Mission
The U.S. Army Corps of Engineers provides vital public engineering services in peace and war to strengthen our Nation’s security, energize the economy, and reduce risks from disasters.

Civil Works
Navigation Assets
• 1,567 Navigation projects
• 27 Inland River Systems
• 226 Lock chambers
• 13,000 Miles of coastal channels
• 13,000 Miles of inland river channels
• 929 Navigation structures
• 844 Bridges

Flood Risk Management
• 8,500 miles of levees and dikes,
• 383 reservoirs,
• 680 storm damage reduction projects
• 240 miles of the nation's 2,700 miles of shoreline

Civilian Workers
37,000 dedicated civilians and Soldiers
**COASTAL TEXAS FEASIBILITY STUDY OVERVIEW**

- Mega-Study – one of the 1st in the Corps
- Team includes National Team of USACE experts
- Kickoff Meeting – January 2016
- Notice of Intent – March 31, 2016
- Initiated Agency Coordination – May 2016
- Alternatives Milestone – June 28, 2016
- Working towards identification of Tentatively Selected Plan – May 2018

**STUDY AREA**

- Broad area of possible effects
- 4 unique areas identified under Recon
- 9 Texas Congressional Districts
- U.S. Senators Cornyn and Cruz (TX)
PURPOSE

Coastal Storm Risk Management - Develop and evaluate coastal storm damage risk reduction measures for coastal Texas residents, industries and businesses which are critical to the nation's economy.

Ecosystem Restoration - Increase the net quantity and quality of coastal ecosystem resources by maintaining, protecting, and restoring coastal Texas ecosystems and fish and wildlife habitat.

PROJECT PROCESS

The Corps process generates an executable project that is authorized by Congress and can compete for federal funding for construction and maintenance.

COASTAL TEXAS EXEMPTION

Exemption approval (October 2015) from Corps 3x3x3 study process with Congressional/Office of Management and Budget notification:

- $19.8 million
- 5.5 years
- Non-Federal Sponsor: Texas General Land Office
- Coastal Storm Risk Management (CSRM) and Ecosystem Restoration (ER) along the entire Texas coast
- Comprehensive Plan for Texas
- Feasibility recommendations for CSRM and ER
NON-FEDERAL SPONSOR

Texas General Land Office (GLO) - study sponsor
- Signed Feasibility Cost Sharing Agreement in November 2015
- Working to identify construction sponsors on the local level
  - Counties
  - Cities
  - Levee improvement districts
  - Drainage districts
  - Municipal utility districts
  - Other special taxing entities

FEASIBILITY STUDIES REQUIRED

- Impacts to physical environment and processes
  - Circulation/salinity/flooding/erosion
- Engineering feasibility
- Real Estate requirements

- Economics
- Environmental

- NEPA compliance
- Impacts to natural environment
- Hazardous material spills
- National Ecosystem Restoration (NER) Plan

- Damages to property
  - Personal and public damages from flooding
- Project costs
  - Study, design, construction and O&M
- Benefit-to-cost ratio
  - National Economic Development (NED)
- Life/health
  - Social impacts

- Habitat
- Fish and wildlife
- Cultural Resources

PLAN FORMULATION PROCESS

- Current Results
- Proposed Path Forward
OVERALL PROBLEMS AND OPPORTUNITIES

Economic damage from coastal storm surge
Inland shoreline erosion
Gulf shoreline erosion
Loss of T&E Critical Habitats
Loss of Natural Delta Processes
Disrupted Hydrology

FORMULATION STRATEGY DEVELOPED

Structural and Nonstructural Measures to address Economic damage from coastal storm surge
Measures to address impacts along navigation features
Measures to address areas of high Gulf shoreline erosion
Measures to address Loss of Critical Habitats
Measures to address Loss of Natural Delta Processes

Planning Example Region 1: Alternative A - Coastal Barrier/Nonstructural System

Nonstructural Improvements
Galveston Ring Levee
Navigation Gate (GCCPRD Alignment)
Beach/Dune Nourishment
GALVESTON BAY SURGE MODELING
1969-1979

- Completed in 1979
- Full scale evaluation of storm protection for entire Texas Coast
- Detailed hydraulic study of Galveston Bay
  - Coastal Spine vs. Inland Barrier

Physical model completed in 1969
- 1:3000 horizontal
- 1:100 vertical

ALPHA PLAN - UNGATED

ALTERNATIVE B - COASTAL BARRIER (ENG. WORKSHOP DISCUSSIONS)

Shift to Avoid Navigation Impacts and Open Gulf Conditions

Galveston Ring Levee
PLANNING EXAMPLE REGION 1: ALTERNATIVE D
UPPER BAY BARRIER: NONSTRUCTURAL SYSTEM

- Navigation Gate and possible Drainage Feature
- Nonstructural Improvements

PLANNING EXAMPLE REGION 1: ALTERNATIVE D
STRUCTURAL ALTERNATIVE

COASTAL TEXAS STUDY SCOPING

Region 1
Region 3
Region 2
Region 4
LIDAR-BASED TRENDS ON THE TX COAST
(USACE-SW, ERDC, JABLTCX, RPEC)

Objectives:
• Compare LiDAR datasets along the TX Coast – 2008 & 2016
• Extract variables and develop algorithm of inherent importance relative to breaching and resilience
• Determine shoreline change rates based on historical data and relative sea level rise predictions
• Perform an analysis of the shorelines, categorizing areas of significant change

Geomorphic
Variables
Dune peak
Barrier island
Dune toe
Beach width
Barrier island cross section volume
Environmental
Vegetation coverage
Height of veg. above ground

SEDIMENT BUDGET

Goal:
• Develop a Sediment Budget for Texas Coast
• Identify possible Sediment Sources
• Understand sediment sources / sinks throughout the state

Approach:
Amalgamate existing data sources and/or crude estimates

SEDIMENT BUDGET

GOT DATA?
LET’S TALK!

Good Data:
Northeast Texas Coast
South Padre Island
City
Dredging Information

Imperfect / Incomplete Data:
Most Other Areas
Bay Systems

Additionally:
Everywhere can always be improved
STORM SURGE BARRIER AND NAVIGATION GATE

• Physical model completed in 1969, study completed 1979
  • 1:3000 horizontal
  • 1:100 vertical
• Full scale evaluation of tropical storm protection for entire Texas Coast
• Detailed hydraulic study of Galveston Bay
  - Coastal Spine vs. Inland Barrier

Worldwide Storm Surge Barrier and Navigation Gate

• Eastern Scheldt and Eider barrier have reduced the original tidal opening
• For other barriers (e.g., Venice, Ems) navigability is important
• For Ramspol, St. Petersburg, the water circulation was already low before construction.
• Galveston peak flow of approx. 2 m/s and tidal prism cross-sectional area of 23,000 m²

Design Considerations

Cross section
- 3,000 ft wide opening Bolivar Roads
- Approximately 60 ft depth
- Navigation gate width opening 840 to 2,000 ft?

Environmental considerations
- Reduction in tidal prism - up to 40%?
- No net change in exchange
  - Navigation gate
  - Tidal exchange gate
  - Intertidal enviro gate
DESIGN PARAMETERS

- Paleo Geomorphology of the former Trinity River Valley 17,000 years ago
- Very poor subsoils at current channel location


COMMUNICATIONS PLAN

- Executing the plan:
  - Single messaging with GLO
  - Attendance/presentations at meetings
    - SSPELD Center Annual Meeting
    - GCCPRD Public Meetings
    - TX Joint Committee Hearing on Coastal Surge Barriers
    - GLO’s upcoming Technical Advisory Meetings
    - Recurring joint meetings with HSC and others
    - Recurring meetings with Resource Agencies
  - Future stakeholder outreach
    - Development of Project video
    - Study website established
    - Meetings/briefings with community stakeholders

Study website/email:
http://www.swg.usace.army.mil/Missions/Projects/CoastalTexasFeasibilityStudy.aspx
CoastalTx@usace.army.mil
Coraggio.Maglio@usace.army.mil

COLLABORATION WITH OTHERS

- Reports and Data
- Stakeholders