

# COASTAL TEXAS STUDY

## STUDY OVERVIEW



US Army Corps  
of Engineers®  
Galveston District



*Members of the public attend the public meetings held in December 2018*

## STUDY BACKGROUND

The Coastal Texas Protection and Restoration Feasibility Study, also known as the Coastal Texas Study, involves engineering, economic and environmental analyses on large-scale civil works projects. The Study team is comprised of the U.S. Army Corps of Engineers (USACE) and Texas General Land Office (GLO) and their engineering, environmental, and public outreach consultants.

The purpose of the Coastal Texas Study is to identify coastal storm risk management and ecosystem restoration measures that would protect the health and safety of Texas coastal communities, reduce the risk of storm damage to industries and businesses critical to the Nation's economy, and address critical coastal ecosystems in need of restoration.

The Coastal Texas Study's history began in 2007 with congressional authorization to identify and evaluate a comprehensive plan for the restoration and conservation of wetlands, barrier islands, shorelines, and related lands and features that protect critical resources, habitat, and infrastructure from the impacts of coastal storms, erosion, and subsidence. In 2015, the non-federal sponsor, the GLO, was identified and funding to initiate the study was received. At that time, three other organizations also began studying a comprehensive solution for the upper Texas Coast, specifically the Houston/Galveston Region, including:

- the Ike Dike Plan from Texas A&M University at Galveston,
- the Coastal Spine Plan by the Gulf Coast Community Protection and Restoration District (GCCPRD), and
- the Bay Park Plan from the Severe Storm Prediction Education and Evacuation from Disasters (SSPEED) Center at Rice University.

In 2018, the Study team presented their plan for the Upper Texas Coast, the Coastal Barrier Plan, for public review. In 2019, the Study team began evaluating feedback received during the public review and comment period for the Draft Integrated Feasibility Report and Environmental Impact Statement.

## About the Study

Serving as an important economic and industrial hub for the United States, the Texas Gulf Coast is home to a coastal ecosystem vital to our national economy which provides valuable natural resources, abundant seafood, recreational fishing and tourism, and a rich cultural heritage. Growth of a healthy economy and preservation of natural resources along the Texas coastline is imperative to provide improved coastal protection measures thus ensuring the stability of the state of Texas and the nation for years to come. Historical and current weather events continue to challenge the vulnerabilities of the Texas coast emphasizing the need for enhanced resiliency of the coast to prevent future damage and loss.

With this in mind, the Coastal Texas Protection and Restoration Feasibility Study, also known as the Coastal Texas Study, was developed to identify coastal storm risk management and ecosystem restoration measures. These key measures will protect the health and safety of Texas coastal communities, reduce the risk of storm damage to industries and businesses critical to the national and local economy, and address important coastal ecosystems needing restoration.

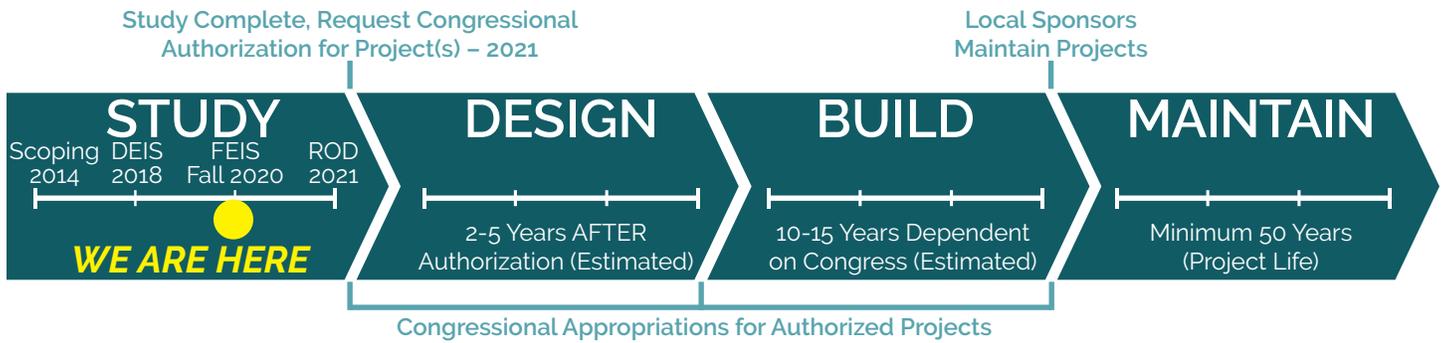
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# ESTIMATED PROJECT SCHEDULE



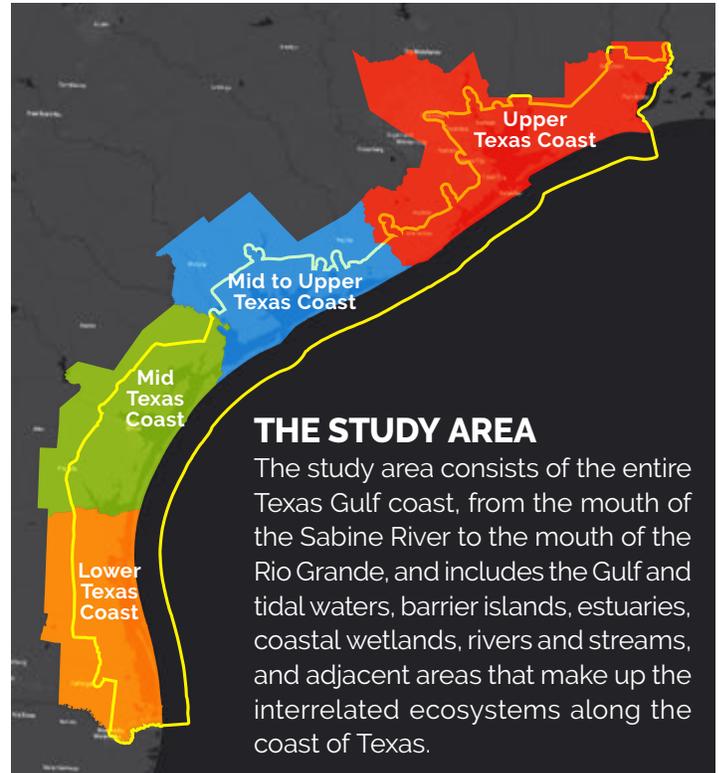
DEIS: Draft Environmental Impact Statement FEIS: Final Environmental Impact Statement ROD: Record of Decision

## STUDY APPROACH

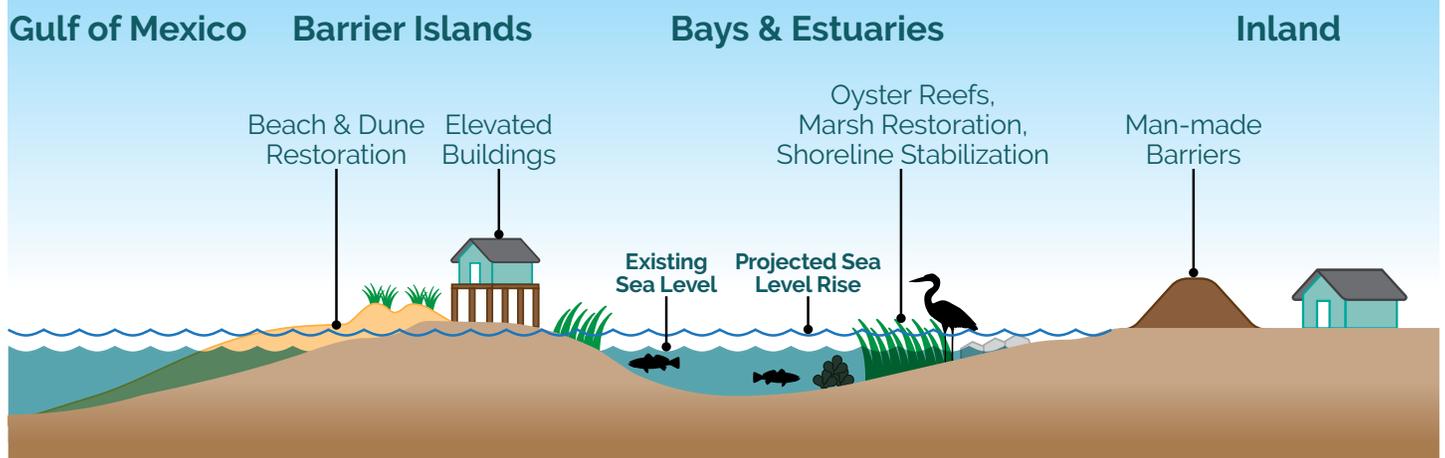
A “multiple lines of defense” strategy is utilized in the formulation of proposed measures and alternatives in the Coastal Texas Study. The system could include a combination of structural, natural, and nonstructural systems that work together to provide the greatest level of safety possible based on societal values and site conditions. To achieve a multiple lines of defense strategy, the Coastal Texas Study evaluates the following coastal problems:

- Economic damage from coastal storm surge
- Bay shoreline erosion
- Gulf shoreline erosion
- Loss of threatened and endangered critical habitats
- Disrupted hydrology

The Coastal Texas Study identifies nationally important environmental restoration strategies along the entire Texas coast. These restoration measures are evaluated based on long-term benefits, costs, feasibility, and resiliency.



## EXAMPLES OF MULTIPLE LINES OF DEFENSE ON THE TEXAS COAST



# PROPOSED STUDY FEATURES

## Proposed Ring Barrier

During Hurricane Ike, the most severe flooding came from the bayside. In order to protect this area, a ring barrier is suggested. **The current proposal envisions a 15.8-mile ring barrier around the bay-side of the City of Galveston, highway and railroad gates, and a 2,400-foot crossing of Offatts Bayou with a storm surge gate system for navigation and environmental flow.** The proposed ring barrier would encompass the Harborview Drive, or "Fish Village," neighborhood on the far east end of Galveston, consisting of a two-foot flood wall on top of the existing piers adjacent to the Strand Historical District on the north side of the island, continue west on Harborside Drive, wrap around Offatts Bayou to 103rd Street, and connect to high ground at the west end of the Seawall. The proposed ring barrier alignment extends to the west end of the Seawall to reduce risk to critical infrastructure (e.g. Scholes International Airport) and to avoid separating communities as much as possible.

Because Galveston Island currently operates on a gravity drainage system, the plan would add a forced drainage system consisting of approximately six new pump stations to move water off the island. The pump stations would address storm surge flooding as well as current flooding.

## Beach and Dune system

The proposed ring barrier would tie into a beach and dune system that would extend west to a tie-in point at the San Luis Pass Bridge. San Luis Pass will not have a closure structure.



*Conceptual rendering of a proposed beach and dune field system.*

The proposed beach and dune system along Bolivar Peninsula and the west end of Galveston Island will provide pedestrian and vehicular beach access by incorporating walk and drive over infrastructure at locations designated in each local government's Beach Access and Dune Protection Plan. Beach access will follow the Texas Open Beaches Act and any federal access requirements. Beach and dune features would be:

- 12-14 feet high
- 15-foot-wide dune crest width
- 250-foot beach

To address erosion and storm surge in the lower Texas coast, approximately 2.9 miles of dune and beach nourishment and sediment management along South Padre Island is being proposed. The proposed nourishment would be aligned parallel to the existing beach and dune system, beginning about two miles north of the Brazos Santiago Pass North Jetty system and extending for an additional 2.9 miles north.

The current proposal includes a 12.5-foot-wide dune and a 100-foot-wide beach berm, with additional sand to be added every 10 years.

## Gate Structure

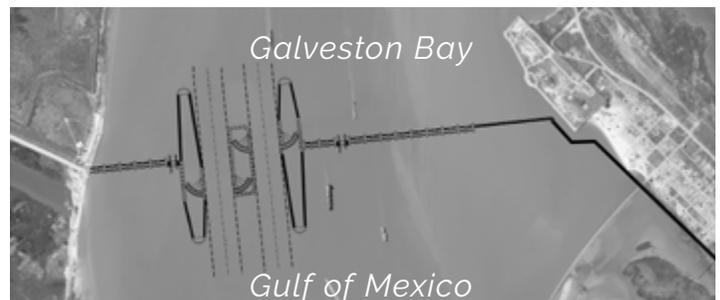
The revised gate configuration includes two 650-foot sector gates separated by an island in the middle, providing two-way vessel traffic between the Gulf of Mexico and Galveston Bay. The remaining components of the gate structure include a combination of vertical lift gates and shallow water environmental gates in the shallower areas of the entrance channel. This gate design would create less than ten percent water flow constriction between the Gulf and the Bay.

Maintaining tidal exchange between the Gulf and the bay is a priority. The gates would be closed only for storms and maintenance. Other large surge barriers worldwide are closed an average of 1 to 3 days per year for storms and operation and maintenance activities.

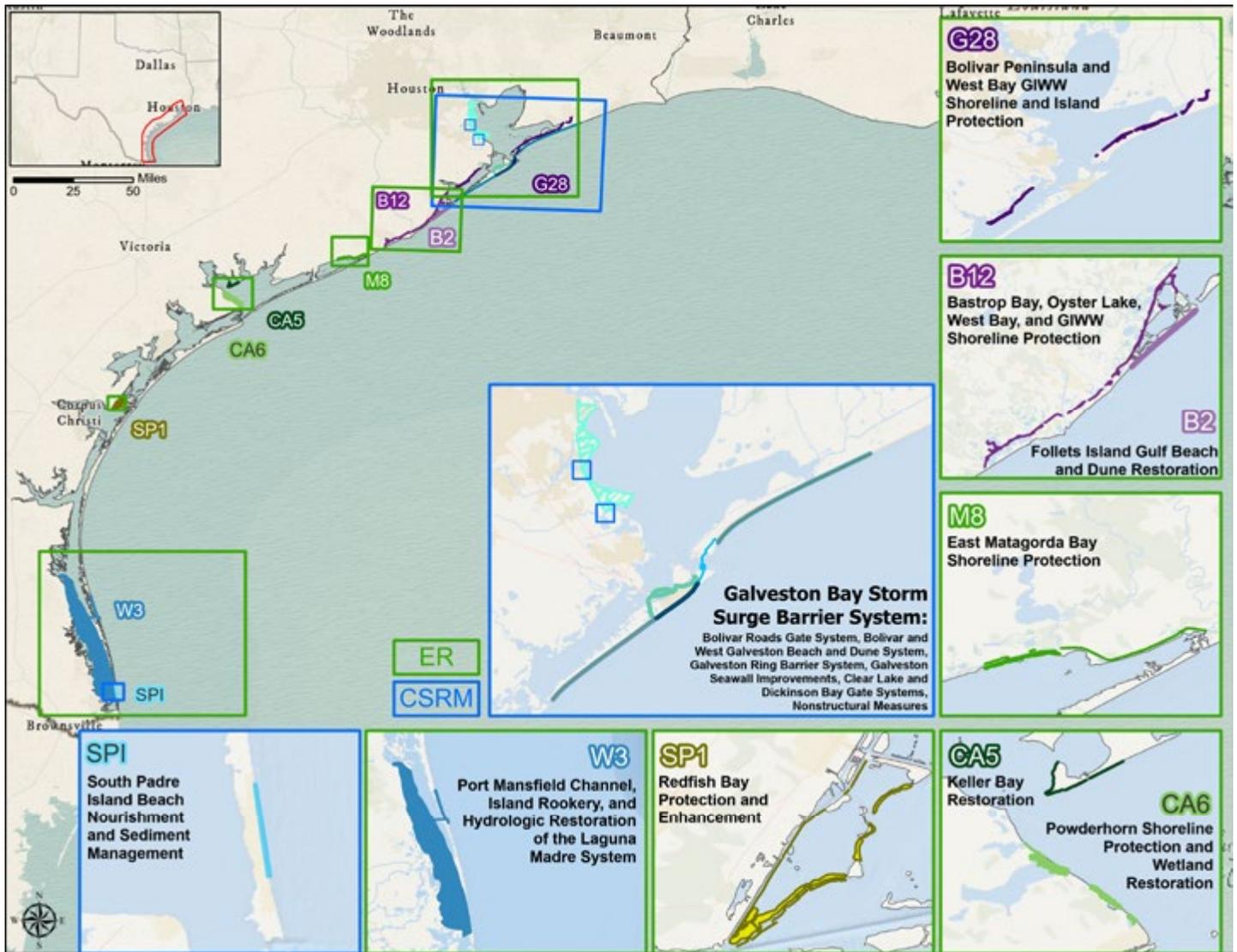
Closures at Clear Lake and Dickinson Bayou are also being investigated to address wind-driven surges in Galveston Bay. Both areas would include surge gates across the channel and associated pump stations.

## Ecosystem Restoration

Ecosystem restoration projects address habitat loss and degradation from coastal processes and support the coastal storm risk management components by providing a natural buffer from coastal storms. Each ecosystem restoration measure represents a combination of features and is formulated in a specific geographic location to restore diverse habitats and provide multiple lines of defense.



*Conceptual drawing of the proposed gate structure across Bolivar Pass*



**Marsh restoration** improves degraded marsh habitat or restores habitat that has become open water due to erosion, relative sea level rise and other coastal forces. Breakwaters interrupt erosion and provide barrier so sediment can be placed to create marsh within tidal ranges. Restoration also includes planting of native marsh vegetation to provide habitat and trap sediment, thus reducing erosion.

**Oyster reef restoration** includes placement of oyster cultch, which is material for new oysters to grow. Oyster reefs provide habitat for many other species and provide natural erosion reduction.

**Beach restoration** places sand on degraded gulf shorelines to restore dune and beach habitat.

**Island restoration** includes placement of sediment to increase the elevation of degraded islands. These restored islands include shoreline stabilization along the Gulf Intracoastal Waterway to withstand erosion and will provide bird nesting habitat. To increase the diversity of habitat and provide natural

erosion control, the bay side of the islands will slope to a created marsh and oyster reef.

**Hydrologic restoration** is the reestablishment of a connection between water bodies to maintain salinity balances that sustain habitats.

**Ecosystem Restoration Features:**

- G-28: Bolivar Peninsula and West Bay Gulf Intracoastal Waterway (GIW/W) Shoreline and Island Protection
- B-2: Follets Island Gulf Beach and Dune Restoration
- B-12: Bastrop Bay, Oyster Lake, West Bay, and GIW/W Shoreline Protection
- M-8: East Matagorda Bay Shoreline Protection
- CA-5: Keller Bay Restoration
- CA-6: Powderhorn Shoreline Protection and Wetland Restoration
- SP-1: Redfish Bay Protection and Enhancement
- W-3: Port Mansfield Channel, Island Rookery, and Hydrologic Restoration of the Laguna Madre System