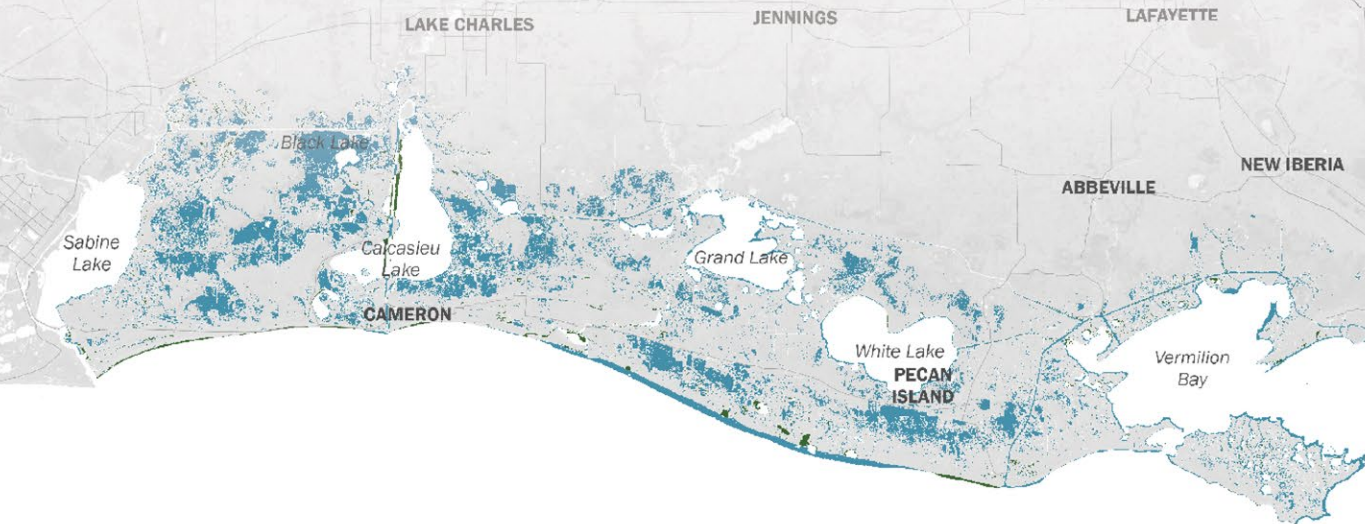


CULTURAL RESOURCES



WORKING COAST

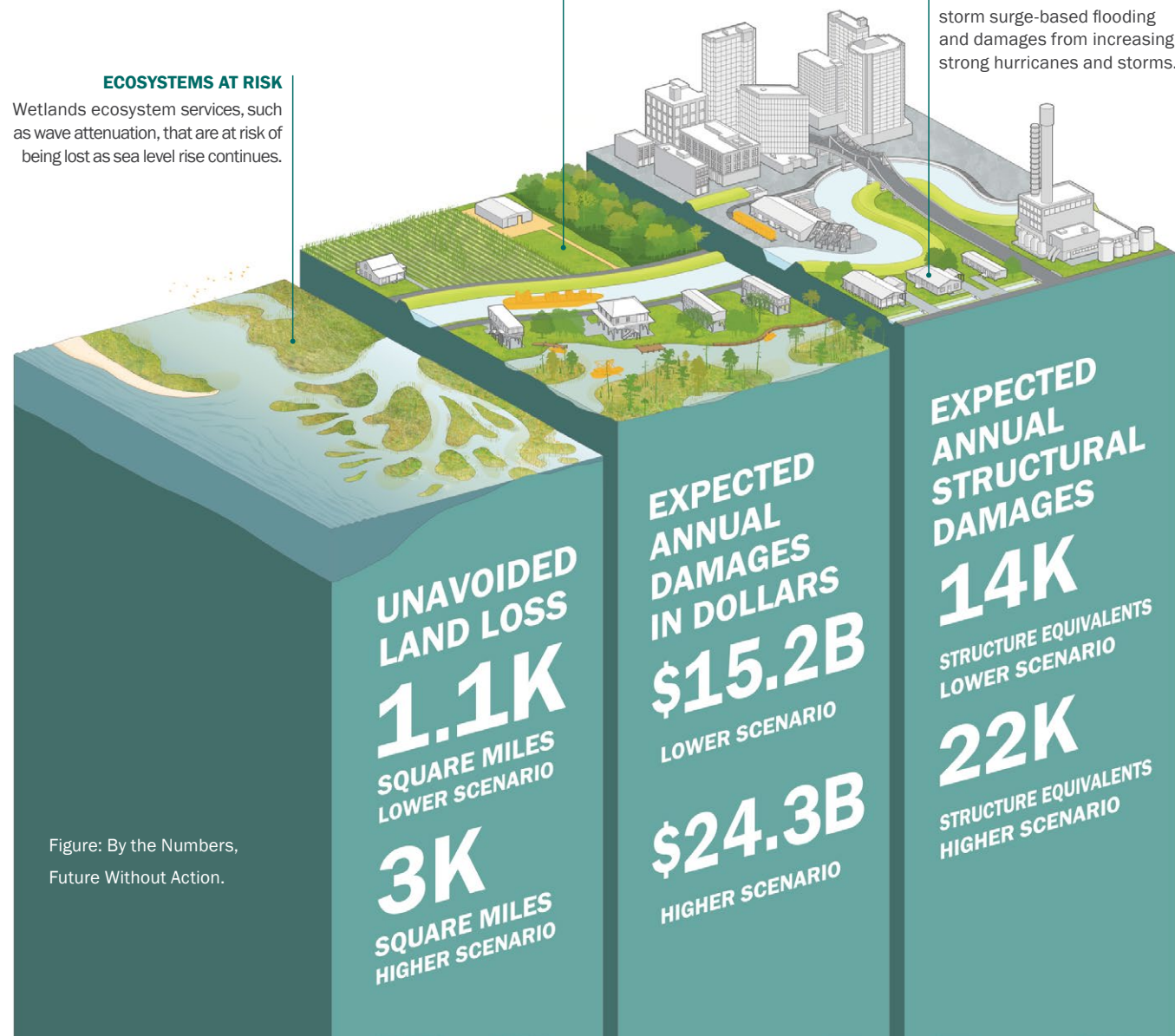
Why do we need a plan?



WIDE-RANGING IMPACTS
Natural resources and the built environment face increased challenges from coastal change.

COMMUNITIES AT RISK
Communities are at risk of storm surge-based flooding and damages from increasingly strong hurricanes and storms.

ECOSYSTEMS AT RISK
Wetlands ecosystem services, such as wave attenuation, that are at risk of being lost as sea level rise continues.



Louisiana is facing a land loss crisis. Over the past century, the state has experienced massive changes to its landscape and the environment that already pose significant challenges to the lives and livelihoods of many Louisianans.

As shown in the map above, more than 2,000 square miles of Louisiana's coast, and the benefits they provide, have been lost since 1932. Natural processes – such as hurricanes, erosion, subsidence, and sea level rise – as well as human-made challenges – like the cutting of canals, oil spills, and building levees on the Mississippi River – make the coast more vulnerable to land loss.

These issues are exacerbated by the impacts of climate change. Climate change contributes to increasing rates of sea level rise and more intense storms. These impacts may include increased flooding in coastal communities (including more regular high tide flooding), drainage challenges as water levels rise, and the degradation of previously vibrant wetlands.

If we do nothing more to prevent this loss, large areas of coastal wetlands will disappear, communities will be more exposed to flooding, livelihoods will be further impacted, and the coast will be irreversibly harmed.

Chapter 3: Predict provides additional details on how future coastal conditions are projected in a future without the master plan.
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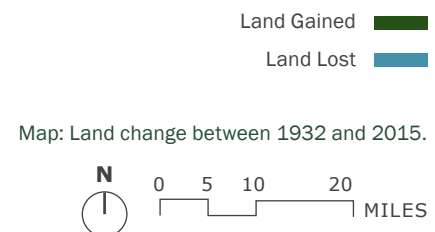


Figure: By the Numbers, Future Without Action.

Map: Land change between 1932 and 2015.

What's at stake?

Much of Louisiana's rich ecology, economy, and culture that depends on the coast is threatened by ongoing land loss and flood risk. Maintaining a healthy and productive coast is of critical importance. The master plan presents a vision that aims to protect, preserve, and strengthen all three of these key components.

A trip to coastal Louisiana makes its value clear. It boasts vast coastal wetlands filled with Spanish moss-draped cypress trees and hundreds of species of birds and other wildlife. These rich ecosystems are home to diverse groups of people and their unique cultures. Their livelihoods are tied to the Louisiana coast – fishing, hunting, and working in industry. Louisiana's working coast dominates key sectors of the nation's economy and generates significant economic activity for the state.

OUR HOMES

Over 2.1 million people who call this coast home could be at risk of future flooding. The master plan approaches damage evaluation as "a home is a home" with metrics that look beyond solely economic value.

The landscape is for more than just making a living. Recreational fishing, hunting, birding, and boating in coastal Louisiana are unparalleled. Locals and people from all around the world come to enjoy the beautiful and bountiful landscapes.

These experiences, skills, and enjoyments have been passed down for generations. Implementing the 2023 Coastal Master Plan is critical to creating a vibrant coast for generations to come. Although the outlook may appear bleak, there is time for residents of these communities to plan for the future.



Image: New Orleans (SCAPE)



Image: Pointe-aux-Chênes, 2020 (Louisiana Sea Grant College Program)

OUR JOBS

Much of Louisiana's economy depends on the well-being of the coast. It is critical for fishing, hunting, shipping, agriculture, and industry. For people seeking to buy property or open a new business, the risk of flooding and cost of flood insurance can deter otherwise promising opportunities.



Image: Rice Farming in Central Coast (Burt Tietje)



Image: Pogie Boats near Venice (Louisiana Sea Grant College Program)

OUR CULTURE

This coast is home to diverse groups of people with their own ties to the landscape. Traditions old and new show a deep appreciation for the coast and a recognition that its value goes beyond utility. Coastal landscapes are deeply entwined in the cultural identity of South Louisianans.

Image: Traditional Mardi Gras Celebration in Mamou, Louisiana, 2016 (CPRA)

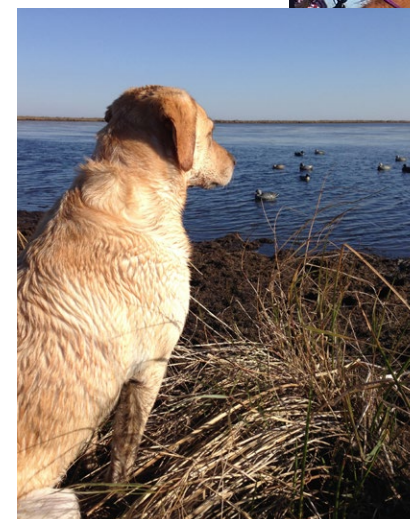
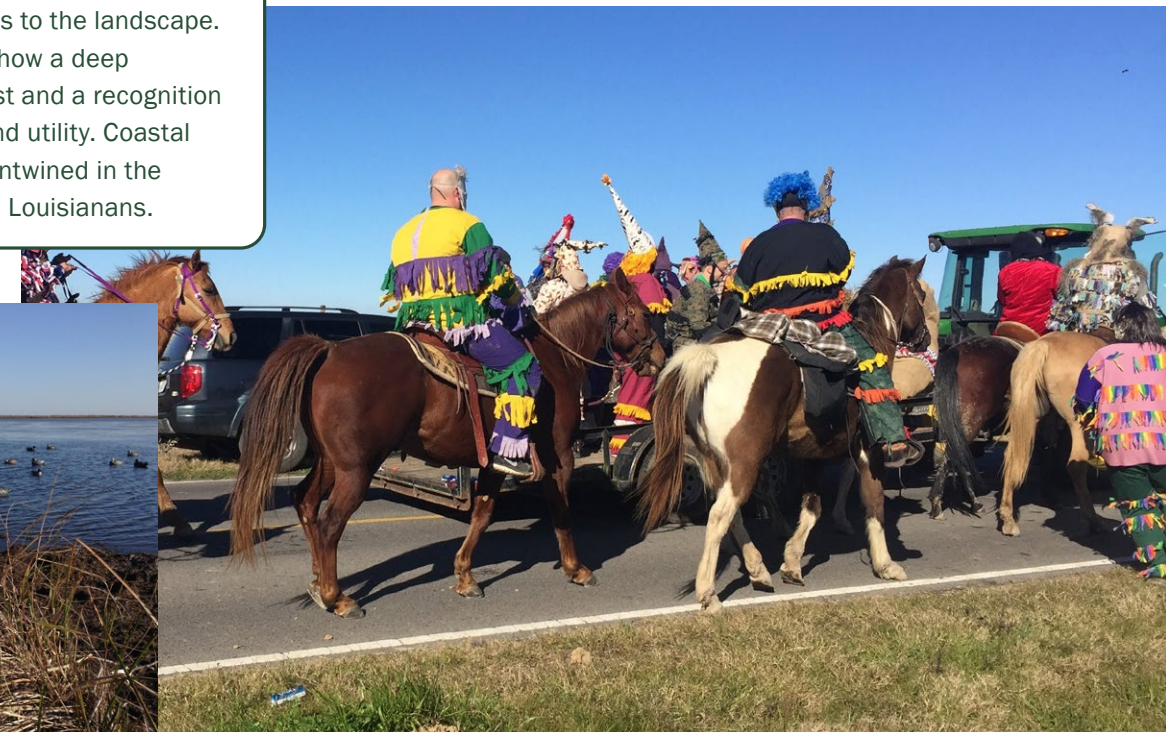


Image: Dog during waterfowl hunt in Delacroix, Louisiana (CPRA)

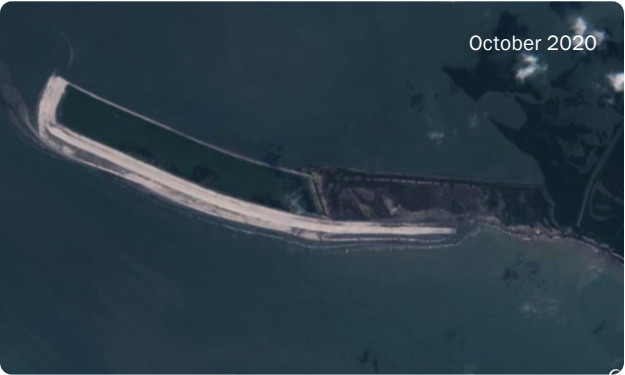
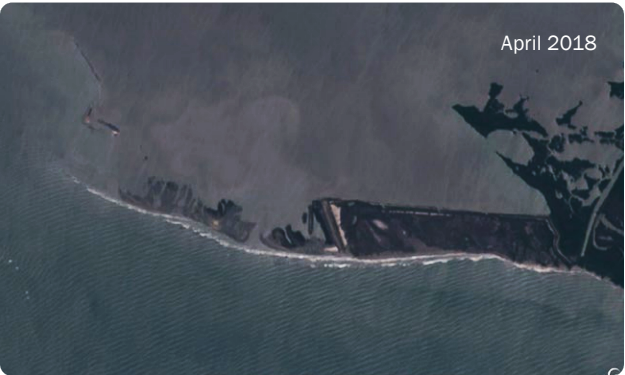
What has been done so far?

CPRA is an implementation agency that does not just plan projects but builds them. For decades, the state and CPRA partners have moved projects forward from conception to construction. Since 2007, CPRA has secured \$21.4 billion for coastal restoration and risk reduction efforts and has completed more than 150 projects. Louisiana is committed to mobilizing dollars quickly and efficiently through the master plan process to implement projects as soon as funds become available.

The projects highlighted here offer glimpses into the master plan's ambitious and comprehensive approach to coastal protection and restoration.

Since 2007, these efforts have totaled:

- 55,807 acres benefited (87.2 square miles)
- 193 million cubic yards of sediment placed
- 369 miles of improved levees
- 71.6 miles of restored barrier islands



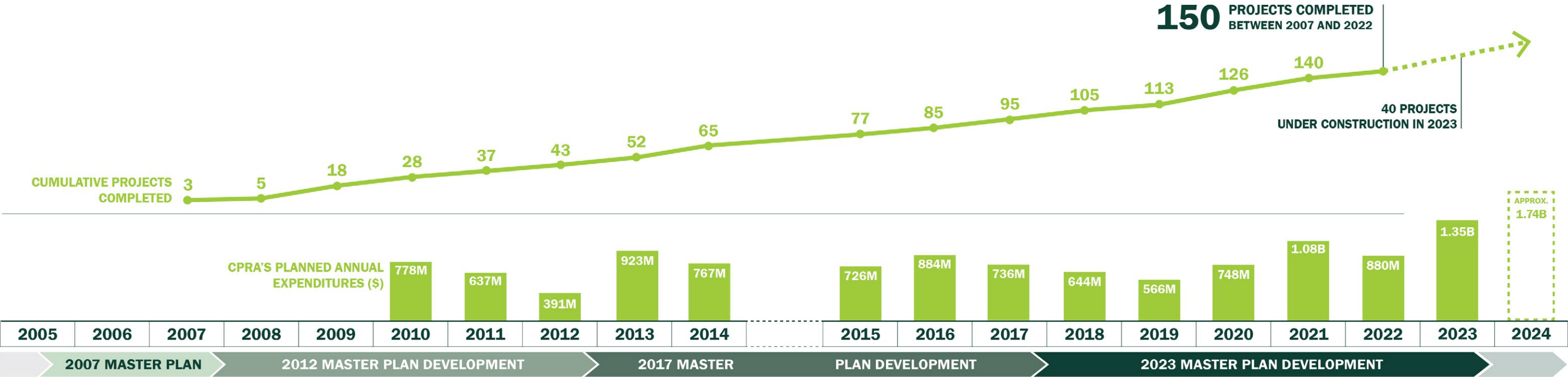
Terrebonne Basin Barrier Island Restoration



Greater New Orleans Hurricane Risk Reduction



Spanish Pass Ridge and Marsh Creation



How is the plan developed?

Every master plan cycle begins by reviewing feedback on the previous master plan process and incorporating recommended improvements. Selecting projects for inclusion in the master plan is a complex effort that is guided by real-world considerations, such as funding, resource constraints, and environmental change. It also considers how projects may interact with each other and their impact on different aspects of the coast. Ultimately, the projects included in the master plan represent a suite of solutions to address a variety of coastal issues Louisianaans face now and in the future.

CANDIDATE PROJECTS

Project concepts are solicited from the public and members of advisory groups to address key coastal concerns. Projects from previous master plans are also considered. All candidate projects are then modeled and evaluated for inclusion based on their performance across both environmental scenarios over 50 years.

EVALUATION

Model outputs are used to develop groups of projects for implementation that best achieve the state's goals, subject to budget and sediment constraints. Many combinations of projects are considered and through a "deliberation-with-analysis" approach, a final set of projects is selected to provide benefits coastwide.

>>> **Chapter 4: Evaluate** provides more information about how projects were selected for the 2023 Coastal Master Plan. **Master Plan page 51**

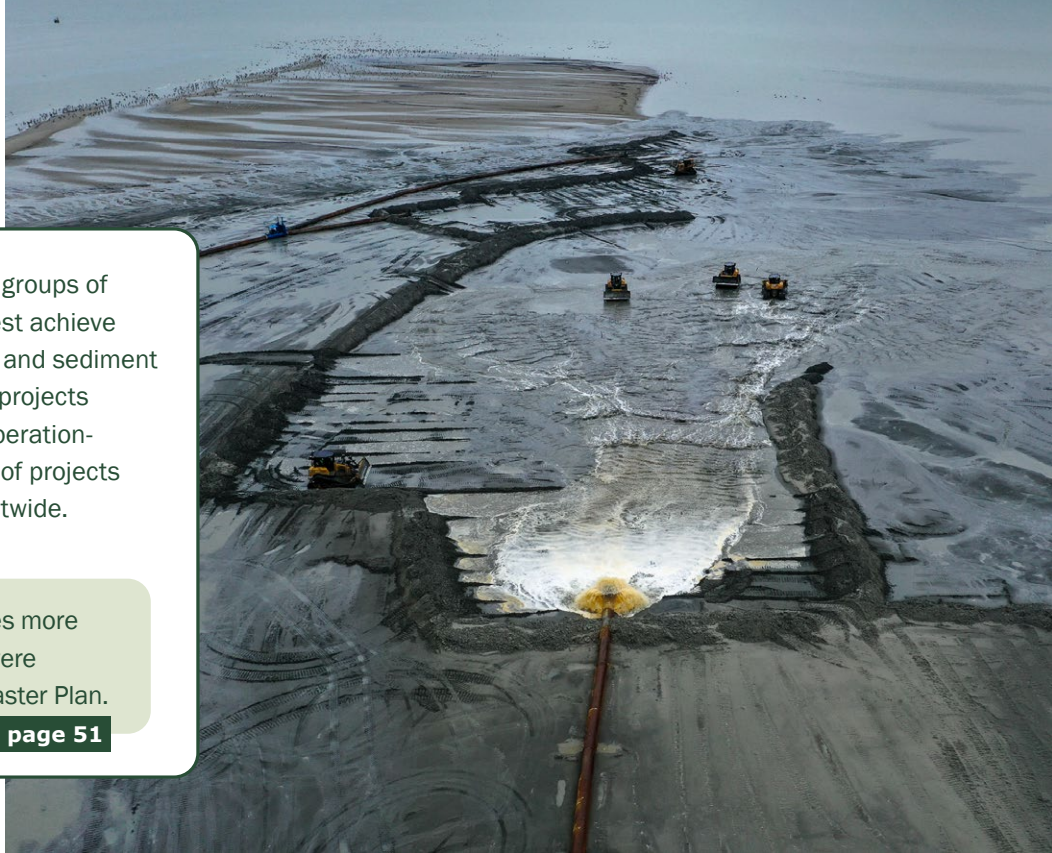


Image: West Belle Barrier Island Maintenance (CPRA)



Image: CPRA Staff on Offshore Trip, 2022 (CPRA)



Image: Regional Workgroup meeting (CPRA)

Image: Master Plan Community Conversation Meeting in Abbeville, 2022 (CPRA)



MODELS

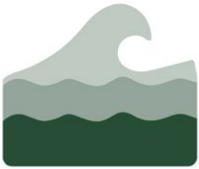
A suite of models are used to predict how the coastal landscape and associated flood risks may change over the next 50 years under different environmental scenarios. They show how different restoration and risk reduction projects could change the coastal landscape and the impact on expected flood damages.

>>> **Chapter 2: Understand** describes the scientific and local knowledge that underpins the master planning process.

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INTEGRATED COMPARTMENT MODEL (ICM)



STORM SURGE AND WAVE MODELS (ADCIRC + SWAN)



COASTAL LOUISIANA RISK ASSESSMENT MODEL (CLARA)

Figure: Models used as part of the 2023 Coastal Master Plan process.

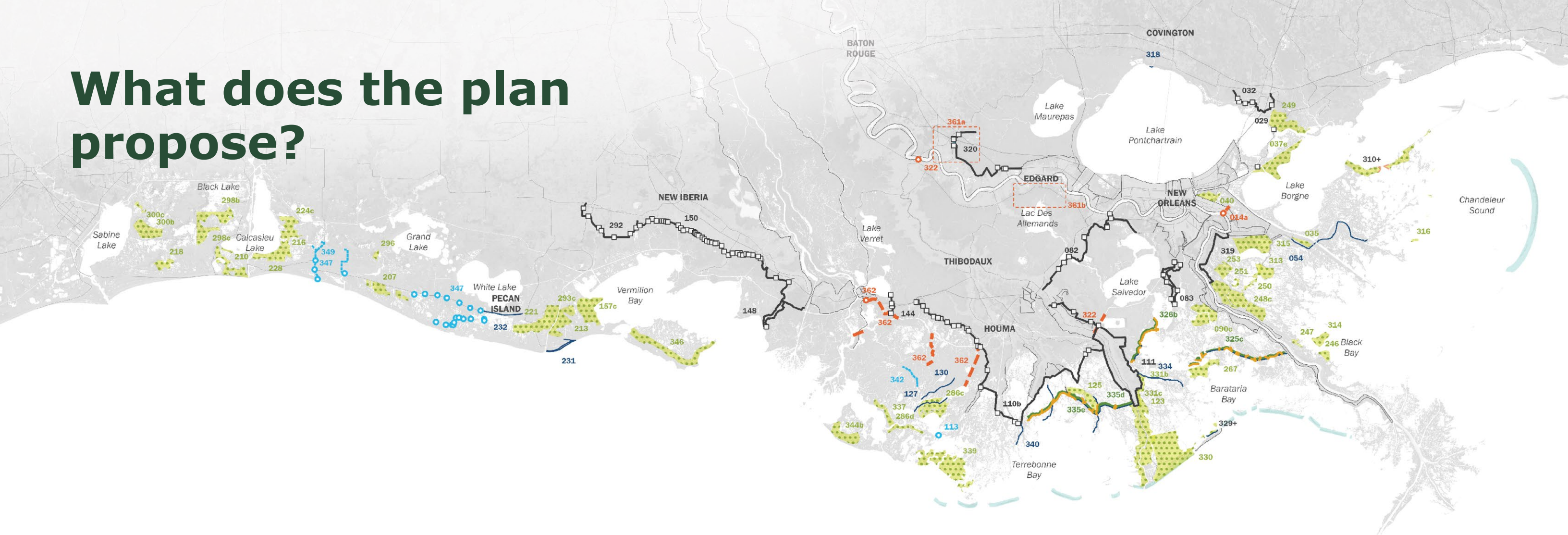
ENGAGEMENT

Throughout the development of the master plan, advisory groups are established and a broad network of coastal experts, residents, landowners, scientists, community leaders, local officials and stakeholders are asked to provide insight and guidance. By doing this, the master plan can identify challenges, understand what people value, and develop projects that respond to the Louisianaans' coastal priorities.



Image: Master Plan Public Outreach Meeting, 2023 (CPRA)

What does the plan propose?



To address the challenges of a changing coast, a suite of 77 restoration and risk reduction projects has been identified. These would prevent hundreds of square miles of land loss and reduce expected annual damage from storm surge-based flooding by billions of dollars and thousands of structures.

- 65 Restoration Projects
- 12 Structural Risk Reduction Projects
- \$11B for Nonstructural Risk Reduction Projects
- \$19B in Dredging Projects

In addition to these projects, \$2.5 billion is allocated to programmatic restoration efforts and small-scale strategies, such as bank stabilization and barrier island maintenance. Additionally, \$11.2 billion is allocated to nonstructural risk reduction activities, such as residential elevations, commercial floodproofing, and voluntary acquisition of properties.

Beyond the projects, the master plan acknowledges that the coast is dynamic, and additional adaptation will be required to continue living, working, and playing here. The master plan alone is not sufficient to respond to all the challenges the future may bring. It aims to be a catalyst for coordinating local, state, and federal efforts to help address the coastal land loss crisis and threats from storm surge-based flooding, and in pursuing the greenhouse gas reductions necessary to avoid the most severe impacts of climate change.

Explore the project types included in the master plan on the following pages. These work together to provide comprehensive restoration and risk reduction benefits.

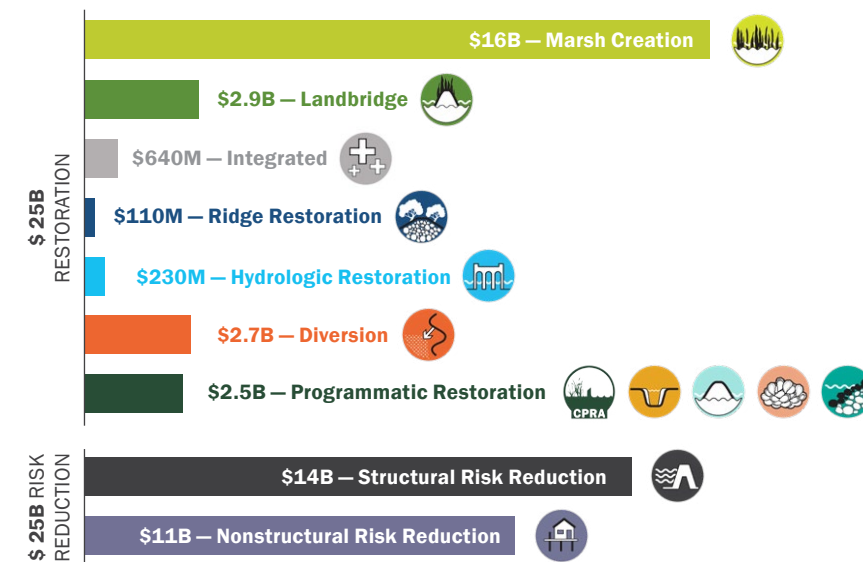
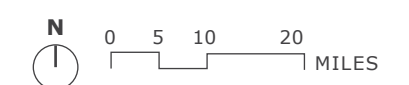


Figure: Funding by Project Type, in USD.

Explore more on CPRA's website. <https://coastal.la.gov/our-plan/2023-coastal-master-plan/>

- Structural Risk Reduction
- Ridge Restoration
- Marsh Creation
- Landbridge
- Diversion
- Hydrologic Restoration
- Barrier Island Maintenance
- Bank Stabilization

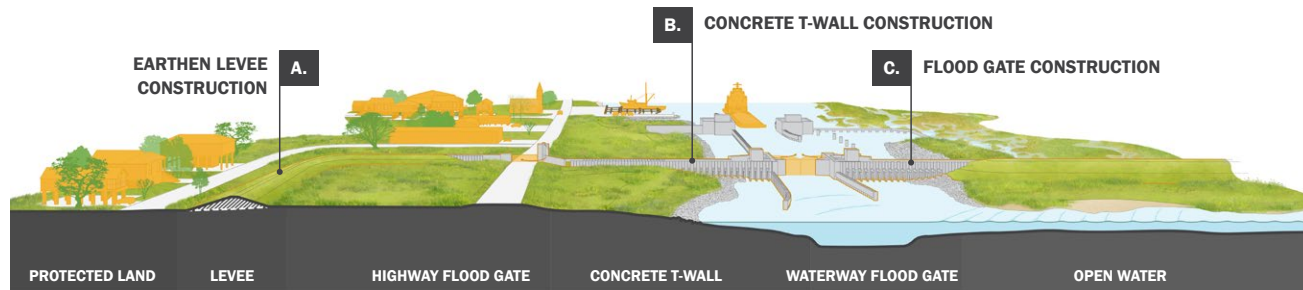
Map: Projects selected for funding as part of the 2023 Coastal Master Plan.



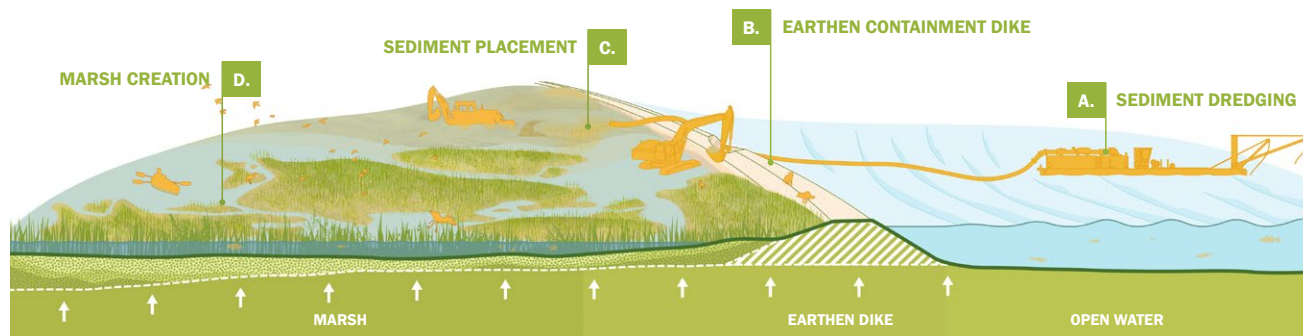
PROJECT TYPES



Structural Risk Reduction projects protect people and property with earthen levees, concrete T-walls, floodgates, and other structural components. They reduce the risk of storm surge flooding and damage within the protected area.



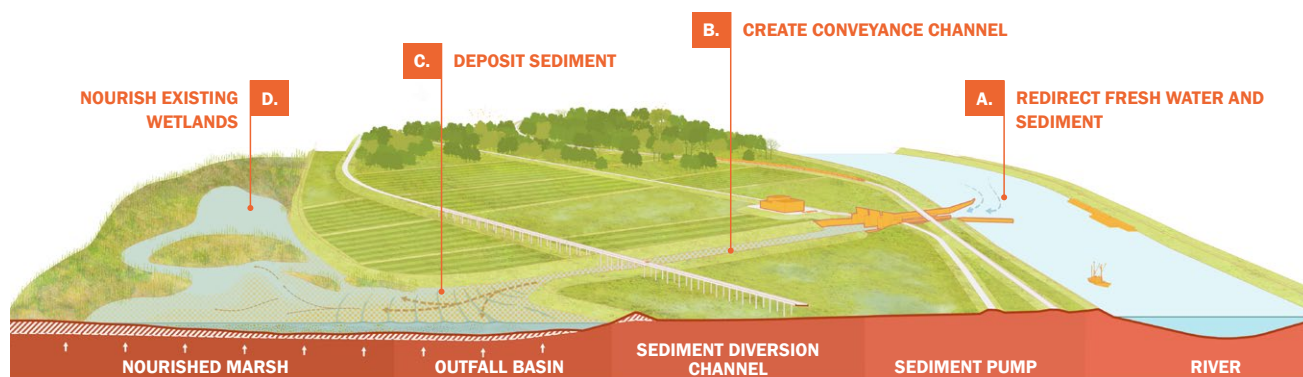
Marsh Creation projects restore landscape and ecosystem processes, enhance habitat, and provide additional storm surge attenuation. Wetlands are created through placement of dredged material and plantings in shallow open water or areas with deteriorated marsh.



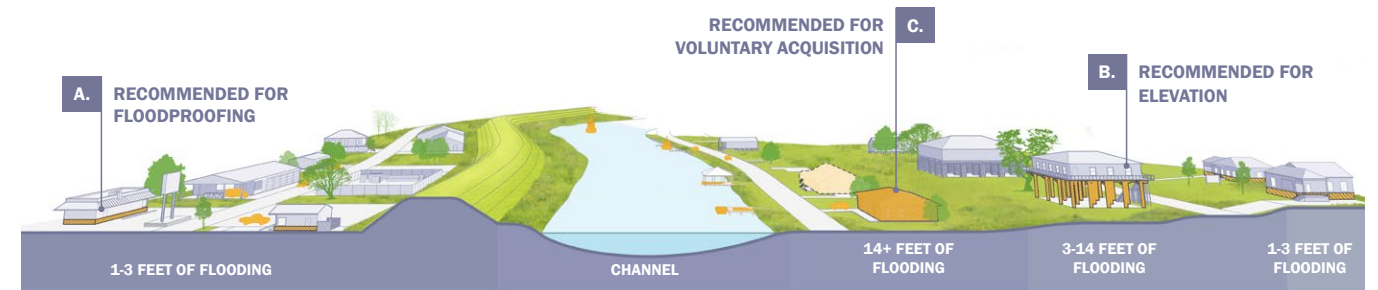
Hydrologic Restoration projects use techniques to ensure water movement across the landscape supports a healthy ecosystem at a basin or sub-basin scale. Small-scale hydrologic restoration focusing on restoring more localized hydrologic patterns are considered programmatically consistent with the master plan.



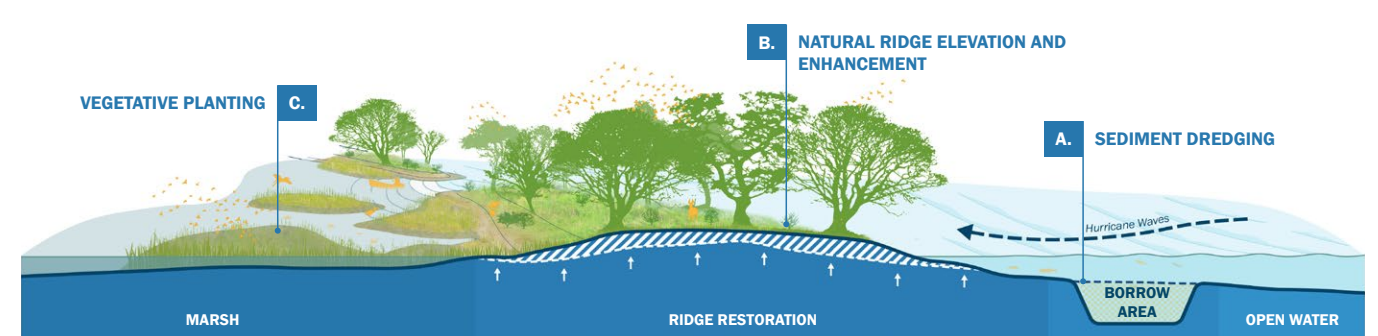
Diversions convey freshwater and sediment from rivers into adjacent wetland basins. These projects restore historic deltaic processes, build new land, nourish existing wetlands, and prevent saltwater incursion into the estuary.



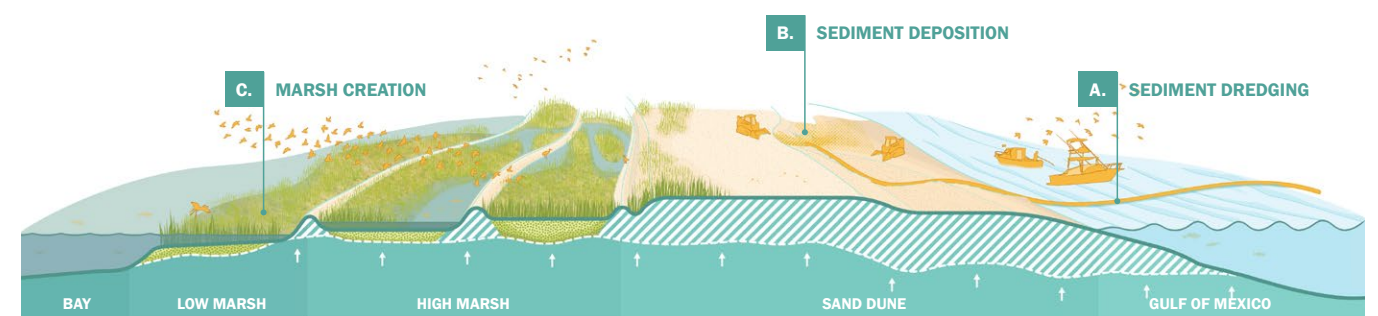
Nonstructural Risk Reduction measures include floodproofing, elevation, or acquisition of at-risk properties depending on projected flood depths. Nonstructural Risk Reduction measures are entirely voluntary and are undertaken in close collaboration with local stakeholders.



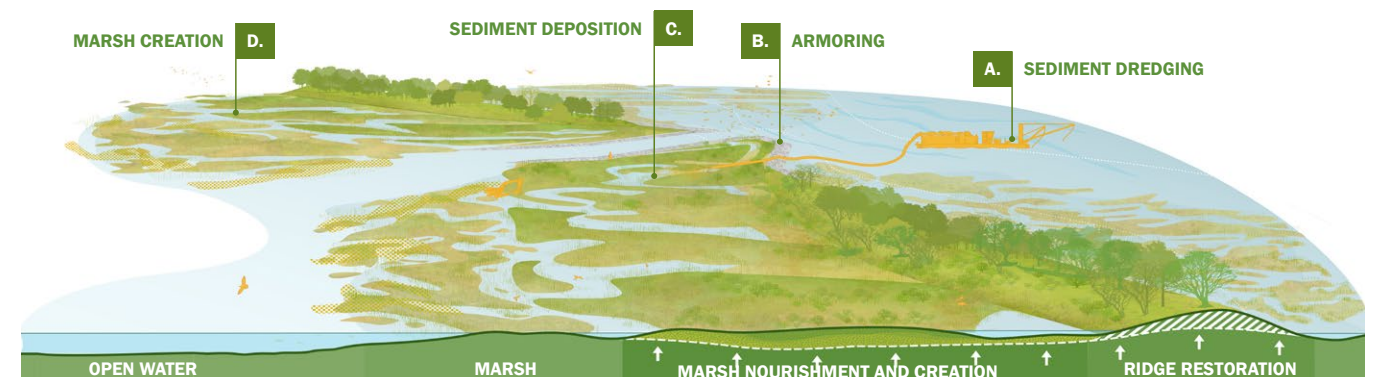
Ridge Restoration projects re-establish historic coastal ridges and forested maritime habitat through sediment placement and new plantings. Restored ridges are high points during storm events, providing refuge for animals and potentially reducing storm surge.



Barrier Island Maintenance projects use dredged sediment to rebuild and strengthen the beaches, dunes, and backbarrier marshes of degrading barrier islands in response to damage from storms. This work enhances natural storm surge attenuation and maintains or improves critical wildlife habitat.



Landbridges are linear tracts of constructed marshes oriented across coastal basins. Landbridges create habitat, attenuate waves, control the dispersal of sediment, and mitigate saltwater intrusion. They include reinforced channels to allow continued water exchange and navigation.

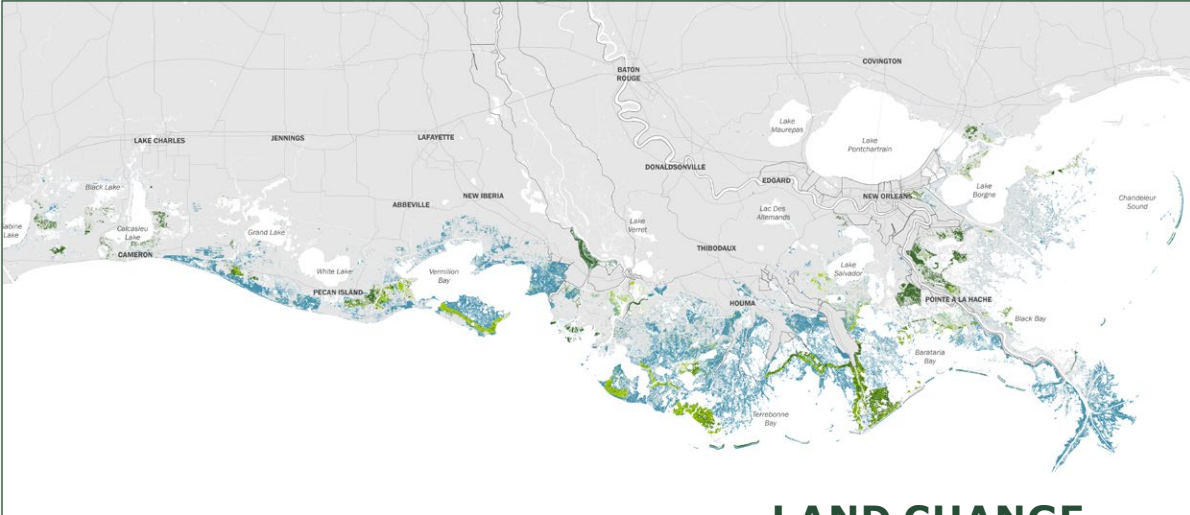
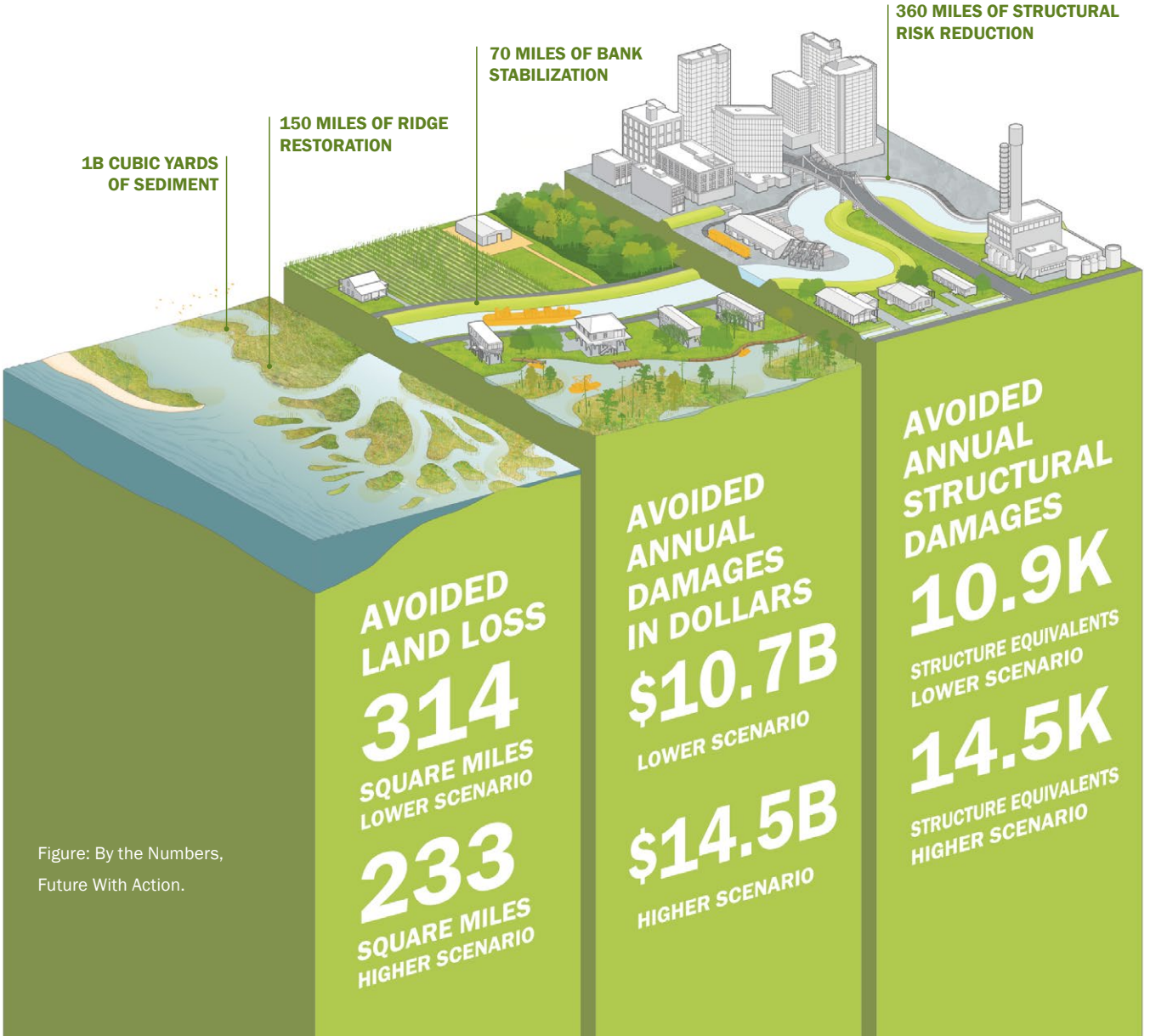


How will the plan benefit the coast?

Project implementation is sequenced over time to ensure the most beneficial projects are completed first. By understanding the impacts of the projects as a group rather than individually, CPRA maximizes benefits across the coast.

Compared to a future without the 65 restoration projects, the plan creates or maintains a significant amount of land that would otherwise be converted to open water over the next 50 years. These projects help maintain diverse ecosystems and retain key landscape features.

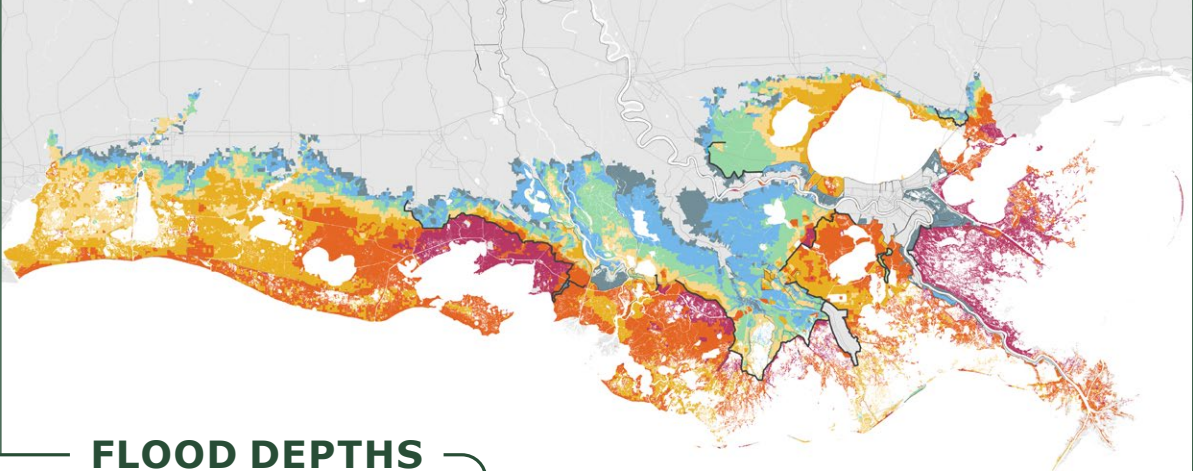
Many communities will benefit from the 12 structural risk reduction projects in the master plan, including new levees and improving existing structures to withstand greater storm surges. To provide risk reduction to coastal communities outside of the current and proposed levee systems, \$11.2 billion of the budget is recommended to support nonstructural risk reduction measures, such as elevations, floodproofing, and voluntary acquisition. This level of investment could mean that, at Year 50, under the lower environmental scenario, Louisiana will have less flood risk from hurricanes and tropical storms than it has today.



LAND CHANGE

Land area built or maintained that would have otherwise been lost by Year 50 ranges from 314 square miles in the lower scenario to 233 square miles in the higher scenario. Under the higher scenario, the benefits of many of the early projects diminish in the final decade as they can no longer keep pace with subsidence and accelerated rates of sea level rise.

FUTURE WITH ACTION | LOWER SCENARIO | YEAR 50



FLOOD DEPTHS

By Year 50, expected annual damage due to storm surge-based flooding may be reduced by \$7.7 billion under the lower scenario and \$10.7 billion under the higher scenario compared to a future without action. Nonstructural measures could further reduce expected annual damage by \$3.0 billion and \$3.8 billion under the lower and higher scenarios, respectively.

FUTURE WITH ACTION | LOWER SCENARIO | YEAR 50

Supporting local decisions

The plan provides a vision for a future coast that is only possible with the involvement of local leaders and individuals across the coast. By providing detailed projections of land change and flood depths, and highlighting regional approaches to target local challenges, the plan aims to empower people and communities.

This plan is the blueprint for where we go from here: the goal is a sustainable coast where people can continue to enjoy the things that make coastal Louisiana's regions economically, ecologically, and culturally unique and valuable. Sharing local information is critical to empower people and communities to get involved with the master plan process and make decisions about their lives on the coast.

>>> Chapter 6: Regional Approach provides insights on locally specific challenges, initiatives, and master plan benefits.

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A REGIONAL APPROACH

Throughout the master plan development process, CPRA met with residents and convened Regional Workgroups to discuss issues, priorities, and possible solutions for each of the regions. These conversations informed every step of the process to develop locally specialized approaches. The result is a master plan that better reflects the experiences of coastal residents to support those that rely on the coast, today and in the future.



Figure: Aerial View of the Barataria Region with the 2023 Coastal Master Plan Projects.

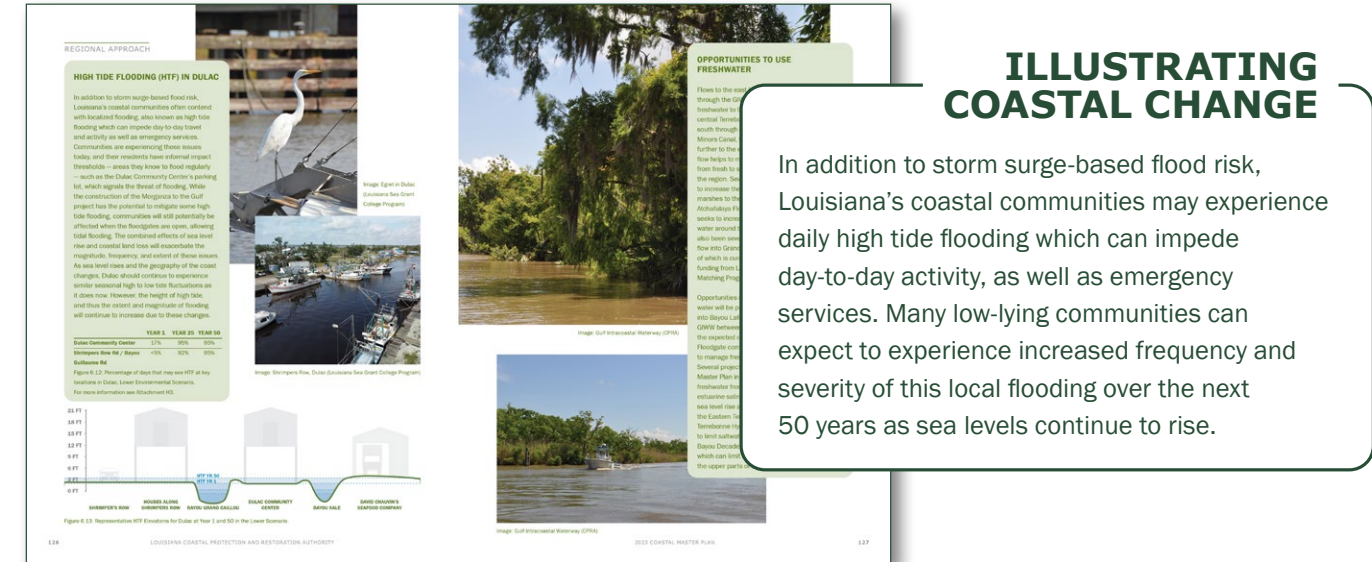


Figure: Illustrating Coastal Change spread from the Master Plan.

AVAILABLE INFORMATION

Data overviews of plan impacts and benefits are available through fact sheets at the Regional, Parish, Community, and Project levels. These include information ranging from localized flood depths to the land change benefits by year of a particular restoration project. The online data viewer provides an even greater level of detail with the ability to find high-resolution benefits data, search projects, understand coastwide implementation, and more. The goal of providing this level of data is to empower local leaders and residents to make decisions using information specific to them.

Figure: Example Parish Fact Sheet.

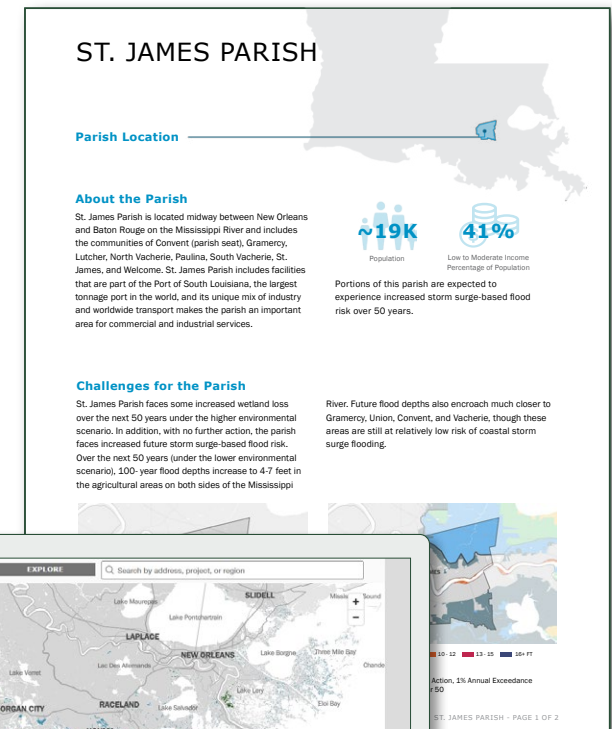
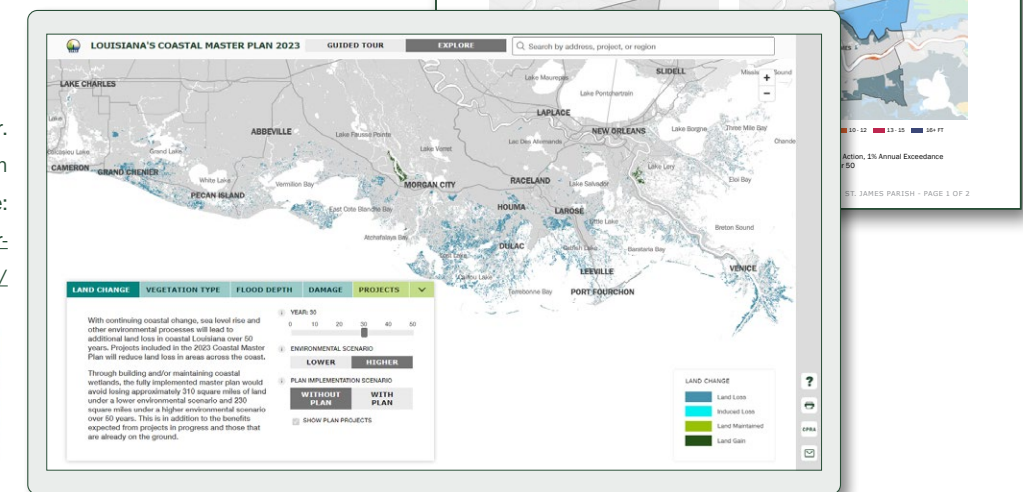


Figure: Data Viewer. Explore more on CPRA's website: <https://coastal.la.gov/our-plan/2023-coastal-master-plan/>



Implementing the plan

While the master plan provides a blueprint for restoration and planning activities in coastal Louisiana, a coalition of support is required to create a more sustainable and resilient coast.

Given the emergency facing coastal Louisiana, it is imperative that all government agencies act quickly and in accordance with the master plan. The goal is for the master plan to drive and expedite state action across agencies, including with the state's partners at the local and federal levels, consistent with their mandates and missions. By leveraging local government initiatives, the efforts of other state agencies, federal studies and funding, and the work of non-profit and community-based organizations, CPRA aims to expand the reach of the coastal program.

The Governor's Adaptive Governance Initiative has promoted information sharing among state agencies and their assessment of vulnerabilities, identification

of adaptation actions, and pursuit of measures to make the coastal communities more resilient. CPRA supports the agencies in their efforts to consider environmental change projections from the master plan in their long-term planning and decision-making.

CPRA also works directly with the United States Army Corps of Engineers to monitor and maintain levees, and coordinates with the Federal Emergency Management Agency and other federal partners during and after damaging storms.

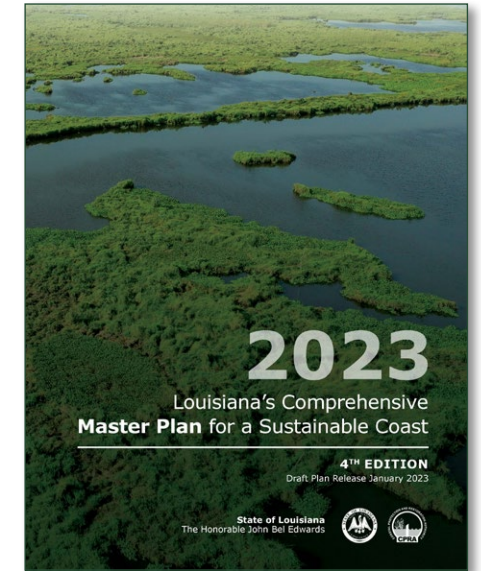
The state's pursuit of these endeavors is anchored in a commitment to the people and places that make up coastal Louisiana. While restoration and risk reduction planning is essential to provide consistent, long-term investment in coastal communities and ecosystems, it cannot meet every need.

Stay involved!

Since the creation of the first master plan, engagement with diverse stakeholders, communities, and technical experts has been crucial to defining goals and developing solutions to address land loss and storm surge-based flooding. Your continued involvement is of critical importance.

2023 Coastal Master Plan Appendices, available online, document the technical improvements and analysis that support the master plan development. The Master Plan Data Viewer was updated to help stakeholders understand the coastal crisis, what implementation of this plan would accomplish, and dive deeper into the data. You can also sign up for master plan updates (email us at masterplan@la.gov) and follow CPRA's social media accounts to stay informed of new advancements and upcoming events.

CPRA's mission is to keep listening and learning through having conversations with coastal residents.



- **Explore the Master Plan**
- **Explore the Data Viewer**
- **Explore the Technical Appendices**



More on CPRA's website:

<https://coastal.la.gov/our-plan/2023-coastal-master-plan/>

or contact us at masterplan@la.gov.

-  @louisianacpra
-  @LouisianaCPRA
-  Louisiana Coastal Protection and Restoration Authority
-  Coastal Protection and Restoration Authority of Louisiana



Image: White Lake Wetlands Conservation Area, 2021 (Louisiana Sea Grant College Program)



**COASTAL PROTECTION AND RESTORATION
AUTHORITY OF LOUISIANA**
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