Coastal Planning in Texas

Ray Newby
Coastal Resources Division
Texas General Land Office

The Texas General Land Office (GLO) and the Texas Coast

- **Since 1836:** Manager of Tidally-Influenced State-Owned Submerged Lands.

- **Lead Agency Responsible for:**
  - Coastal Management Program;
  - Beach and Dune Protection;
  - State Coastal Erosion Program;
  - Debris Removal;
  - Coastal Oil Spill Response; and
  - Disaster Recovery Program.

The Single Deadliest and Three of the Ten Costliest U.S. Hurricanes Impacted Texas

#2: $125 Billion – Hurricane Harvey (2017)

#7: $34.8 Billion – Hurricane Ike (2008)

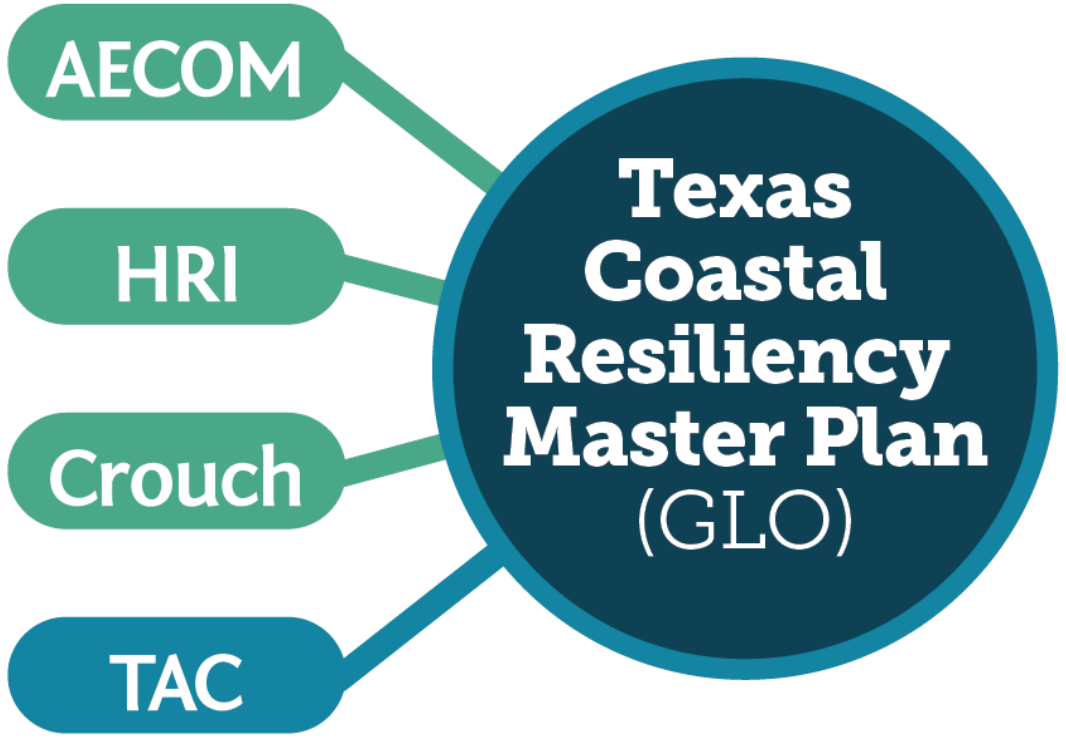
GLO Coastal Plans

- **Texas Coastal Resiliency Master Plan** provides a framework for community, socio-economic, ecological and infrastructure protection from coastal hazards. The plan is presented to the state legislature.

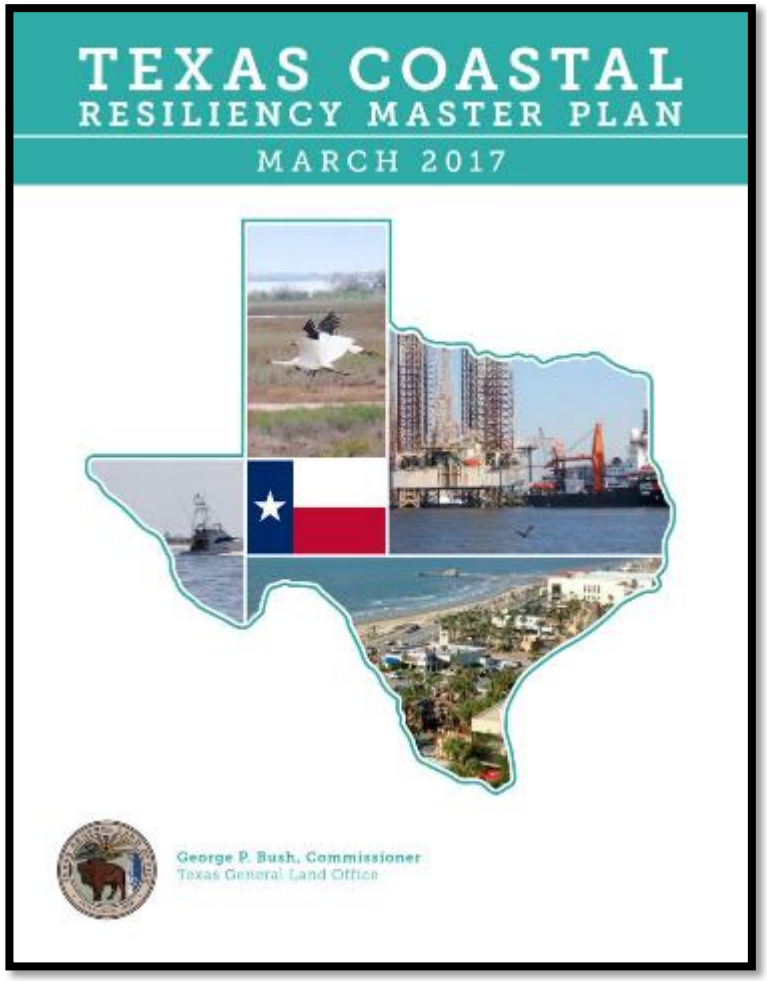
- Coastal Texas Protection & Restoration Feasibility Study, also known as the **Coastal Texas Study**, is an engineering, environmental and economic analysis to protect the Texas coast. In partnership with the U.S. Army Corps of Engineers, the study will present coastal storm risk management and ecosystem restoration alternatives to Congress for funding.

Planning Team for Texas Coastal Resiliency Master Plan

- GLO contracted with AECOM for engineering services, the Harte Research Institute for data analysis, and Crouch Environmental for education and outreach.
- The Technical Advisory Committee (TAC) is made up of more than 100 coastal experts.



2017 Texas Coastal Resiliency Master Plan



- Described the State of the Coast and a Path Forward toward Resiliency
- Outlined Coastal Issues of Concern (IOCs)
- Defined Ecological Resiliency Strategies
- Identified Tier 1 (highest priority) Projects for the Coast
- Used for Post-Harvey Emergency Appropriations Requests.

http://www.glo.texas.gov/coast/coastal-management/hurricane-preparedness/index.html

Region 1 - Tier 1 Projects by Resiliency Strategy

Strategy	ID	Tier 1 Projects	Estimated Cost Range
Restoration of Beaches and Dunes	R1-1	Bolivar Peninsula Beach & Dune Restoration	$50 M - $95 M
	R1-2	Follets Island Nourishment and Erosion Control	$60 M - $115 M
	R1-7	McFaddin National Wildlife Refuge Shoreline Restoration	$100 M - $190 M
	R1-22	Galveston Island West of Seawall to 8 Mile Road Beach Nourishment	$2 M - $12 M
Bay Shoreline Stabilization and Estuarine Wetland Restoration (Living Shorelines)	R1-4	Old River Cove Marsh Restoration	$10 M - $30 M
	R1-8	Gordy Marsh Restoration & Shoreline Protection	$15 M - $35 M
	R1-10	Coastal Heritage Preserve – Phase 4	$3 M - $10 M
	R1-11	Sweetwater Preserve Expansion	$1 M - $3 M
	R1-12	Pierce Marsh Living Shoreline	$25 M - $45 M
	R1-13	IH-45 Causeway Marsh Restoration	$5 M - $18 M
	R1-14	Moses Lake Wetlands Restoration – Phase 3	$1 M - $3.5 M
	R1-18	Follets Island Marsh Restoration	$30 M - $50 M
	R1-21	Bessie Heights Marsh Restoration	$5 M - $25 M
	R1-23	Follets Island Conservation Initiative	$4.5 M - $15 M
Stabilizing the Texas Gulf Intracoastal Waterway	R1-3	Old River Cove Barrier Island Restoration	$5 M - $15 M
	R1-5	Anahuac National Wildlife Refuge Living Shoreline	$50 M - $105 M
	R1-6	Willow Lake Shoreline Stabilization	$3 M - $8 M
	R1-17	Brazoria National Wildlife Refuge GIWW Shoreline Protection	$20 M - $35 M
	R1-19	North Pleasure Island Barrier Island Restoration	$1.5 M - $5 M
	R1-20	Sabine-Neches Waterway Barrier Island Habitat Restoration	$0.5 M - $1.5 M
Freshwater Wetlands and Coastal Uplands Conservation	R1-15	Salt Bayou Siphons	$3 M - $7 M
	R1-24	Sabine Ranch Habitat Protection	$65 M - $120 M
Oyster Reef Creation and Restoration	R1-25	Galveston Bay Oyster Reef Planning & Restoration	$5 M - $60 M
Rookery Island Creation and Restoration	R1-9	Galveston Bay Rookery Island Restoration	$45 M - $80 M
	R1-16	Dickinson Bay Rookery Island Restoration	$0.5 M - $2 M
		Total for Region 1:	**$510 M - $1.1 B**

Coastal Issues of Concern and Resiliency Strategies

Altered, Degraded or Lost Habitat

Gulf Beach Erosion & Dune Degradation

Bay Shoreline Erosion

Existing & Future Storm Surge Damage

Coastal Flood Damage

Impact on Water Quality & Quantity

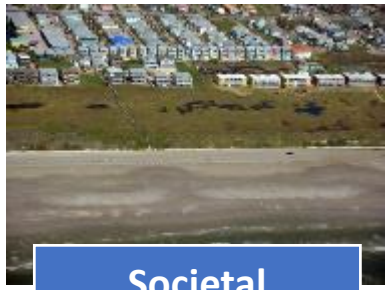
Impact on Coastal Resources

Abandoned or Derelict Vessels, Structures, & Debris

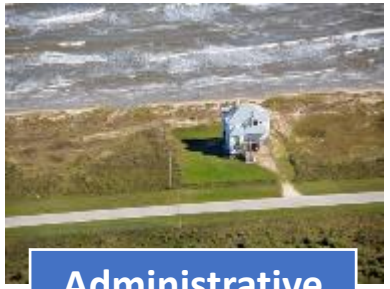
2017

2019

Ecological Resiliency



Societal Resiliency



Administrative Resiliency

COASTAL RESILIENCY STRATEGIES

Ecological Resiliency

- Beach and Dune Enhancement
- Wetland Enhancement
- Upland Enhancement
- Oyster Reef Enhancement
- Rookery Island Enhancement
- Freshwater Inflow and Tidal Exchange Enhancement

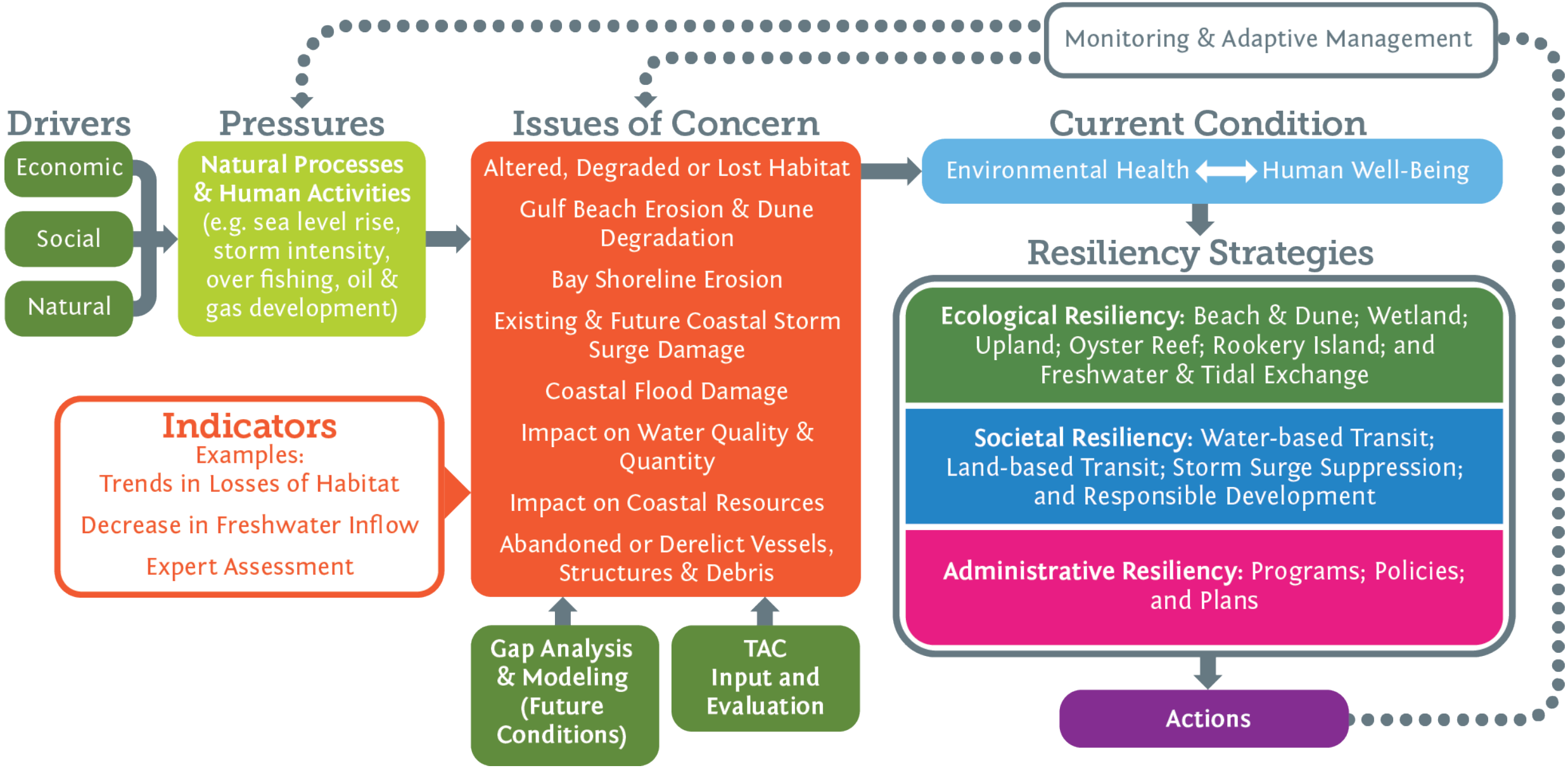
Societal Resiliency

- Water-based Transit Enhancement
- Land-based Transit Enhancement
- Storm Surge Suppression
- Responsible Development

Administrative Resiliency

- Programs
- Policies
- Plans

Resiliency Strategy Framework



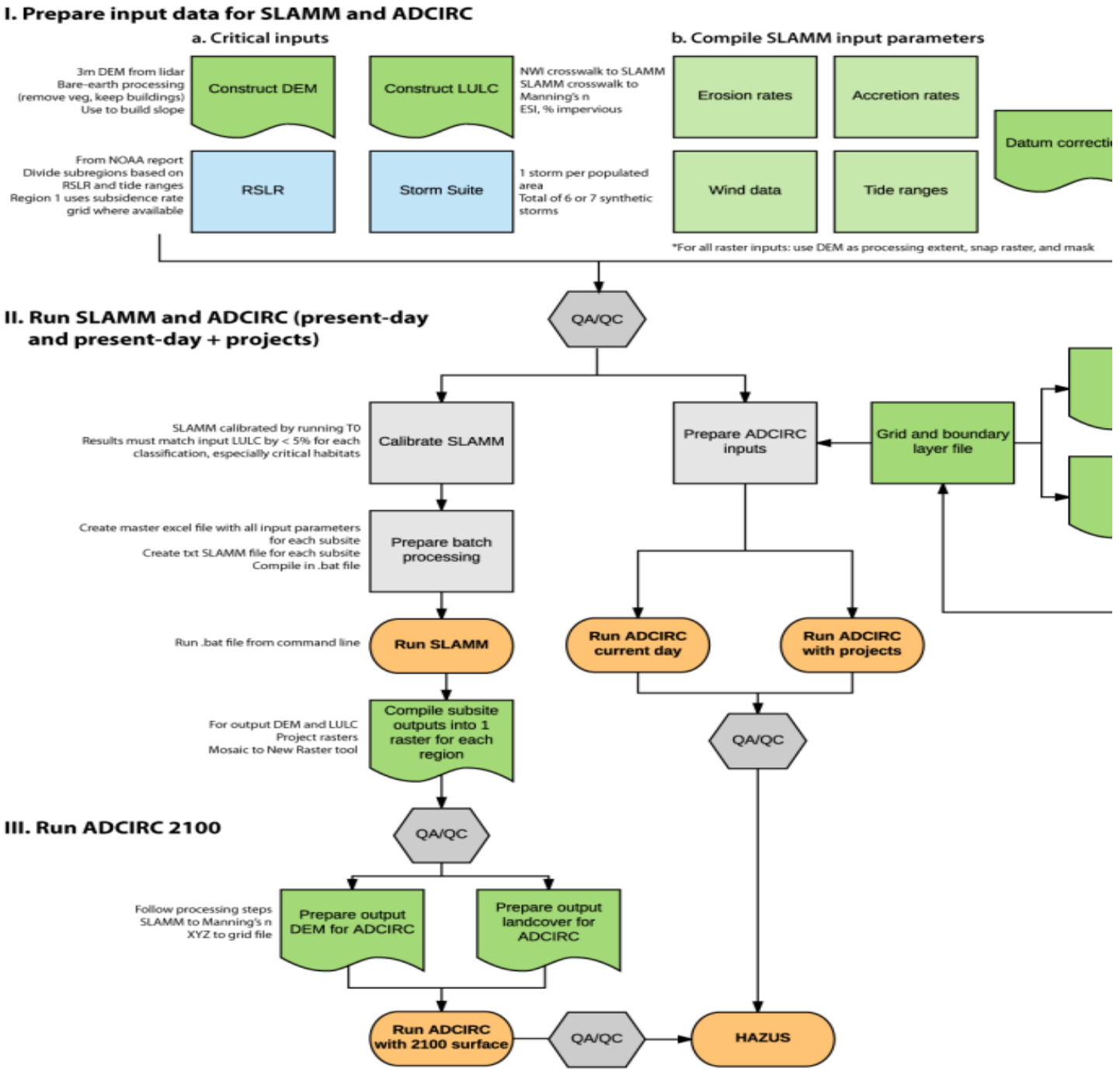
Detailed Model Flowchart

Three Distinct Models:

- Sea Level Affecting Marsh Migration (SLAMM)
  - Land type changes over time
- SWAN + ADCIRC
  - Storm surge inundation
- HAZUS
  - Monetary infrastructure damages

Three Distinct Scenarios

- Current Conditions
  - Establish base case
- Future Conditions without Projects
  - Establish increasing risk
- Future Conditions with Projects
  - Establish Plan implementation benefits



2019 Texas Coastal Resiliency Master Plan Goals

Develop a list of recommended coastal projects to advance the GLO's mission to make our coastal communities more resilient.

Obtain state and federal funding to implement the recommended projects to restore, enhance and protect the Texas coast.

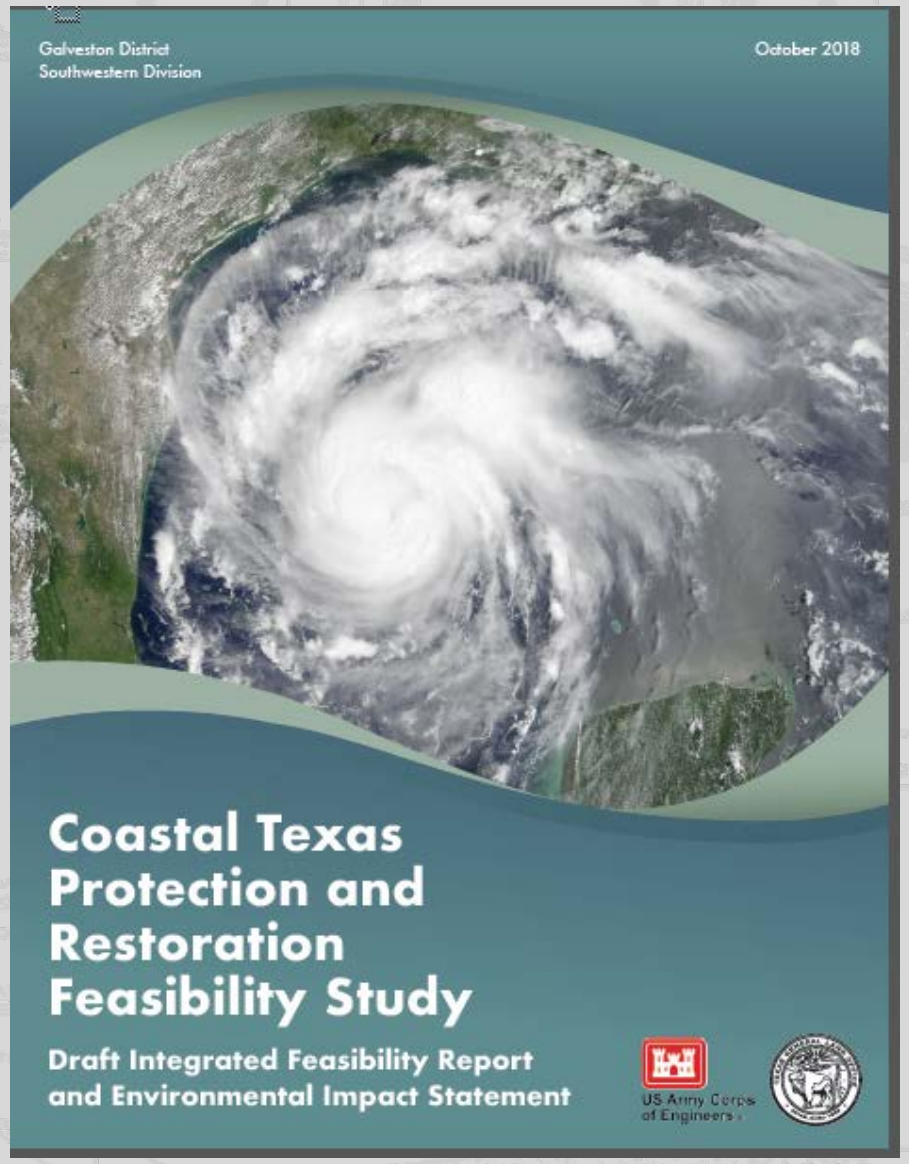
The GLO's Coastal Resources Division will use the list of projects in the Plan to guide its project selection for funding.

Local leaders can use the Plan as a tool to champion solutions that will make their coastal communities more resilient.

Schedule for
2019 Texas Coastal Resiliency Master Plan

US Army Corps of Engineers

COASTAL TEXAS PROTECTION AND RESTORATION FEASIBILITY STUDY



U.S.ARMY

Authorization for Coastal Texas Study

Section 4091, Water Resources Development Act (WRDA) of 2007 Public Law (P.L.) 110-114

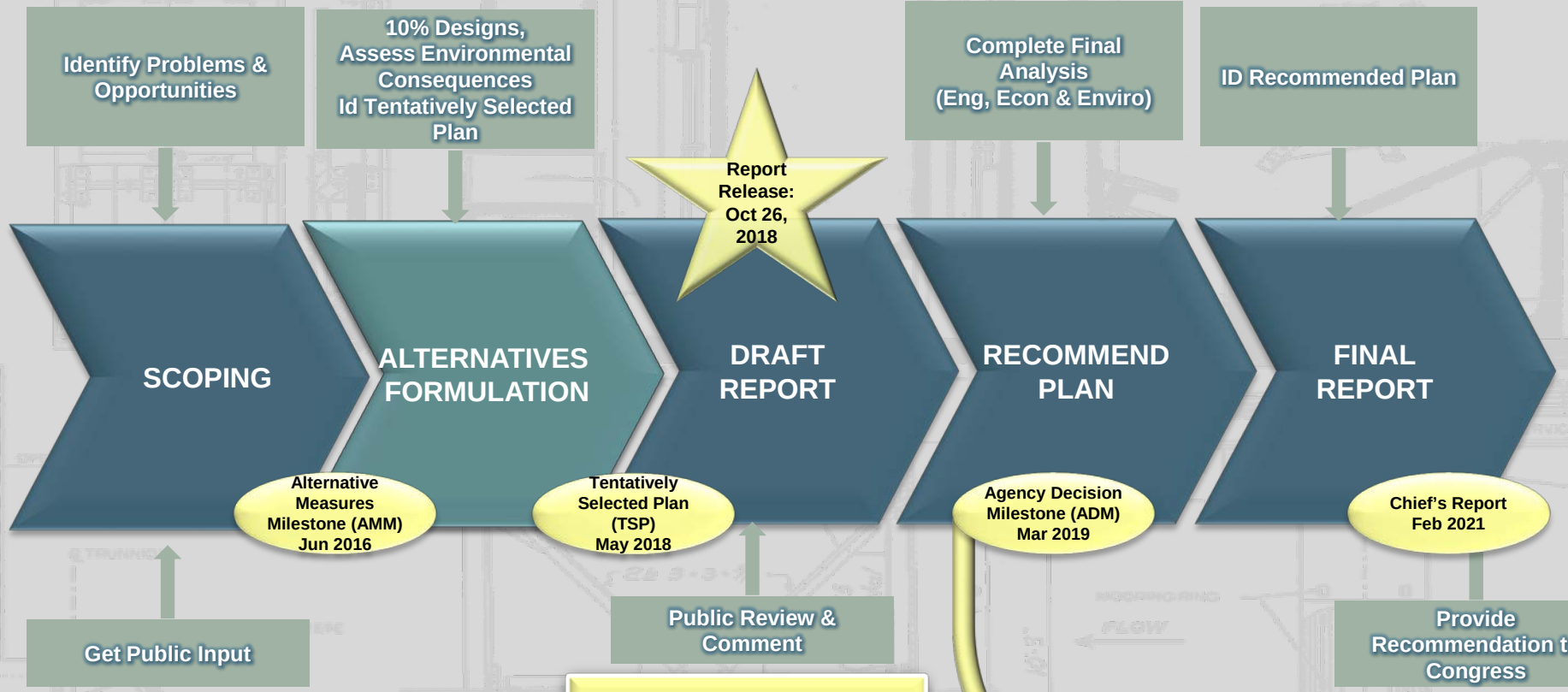
Coastal Texas Ecosystem Protection and Restoration, Texas.

(a) In General.—The Secretary shall develop a comprehensive plan to determine the feasibility of carrying out projects for ***flood damage reduction, hurricane and storm damage reduction, and ecosystem restoration*** *in the coastal areas of the State of Texas.*

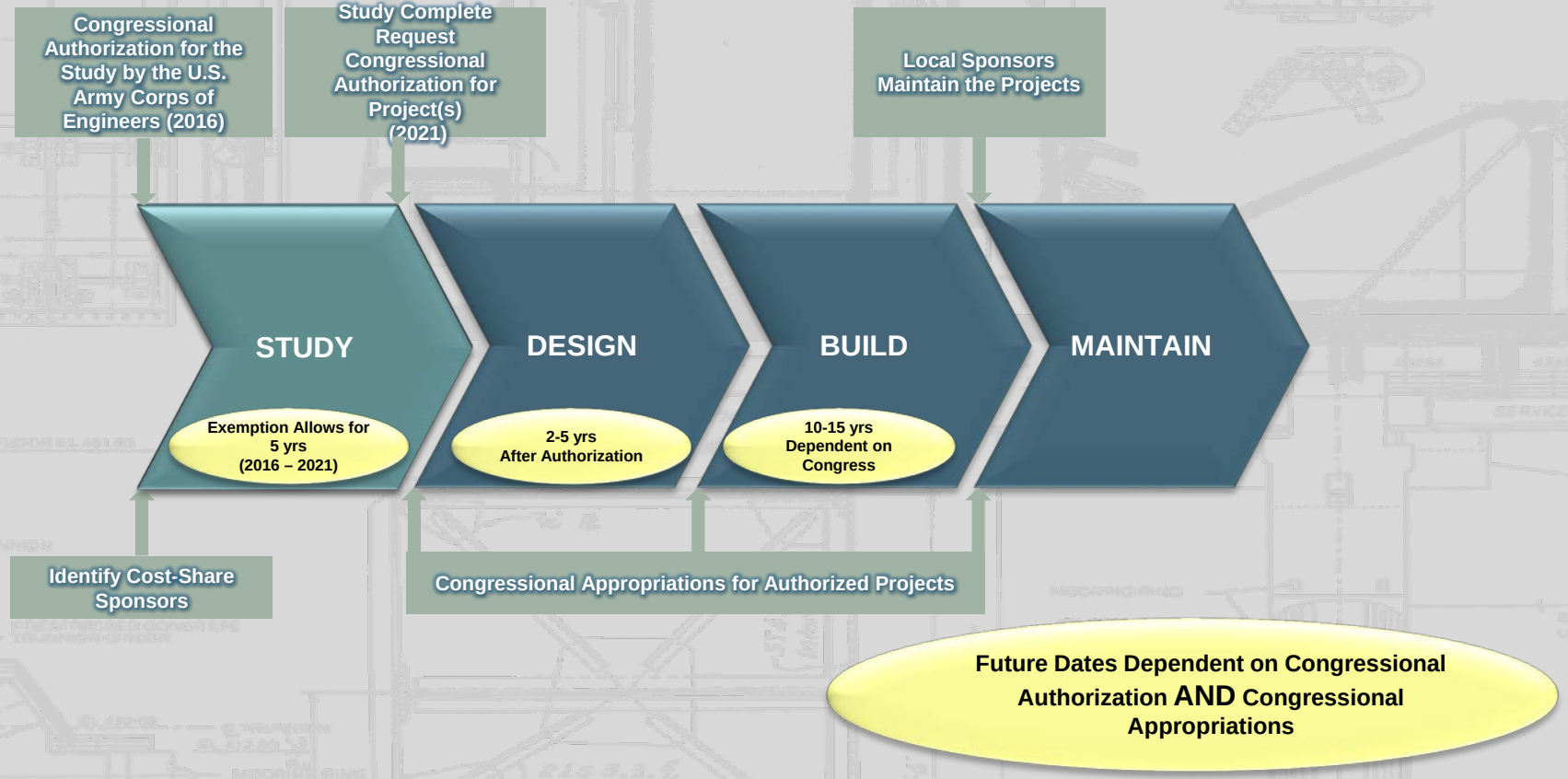
(b) Scope.—The comprehensive plan shall provide for the ***protection, conservation, and restoration*** *of* ***wetlands, barrier islands, shorelines, and related lands and features that protect critical resources****, habitat, and infrastructure from the impacts of coastal storms, hurricanes, erosion, and subsidence.*

(c) Definition.—For purposes of this section, the term "coastal areas in the State of Texas" means the coastal areas of the State of Texas from the ***Sabine River on the east to the Rio Grande River*** *on the west and includes tidal waters, barrier islands, marshes, coastal wetlands, rivers and streams, and adjacent areas."*

STUDY SCHEDULE



PROJECT PROGRESSION & MAJOR MILESTONES



Goals and Objectives of Coastal Texas Study

Coastal Storm Risk Management

Goal:

Promote a sustainable economy by reducing the risk of storm damage to residential structures, industries and businesses critical to the nation's economy.

Objectives:

- **Reduce economic damage** from coastal storm surge to business, residents and infrastructure along coastal Texas;
- **Reduce risk to human life** from storm surge impacts along coastal Texas;
- **Enhance energy security and reduce economic impacts** of petrochemical supply-related interruption due to storm surge impacts;
- **Reduce risks to critical infrastructure** (e.g., medical centers, ship channels, schools, transportation, etc.) from storm surge impact;
- **Manage regional sediment** so it contributes to storm surge attenuation where feasible.
- **Increase coastal resilience** in the face of sea level rise and storm surge impacts.
- **Enhance and restore coastal geomorphology** that contributes to storm surge attenuation where feasible.

Ecosystem Restoration

Goal:

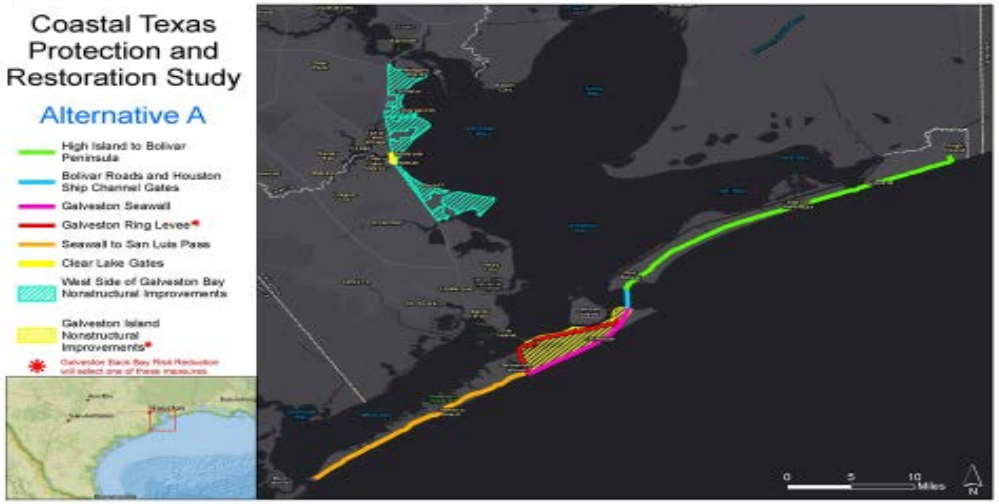
Promote a sustainable coastal ecosystem by minimizing future land loss, enhancing wetland productivity, and providing and sustaining diverse fish and wildlife habitats

Objectives:

- **Restore size and quality** of fish and wildlife habitats such as coastal wetlands, forested wetlands, rookery, oyster reefs, and beaches and dunes;
- **Improve hydrologic connectivity** into sensitive estuarine systems;
- **Reduce erosion** to barrier island, mainland, interior bay and channel shorelines;
- **Create, restore and nourish oyster reefs** to benefit coastal and marine resources;
- **Manage regional sediment** so it contributes to improving and sustaining diverse fish and wildlife habitat.

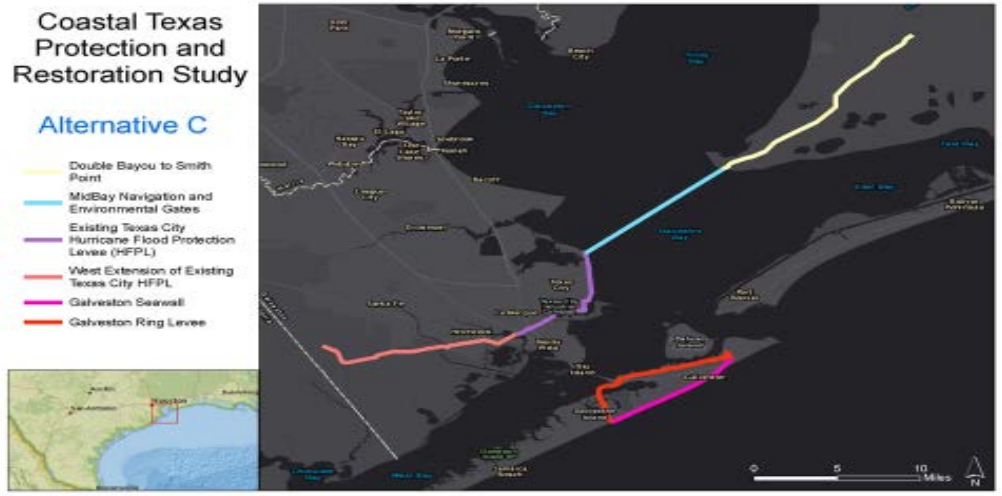
Coastal Storm Risk Management Alternatives

Region 1: Alternative A - Coastal Barrier/Nonstructural System



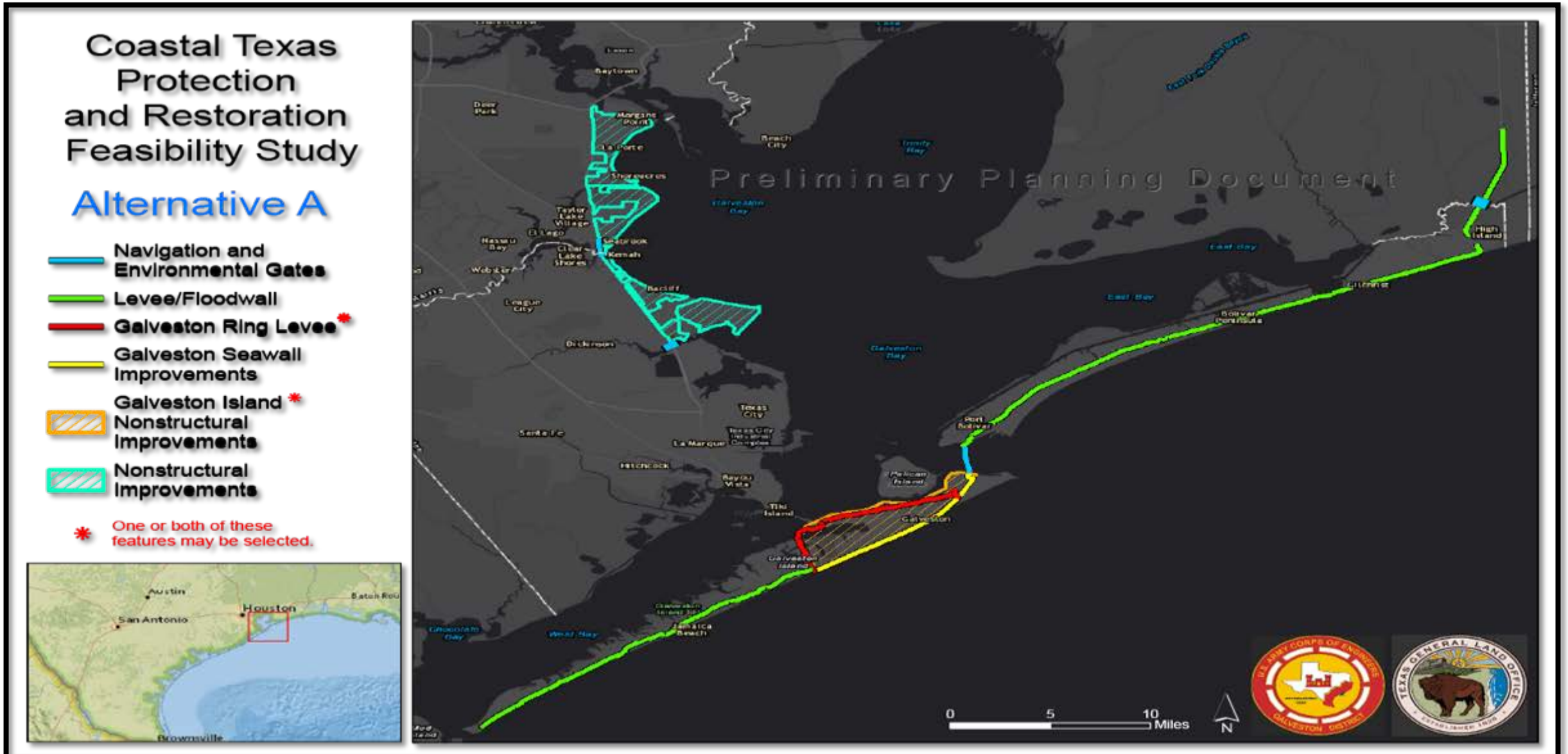
Region 1: Alternative B - Coastal Barrier

Region 1: Alternative C – Mid Bay

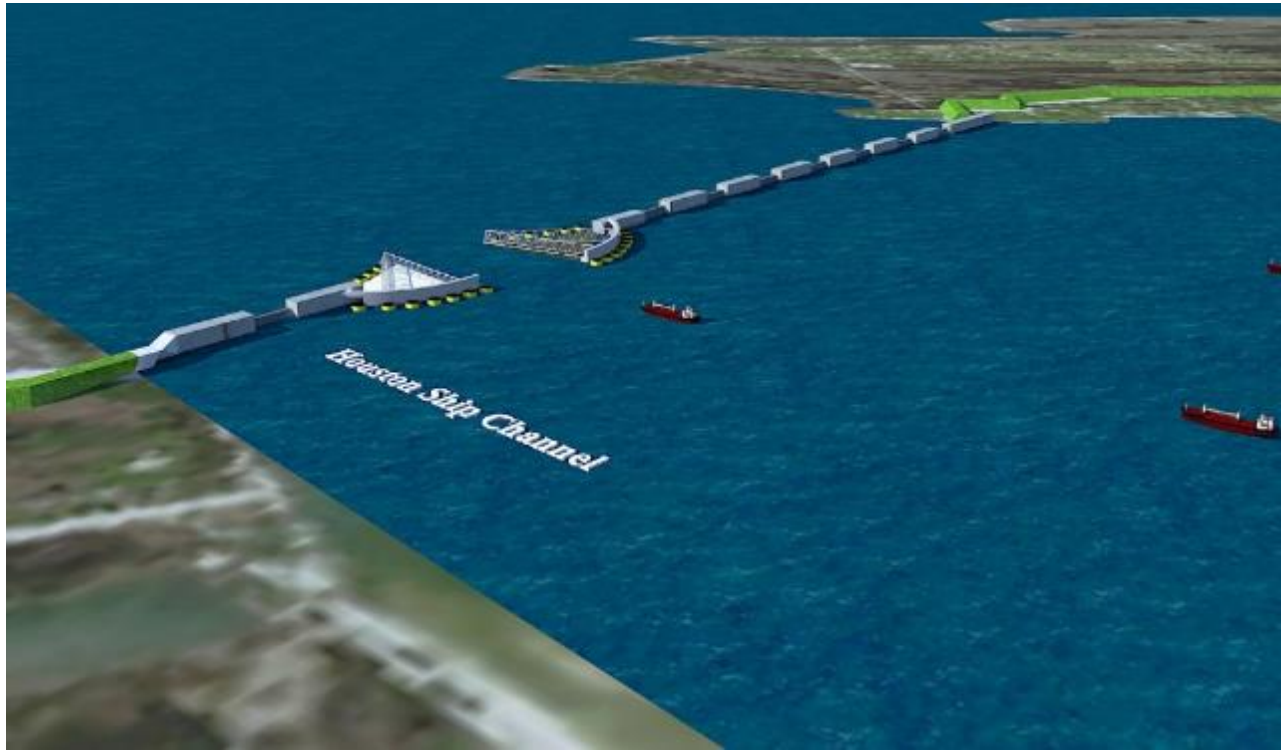


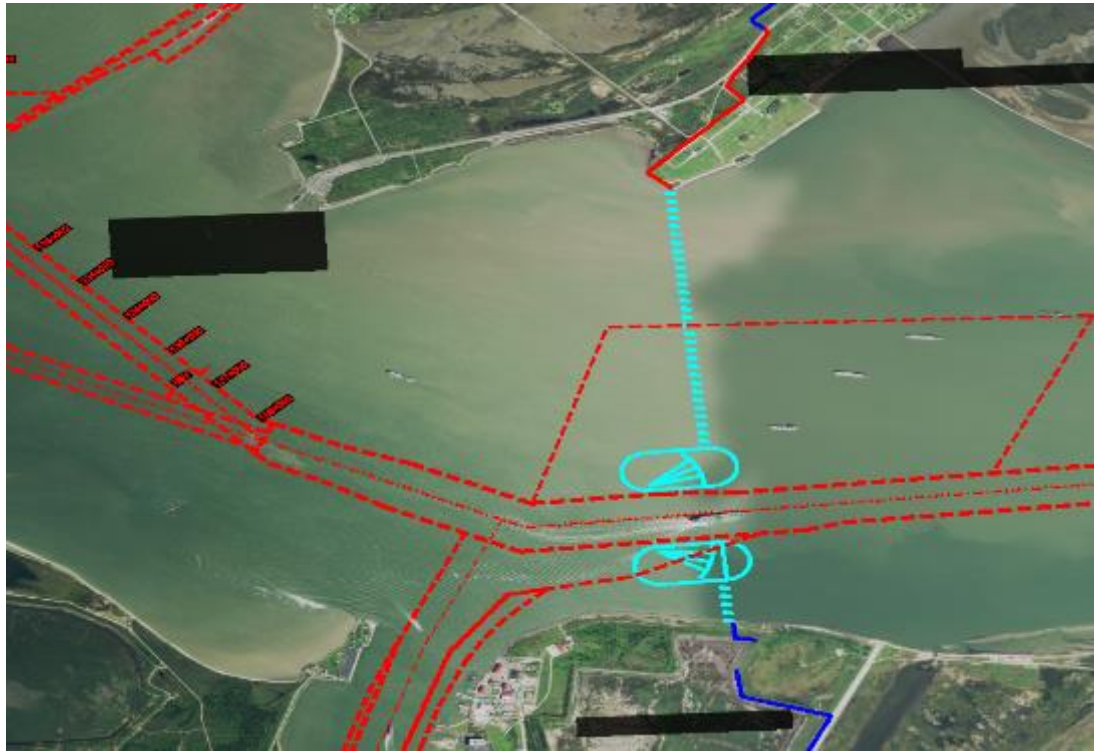
Region 1: Alternative D Upper Bay Barrier/ Nonstructural System

Alt. A – Coastal Barrier/Nonstructural System

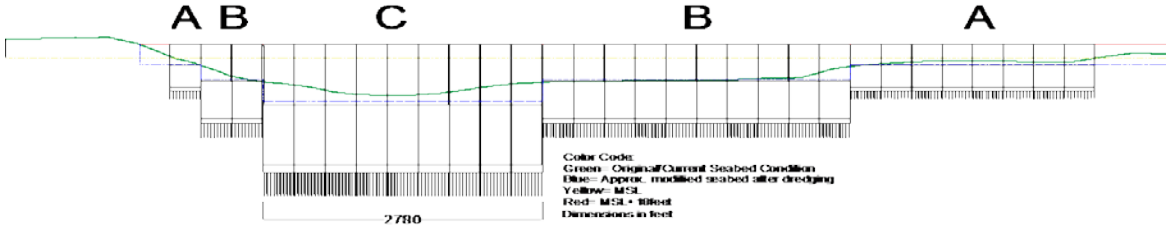


Alt. A – Preliminary Gate Designs





Lift Gates or Rising Gates

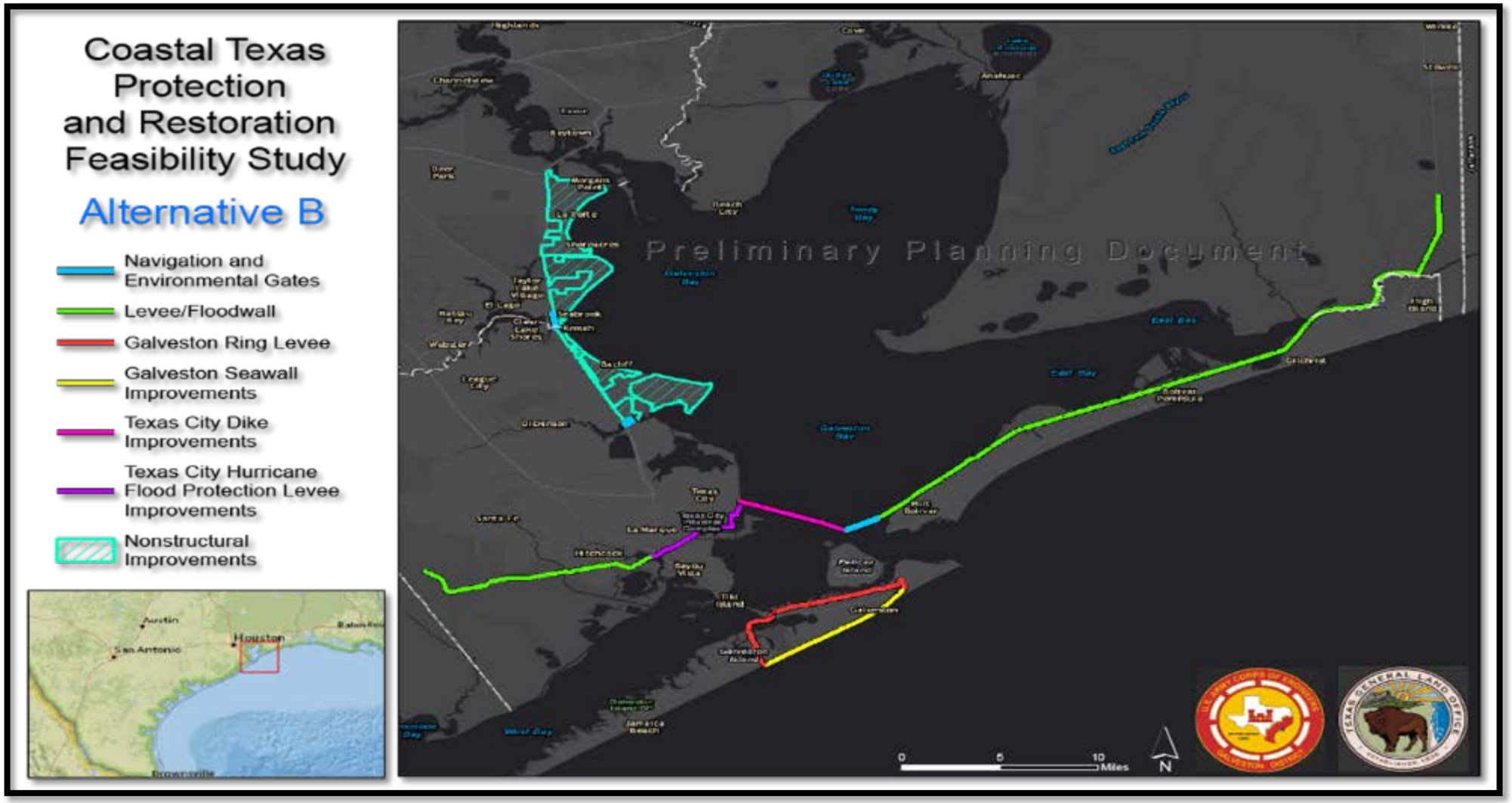


Potential Gate Options for Storm Surge Barrier

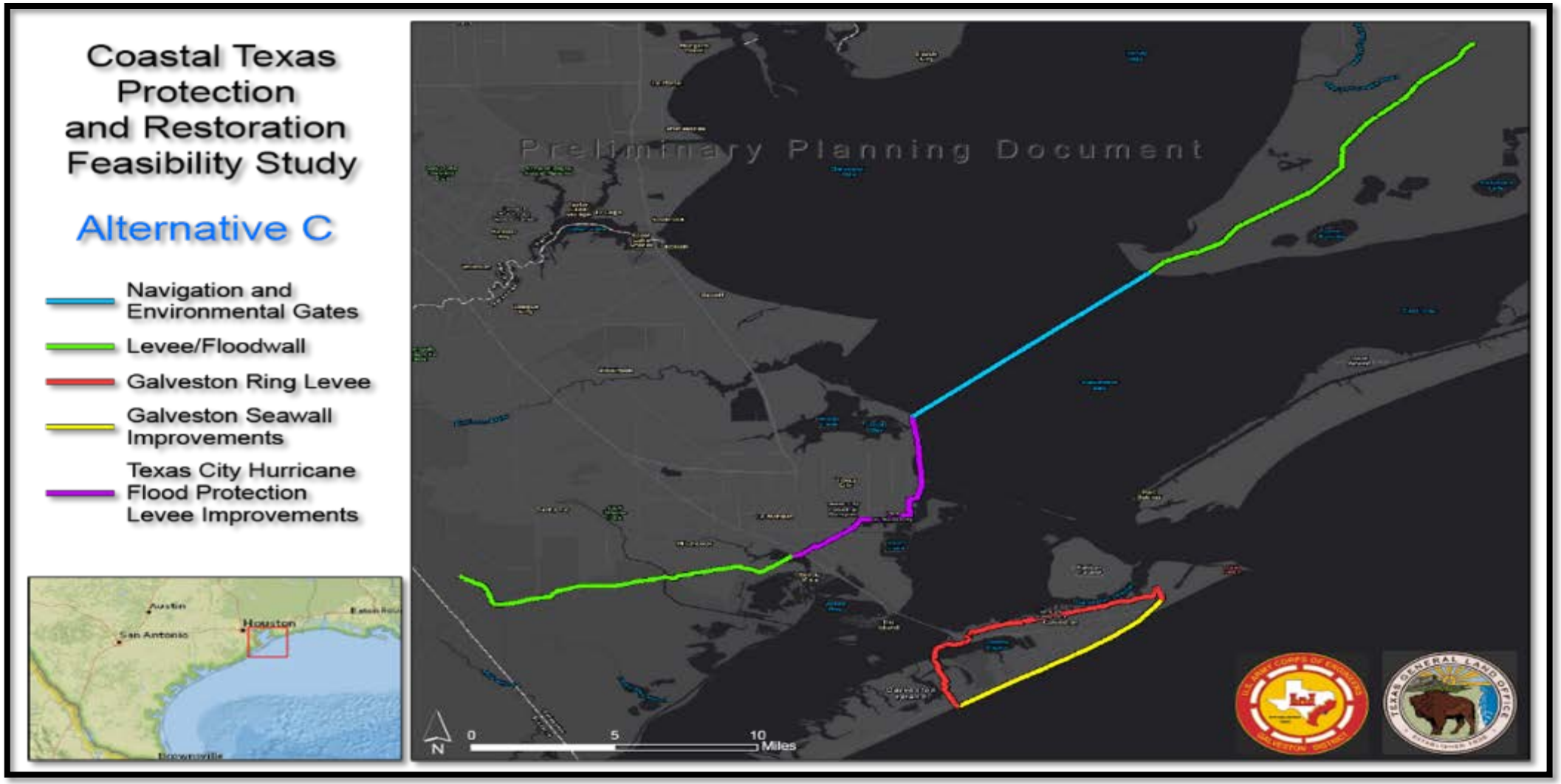
Maeslant Barrier, Netherlands

Eastern Scheldt Barrier, Netherlands

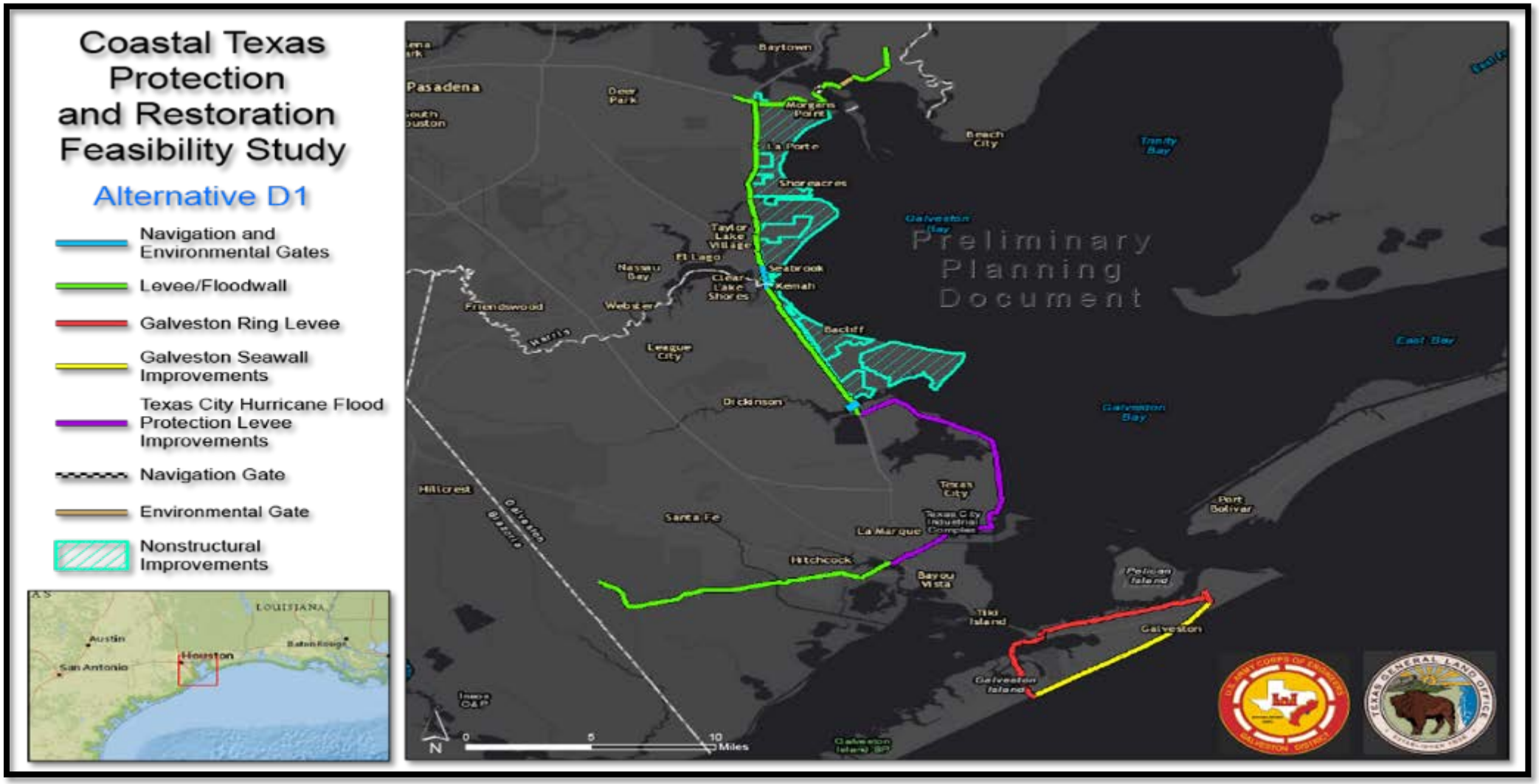
Plan B: Modified Coastal Barrier Nonstructural System



Plan C: Mid-Bay Coastal Barrier System

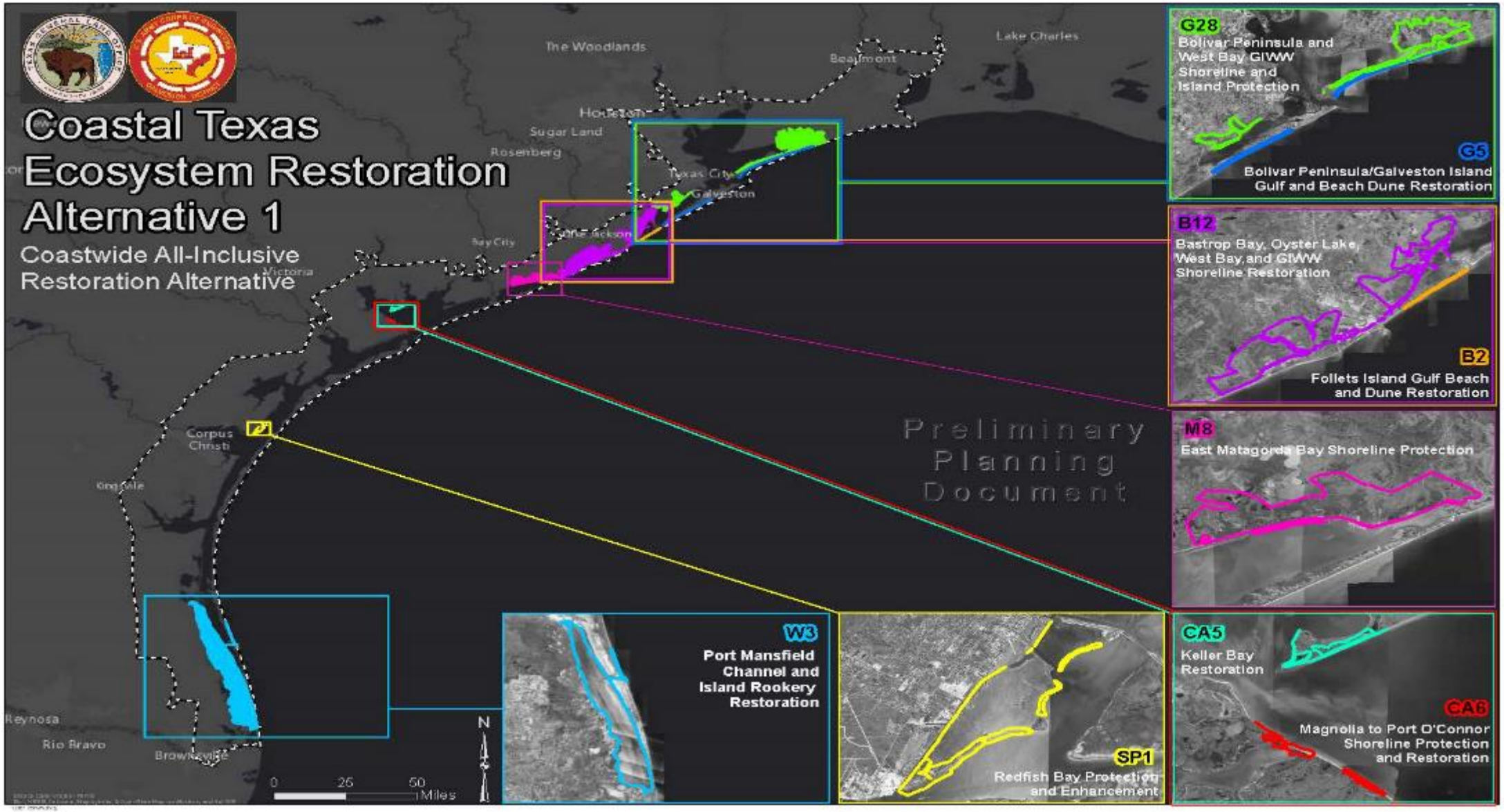


Plan D1: Upper Bay Barrier Nonstructural



Plan D2: Upper Bay Barrier Bay Rim

Ecosystem Restoration Alternatives

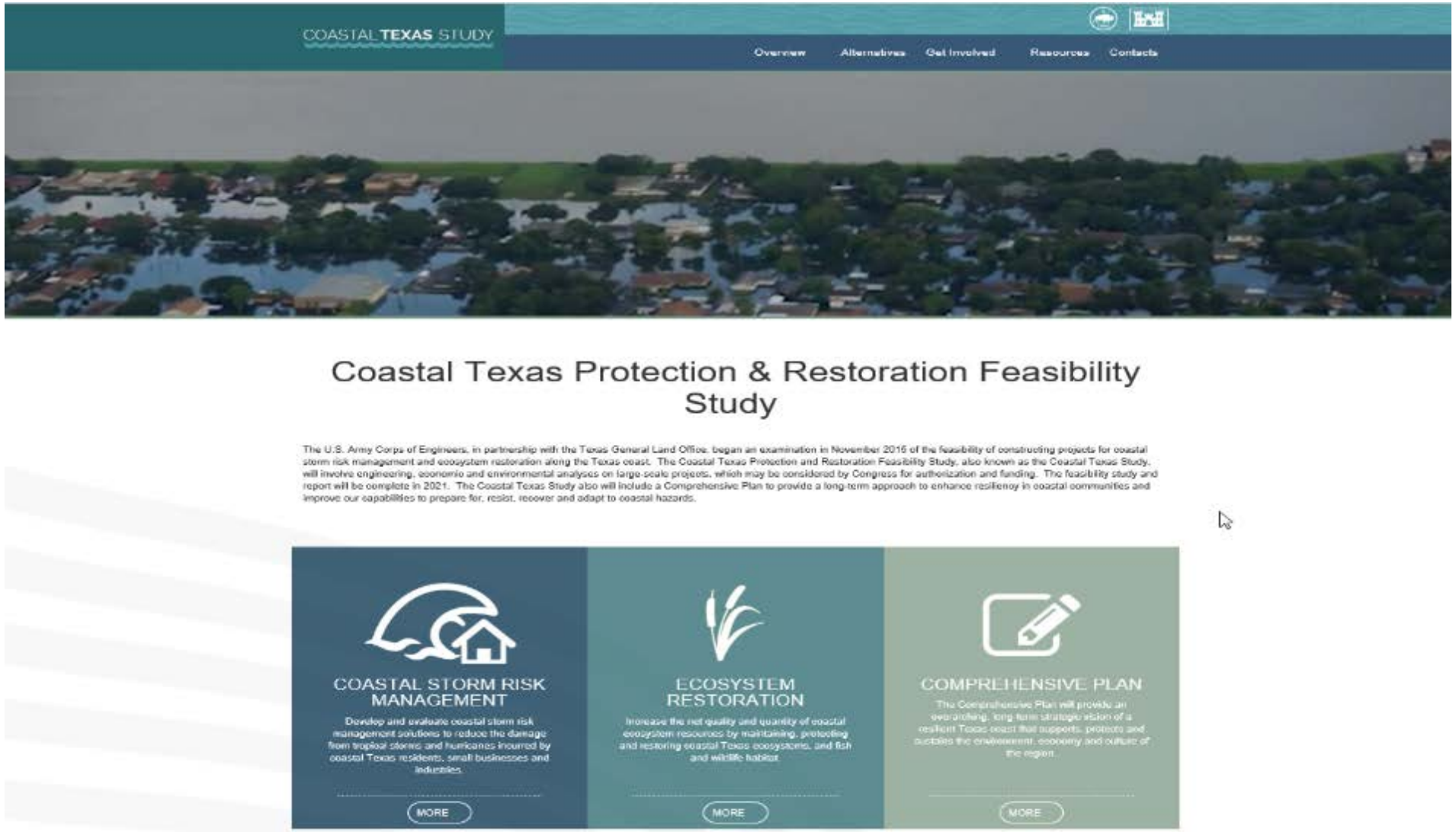


Public Meetings & Outreach

Tuesday, November 27:	Bauer Community Center, 2300 TX-35, **Port Lavaca, TX** 77979
Wednesday, November 28:	Harte Research Institute at Texas A&M Corpus Christi, 6300 Ocean Dr, **Corpus Christi, TX** 78412
Thursday, November 29:	Port Isabel Event & Cultural Center, 309 Railroad Ave, **Port Isabel, TX** 78578
Tuesday, December 11:	Winnie Community Building, 335 South Park St, **Winnie, TX** 77665
Wednesday, December 12:	Galveston Island Convention Center, 5600 Seawall Blvd, **Galveston, TX** 77551
Saturday, December 15:	Crenshaw Elementary and Middle School, 416 State Hwy 87, **Crystal Beach, TX** 77650
Tuesday, December 18:	Bay Area Community Center, 5002 E NASA Parkway, **Seabrook, TX** 77586

STAKEHOLDERS & COLLABORATORS

CoastalStudy.Texas.gov



“Millions of Texans live and work along the coast and the time has come to get serious about investing in its protection. By working together, we will directly address ongoing threats to the Texas coast and ensure a safer, more protected region for future generations.”

George P. Bush,
Commissioner, Texas General Land Office


Thank you.