

Port Alto, Calhoun County, Matagorda Bay, Texas



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Presentation Outline

An aerial photograph of a coastal area. On the left, a large body of water (likely a bay or inlet) is visible. A narrow, sandy strip of land runs vertically from the water towards the center. To the right of this strip, there is a residential area with several houses, a road, and a white water tower. Further to the right, there is a larger area with more houses and a large open field. The background shows a vast, flat landscape with sparse vegetation and a few more buildings.

- Background
- Objectives
- Approach
- Design
- Construction

Project Location – Carancahua Bay Calhoun County, Texas



Project Background

Funding Source and Project Partners

- This project was funded by the **U.S. Department of Interior** through a **U.S. Fish and Wildlife Service** grant known as the *Coastal Impact Assistance Program* (CIAP)
- The local project sponsor is Calhoun County
- Project engineering & construction oversight was provided by Atkins
- Project Constructed by Lester Contracting, Inc
 - Construction began in July 2013 and completed in October 2013



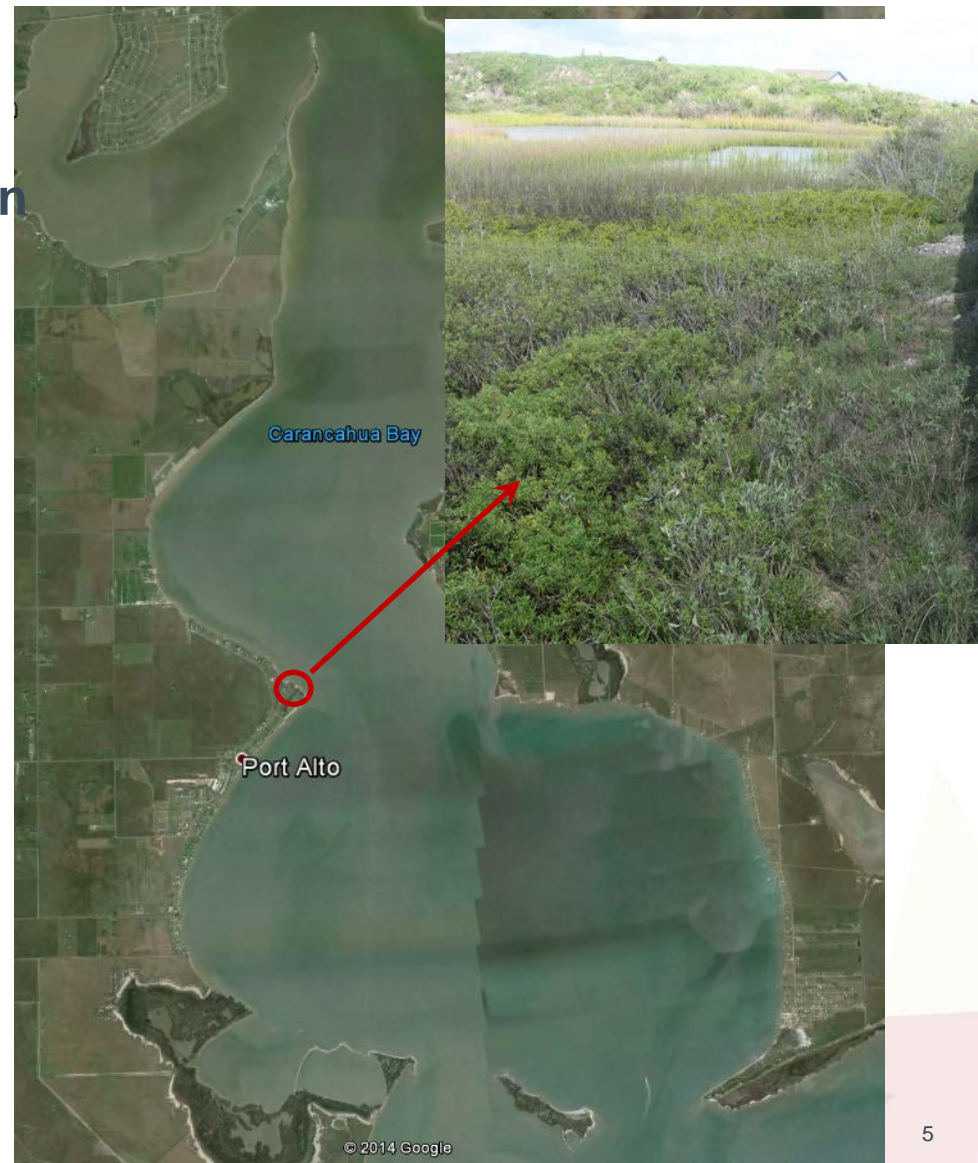
Project Background

Typical Coastal Wetland - Vegetation

- *Spartina alterniflora*
- *Batis maritima*
- *Boricchia frutescens*
- *Distichlis spicata*
- *Salicornia* spp

Typical Coastal Wetland - Animals

- Wading birds
- Shrimp
- Crabs
- Fish



Project Objectives

Design Considerations

- Stabilize 1,750 linear feet of shoreline.
- Protect a minimum of 10.5 acres of tidal coastal marsh.
- Restore and enhance the habitats of the coastal environment.
- Improve public access.

Additional Considerations

- Enhance recreational benefits such as hard substrate for enhanced fishing and a swimming beach
- Maintain a living shoreline
- Create a sustainable solution
- Craft a desirable destination



Project Approach

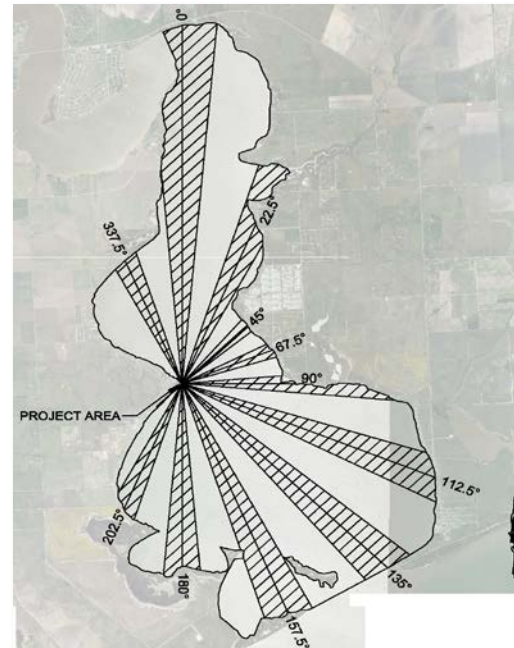
Design Conditions

- The dominating factors considered affecting wave generation are:
 - 1) design wind speed,
 - 2) wind direction,
 - 3) wind fetch,
 - 4) wind duration and
 - 5) water depth.

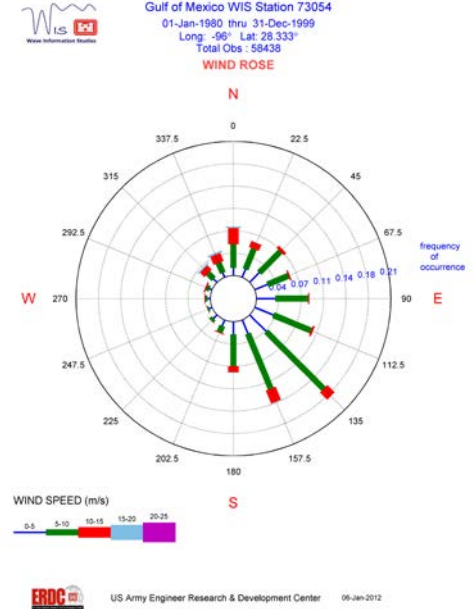
Breaking criteria		0.780
Item	Value	Units
El of Observed Wind (Zobs)	33.00	feet
Observed Wind Speed (Uobs)	20.00	mps
Air Sea Temp. Diff. (dT)	0.00	deg F
Dur of Observed Wind (DurO)	2.00	min
Dur of Final Wind (DurF)	1.00	hours
Lat. of Observation (LAT)	28.33	deg
Results		
Wind Fetch Length (F)	3.21	MILES
Wind Direction (WDIR)	0.00	deg
Eq Neutral Wind Speed (Ue)	15.39	mps
Adjusted Wind Speed (Ua)	20.55	mps
Mean Wave Direction (THETA)	360.00	deg
Wave Height (Hmo)	2.32	feet
Wave Period (Tp)	2.96	sec

Wave Growth: Deep

Wind Obs Type	Wind Fetch Options	
Over water	Deep restricted	
Restricted Fetch Geometry		
#	Fetch Angle (deg)	Fetch Length (miles)
1	355.00	2.94
2	0.00	4.90
3	5.00	4.95



Fetch Radials Relative to Port Alto

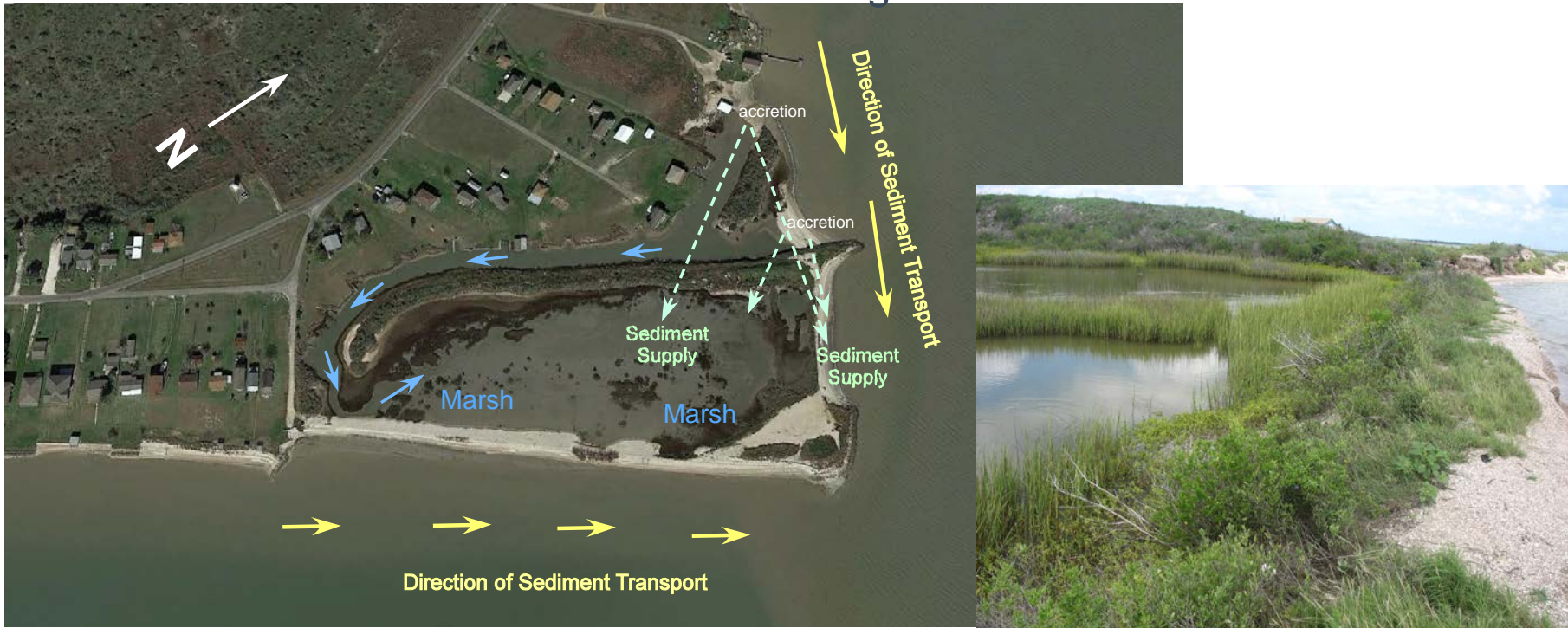


WIS Station 73054 Wind Rose (m/s)

Project Approach

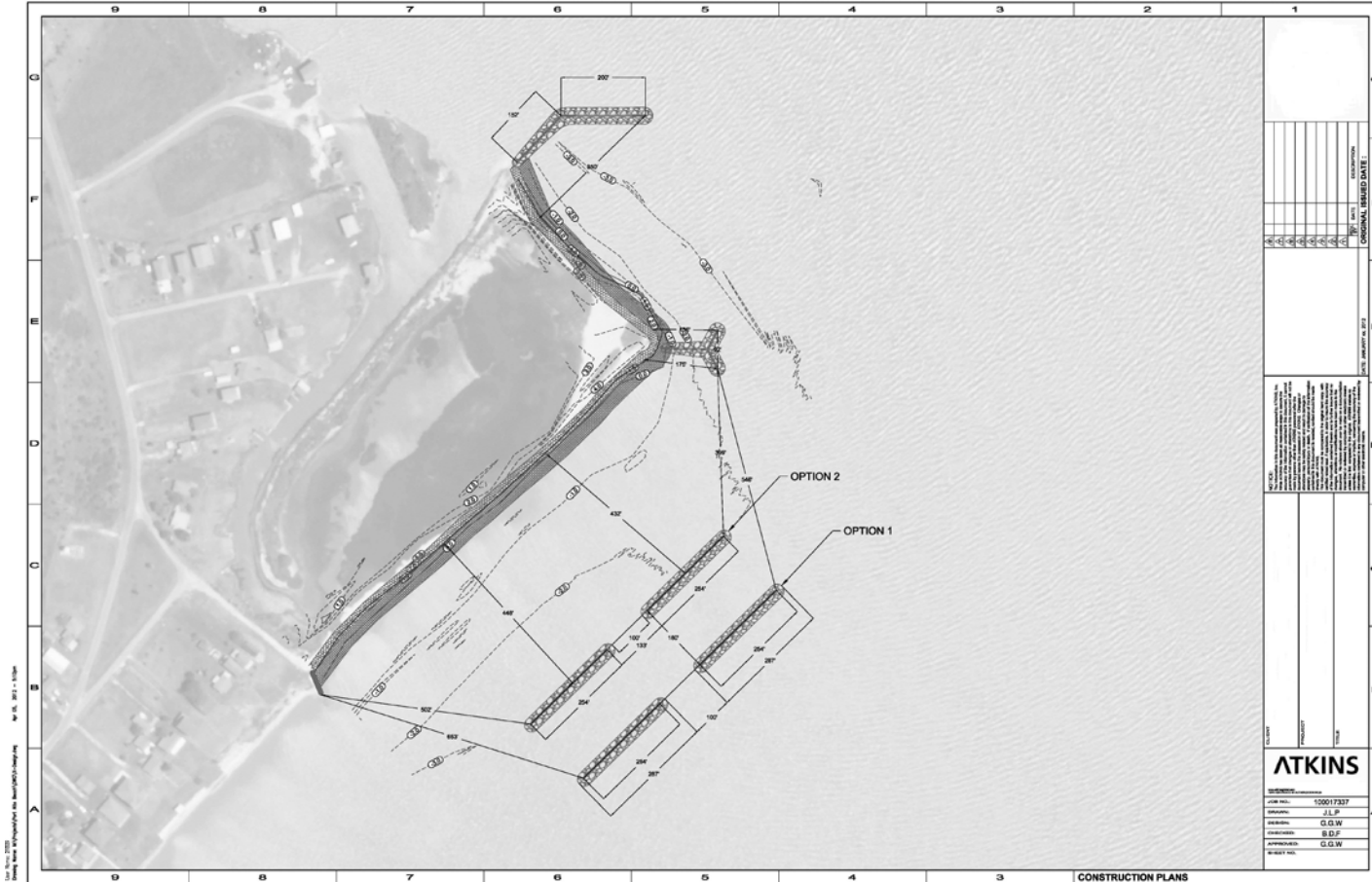
Design Conditions

- Sediment transport processes well identified
- Excess of sediment on the bay inlets + Needed sediment on the marshes and beaches = Local Sediment Management Plan



Project Approach

Proposed Restoration Project

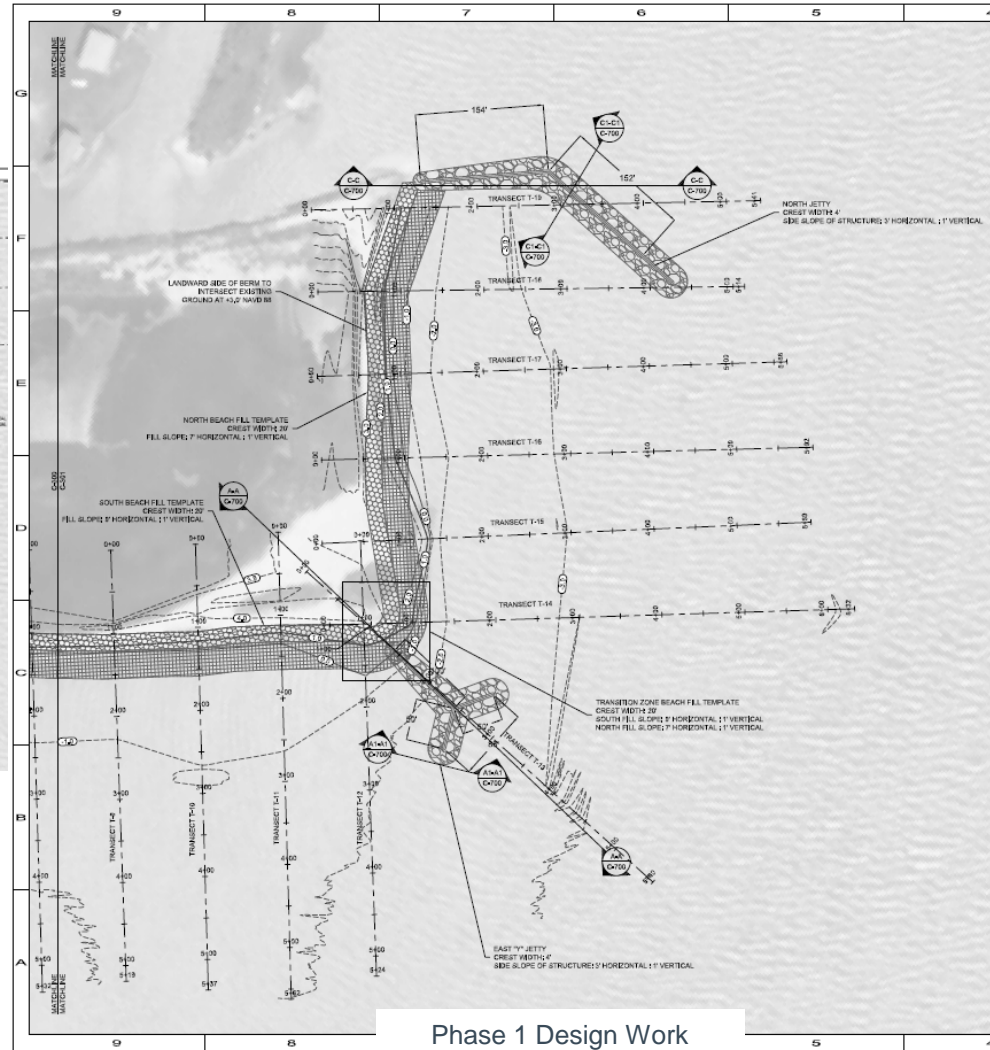


Project Approach

Project Design Elements



Phase 2 Design Work



Phase 1 Design Work

Project Design

Design Criteria

- South Groin*
 - 75 ft length
 - Designed at 4.5 ft wide, built at ~12 ft wide crest
 - +4.5 ft NAVD crest elevation
- Southern Beach
 - 1200 ft length
 - 20 ft design dry beach width
 - +2.0 NAVD berm elevation, 1:7 to natural grade
- Y-Groin
 - 155 ft length
 - Designed at 4.5 ft wide, built at ~12 ft wide crest
 - +4.5 ft NAVD crest elevation
- North Groin
 - 163 ft length
 - 12 ft wide crest
 - +4.5 ft NAVD crest elevation
- North Beach *
 - 550 ft length
 - 15 ft dry beach width
 - +2.0 ft NAVD
- Adaptive Management
 - Armor stone volume discount
 - County provides material disposal
 - County responsible for road damage.
 - Removal of North Beach
 - Removal of Southern groin
 - Shorten North jetty from 264' to 115'

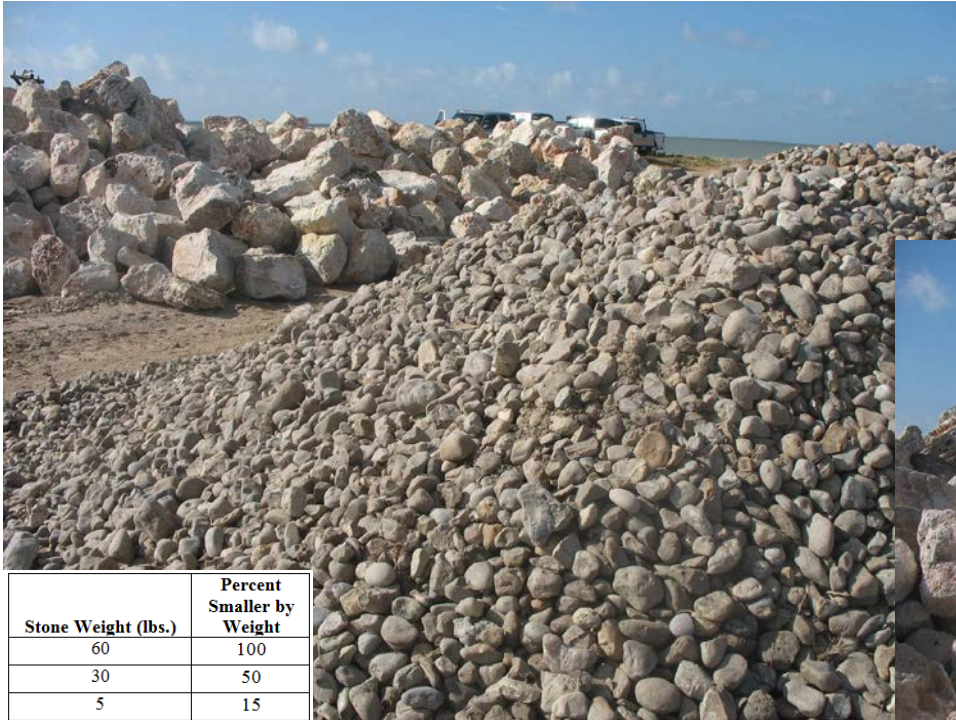
Construction

Staging Areas



Construction

Staging Material



Stone Weight (lbs.)	Percent Smaller by Weight
60	100
30	50
5	15



Stone Weight (lbs.)	Percent Smaller by Weight
850	100
565	50
300	15

Construction

Construction Issues



Geotextile Fabric Placement

Equipment Access



Construction

Construction Issues



Equipment Access – Wood Pallet Road Along South Beach

Construction

Construction Issues – North Groin Access



Before construction, North Beach



During Construction, North Beach

Construction

Before and After Conditions – South Groin



Construction

Before and After Conditions – South Beach



Construction

Before and After Conditions – “Y”-Groin



Construction

Before and After Conditions – North Beach



Construction

Before and After Conditions – North Groin



Next Phase

Channel Dredging & Beach Nourishment



4 months post-construction, North Beach

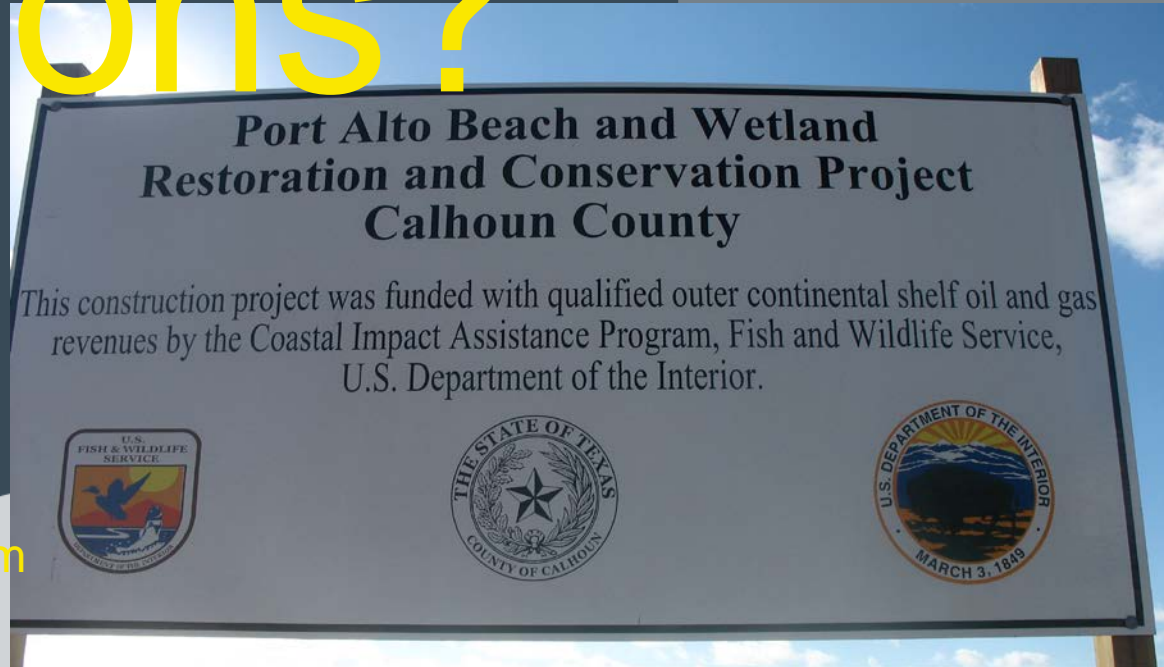


Pre-construction aerial

ATKINS

Port Alto Beach and Wetland Restoration Conservation Project

Questions?



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