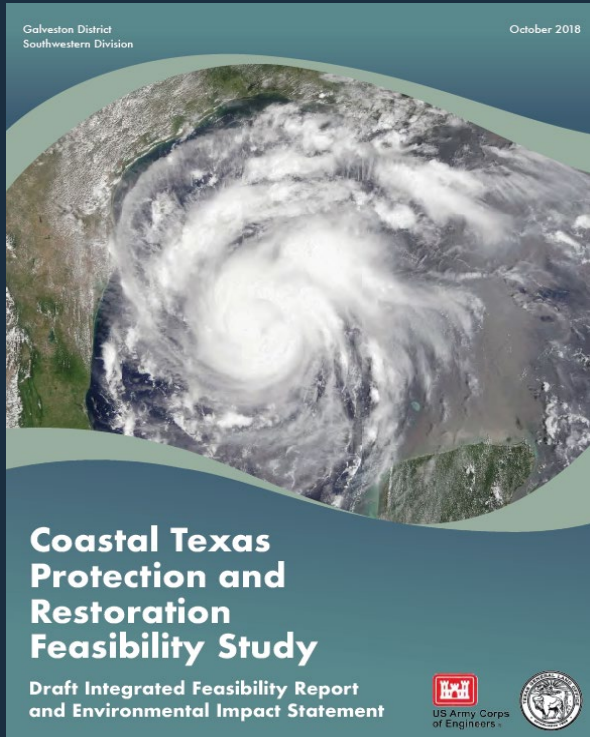


The Coastal Barrier: Observations, Concerns & Comments



*Bob Stokes, President
Galveston Bay Foundation*

Galveston Bay Foundation

Mission: To preserve and enhance Galveston Bay as a healthy and productive place for generations to come.

Four target areas:

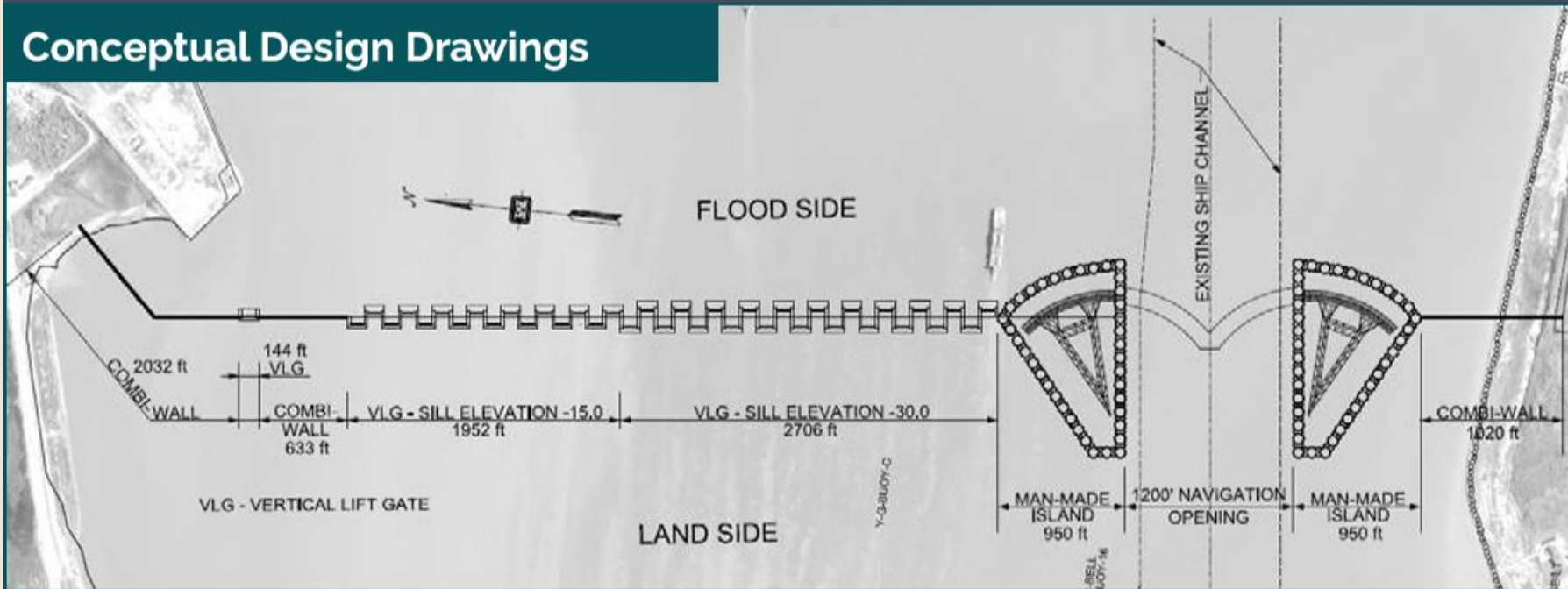
- *Advocacy*
- *Education*
- *Research*
- *Conservation*





Bolivar Roads Gate Structures – Plan View (Bird's Eye View)

Conceptual Design Drawings



Bolivar Roads - Navigation Gate

Conceptual Design Features

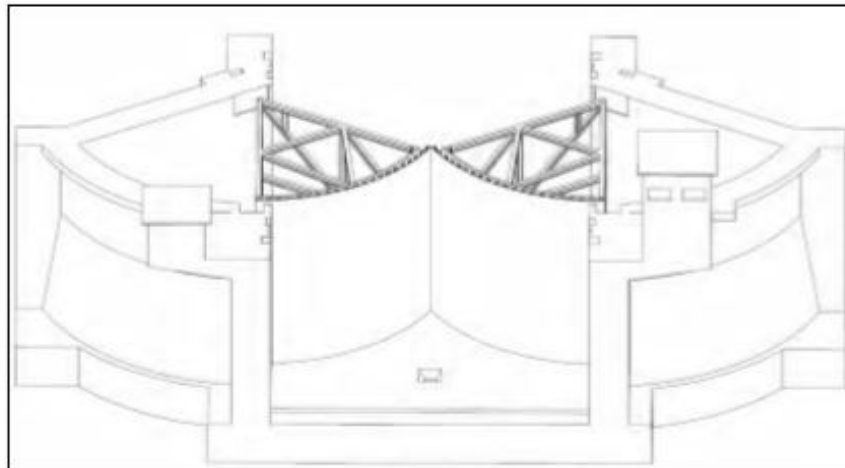
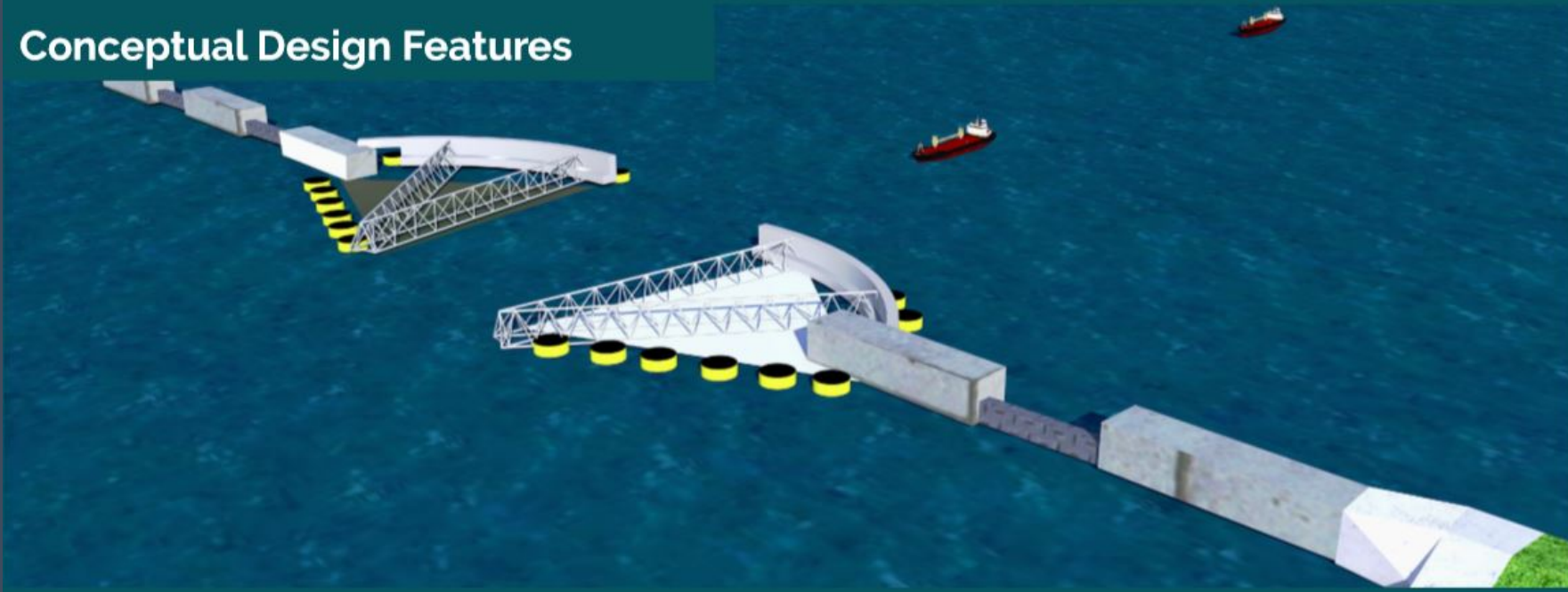
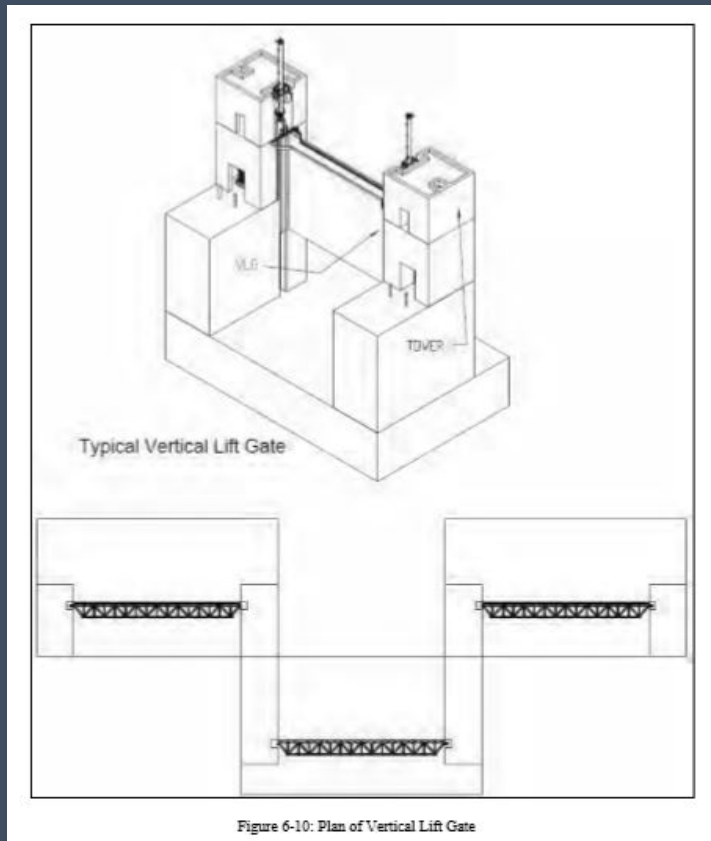


Figure 6-5: Typical Sector Gate

Maeslant Gate near Rotterdam, NL

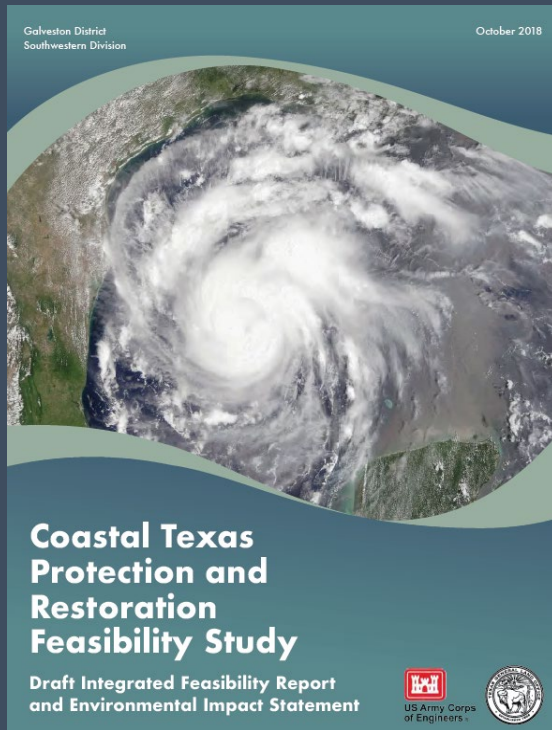


Bolivar Roads – Environmental Gates



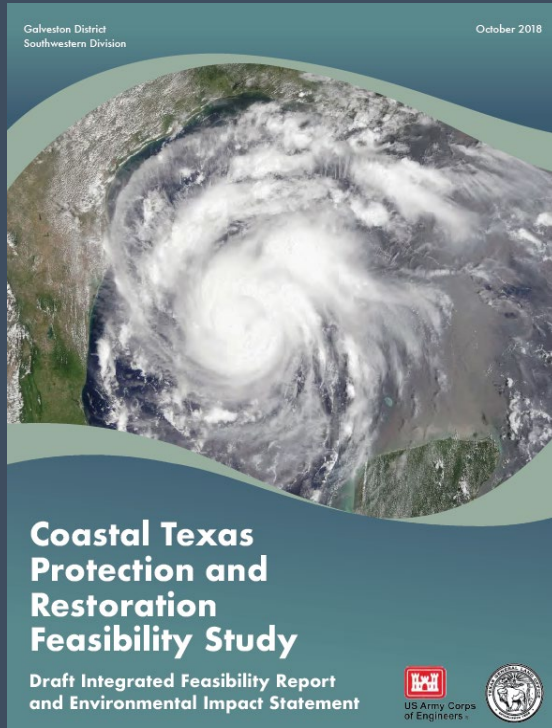
Eastern Scheldt,
Netherlands

GBF's Observations on DIFR-EIS – 7 areas of deficiency



1. Inadequate analyses of impacts to water quality and to Bay animals, including critical commercial and recreational fisheries species
2. Uncertainty in the Tentatively Selected Plan (TSP) alignment and gate structures
3. Cost-benefit analysis based on a TSP that will likely change
4. Inadequate development and assessment of nature-based/non-structural alternative

GBF's Observations on DIFR-EIS – 7 areas of deficiency



5. No study of alternative that utilizes and incorporates existing, new or improved levees protecting Houston Ship Channel industries
6. List of protected lands is incomplete, including GBF's
7. SSPEED Center's Mid-Bay concept was incorrectly screened out

GBF's *Environmental* Concerns



- Changes to bay hydrology and chemistry
- Direct and indirect impacts to habitat and bay species

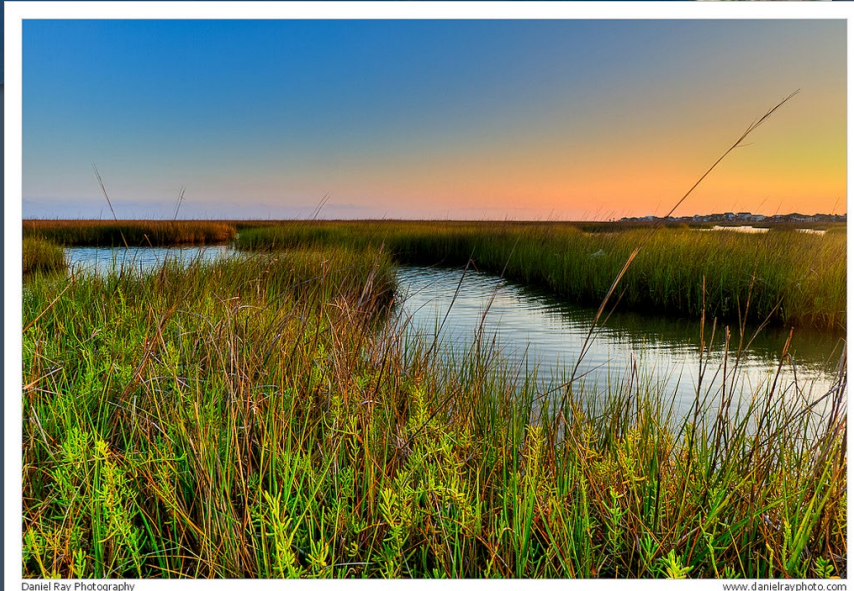
Physical Impacts Listed in Corps' DEIS



- Constriction of pass – 27.5%
- Tidal range (difference between high and low tide) decreased by up to 22%
- Tidal prism (volume) decreased by up to 17%
- Flow velocity increased by up to 6.6 feet/second
- Gulf shoreline will see increasing erosion
- Bay shoreline will see areas of increasing erosion



Water Quality & Sediment Transport Impacts Listed in DEIS – Effects on Wetlands and Oysters



Daniel Ray Photography

www.danielrayphoto.com

- Water residence time will increase = pollution impacts?
- Salinities altered – higher in times of drought and lower in times of flooding = impacts on oysters?
- Sediment delivery shift from Bay margins to middle of Bay = impacts on wetlands and oysters
- Intertidal area will decrease = loss of wetlands

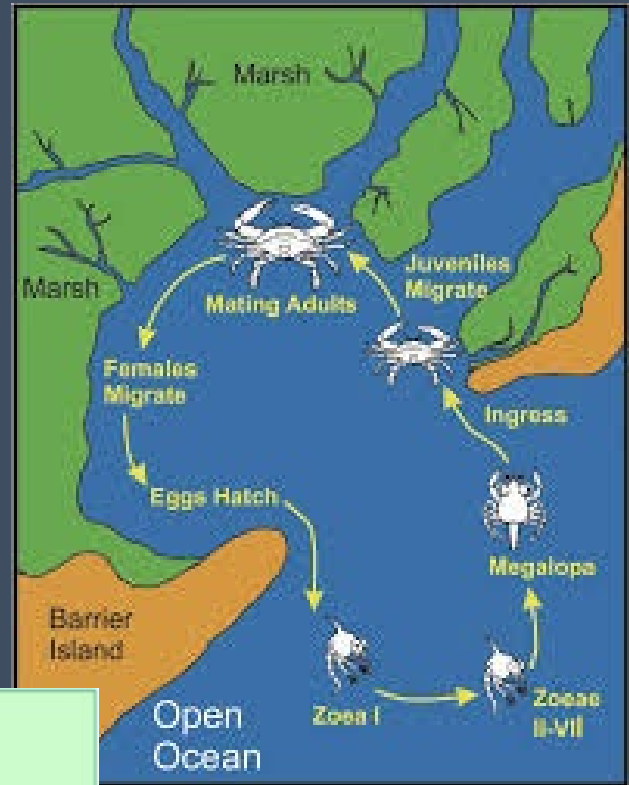
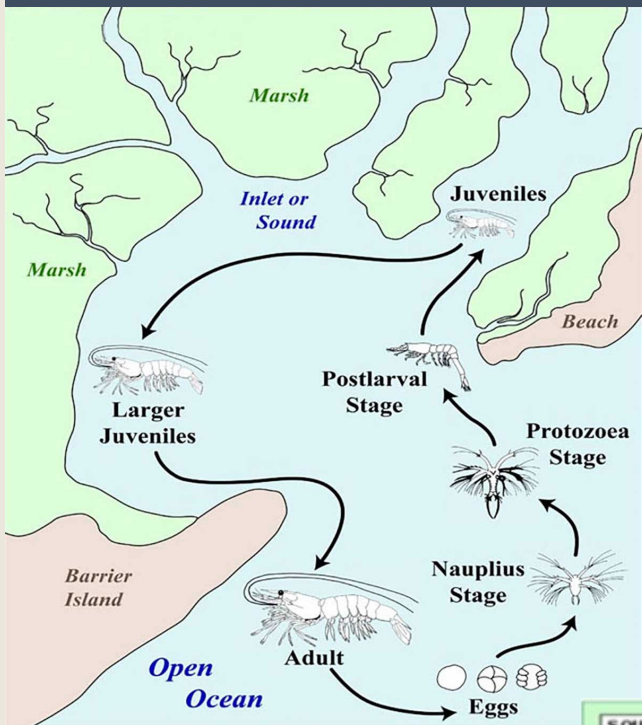


GALVESTON BAY
FOUNDATION

Potential Impacts to Fisheries Species, Dolphins and Turtles



- Can finfish and crab successfully spawn and reproduce?
- Can larval shrimp, crab and finfish survive the trip back into the Bay?
- Will dolphins be impacted?
- Will endangered sea turtles be impacted by changes to Gulf shoreline and passes?



Sample DEIS Language -

From Executive Summary, page xxi (emphasis added):

“Preliminary studies... show that the surge barrier gates proposed as features of the Coastal Barrier Alternative **may affect wetland functions** by constricting tidal exchange and the associated sediment transport and altering hydrosalinity gradients. This, in turn, **could potentially impact the ecology of the Galveston Bay estuary and the fish, birds, and wildlife species** that depend on the resources provided by wetland and marsh habitats. ...Additionally, estuarine modeling... shows that construction of the surge barrier gates could reduce flow into and out of Galveston Bay and increase velocities along the opening of the gates during specific times. These effects **could have long-term impacts on estuarine habitats and fauna** within the bay.”

Sample DEIS Language -

From Section 5.4.4.2.1 on fisheries impacts (emphasis added):

“The predicted reduced flow and increased velocities ***could impede the migrations and movements*** through Bolivar Roads of various life stages of fish into and out of the Galveston Bay system.”

GBF's Overall Comments and Action


The DIFR-EIS does not meet requirements in the Code of Federal Regulations for an EIS.

In our official comment letter, we stated that we could not support the Corps' current proposal due to these deficiencies and requested that they prepare a Supplemental DEIS to address them, and provide an opportunity for public review.

GBF, along with other NGOs, provide info pages and comment letters. Ours is at:

<https://galvbay.org/get-involved/coastalbarrier/>.

Extra Slides

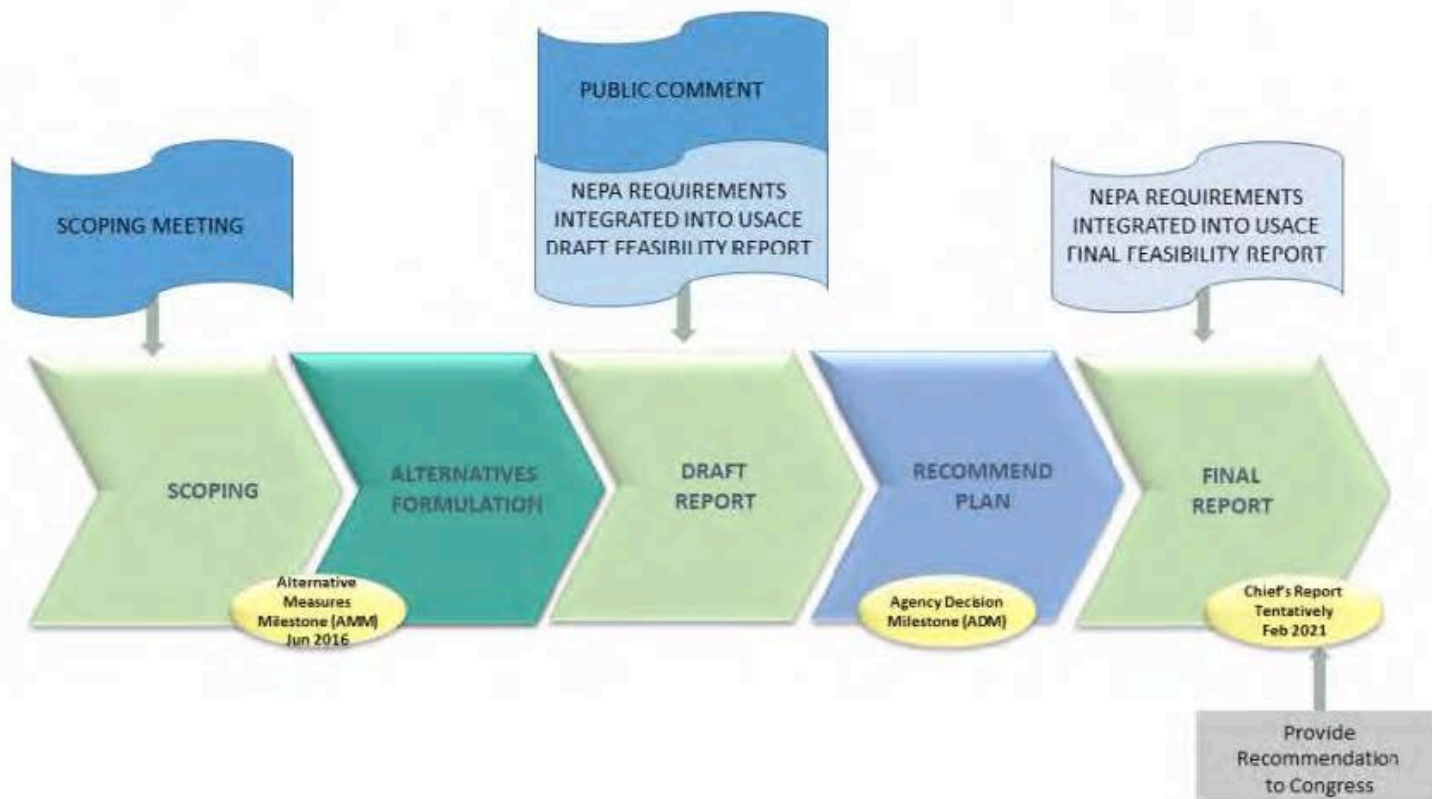


U.S. Army Corps of Engineers
*Coastal Texas Protection and Restoration
Feasibility Study*
(*Coastal Texas Study*) –

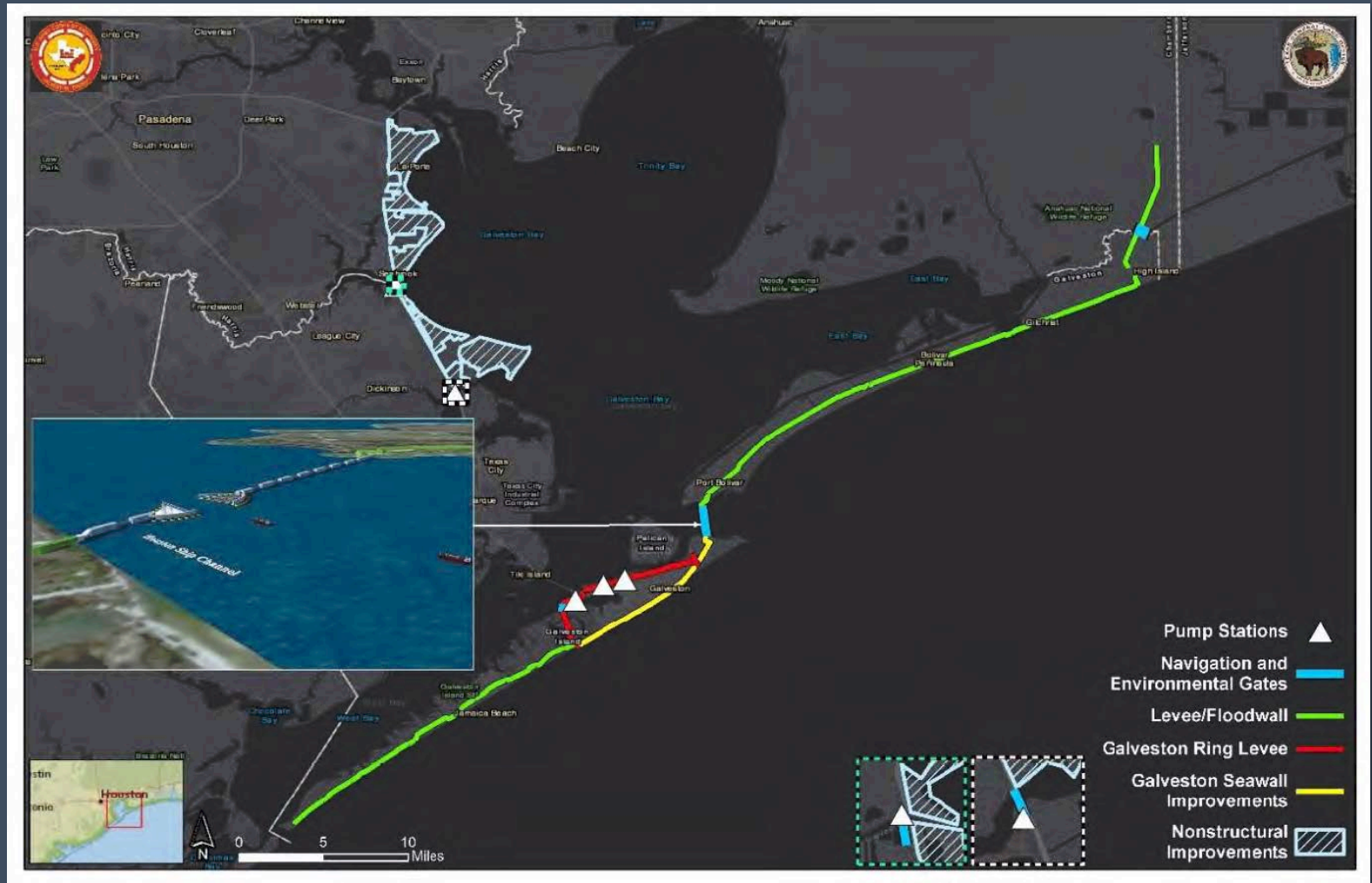
*Draft Integrated Feasibility Report and
Environmental Impact Statement*
(*DIFR-EIS*)

Timeline - Studies and Reports – to be completed by 2021

INTEGRATED FEASIBILITY AND NEPA REPORT

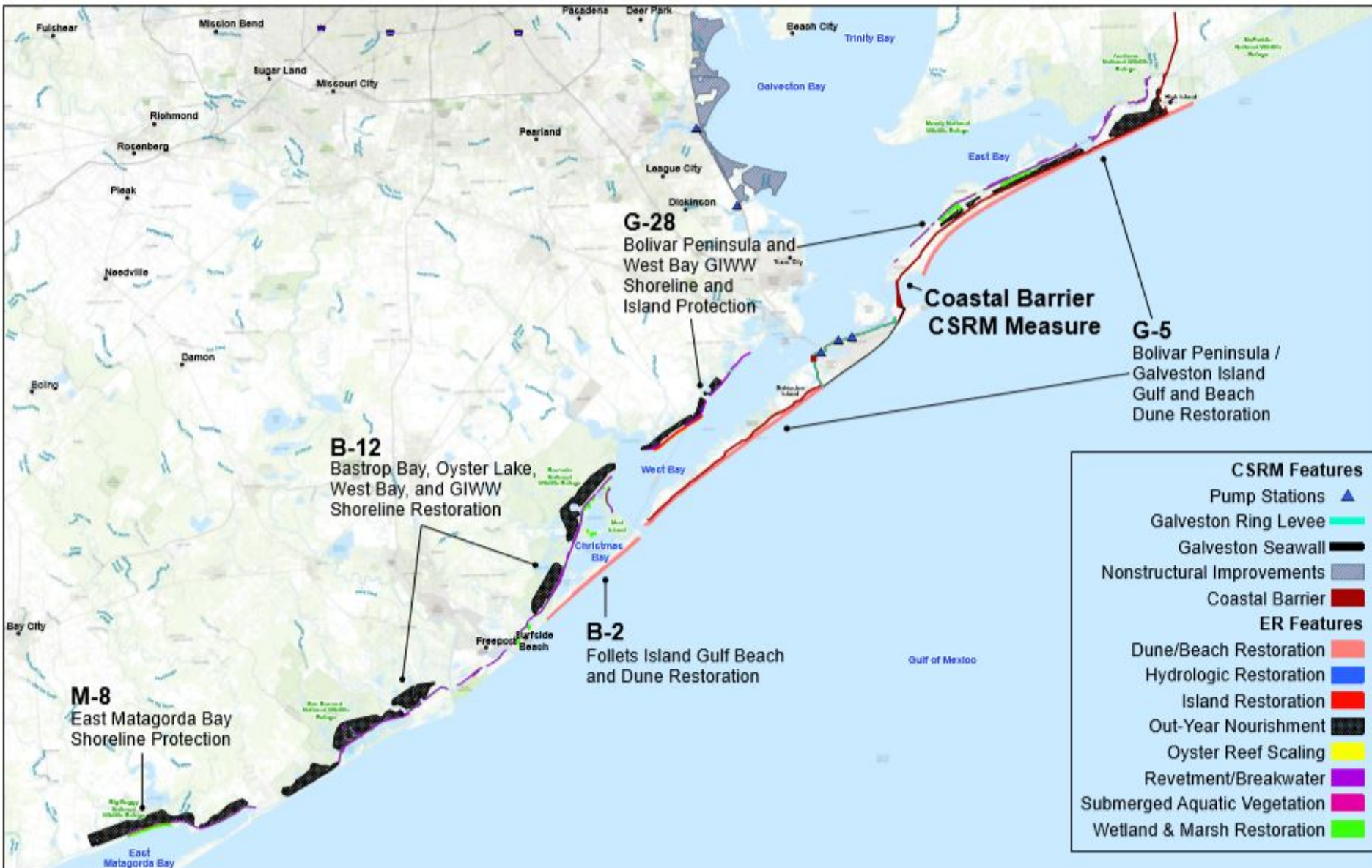


Coastal Storm Surge Barrier – previously known as Alternative A

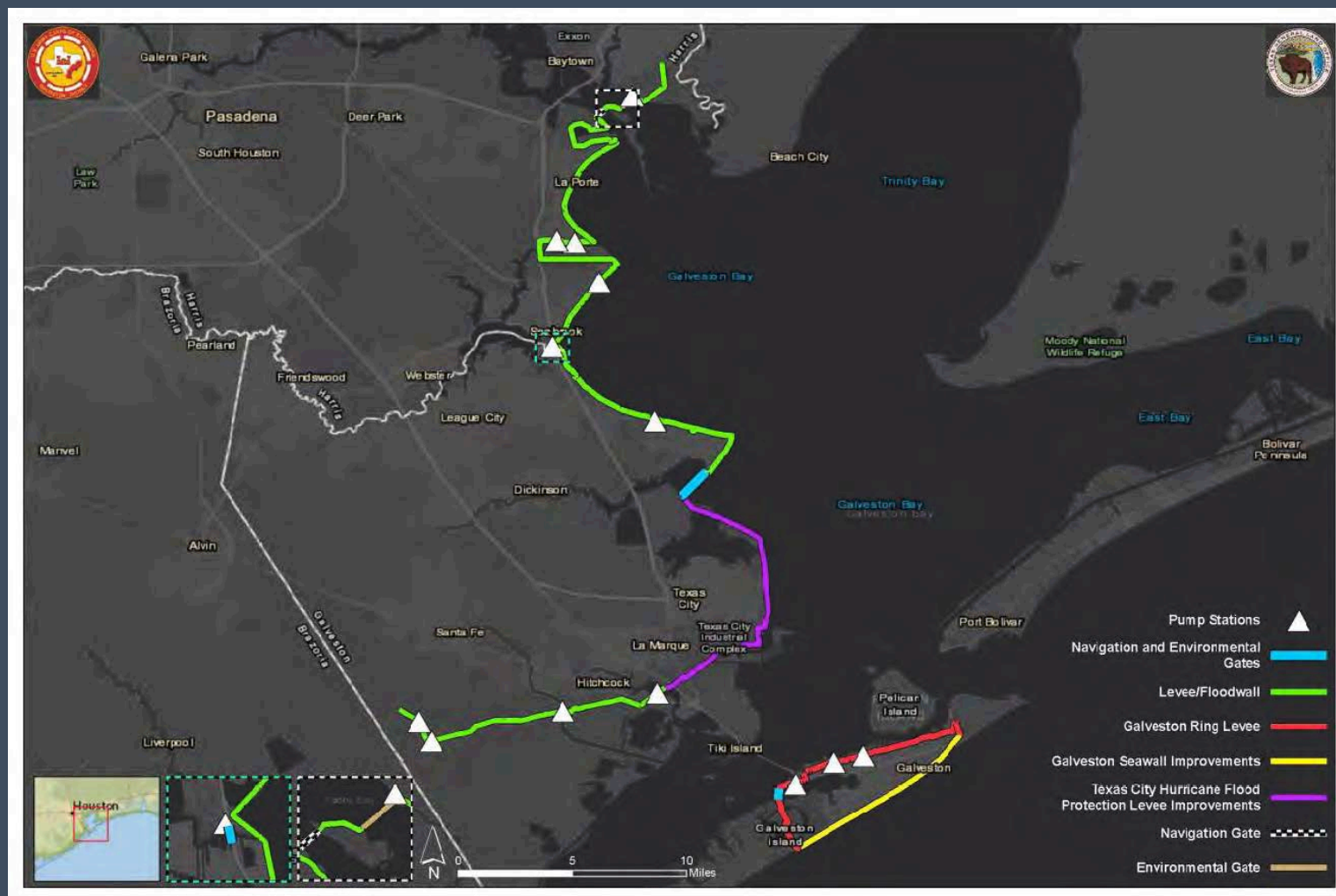


UPPER TEXAS COAST TENTATIVELY SELECTED PLAN

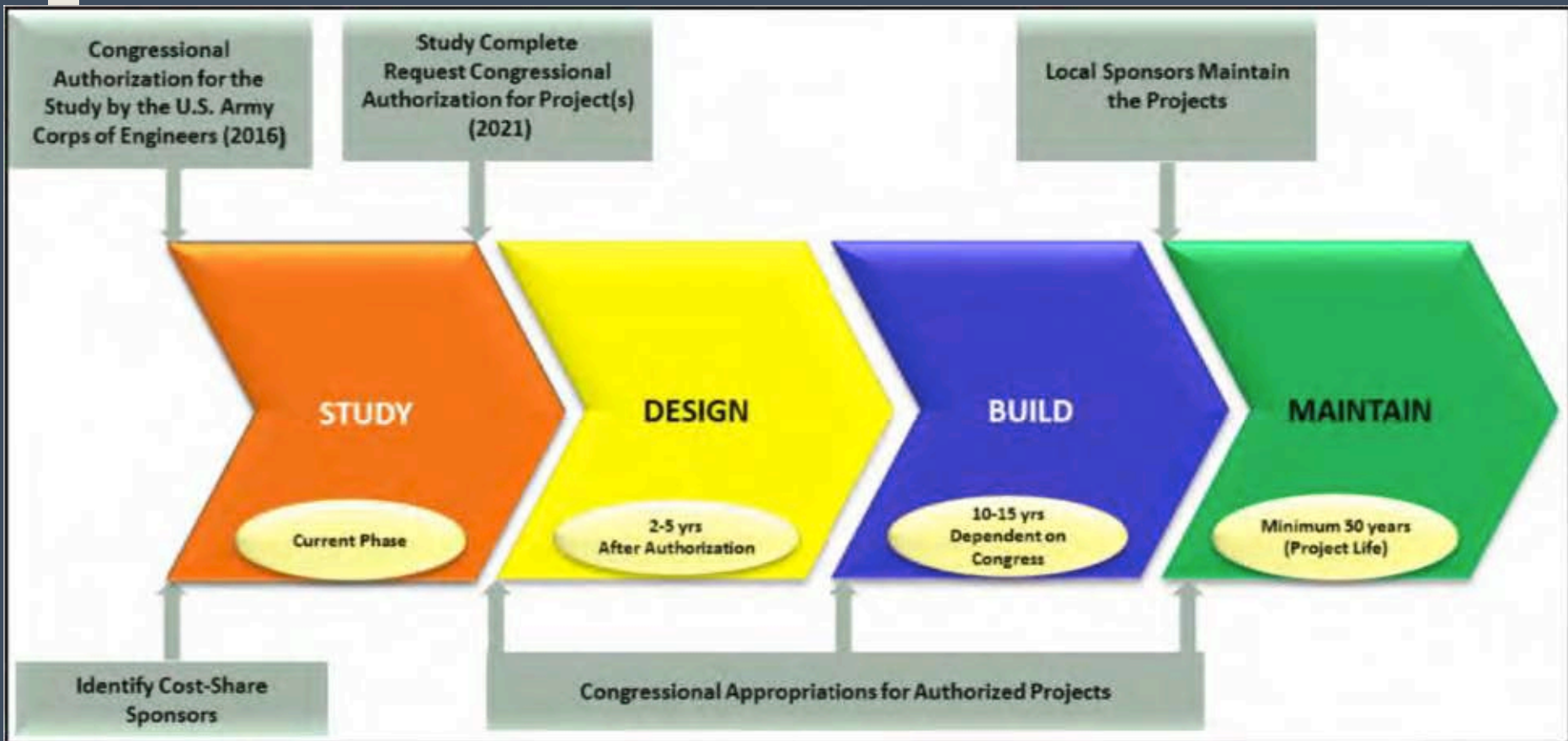
COASTAL TEXAS STUDY



Galveston Bay Rim Storm Surge Barrier – previously known as Alternative D2



Timeline Until Construction Complete (lower end estimate) - 2035



Resulting Human Impacts...



- Direct impacts to homes and businesses from construction
- Indirect impacts to homes and businesses - construction and post-construction
- Impacts to commercial and recreational fishing harvests
- Impacts to related industry and businesses – commercial fishermen, hospitality, bait and tackle retailers, guides
- Ecotourism industry – loss of birding habitat

Corps of Engineers – Coastal Texas Protection and Restoration Feasibility Study

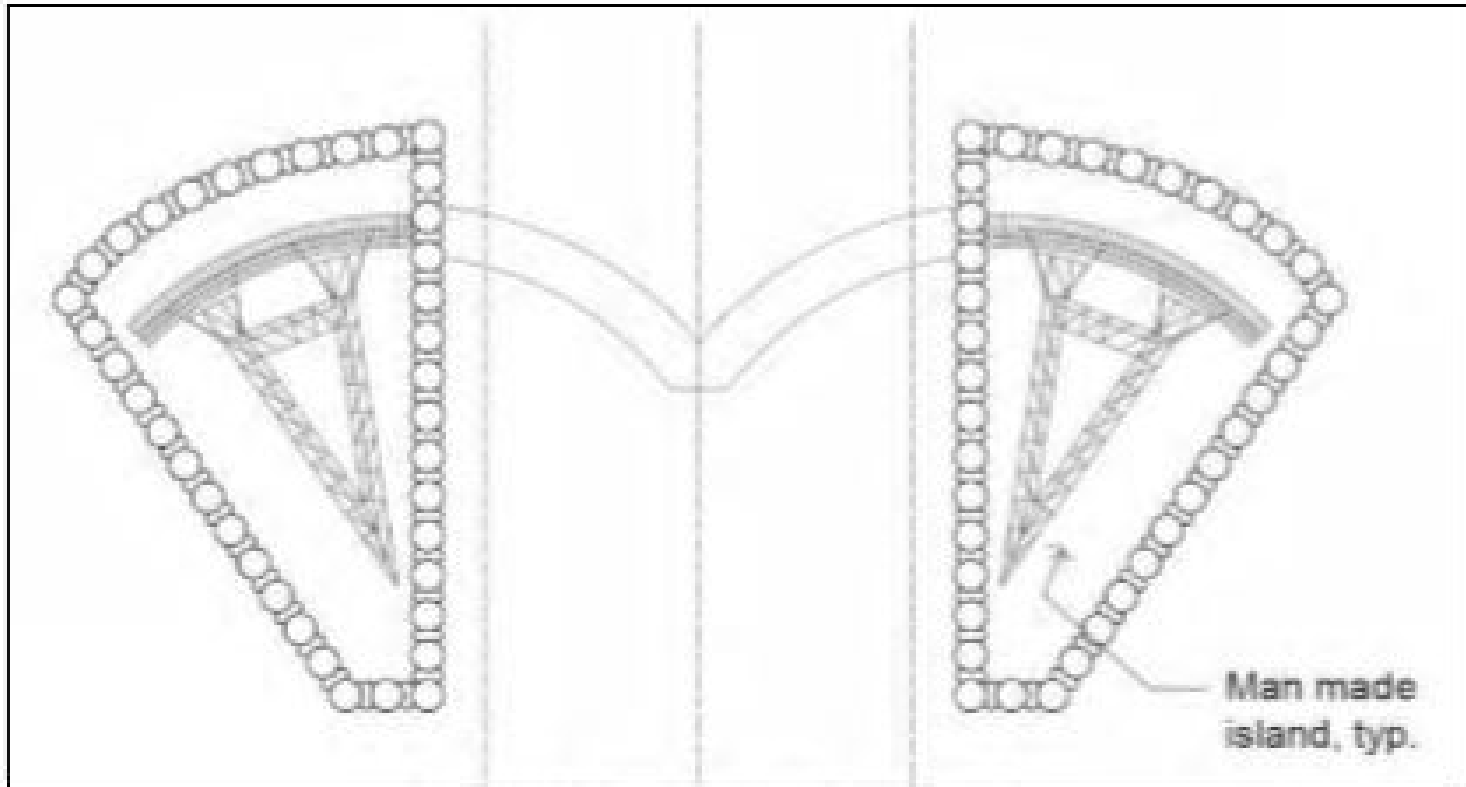


Figure 6-8: Surge Barrier Gate for Houston Ship Channel Structure

Corps of Engineers – Coastal Texas Protection and Restoration Feasibility Study

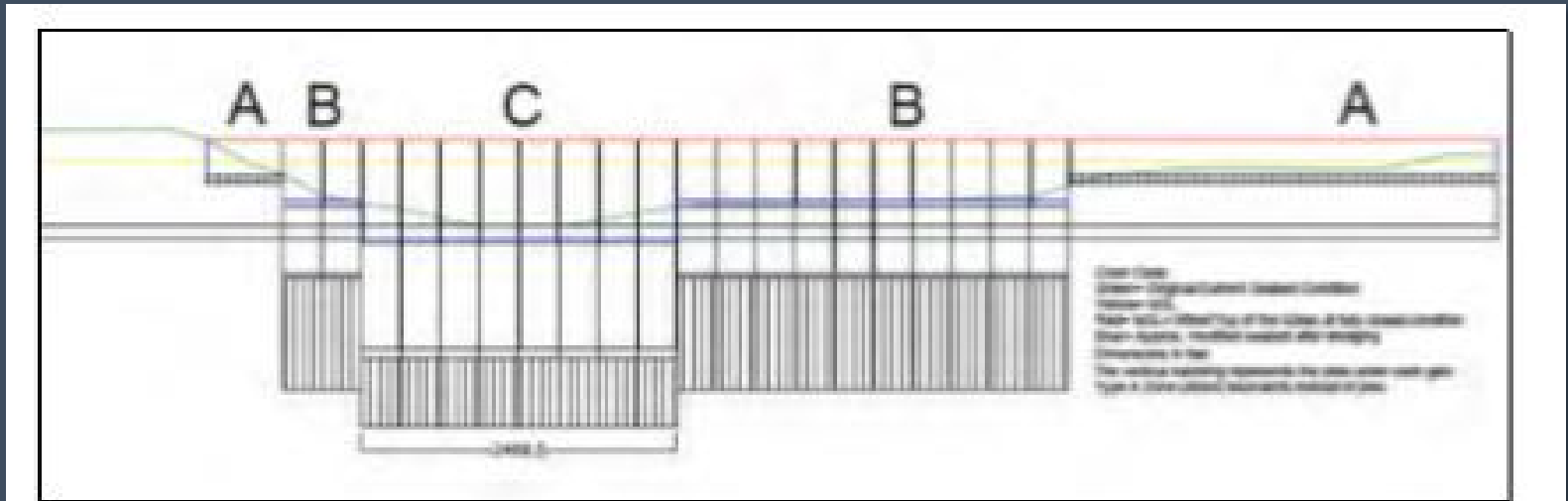


Figure 6-11: Cross Section of Galveston Bay Inlet with Surge Barrier Gates Fully Closed
(vertical dimension X10)

Study Updates — Preliminary Planning Evaluation

Alternative A –

- Provides risk reduction to greatest portion of the study area and largest number of structures and contents
- Mitigation cost estimate could be significant number due to environmental impacts: gate structure would have functional impacts to fishery access, salinity effects, and indirect erosion impacts to bay margins
- Environmental impacts highly depended on the gate design
- Redundant risk reduction components to enhance performance(Texas City)

Alternative B –

- High Risk in assumption of rebuilding or connecting to existing features such as Texas City Dike
- Potential for additional induced damages on Bolivar and Galveston
- Significant Navigation impacts (Traffic Counts, 36K to 360K)
- Reduced Environmental Impacts (Limited Impacts to Fish Habitat in W. Galveston Bay)

A and B provide additional risk reduction during exceedance events due to storage capacity in bay

Alternatives also limit risk with compounding events: Harvey Rainfall with Ike Surge



US Army Corps
of Engineers



Study Updates — Preliminary Planning Evaluation

On-going evaluations:

- Fishery Access Impacts

- Gates may impede aquatic organism movement
 - Reduction in tidal prism due to constriction created by support structures
 - Higher velocities through structures
 - Creation of eddies or other trapping mechanisms
- On-going consultations with key Interagency members to document and mitigate impacts (Design Changes)
- Reviewing fisheries friendly design and operation considerations - Developed by NMFS
- Fish Larval Transport Model can be coupled with 3-D AdH model to evaluate impacts of navigation/environmental gates on fish larval transport

- Marine Mammal Impacts - Bottlenose Dolphins

- Largest concern is noise during construction
- Possible placement of noise reduction devices
i.e. bubble curtains, silt fence to keep them out of restricted areas
- Dolphins resilient to stationary structures and will adapt to go through and under something in time



US Army Corps
of Engineers



Impacts Seen in The Netherlands – Eastern Scheldt (De Ronde, 1990)

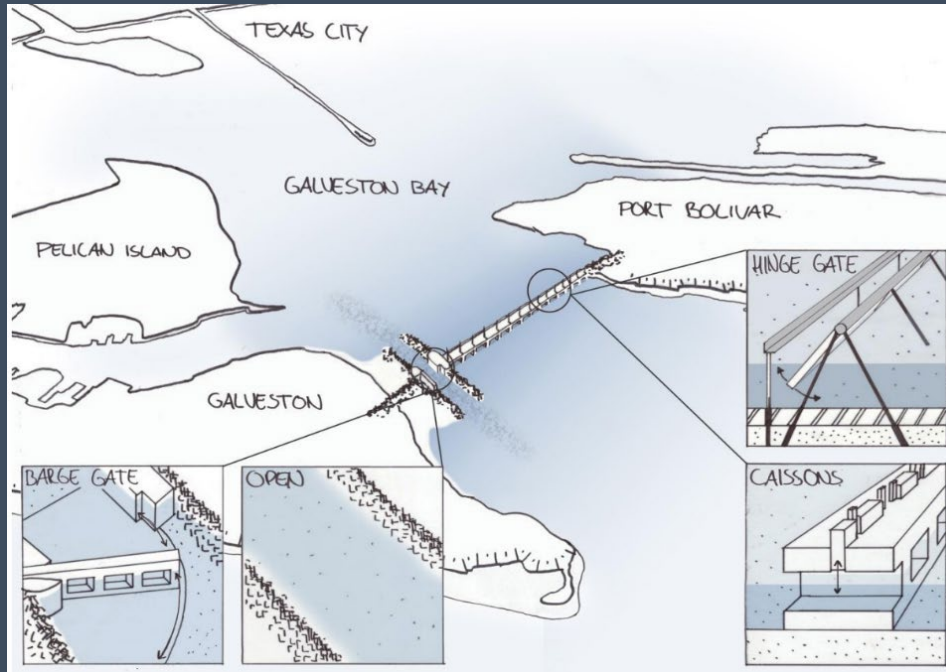


- Tidal range (difference between high and low tide) decreased by 15-20%
- Tidal prism (volume) decreased by 30%
- Intertidal area decreased by 30%
- Salt marsh area decreased by 60%
- Loss of intertidal and salt marsh destroyed large feeding area for birds



Potential Impacts in Galveston Bay from Ike Dike

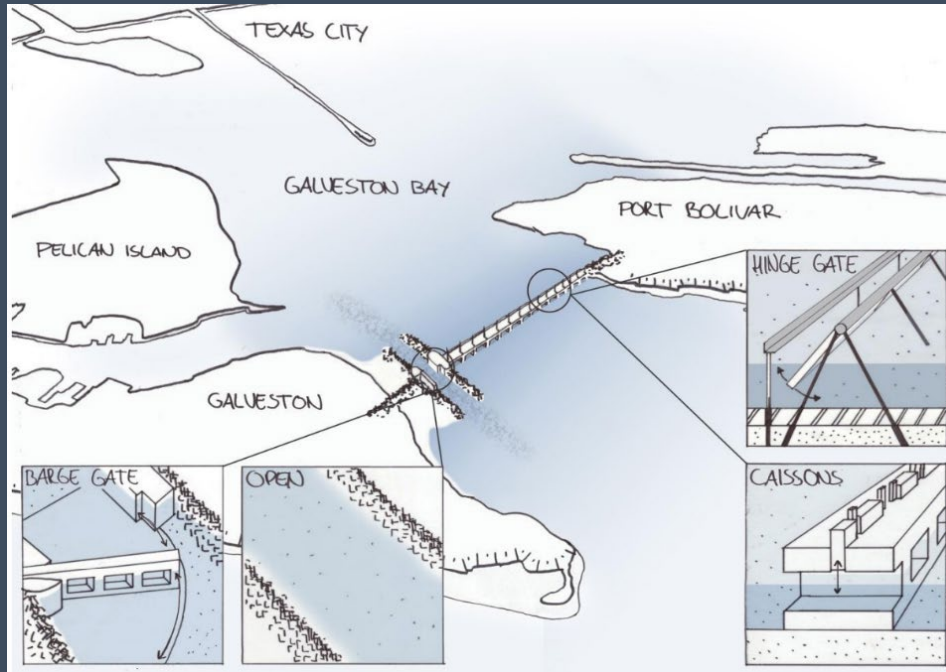
(M. Ruijs, 2011 Master's Thesis – 2D Modeling)



- Reduction in flow area of Bolivar Roads
- Reduction in tidal prism (volume)
- Increased speeds in Bolivar Roads resulting in scour
- Decreased speeds inside the Bay resulting in sedimentation of channels

Potential Impacts in Galveston Bay from Ike Dike

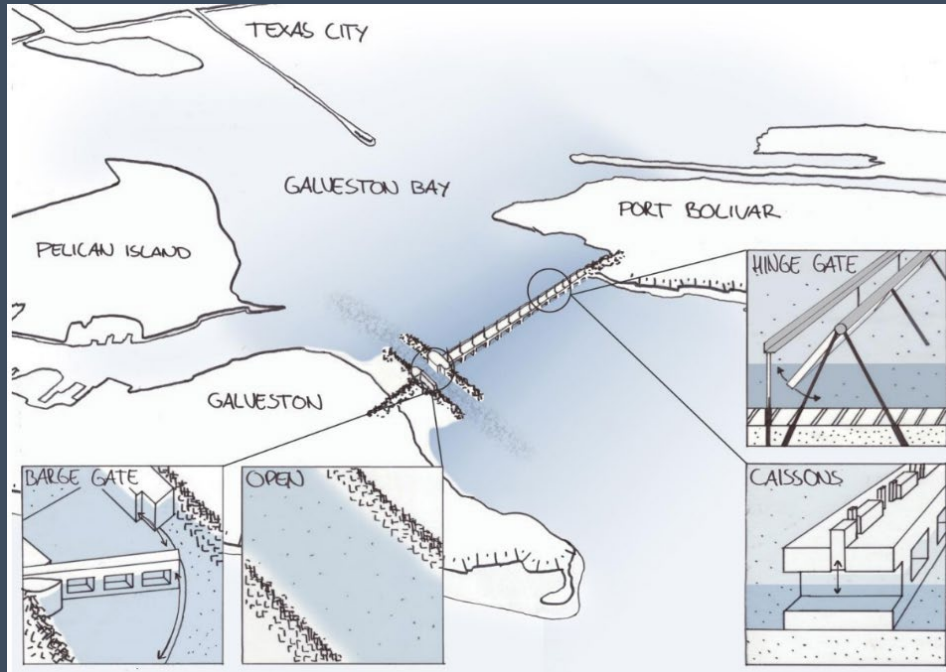
(M. Ruijs, 2011 Master's Thesis – 2D Modeling)



- More of the ebb flow is directed to HSC
- More of the flood flow is directed to sides of Bay
- Blocking of sediment by barriers and redistribution of sediment due to decrease in tidal prism could exacerbate the sediment deficit problem in the Bay

Potential Impacts in Galveston Bay from Ike Dike

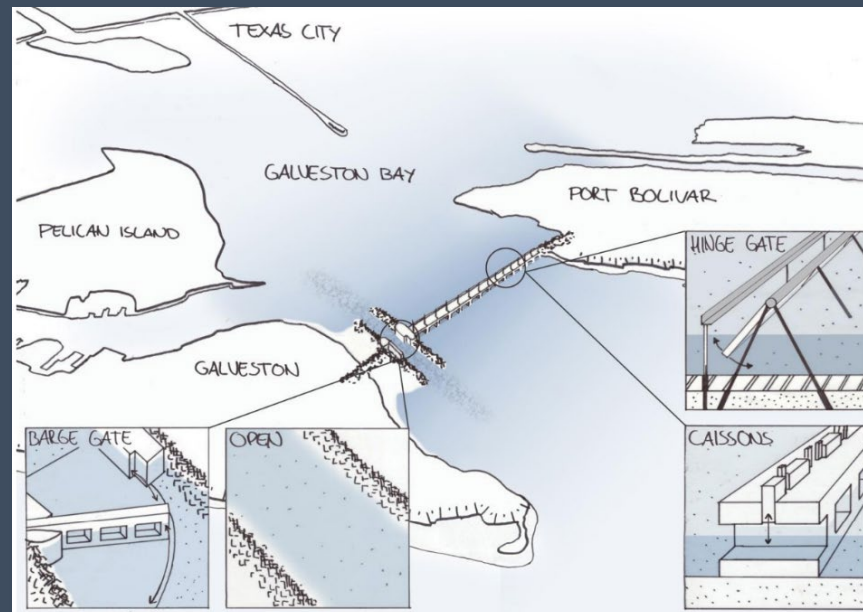
(M. Ruijs, 2011 Master's Thesis – 2D Modeling)



- Residence time of water in the Bay will increase – decreased salinity, increase in concentration of contaminants
- Changes to habitats – tidal flats and marshes MAY decrease – needs more investigation

Ruijs' Recommendation

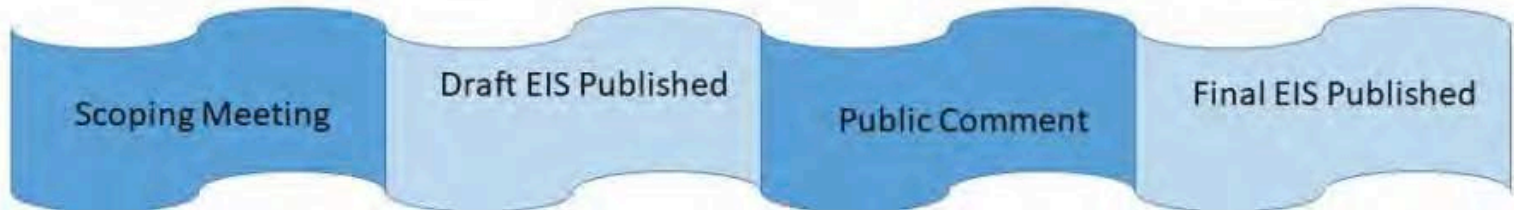
“The effects of the changing hydrodynamics, water quality and morphology on the ecology should further be investigated by an ecologist. It should be investigated what the effects are on the habitats and its flora and fauna.”



Study and Understand Environmental Impacts

- Ensure that we fully evaluate impacts to make an informed decision
- Fiscally responsible to understand those impacts ahead of time
- Consistently heard that we would learn lessons from the Dutch
- Mitigate impacts where necessary

NEPA PROCESS



- Agencies and Public notified of proposed action
- Scope of Study identified
- Information sharing

- No Action Alternative and Alternatives described
- Potential impacts of alternatives disclosed
- Notice of availability

- Notice of availability
- Formal public comment period
- Public meetings in study area

- *Comments available for review*
- Lead agency record of decision issued

Requirements of an EIS – Environmental Consequences:

§1502.16 Environmental consequences.

This section forms the scientific and analytic basis for the comparisons under §1502.14. It shall consolidate the discussions of those elements required by sections 102(2)(C)(i), (ii), (iv), and (v) of NEPA which are within the scope of the statement and as much of section 102(2)(C)(iii) as is necessary to support the comparisons. The discussion will include the environmental impacts of the alternatives including the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented. This section should not duplicate discussions in §1502.14. It shall include discussions of:

- (a) Direct effects and their significance (§1508.8).
- (b) Indirect effects and their significance (§1508.8).
- (c) Possible conflicts between the proposed action and the objectives of Federal, regional, State, and local (and in the case of a reservation, Indian tribe) land use plans, policies and controls for the area concerned. (See §1506.2(d).)
- (d) The environmental effects of alternatives including the proposed action. The comparisons under §1502.14 will be based on this discussion.
- (e) Energy requirements and conservation potential of various alternatives and mitigation measures.
- (f) Natural or depletable resource requirements and conservation potential of various alternatives and mitigation measures.
- (g) Urban quality, historic and cultural resources, and the design of the built environment, including the reuse and conservation potential of various alternatives and mitigation measures.
- (h) Means to mitigate adverse environmental impacts (if not fully covered under §1502.14(f)).

[43 FR 55994, Nov. 29, 1978; 44 FR 873, Jan. 3, 1979]



Corps public meetings

Upper Coast

Tuesday, 11-Dec | 5:30pm - 9:00pm | Winnie

Winnie Community Building

335 South Park Street

Winnie, TX 77665

Wednesday, 12-Dec | 5:30pm - 9:00pm | Galveston

Galveston Island Convention Center

5600 Seawall Blvd

Galveston, TX 77551

Saturday, 15-Dec | 1:00pm - 4:30pm | Crystal Beach

Crenshaw Elementary and Middle School

416 State Hwy 87

Crystal Beach, TX 77650

Tuesday, 18-Dec | 5:30pm - 9:00pm | Seabrook

Bay Area Community Center

5002 E NASA Parkway

Seabrook, TX 77586





For more information on the
*Coastal Texas Protection and
Restoration Feasibility Study:*

Corps and TGLO page:
coastalstudy.texas.gov



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www.galvbay.org

