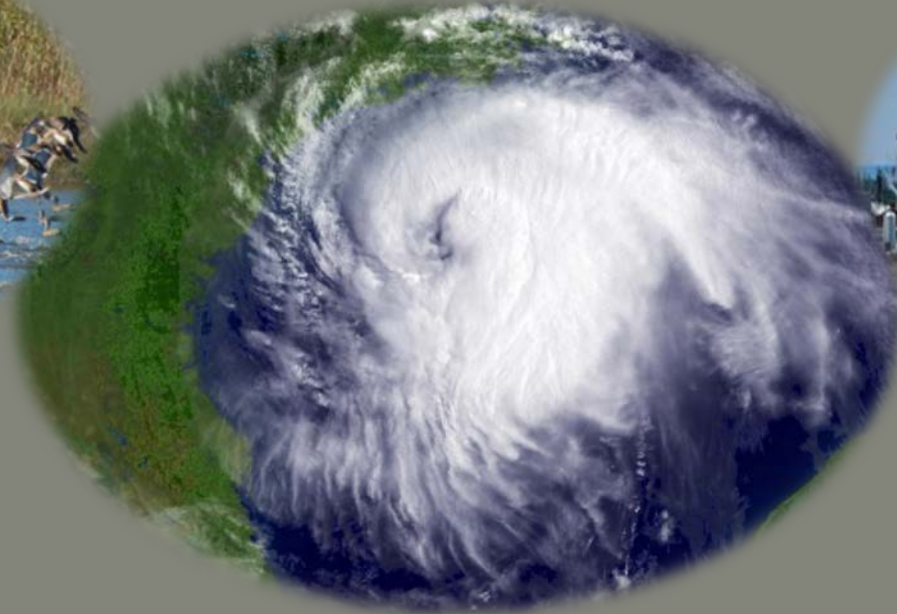


# Coastal Texas Ongoing Planning Studies: BU Opportunities



**Kelly A. Burks-Copes, PM**  
**BU Workshop**  
**30 October 2017**

*"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."*



**US Army Corps  
of Engineers®**



# Galveston Island After Ike



## Important Infrastructure



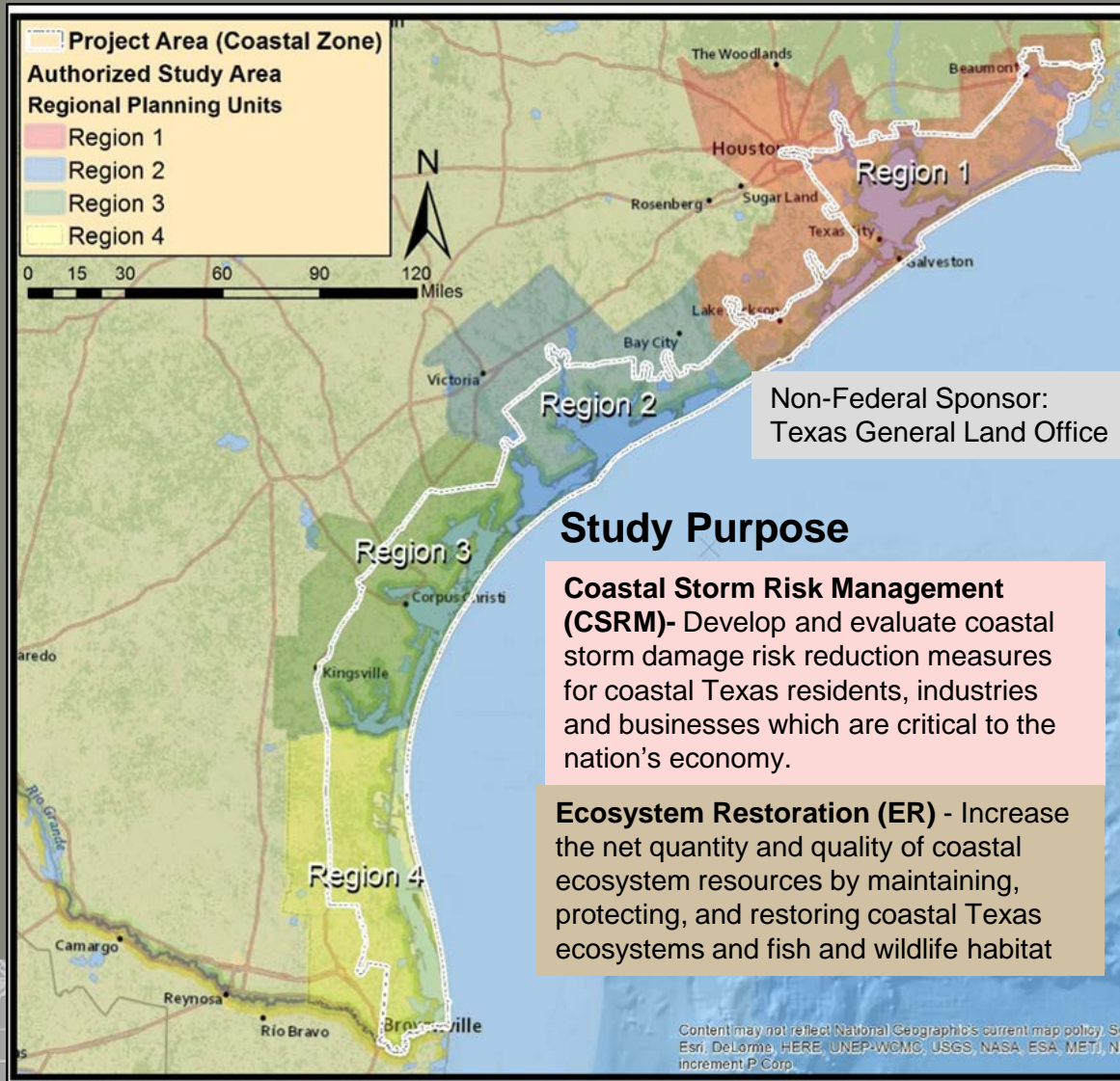
## Aquatic Resources



## Endangered Species



# Coastal Texas Protection and Restoration Study



Milestone		Date
Scoping	Exemption Approval by USACE	Sep 2015
	Exemption Approval by ASA(CW)/OMB	Nov 2015
	Execute FCSA w/GLO	Nov 2015
Alt. Eval./ Analysis	Alternatives Milestone	June 2016
	Tentatively Selected Plan (TSP) Milestone	May 2018
Feasibility Level Analysis	Agency Decision Milestone (ADM)	Oct 2018
	Feasibility Report Complete	Oct 2020
	Civil Works Review Board (CWRB)	Jan 2021
	S&A Review	Feb 2021
	Chief's Report	Apr 2021

Fiscal Year*	Total Funding (\$)	Federal Funding (\$)	Non-Federal Funding*** (\$)
2016	2,506,000	1,253,000	1,253,000
2017	3,650,000	1,825,000	1,825,000
2018	3,950,000	2,175,000**	1,775,000
2019	5,350,000	2,675,000	2,675,000
2020	4,244,000	2,122,000	2,122,000
2021	100,000	50,000	50,000
<b>Total</b>	<b>19,800,000**</b>	<b>10,100,000</b>	<b>9,700,000</b>



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## CSRM – ALTERNATIVES – REGION 1

Alternative A - Coastal Barrier/Nonstructural System  
+/- Galveston Ring Levee

Alternative B – Coastal Barrier (Modified)

Alternative C – Mid Bay Barrier

Alternative D – Upper Bay Barrier/ Nonstructural System  
+/- Bay Rim



US Army Corps  
of Engineers®



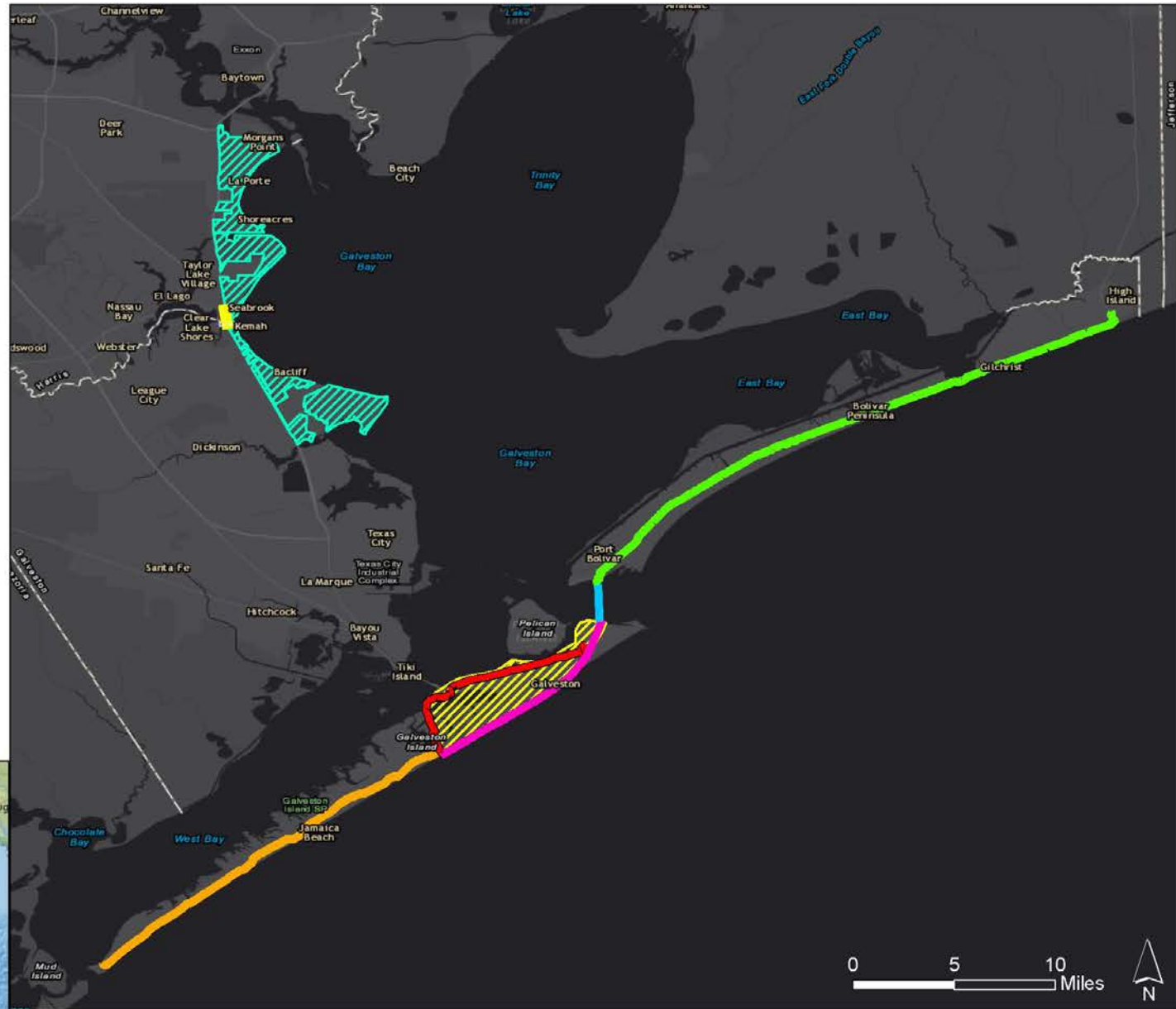
# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## REGION 1: ALT. A – COASTAL BARRIER/NONSTRUCTURAL SYSTEM

### Coastal Texas Protection and Restoration Study

#### Alternative A

- High Island to Bolivar Peninsula
- Bolivar Roads and Houston Ship Channel Gates
- Galveston Seawall
- Galveston Ring Levee\*
- Seawall to San Luis Pass
- Clear Lake Gates
- West Side of Galveston Bay Nonstructural Improvements
- Galveston Island Nonstructural Improvements\*
- \* Galveston Back Bay Risk Reduction will select one of these measures.



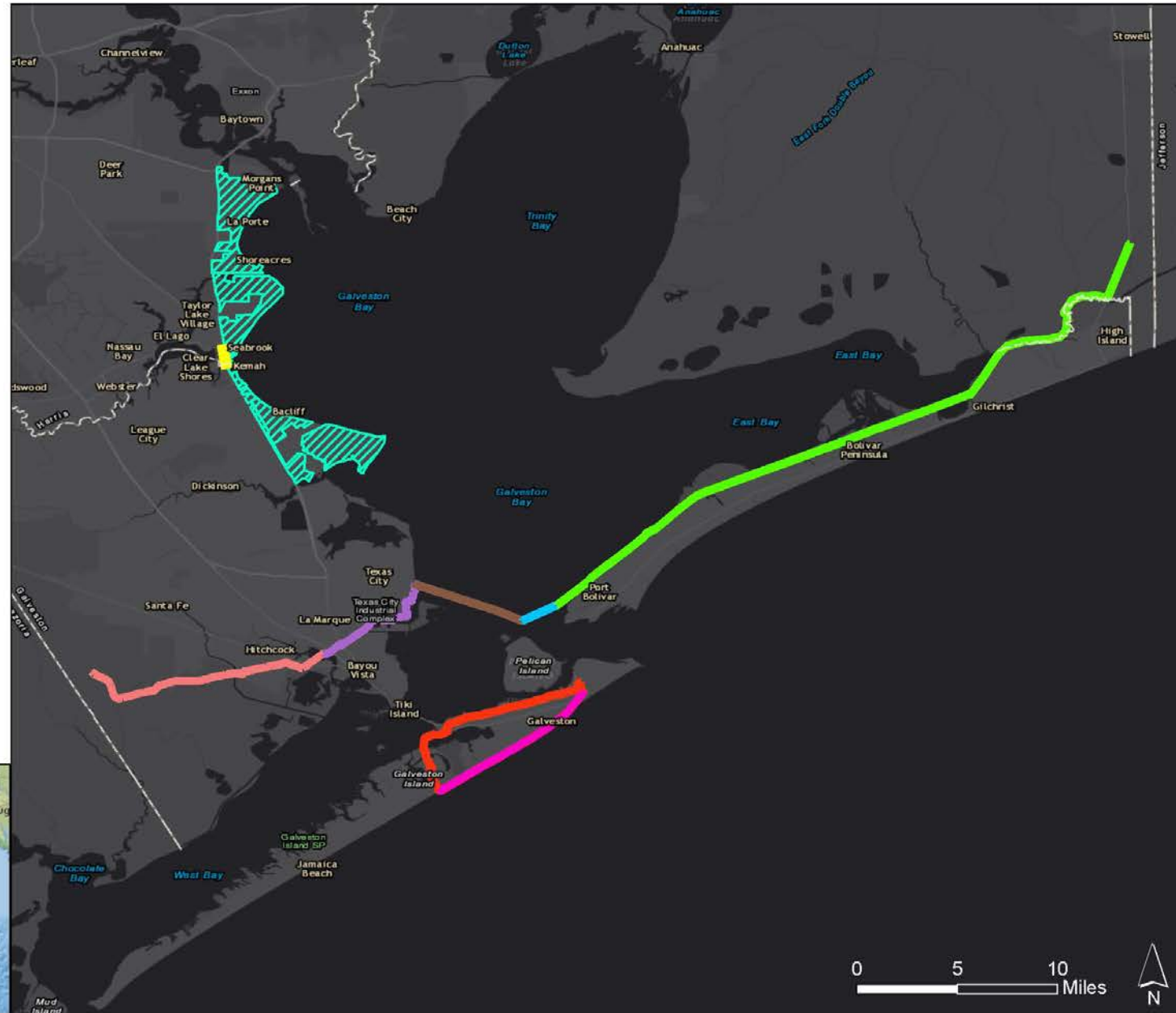
# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## REGION 1: ALT. B – COASTAL BARRIER (MODIFIED)/GALVESTON RING LEVEE

### Coastal Texas Protection and Restoration Study

#### Alternative B

- High Island to Port Bolivar
- Bolivar Roads and Houston Ship Channel Gates
- Existing Texas City Dike
- Existing Texas City Hurricane Flood Protection Levee (HFPL)
- West Extension of Texas City HFPL
- Galveston Seawall
- Galveston Ring Levee
- Clear Lake Gates
- West Side of Galveston Bay Nonstructural Improvements



0 5 10 Miles



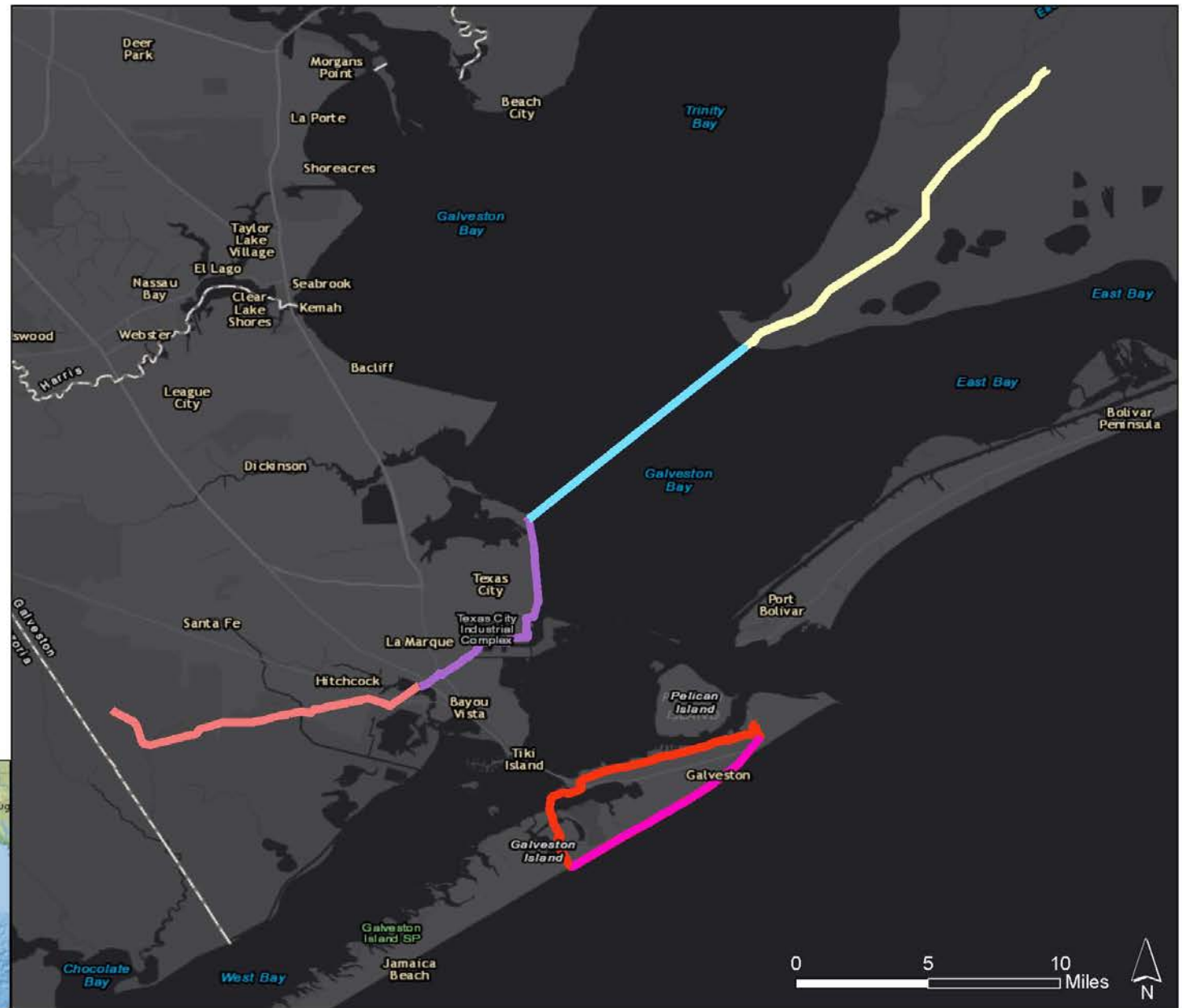
# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## REGION 1: ALT. C – MID BAY BARRIER

### Coastal Texas Protection and Restoration Study

#### Alternative C

- Double Bayou to Smith Point
- MidBay Navigation and Environmental Gates
- Existing Texas City Hurricane Flood Protection Levee (HFPL)
- West Extension of Existing Texas City HFPL
- Galveston Seawall
- Galveston Ring Levee



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

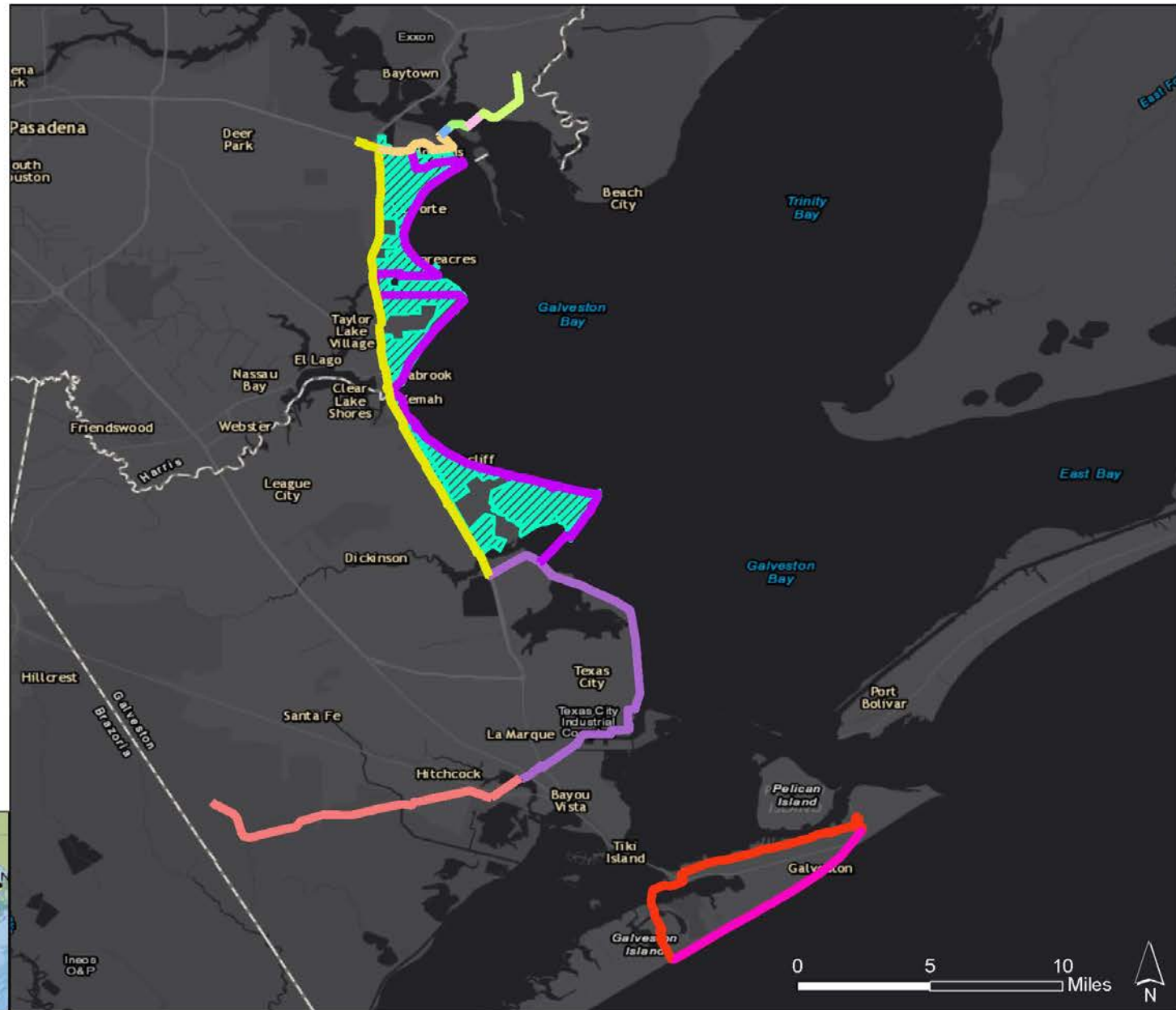
## REGION 1: ALT. D- UPPER BAY BARRIER/ NONSTRUCTURAL SYSTEM

### Coastal Texas Protection and Restoration Study

#### Alternative D

-  Baytown to Tabbs Bay
-  Tabbs Bay Environmental Gates
-  Hog Island
-  Houston Ship Channel Gates
-  Spillman Island
-  Highway 146 Alignment\*
-  Bay Perimeter Alignment\*
-  Existing Texas City Hurricane Flood Protection Levee (HFPL)
-  Extension of Texas City HFPL
-  Galveston Seawall
-  Galveston Ring Levee
-  West Side of Galveston Bay\* Nonstructural Improvements

\* Alternative D will select one of these measures.





# ROUGH ORDER OF MAGNITUDE MITIGATION NEEDS

	Alt A	Alt B	Alt C	Alt D1 (Hwy 146)	Alt D2 (Bay Rim)
<b>IMPACTS</b>					
<b>Direct</b>	Acres	Acres	Acres	Acres	Acres
Palustrine Wetlands	230	237.7	181.4	181.4	170.1
Estuarine Wetlands	330	449.5	117.5	162.2	194.7
Oyster	0	0	240	0	0
<b>Total Direct Impacts</b>	<b>560</b>	<b>687.2</b>	<b>538.9</b>	<b>343.6</b>	<b>364.8</b>
<b>Indirect</b>					
<b>Fishery Access</b>	<b>81,190</b>	<b>41,005</b>	<b>20,503</b>	<b>4,100.5</b>	



US Army Corps of Engineers®



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## ECOSYSTEM RESTORATION

- Final Measures Array screened from 33 to 9 measures
- Used 8 criteria presented at last IPR; some measures were also combined and refined
- Final measures combined into 7 Alternatives
- Based on the Lines of Defense plan formulation strategy
  - Alternative 1 – Coastwide All-Inclusive Restoration
  - Alternative 2 – Coastwide Restoration of Critical Geomorphic Features
  - Alternative 3 – Coastwide Barrier System Restoration
  - Alternative 4 – Coastwide Bay System Restoration
  - Alternative 5 – Coastwide ER Contributing to Infrastructure Protection
  - Alternative 6 – Coastwide Shoreline Protection and Stabilization
  - Alternative 7 – Top Performers

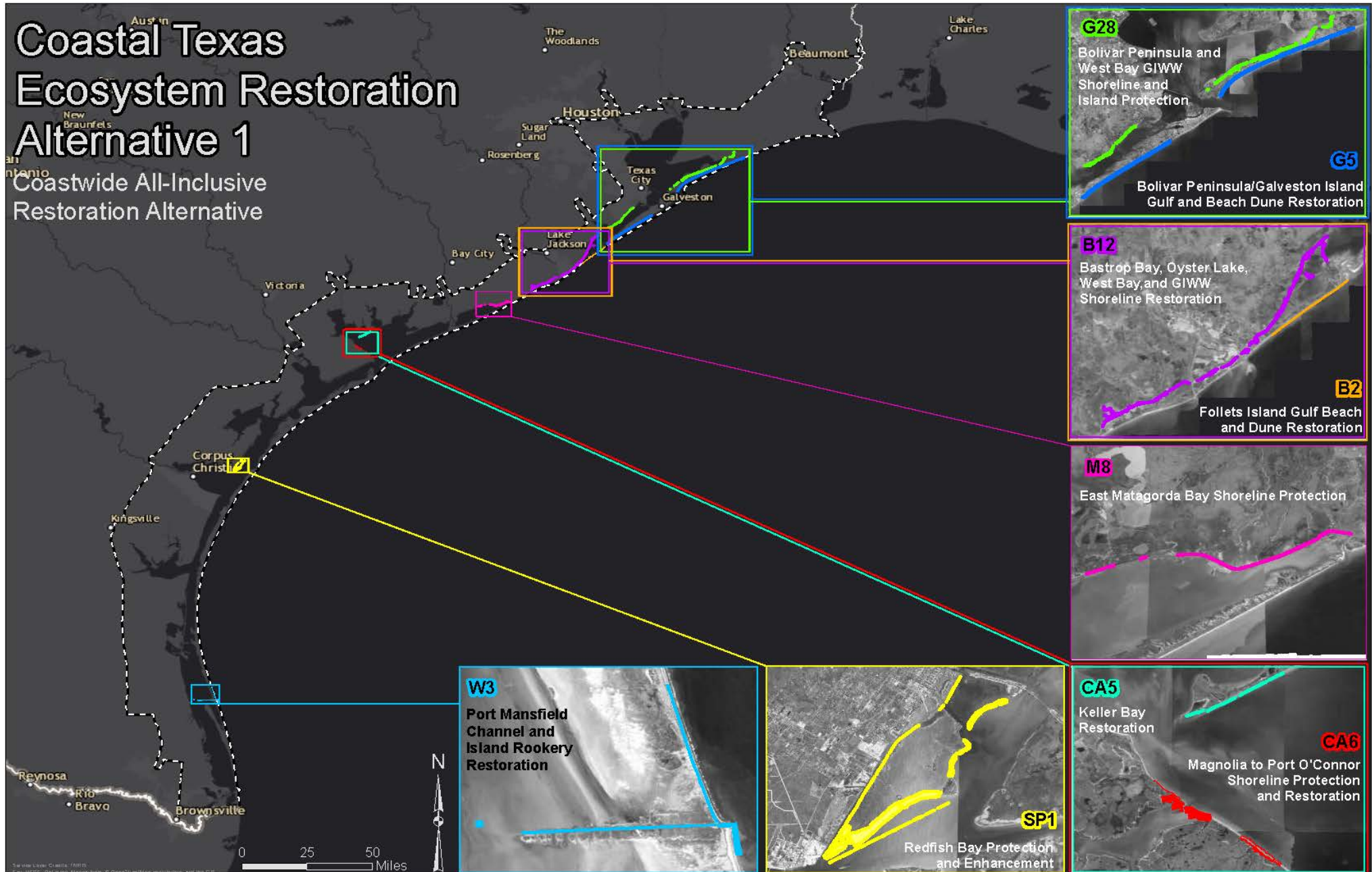


US Army Corps  
of Engineers®



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

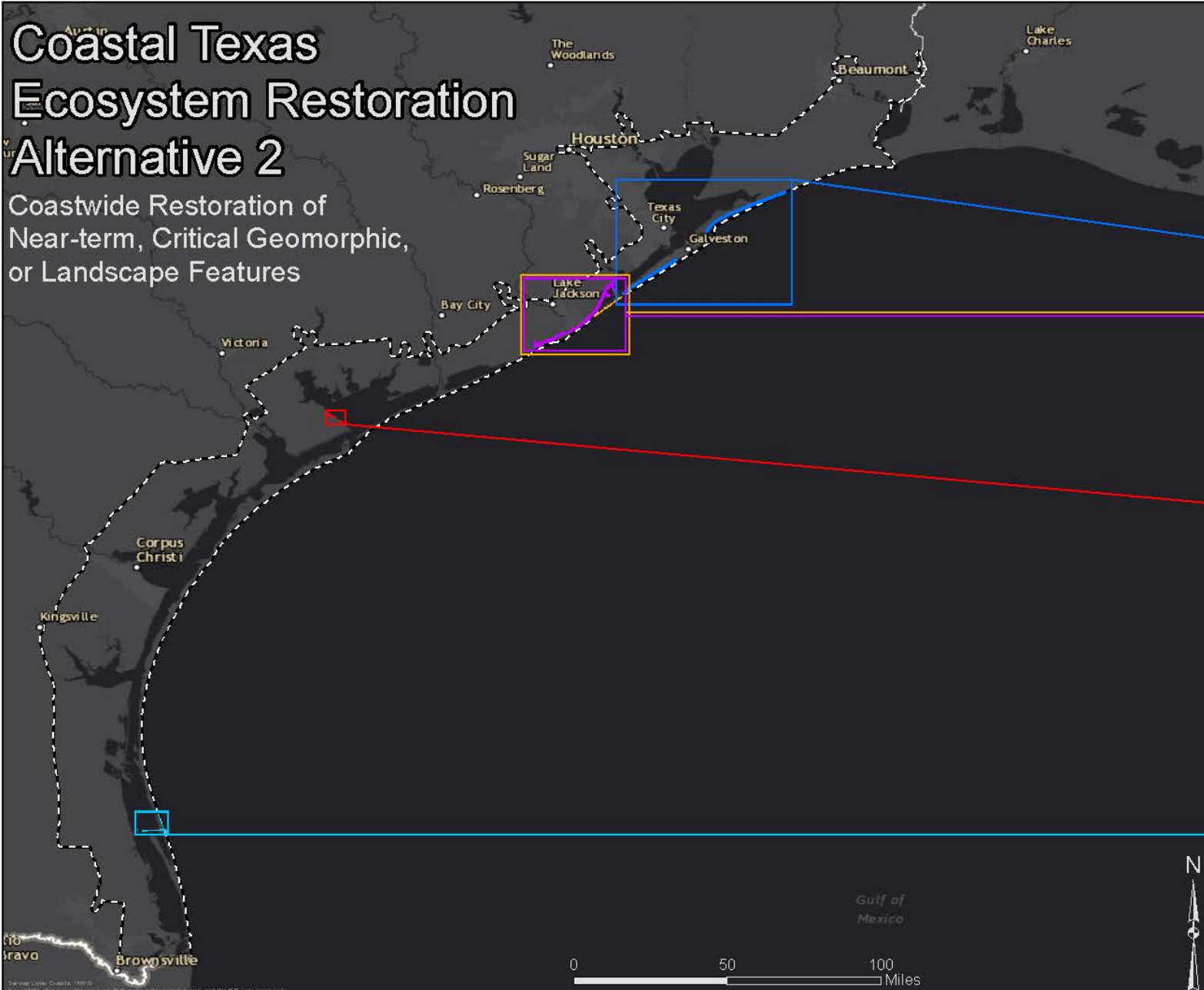
## Coastal Texas Ecosystem Restoration Alternative 1 Coastwide All-Inclusive Restoration Alternative



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 2

Coastwide Restoration of  
Near-term, Critical Geomorphic,  
or Landscape Features



**G5**  
Bolivar Peninsula/Galveston Island  
Gulf and Beach Dune Restoration



**B12**  
Bastrop Bay, Oyster Lake,  
West Bay, and GIWW  
Shoreline Restoration

**B2**  
Follets Island Gulf Beach  
and Dune Restoration



**CA6**  
Magnolia to Port O'Connor  
Shoreline Protection  
and Restoration



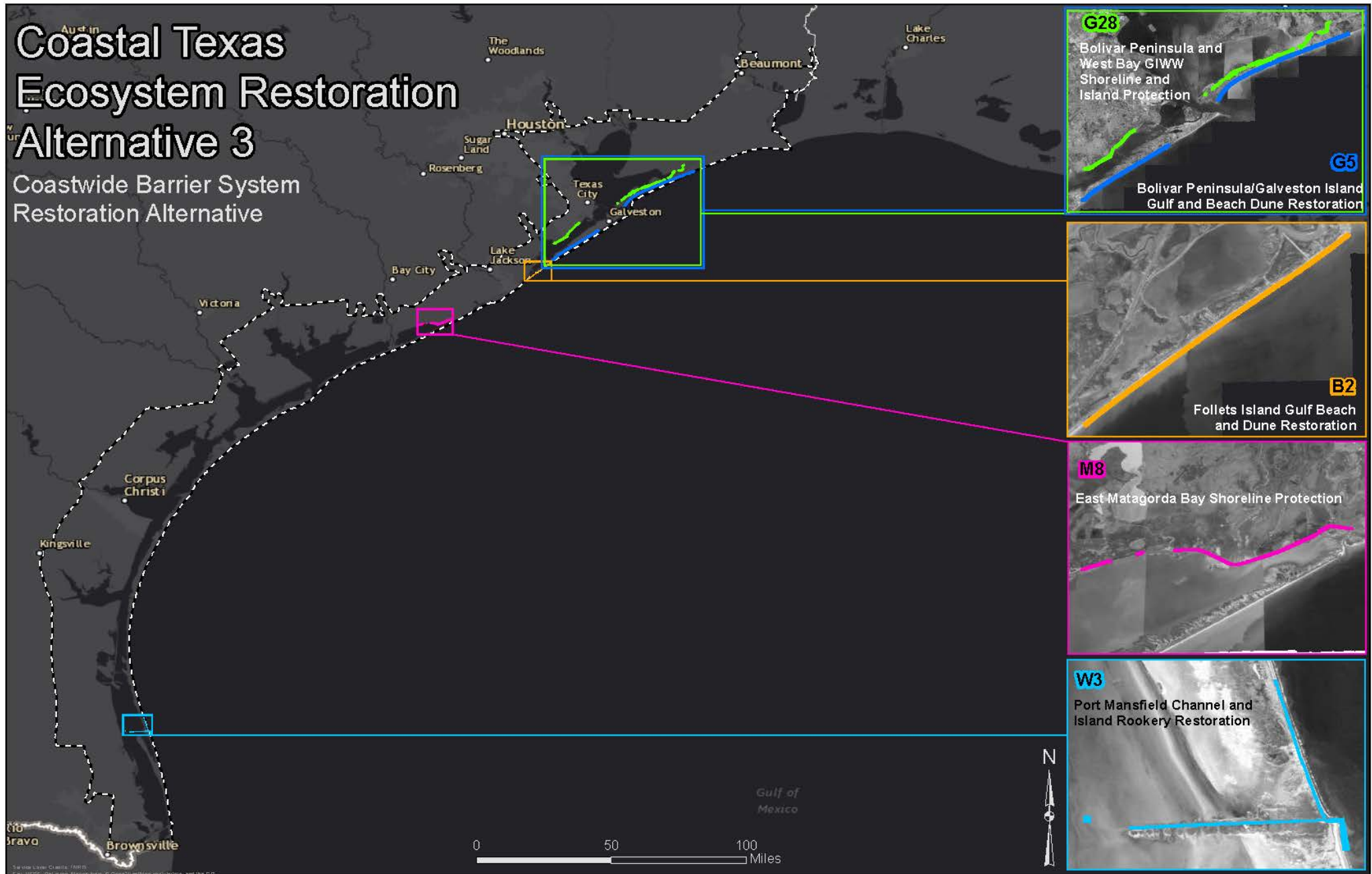
**W3**  
Port Mansfield Channel and  
Island Rookery Restoration



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 3

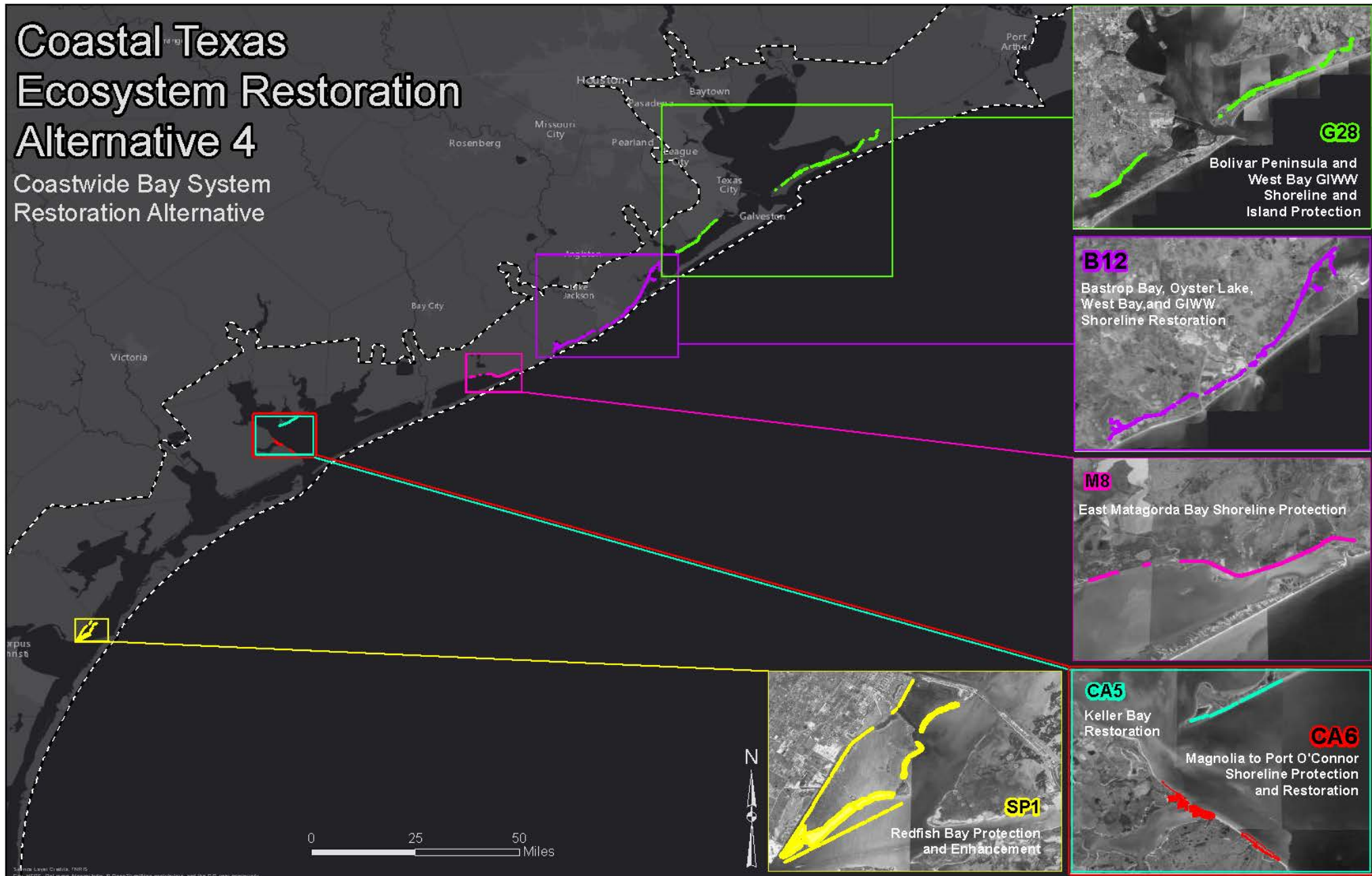
### Coastwide Barrier System Restoration Alternative



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 4

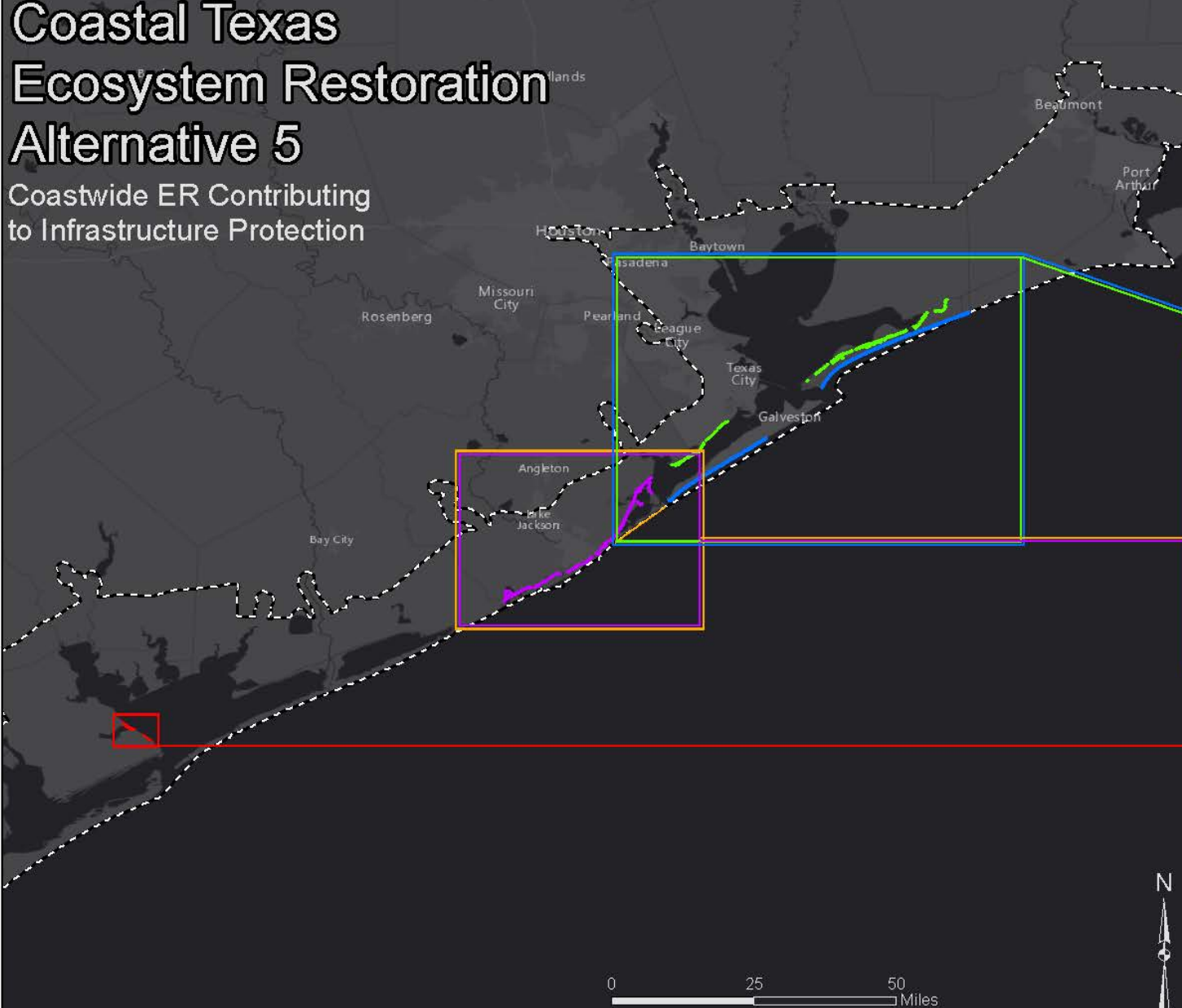
Coastwide Bay System  
Restoration Alternative



# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 5

Coastwide ER Contributing  
to Infrastructure Protection



**G28**  
Bolivar Peninsula and  
West Bay GIWW  
Shoreline and  
Island Protection

**G5**  
Bolivar Peninsula/Galveston Island  
Gulf and Beach Dune Restoration

**B12**  
Bastrop Bay, Oyster Lake,  
West Bay, and GIWW  
Shoreline Restoration

**B2**  
Follets Island Gulf Beach  
and Dune Restoration

**CA6**  
Magnolia to Port O'Connor  
Shoreline Protection  
and Restoration

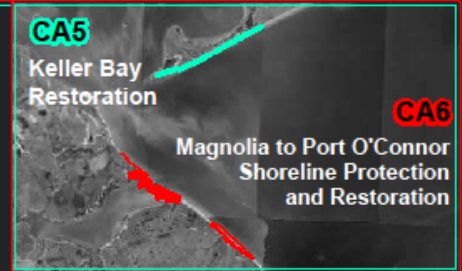
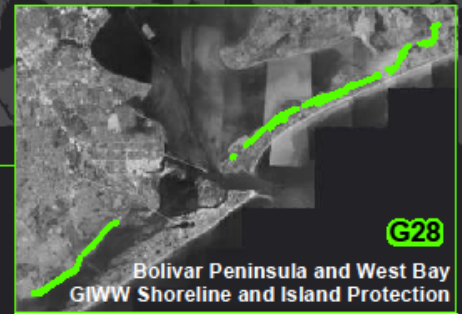
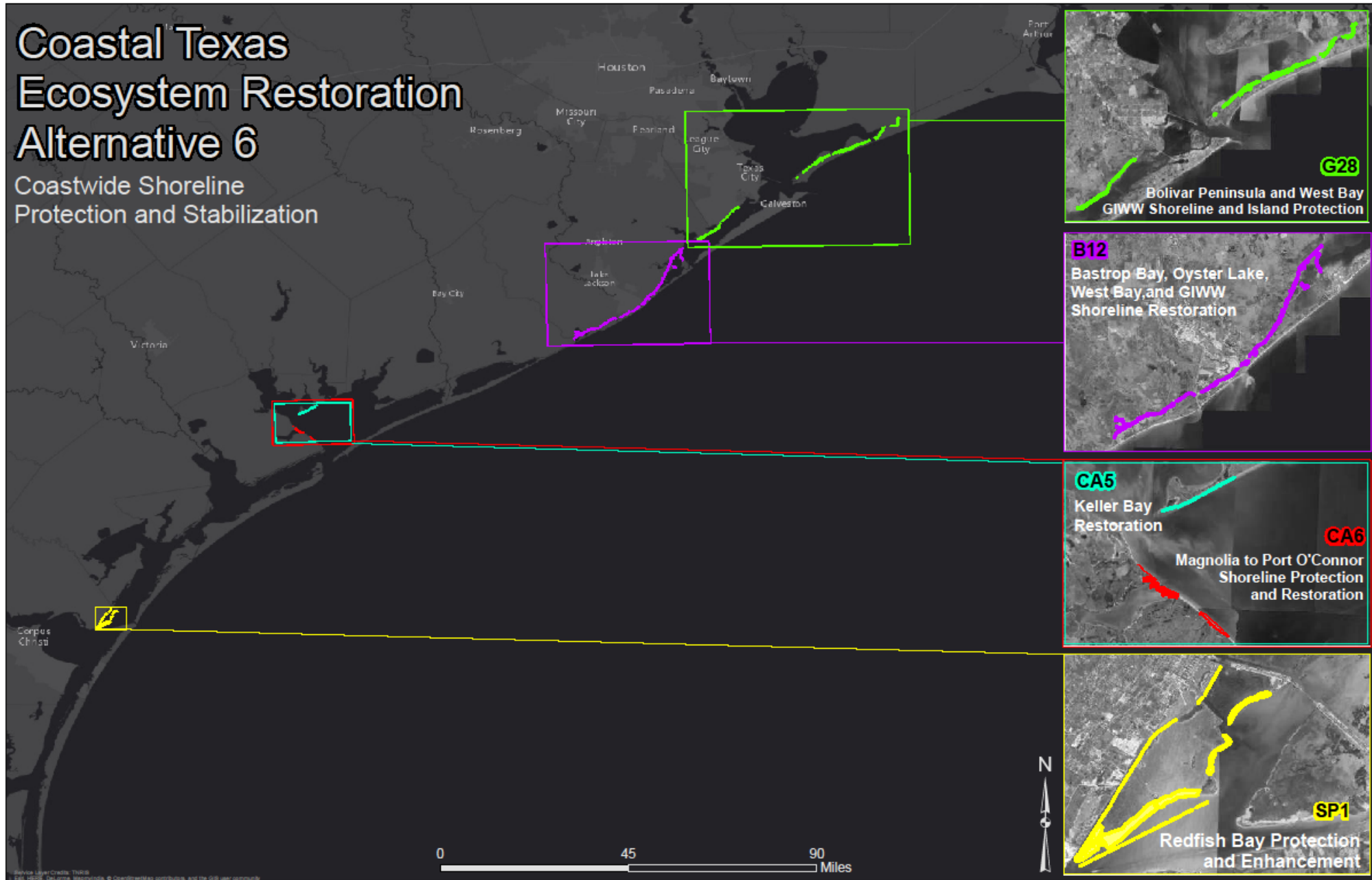


Service Level Credits: TNRIS  
EPA, DEPR, DeLorme, Mapbox, and OpenStreetMap contributors, and the GIS  
Community

# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 6

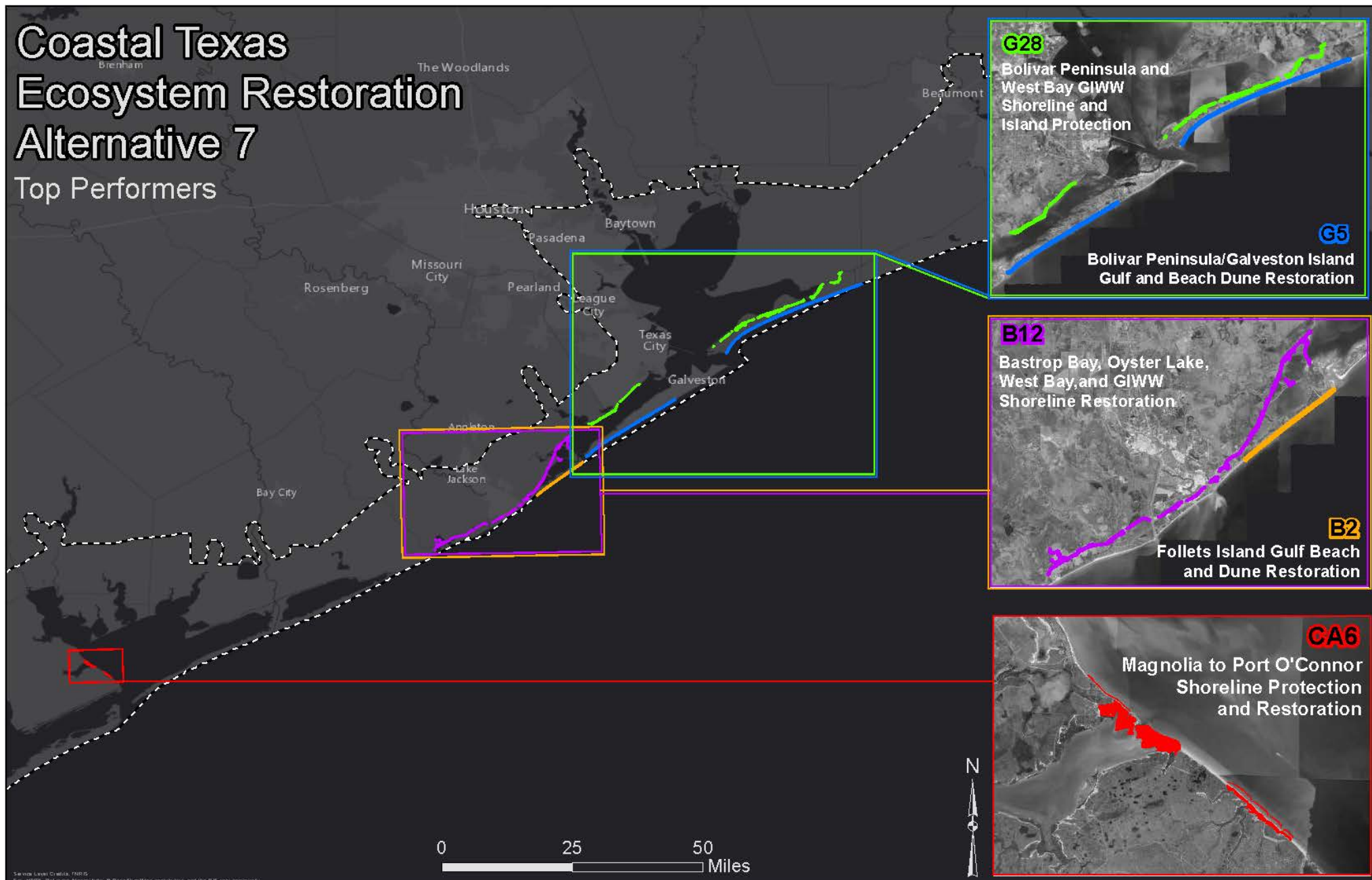
Coastwide Shoreline  
Protection and Stabilization



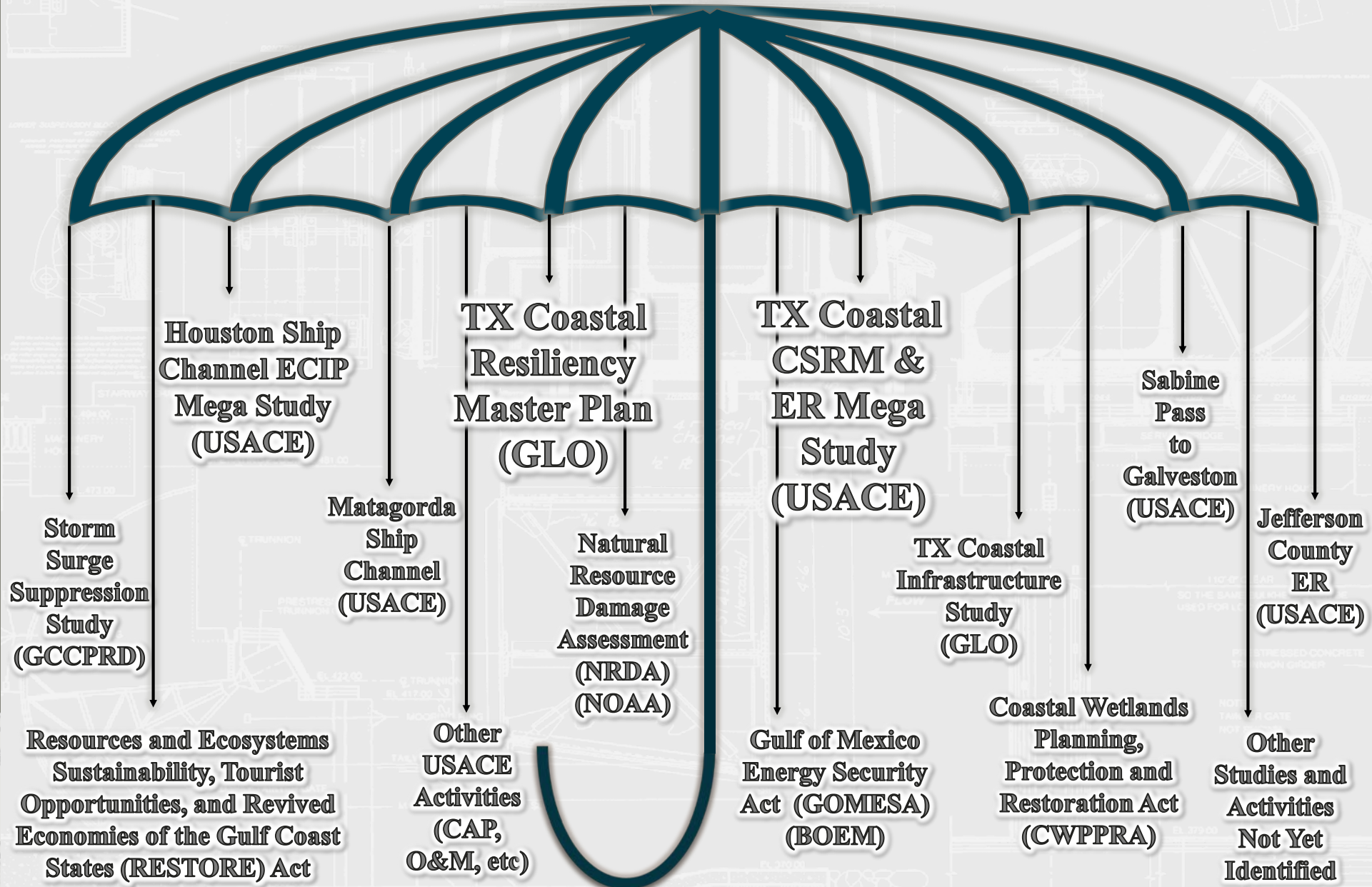


# COASTAL TEXAS PROTECTION AND RESTORATION STUDY

## Coastal Texas Ecosystem Restoration Alternative 7 Top Performers



# Comprehensive Plan: Overarching Vision



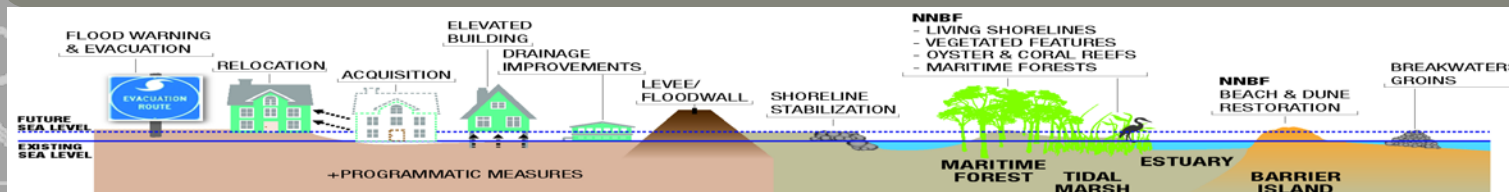
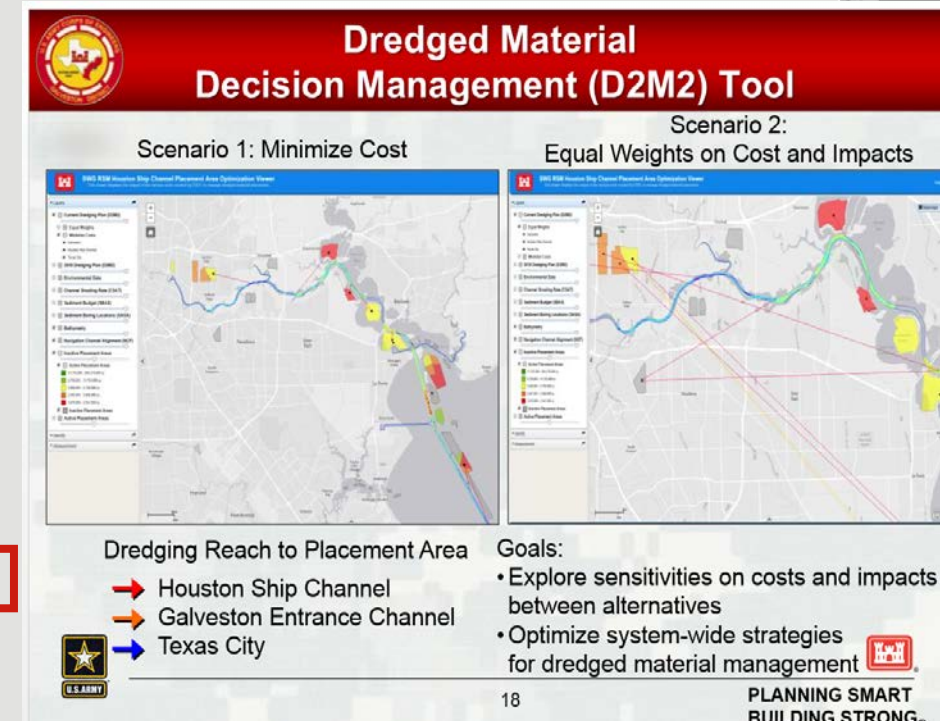
# Comprehensive Plan: Purpose & Goals

## Purpose

Provide an **overarching, long-term strategic vision** of a **resilient Texas coast** that supports, protects, and sustains the environment, economy and culture of the region, and that contributes greatly to the economy and well-being of the nation.

## Goals

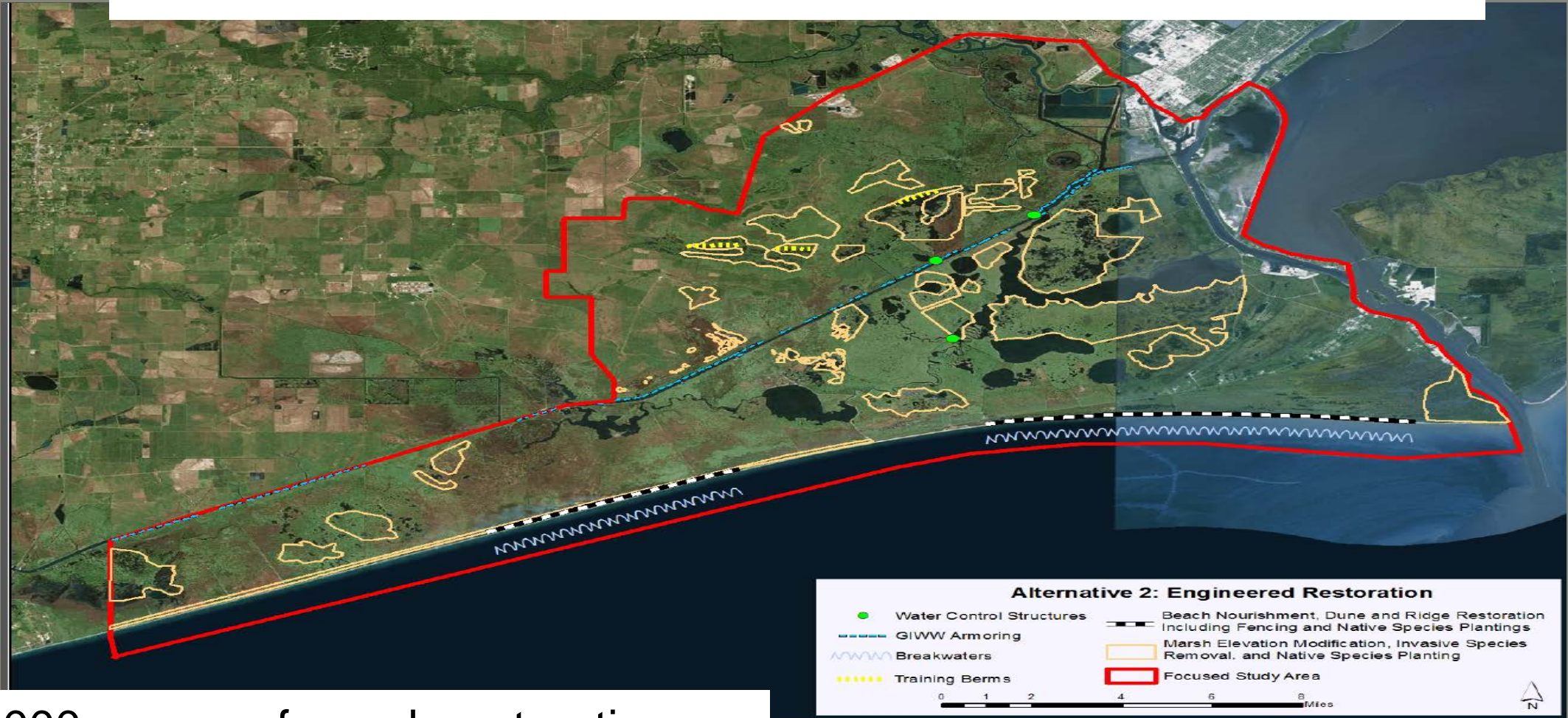
- Focus on the **long-term** (100+ years)
- Identify **threats** & future conditions (coastal storms, urbanization, changing climate/sea level rise, petrochemical/oil & transportation outlooks, etc.)
- Enhance **resilience** – e.g., improve our capabilities to **prepare** for, **resist**, **recover**, and **adapt** to significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment
- Take a **systems-based** approach and promote **ecosystem-based** management
- Adopt and communicate our “**multiple lines of defense**” strategy (structural, non-structural, natural and nature-based solutions)
- Highlight benefits and present these in terms of **ecosystem goods and services**
- Utilize the **D2M2 Tool** to develop a long-term outlook for USACE BU in synch with the region
- Incorporate **ALL** ongoing and potential future activities (where possible)
- Lay the groundwork for **future authorizations & programs**
- Identify areas where **additional research** and development is warranted



US Army Corps of Engineers®



# Jefferson County Ecosystem Restoration Study



61,000+ acres of marsh restoration  
 32+ miles of beach nourishment



US Army Corps of Engineers®



# DISCUSSION



US Army Corps  
of Engineers®



U.S. ARMY