

# Coastal Planning and Lands Management at the Texas General Land Office



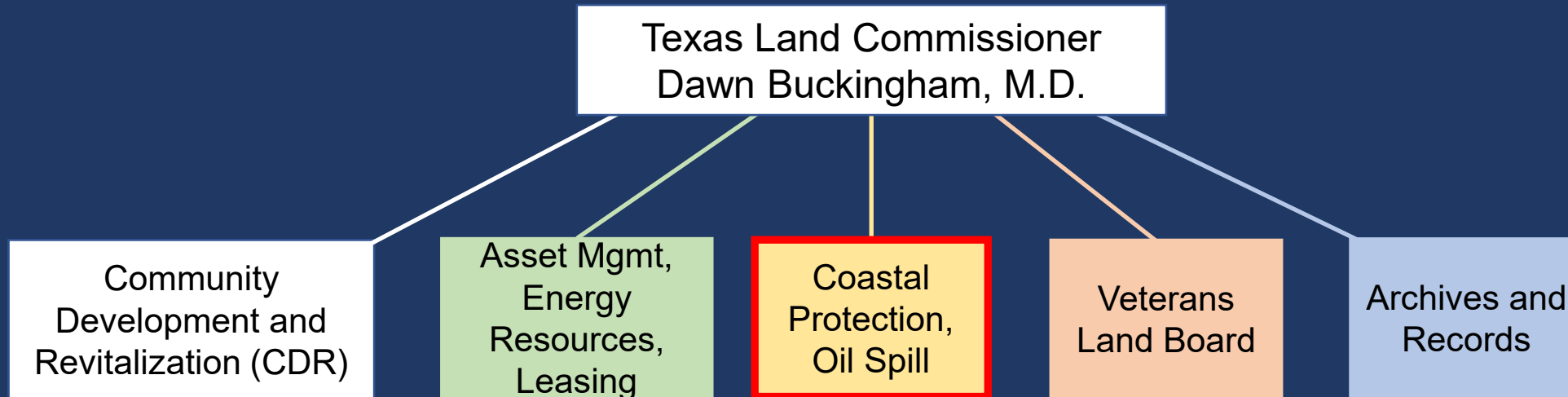
2024 Environmental Workshop (WOTUS)  
April 16, 2024  
Junior League of Houston

Tony Williams,  
Deputy Director of Coastal Field Operations and Planning

# Texas General Land Office

## Agency Mission

The Texas General Land Office primarily serves the schoolchildren, veterans, and the environment of Texas. The agency does so by preserving our history, maximizing state revenue through innovative administration, and through the prudent stewardship of state lands and natural resources.



# Texas General Land Office

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- Oldest State Agency in Texas
- Established in 1836 by the Constitution of the Republic of Texas
- Opened the doors in 1837
- Over 175 years of continuous operation



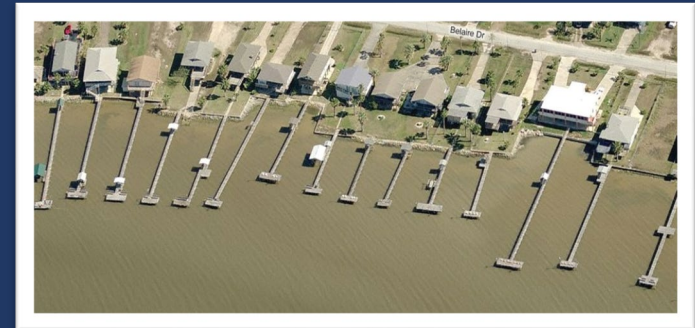
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# Texas General Land Office

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- Management of State Land
- Coastal Resiliency Planning and Implementation
- Oil Spill Prevention and Response
- Veterans Land Board
- Alamo
- Disaster Recovery Grant Administration

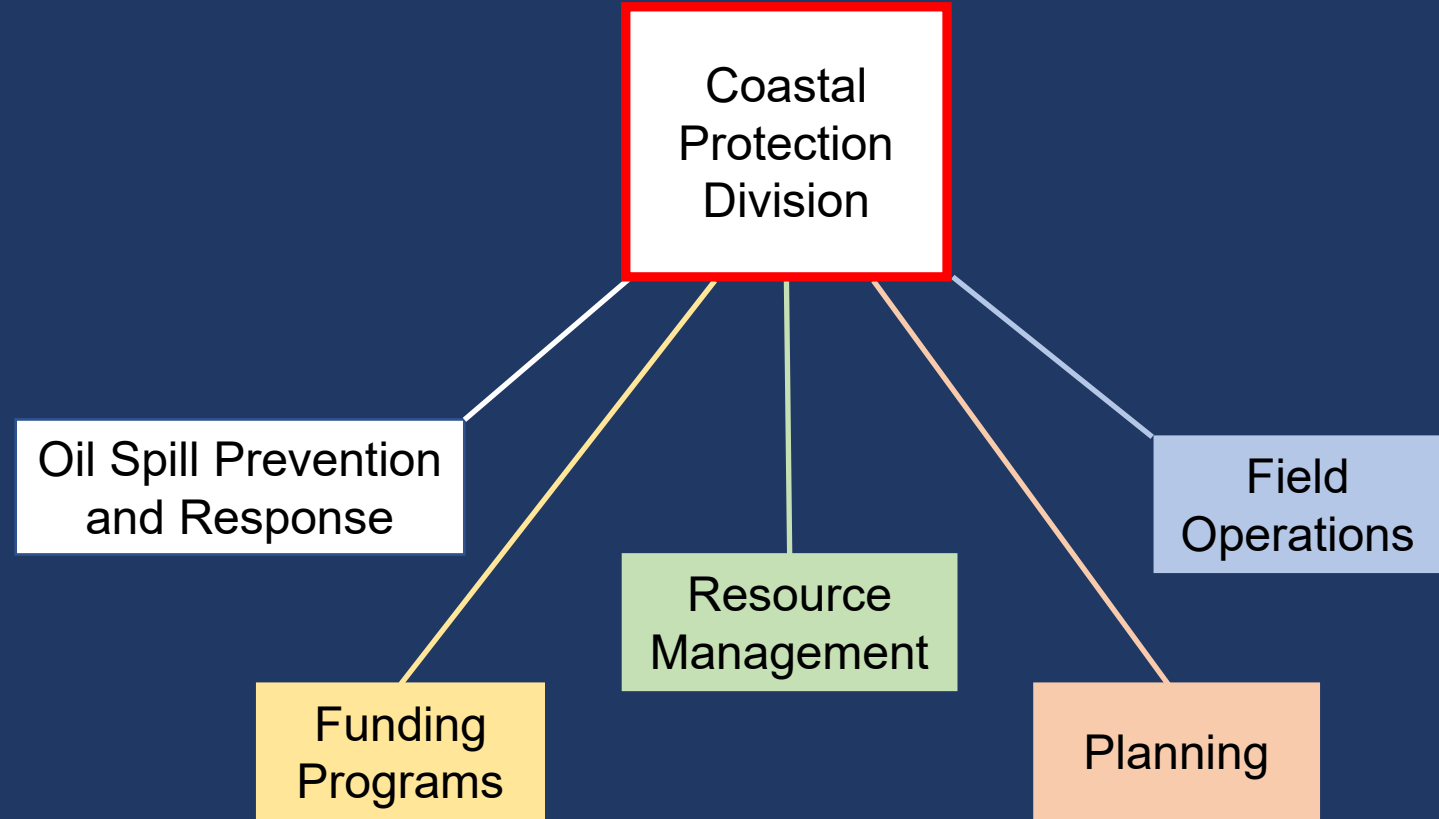


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# GLO Coastal Protection



# Coastal Planning

With 367 miles of Gulf beaches and more than 3,300 miles of bays and estuaries, Texas has one of the longest coastlines in the country. The GLO Coastal Planning Team is a focused effort to pool local, state and federal resources, and begin prioritizing efforts to build a resilient Texas coast.

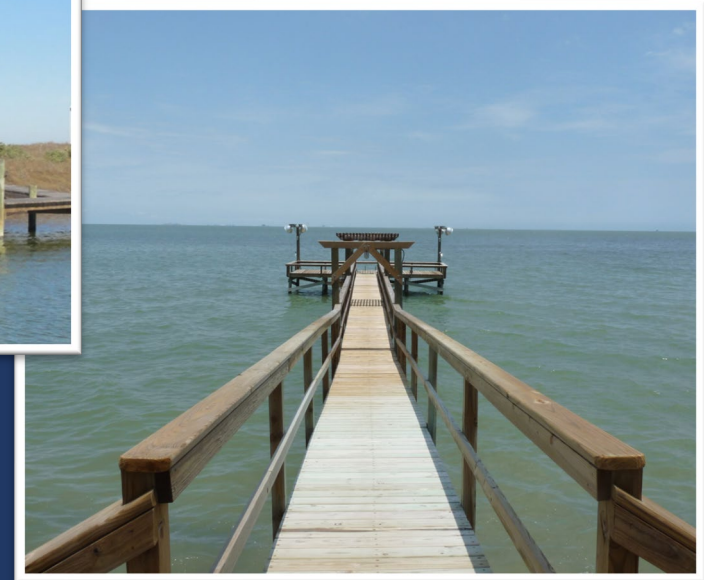
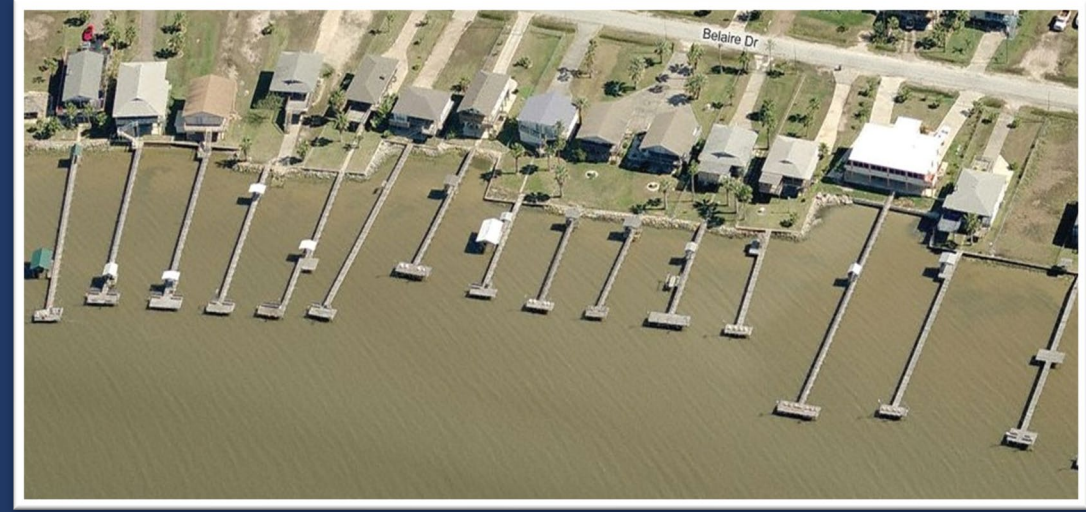




# Coastal Surface Leasing

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- Responsible for the prudent management of state-owned submerged land through the issuance of leases and easements in accordance with the Texas Natural Resources Code
- This encompasses over 3,300 square miles of bays and estuaries and extends to 10.3 miles in the Gulf
- Our team of 25 staff in two field offices provide technical field assessments and subsequent contracts for proposed and existing projects
- This includes: piers, docks, marinas, commercial projects, pipelines, habitat creation projects, and oyster mariculture projects
- Currently, there are over 9,000 active Coastal Leases, Easements, and Registrations

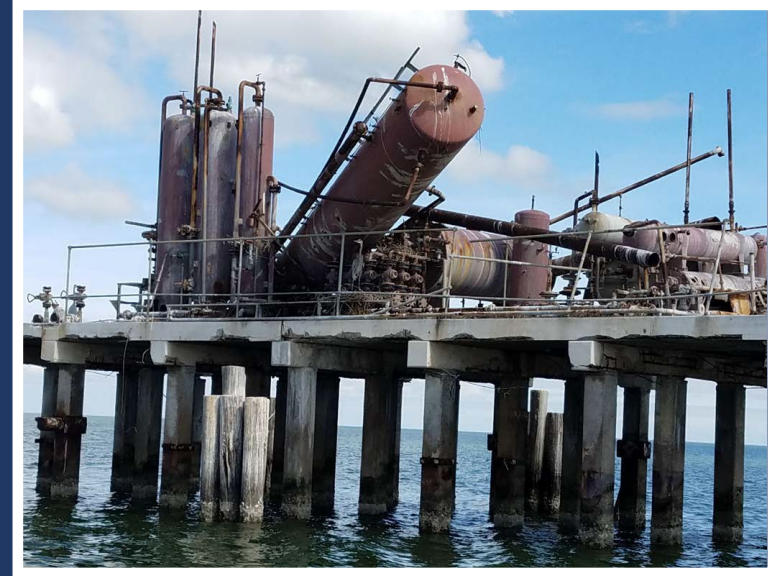
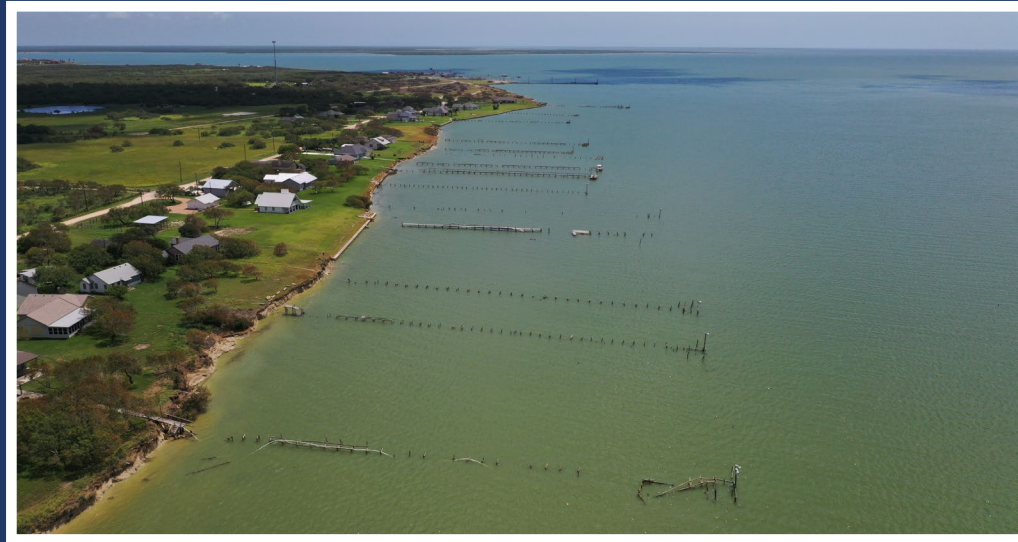


# Debris Removal

GLO is responsible for removal of all debris that poses a threat to human health and safety on state land. This is divided into two phases that includes impact assessment and subsequent debris removal as funding allows.

Jurisdiction includes:

- Public Beaches
- Gulf, bays, and tidally influenced rivers





# Debris Removal – Bays and Tidal Rivers



Following Hurricane Harvey - 29,152 cubic yards of debris were removed from Texas public waterways

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# Debris Removal – Public Beach



Following Hurricane Harvey - 11,256.15 cubic yards of debris were removed from Texas public beaches

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# Need for a Plan

- Texas has 367 miles of Gulf beach shoreline (6<sup>th</sup>) and 3,359 miles of total shoreline (7<sup>th</sup>)
- The Bad News – Disasters
  - 2008 Hurricane Ike
  - 2010 Deepwater Horizon BP Oil Spill
  - 2017 Hurricane Harvey
  - 2020 Season (most named storms record of 30)
- The Good News – Funding
  - Help prioritize internal GLO funding decisions
  - Help inform external funding partners
  - Hotel Occupancy Tax to address coastal erosion
  - GOMESA

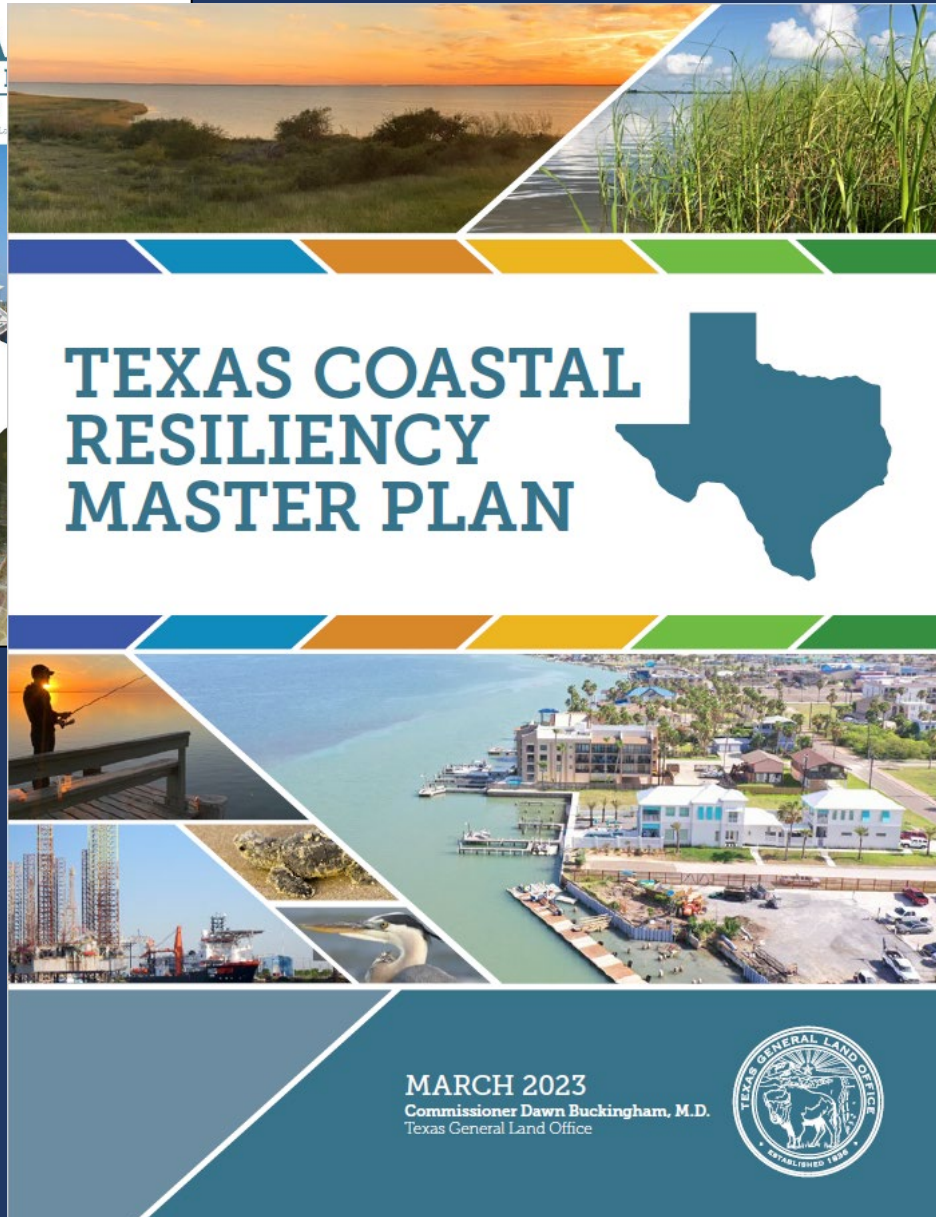


*Bolivar Peninsula after Hurricane Ike*

*source: NWS*







# Goals and Objectives

1. Identify, select, and fund projects that address the coastal vulnerabilities to restore, enhance, and protect the Texas coast
2. Adapt priorities to accommodate changing conditions through future iterations
3. Communicate the environmental and economic value of the Texas coast to state and national audiences





# Role of this Plan

## What this Plan is

- A list of high-priority coastal resiliency initiatives and projects
- A snapshot of the needs of the state for coastal resiliency at the time of publication
- An opportunity for the GLO to align coastal resiliency priorities with feedback from stakeholders, coastal experts, and other public agencies

## What this Plan is NOT

- An automatic funding mechanism
  - \* *Tier 1 projects are typically prioritized for GLO funding programs*
- A guarantee that projects will be funded or completed
- A completely comprehensive list of the coastal resiliency projects that are necessary coastwide



## Concurrent State and Federal Efforts on the Texas Coast



# Complementary Planning

## Coastal Texas Project

- Galveston Bay Storm Surge Barrier System
- South Padre Island Beach Project
- Coastwide Ecosystem Restoration (8 projects)

## Regional Flood Planning

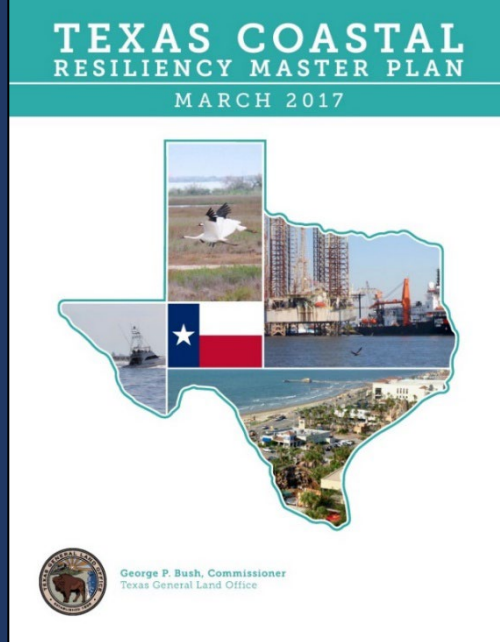
- GLO River Basin Flood Studies
- TWDB Regional Flood Planning Groups

## Restoration Planning

- NRDA
- RESTORE
- NFWF

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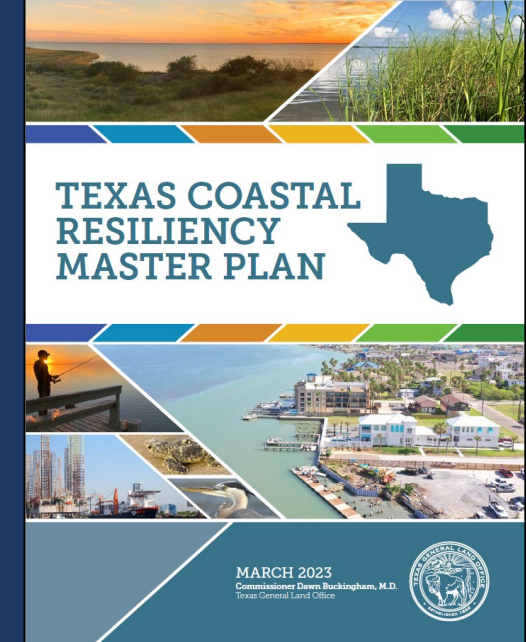
2017

- 63 Tier 1 projects
- Ecologically focused
- 7 projects completed



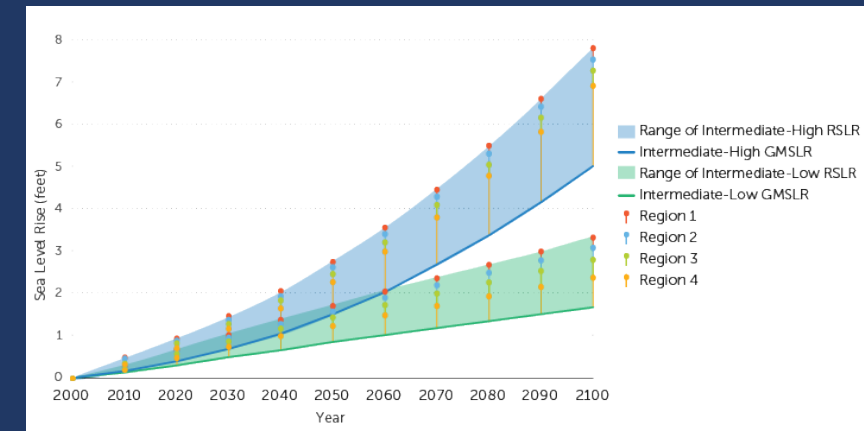
2019

- 123 Tier 1 projects
- Future conditions modeling
- 7 projects completed, 28 fully funded

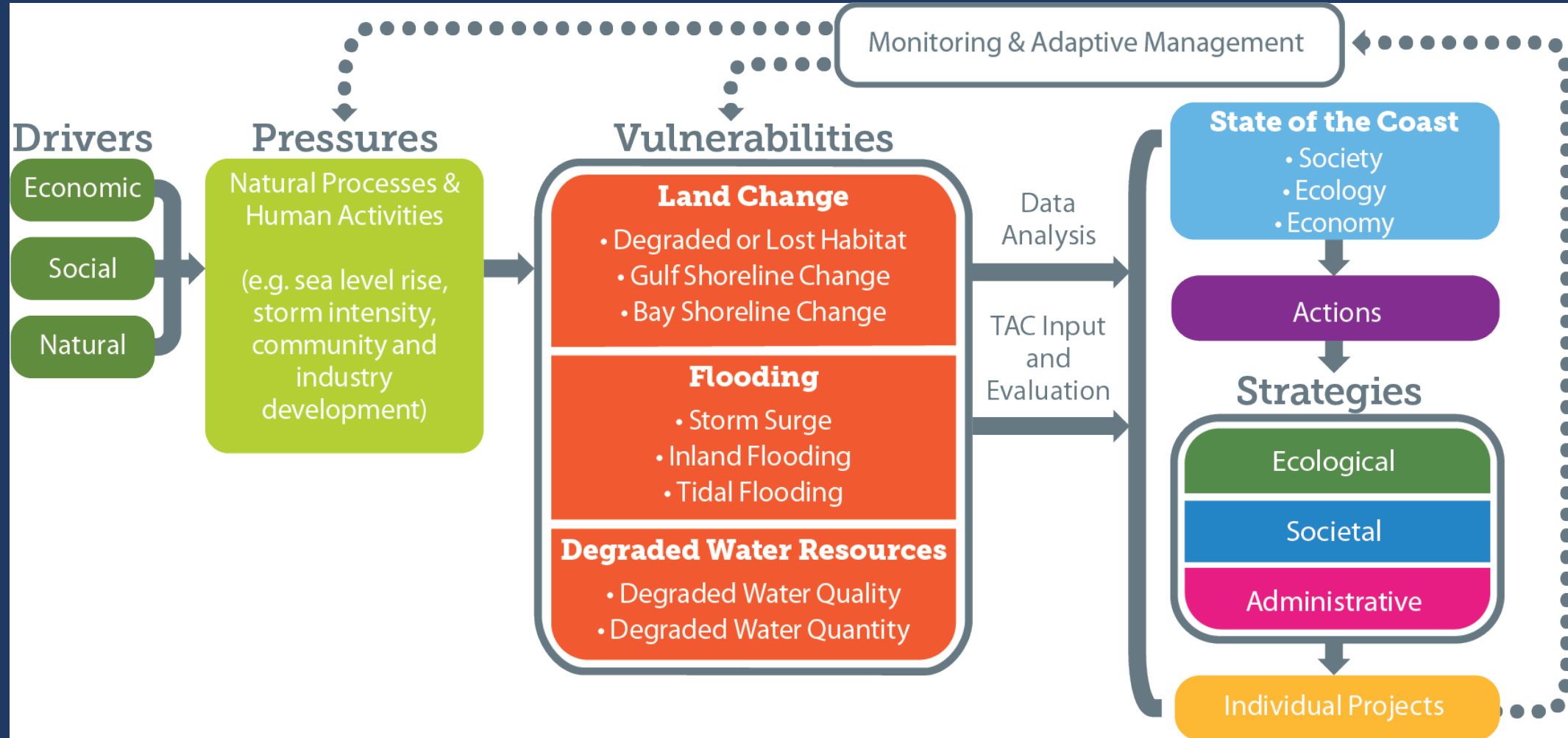


2023

- 121 Tier 1 projects
- Expanded modeling scenarios



# Coastal Resiliency Framework





# Vulnerabilities

## Planning Regions



### Land Change



Degraded or Lost Habitat



Gulf Shoreline Change



Bay Shoreline Change

### Flooding



Inland Flooding



Storm Surge



Tidal Flooding

### Degraded Water Resources



Degraded Water Quality



Degraded Water Quantity



# Stakeholder Input

## Planning Regions



### Technical Advisory Committee (TAC)



#### Local Governments and Community Leaders

- Elected officials
- Local government staff
- Councils of government (COGs)
- Metropolitan Planning Organizations (MPOs)
- Other local and regional community leaders



#### Coastal Experts and Practitioners

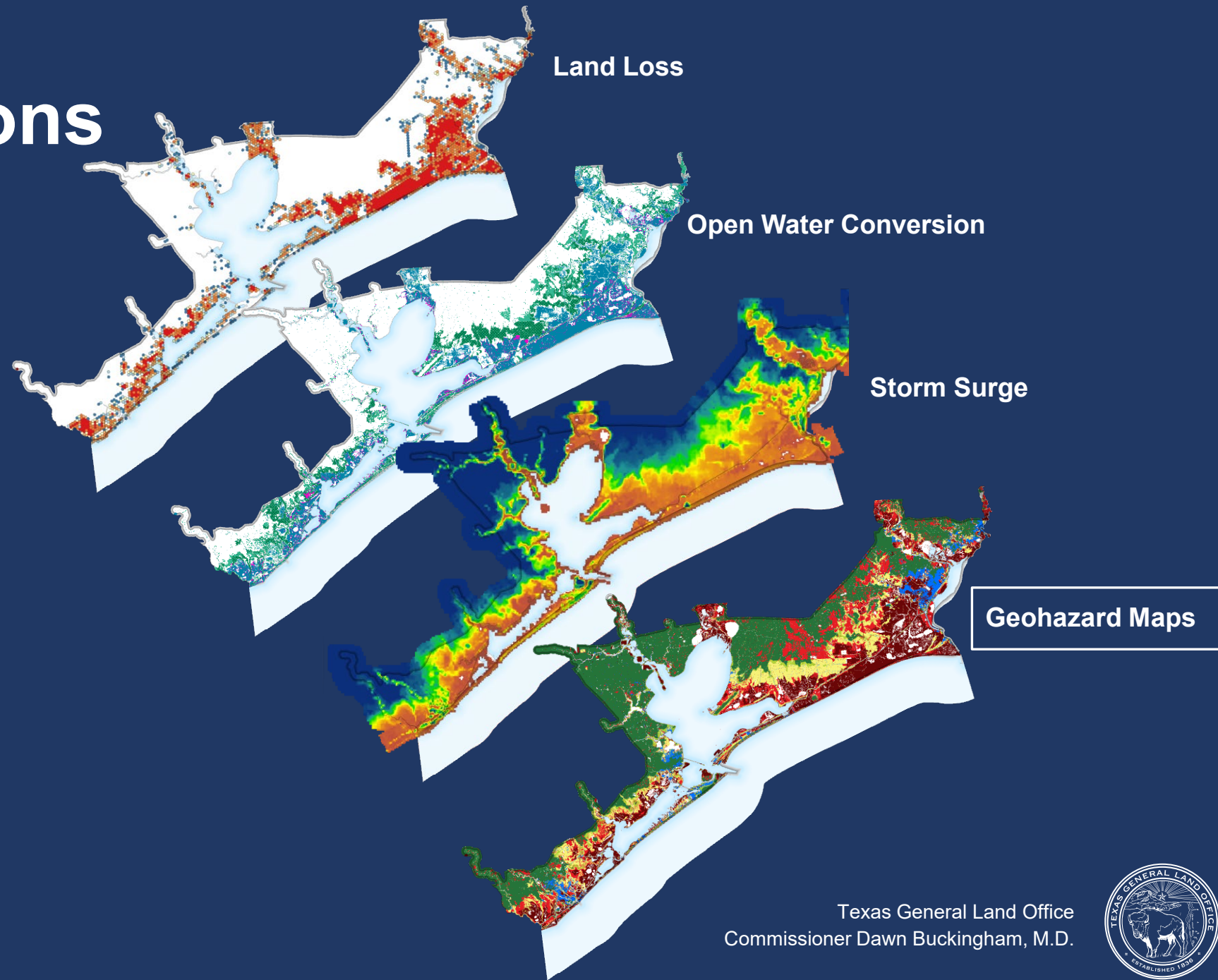
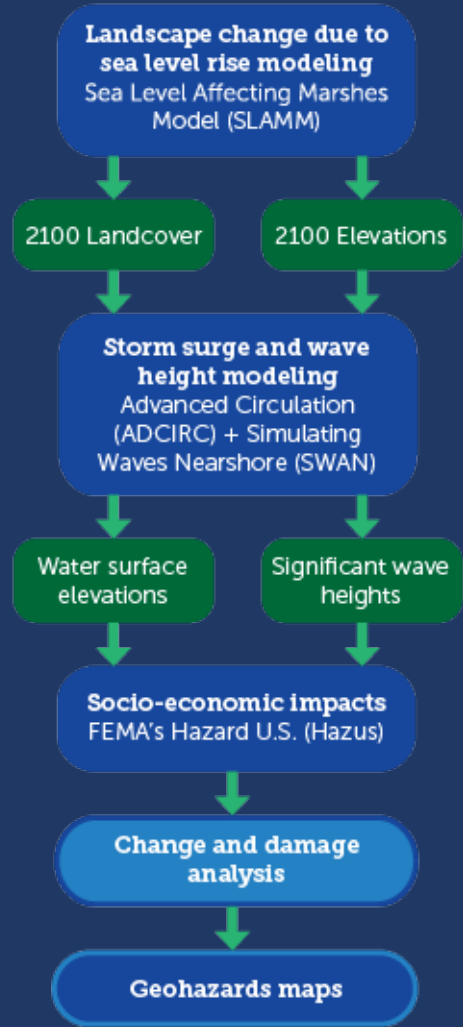
- State agencies
- Federal agencies
- Universities
- Ports and navigation districts
- River authorities
- Non-profits
- Other technical partners





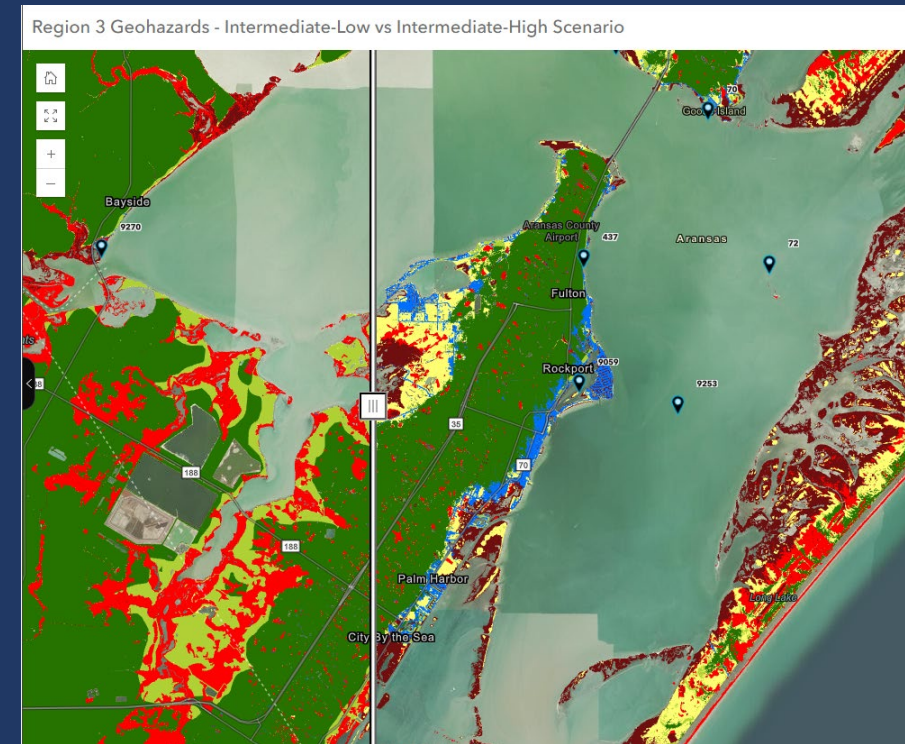
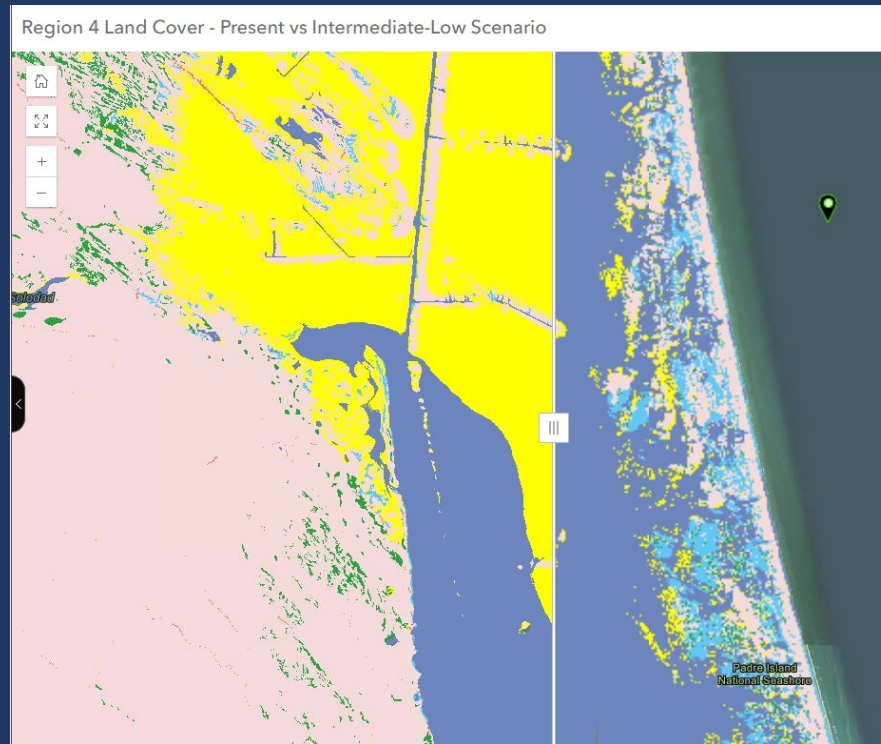
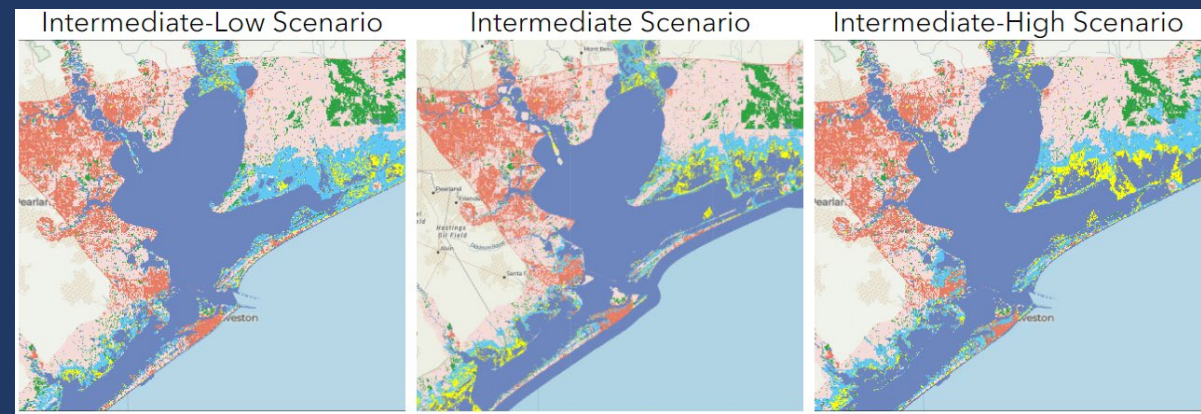
# Modeling Future Conditions

## MODELING FRAMEWORK



# Modeling Data Viewer

- Choose SLR scenario
- Search by location
- Compare slide bar
- Landscape type
- Storm surge
- Geohazards
- Downloads tab
- Tier 1 projects



[www.glo.texas.gov/crmp](http://www.glo.texas.gov/crmp)

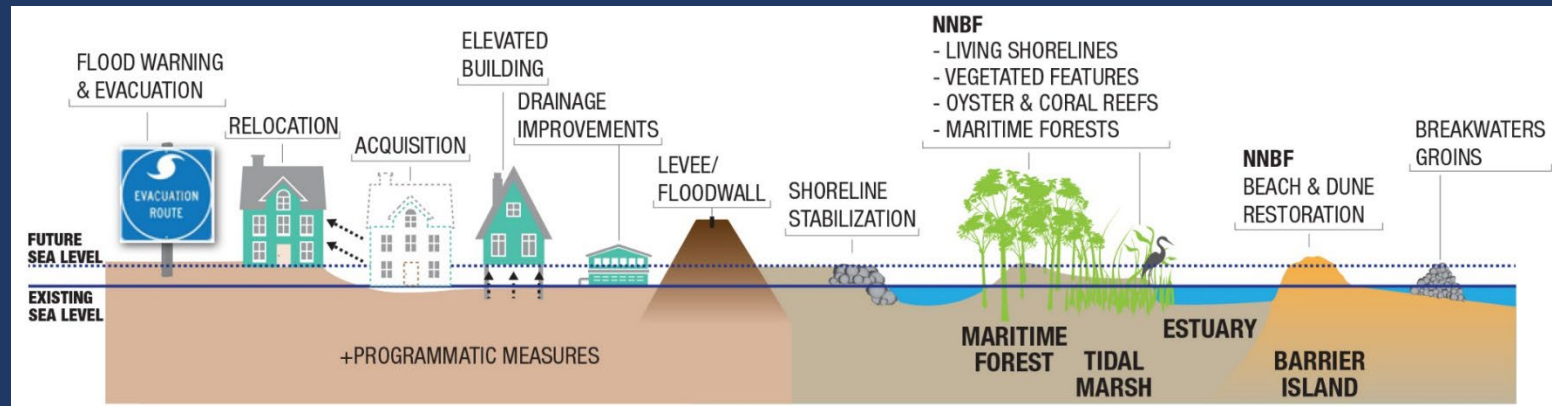
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# Project Types

Project Type	Project Subtypes
Nature-Based	<b>Hydrologic Connectivity</b> <ul style="list-style-type: none"> <li>Freshwater Inflow</li> <li>Hydrologic Restoration</li> </ul>
	<b>Habitat Creation &amp; Restoration</b> <ul style="list-style-type: none"> <li>Estuarine Wetlands</li> <li>Freshwater Wetlands</li> <li>Oyster Reef</li> <li>Barrier Islands</li> <li>Coastal Uplands</li> <li>Coastal Prairies</li> <li>Rookery Islands</li> <li>Dredge Placement Islands</li> <li>Seagrasses</li> <li>Tidal Flats</li> <li>Fisheries</li> </ul>
	<b>Beach Nourishment</b> <ul style="list-style-type: none"> <li>Bay</li> <li>Gulf</li> </ul>
	<b>Dune Restoration</b> <ul style="list-style-type: none"> <li>Dune</li> </ul>
	<b>Shoreline Stabilization</b> <ul style="list-style-type: none"> <li>Living Shoreline</li> <li>Breakwater</li> <li>Misc. Wave Break</li> <li>Seawall</li> <li>Bulkhead</li> <li>Revetment</li> <li>Jetty</li> <li>Groin</li> </ul>
Infrastructure-Based	<b>Land Acquisitions</b> <ul style="list-style-type: none"> <li>Acquisitions</li> <li>Conservation Easements</li> <li>Fee Simple</li> </ul>
	<b>Structure/Debris Removal</b> <ul style="list-style-type: none"> <li>Structures on Public Easement</li> <li>Abandoned Oil and Gas Wells</li> <li>Abandoned Boats</li> <li>Dock Pilings</li> <li>Post Storm Cleanup</li> </ul>
	<b>Public Access &amp; Improvements</b> <ul style="list-style-type: none"> <li>ADA Accessibility</li> <li>Walkovers</li> <li>Piers, Boat Ramps</li> </ul>
	<b>Flood Risk Reduction</b> <ul style="list-style-type: none"> <li>Levees</li> <li>Flood Wall</li> <li>Storm Surge Barrier</li> </ul>
	<b>Community Infrastructure</b> <ul style="list-style-type: none"> <li>Drainage</li> <li>Utilities</li> <li>Roadway/Bridge Repair</li> <li>Roadway/Bridge Elevation</li> <li>Critical Facilities</li> <li>Structure Raising</li> </ul>
	<b>Plans, Policies, Programs &amp; Studies</b>



Shoreline Stabilization	27%
Habitat Restoration	17%
Programmatic	16%
Land Acquisitions	10%
Rookery Islands	9%
Beach Nourishment	9%
Oyster Reef	5%
Hydrologic Connectivity	5%
Community Infrastructure	2%



# 2023 Tier 1 Projects

## Project Information

- Ability to Address Vulnerabilities
- Description and Need
- Location
- Status
- Stakeholders
- Actions
- Project Types
- Potential Local Benefits

Project CutsheetsRegion 4Cameron County

### South Padre Island Beach and Dune Management and Restoration (145)

Estimated Project Cost: \$89,000,000

**ABILITY TO ADDRESS VULNERABILITIES**

Land ChangeFloodingDegraded Water Resources



#### Project Description

The City of South Padre Island's beach and dune system is a widely recognized symbol of the South Texas coastline and has been partially preserved through the beneficial use of dredged material (BUDM) from the Brownsville Ship Channel since 1988 under a perpetual Memorandum of Agreement between the U.S. Army Corps of Engineers (USACE) Galveston District and the Texas General Land Office (GLO). This project would fund annual beach renourishment along the eroding shoreline. Additionally, annual beach monitoring surveying, analysis, and reporting are undertaken as part of the project. Whenever possible, the City of South Padre Island, as the permit holder, and Cameron County work alongside GLO and USACE to place BUDM on beaches when regular dredging at the channel occurs. The most recent onshore placement of material took place from May to July 2021 and included approximately 355,250 cubic yards. Three-quarters of the material (75%) was placed in Placement Area 5 within the northern City limits and one-quarter (25%) of the material was placed in Isla Blanca Park.

#### Project Need

Gulf shoreline erosion occurs across the island at a regional scale, impacting County and City beaches, leading to potential damage to the environment, private property, and public infrastructure while hindering economic development. The Gulf shoreline erosion rate along much of the island averages between 10 to 15 ft/yr. The beaches and dunes are the primary defense against storm surge from tropical storms and hurricanes to islanders and bayfront communities on the mainland.

**LOCATION:**  
Gulf shoreline of the City of South Padre Island

**STATUS:**  
Shovel Ready

**STAKEHOLDERS:**

- City of South Padre Island
- Cameron County
- Texas General Land Office
- U.S. Army Corps of Engineers

**ACTIONS:**

**PROJECT TYPE(S):**  
Beach Nourishment;  
Dune Restoration

**POTENTIAL LOCAL BENEFITS**

<b>160</b> Homes	<b>1</b> Wetland Type
<b>\$41.1M</b> Structure Replacement Value	<b>Structure Damage (1% Storm)</b>
<b>\$723M</b> Building Replacement Value	<b>2</b> Critical Facilities
<b>High</b> Social Vulnerability	

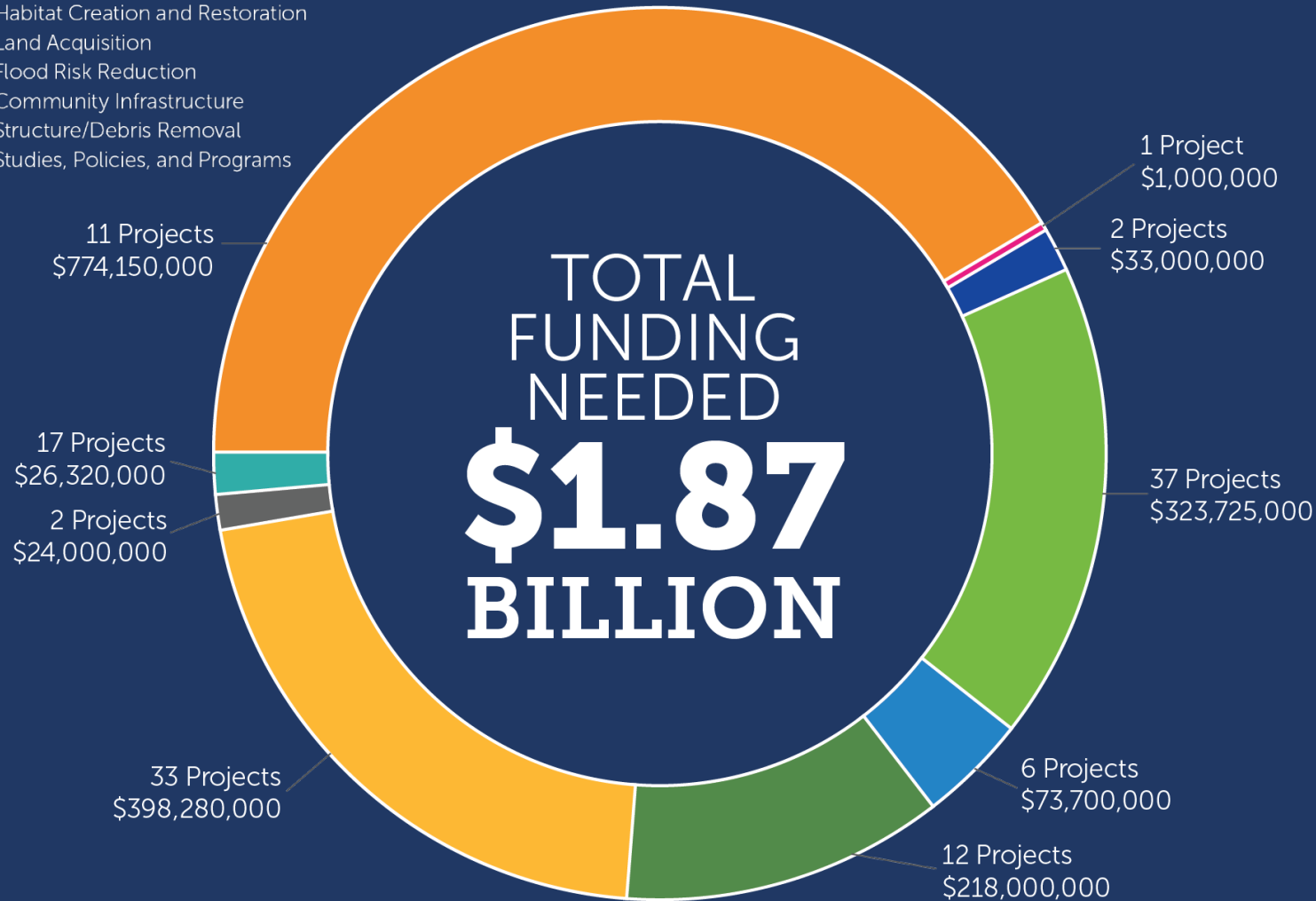
For more information on cost estimates and project benefits calculations, see page 132 of the 2023 Texas Coastal Resiliency Master Plan.

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# Project Funding Needs

## Project Types

- Hydrologic Connectivity
- Beach Nourishment
- Shoreline Stabilization
- Habitat Creation and Restoration
- Land Acquisition
- Flood Risk Reduction
- Community Infrastructure
- Structure/Debris Removal
- Studies, Policies, and Programs



## GLO Program Funding:

### CEPRA

- \*\*\*\$54 Million this biennium

### CMP

- \$3 Million annually Federal

### Gulf of Mexico Energy Security Act (GOMESA)

- \$46 Million FY 2019 to Texas
- \$76 Million FY 2020
- \$54 Million FY 2021
- \$55 Million FY 2022
- \$76 Million FY 2023

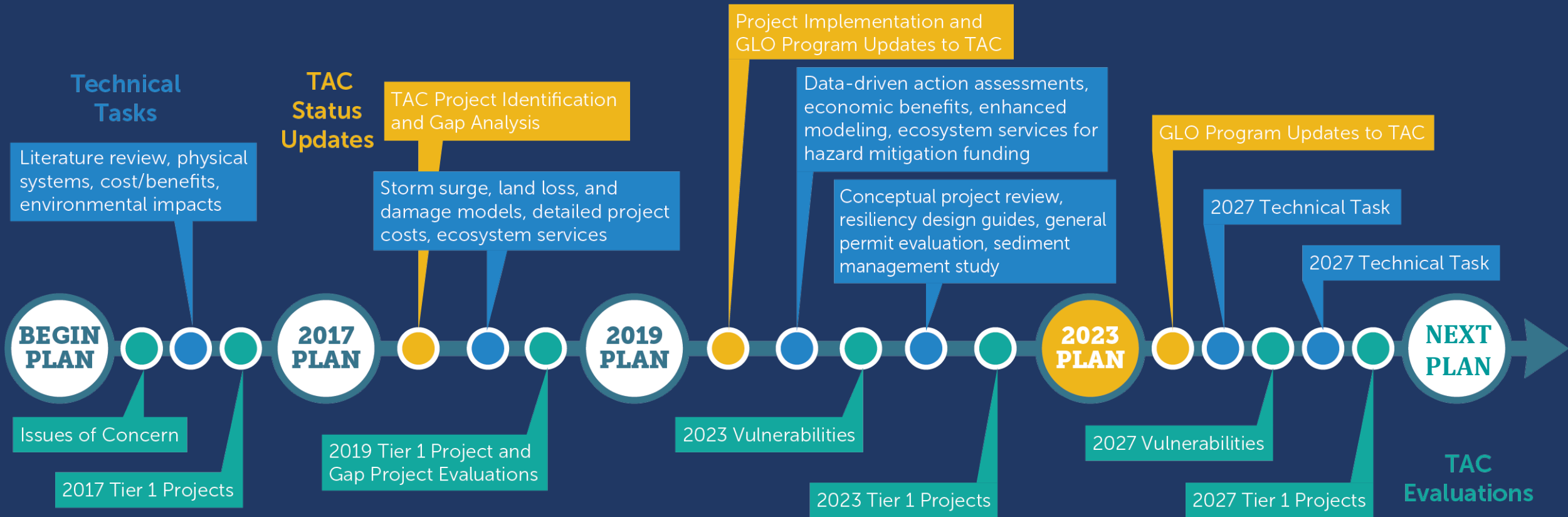
### Community Development Block Grant – Mitigation Fund

- Coastal Resilience Program

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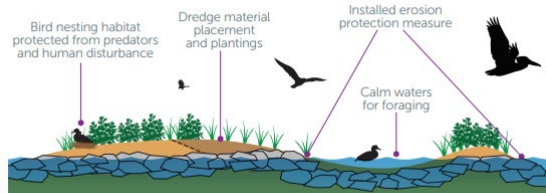
# Ongoing, Iterative, Long-Term





## Profile View

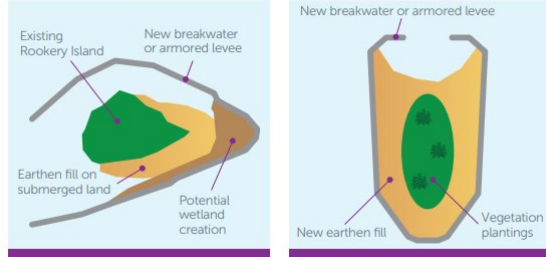
Profile view of a healthy rocky island.



## Rookery Island Creation & Restoration

## Plan View

Plan view showing possible designs for BUDM placement and ways to enhance existing rookery islands or build new rookery islands.



## Sketches for Oyster Reef Enhancement

Illustrating spacing of oyster reef components and typical elevations relative to tidal datums.

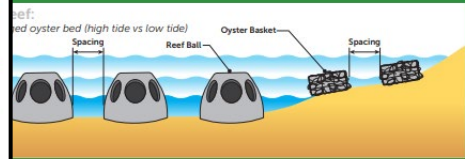
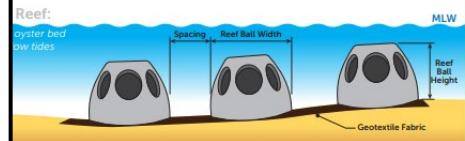
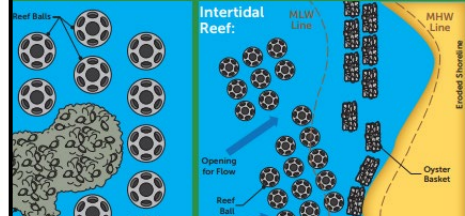


Diagram illustrating the spacing of oyster reef components and typical elevations relative to tidal datums.



Permanence	Cost	Adaptability to RSLR	Wave Energy Reduction	Benefits and Drawbacks
low	low	mod	low	Benefits: stabilizes and captures sediment, assists in additional plant colonization, improves habitat for marine and benthic species, aesthetics Drawbacks: low permanence unless coupled with structures, susceptible to RSLR
mod	low	low	low	Benefits: anchors sediment, assists in plant colonization, small footprint, unobtrusive, aesthetics Drawbacks: requires periodic adjustment for maximum effect, may become a safety or debris concern once deteriorated
mod	low	mod	mod	Benefits: provides natural estuarine habitat, recreation opportunities, and water filtration Drawbacks: may be limited in the amount of vertical relief attained
low	mod	mod	mod	Benefits: can create additional protected space for habitats, such as marsh grass, and estuarine species, berms can act sacrificially and add sediment to the nearshore system Drawbacks: low permanence unless coupled with structures, susceptible to RSLR, may become a safety or debris concern once deteriorated
low	high	high	high	Benefits: provides recreational opportunities, able to adapt to wave climate and recover from losses Drawbacks: causes disruption to beach microbiome, turtle nesting, and beach recreation during construction, cyclical sand losses are expected
high	high	mod	high	Benefits: provides transitional estuarine habitat area, adaptive to RSLR, reduces need for structure height and hardening when compared to a traditional levee Drawbacks: requires larger footprint than a traditional levee to construct, requires maintenance
mod	mod	low	mod	Benefits: provides interstitial estuarine habitat Drawbacks: requires periodic adjustment for maximum effect, may become a safety or debris concern once deteriorated
high	high	mod	mod	Benefits: allows leeward sediment accretion, creates sheltered estuarine areas, can be coupled with natural features to create a living shoreline Drawbacks: downdrift erosion, may become a safety or debris concern once deteriorated
high	high	mod	mod	Benefits: anchors shoreline location, prevents upland erosion Drawbacks: downdrift erosion, disallows shoreline migration, vulnerable to flanking and scouring, difficult to permit
mod	mod	low	mod	Benefits: anchors shoreline location, prevents upland erosion, small footprint Drawbacks: profile deflation, vulnerable to flanking, erosion, and overwash, disrupts aesthetics, cuts off upland habitat from water
high	high	low	low	Benefits: updrift accumulation Drawbacks: downdrift erosion, vulnerable to flanking
				Benefits: anchors shoreline location, flood and storm surge control Drawbacks: downdrift erosion, vulnerable to flanking and scouring, disruption of aesthetics

# Communication

- All Plan Documents
- Story Map
- Modeling Data Viewer
- Resiliency Design Guides

[www.glo.texas.gov/crmp](http://www.glo.texas.gov/crmp)

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# Thank you!

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