

# Dredging of the Historical Cedar Bayou Tidal Inlet on the Texas Gulf Coast

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**Patrick McLaughlin, E.I.T.**

**Aaron Horine, PE**

**Josh Carter, PE**

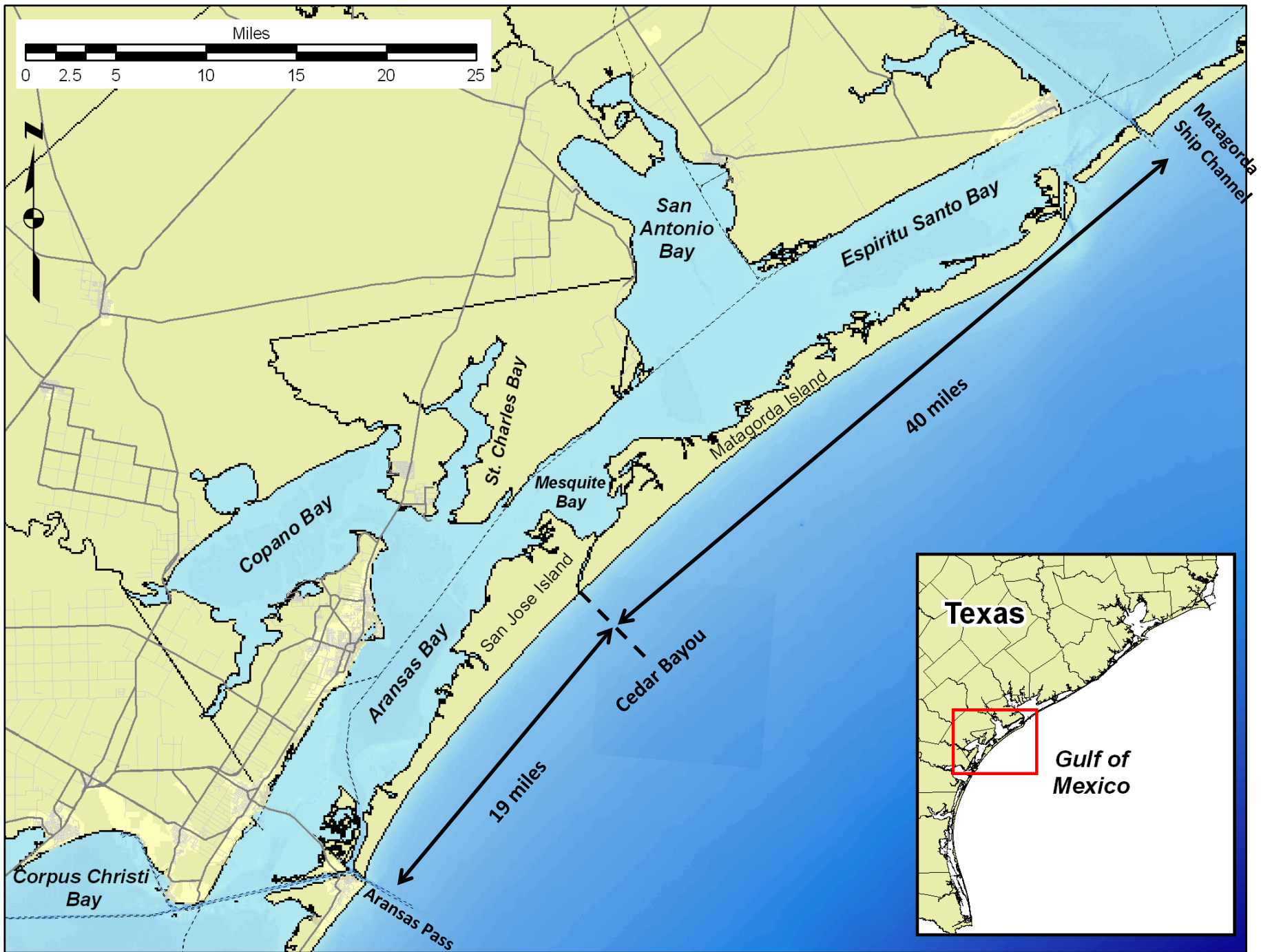
**Matthew Campbell, PE**

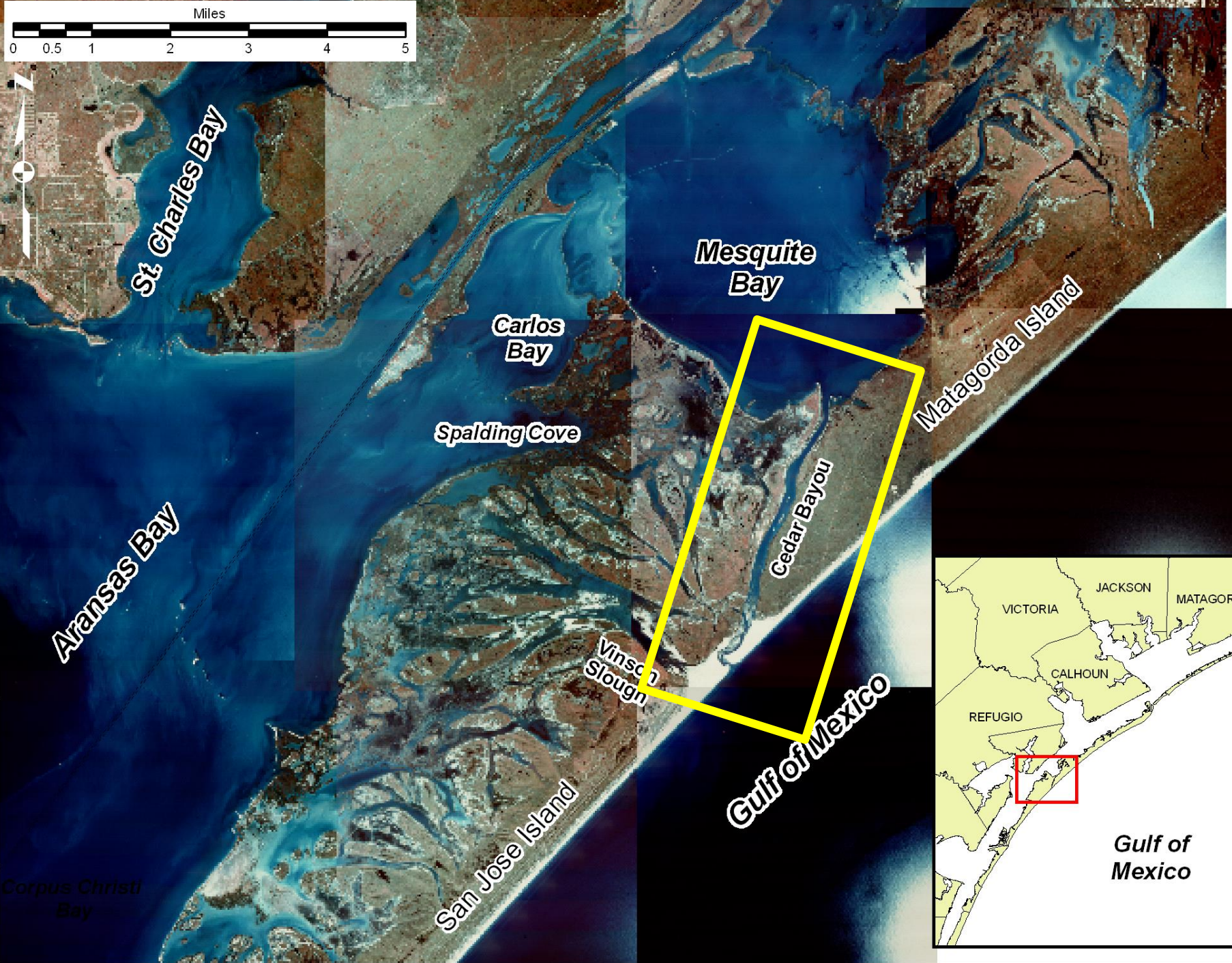


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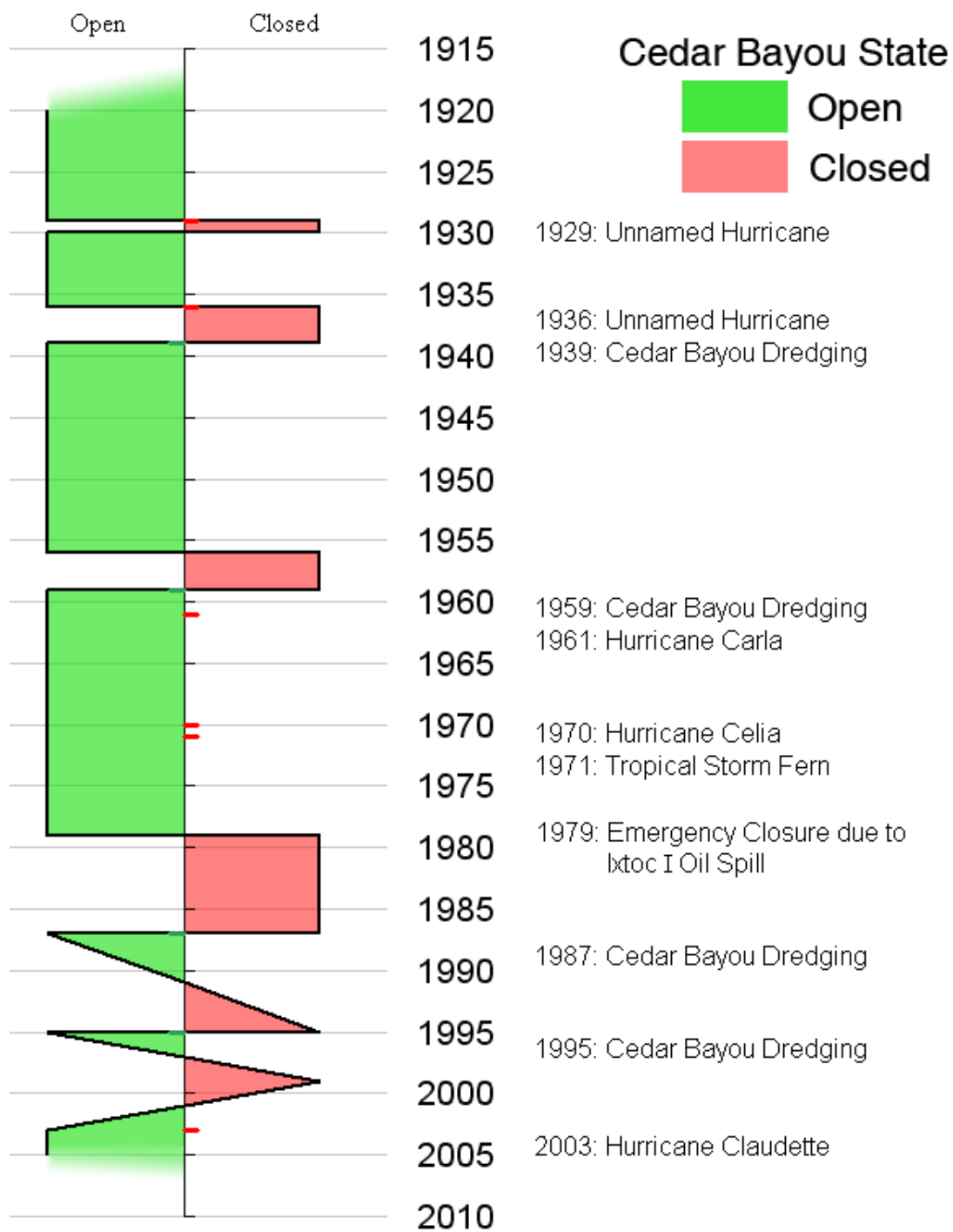
Gulf of Mexico



# Analysis/Design Procedure

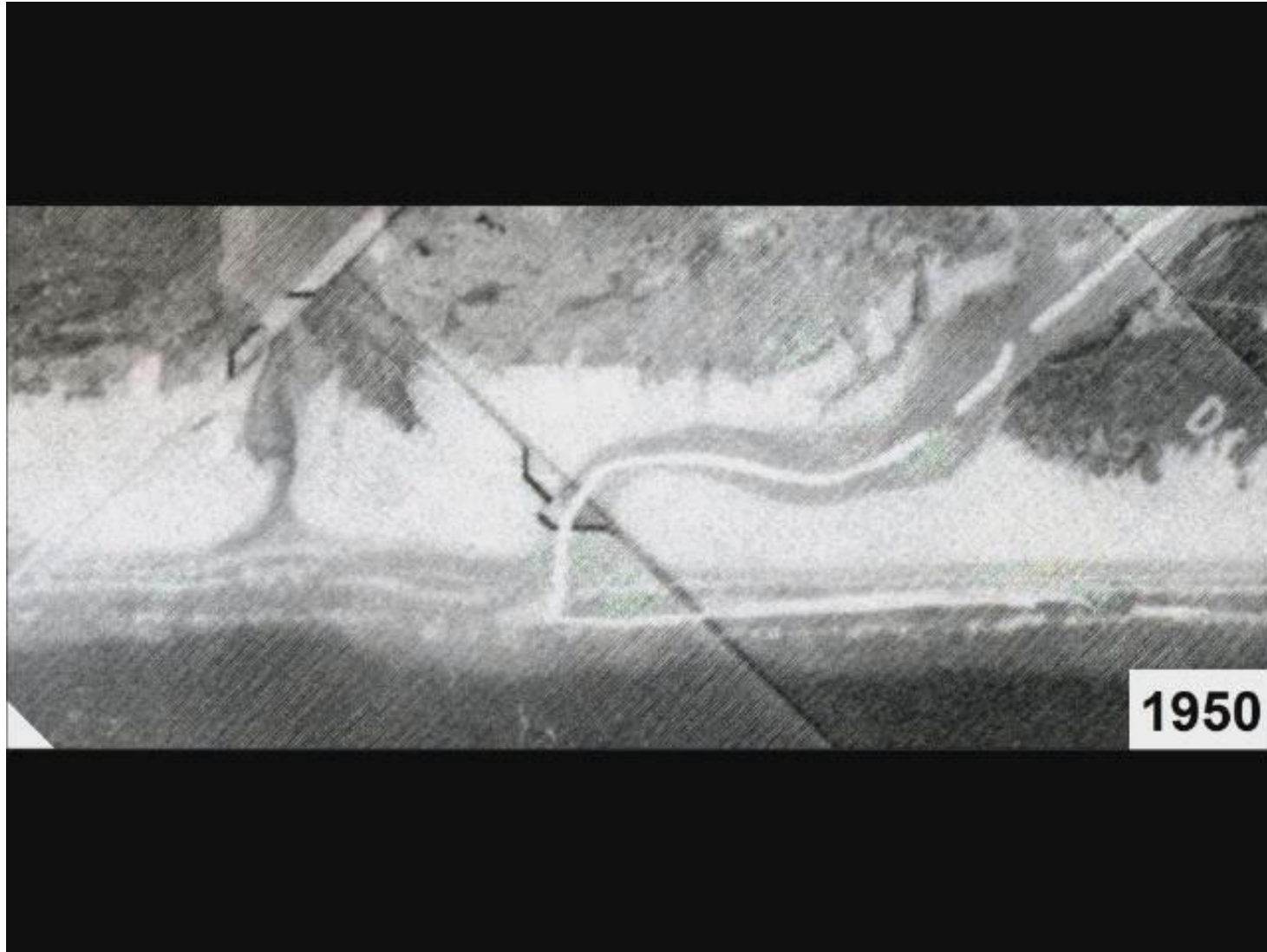
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- Where to dredge?
  - History of inlet
  - Direction of inlet migration



# Historical Morphology

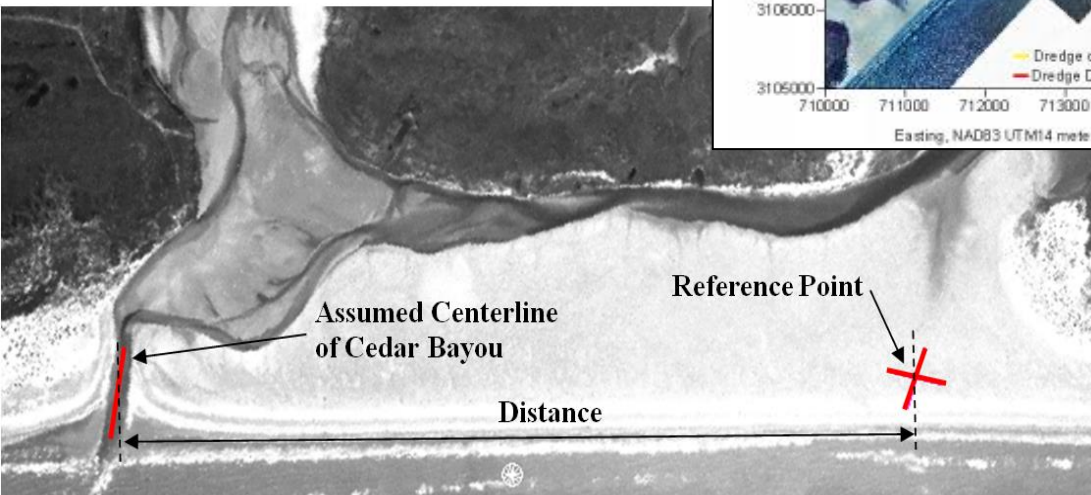
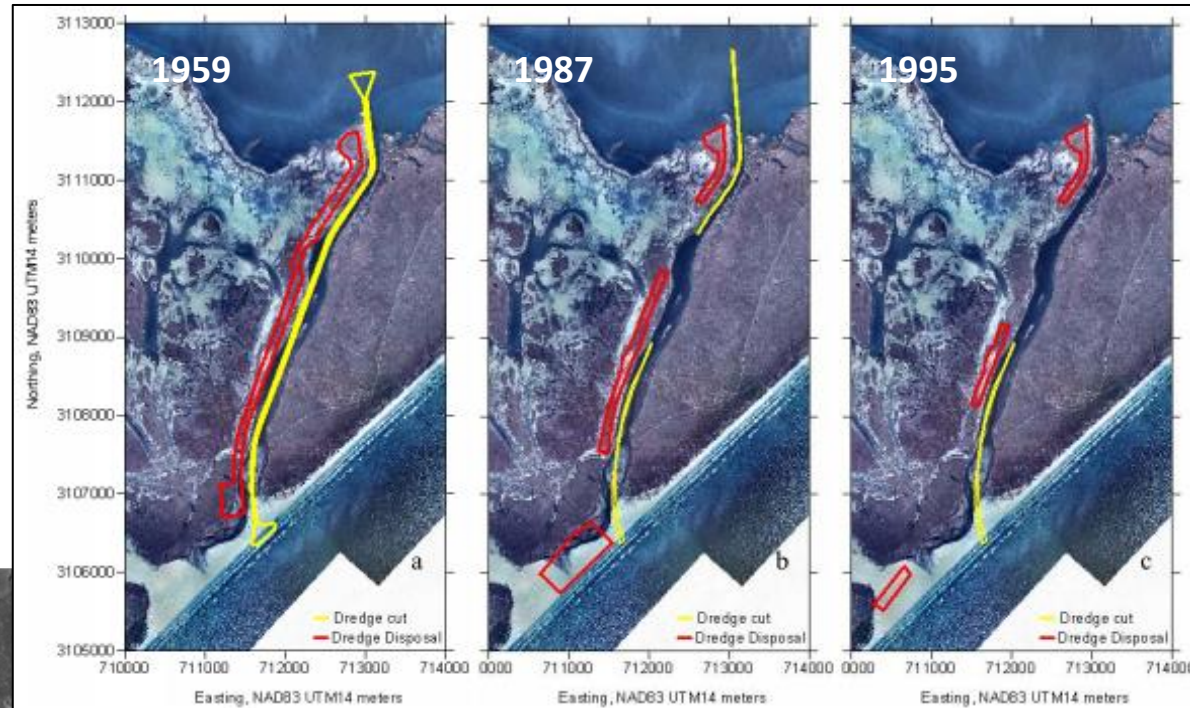
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# Analysis/Design Procedure

## Lessons Learned

- Dredged material disposal.
- Only Cedar Bayou dredged.



# Analysis/Design Procedure

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- Where to dredge?
- Dredged channel configuration and dimensions?
  - Opening and closing forces
  - Flow Rates





# Driving Forces for Design

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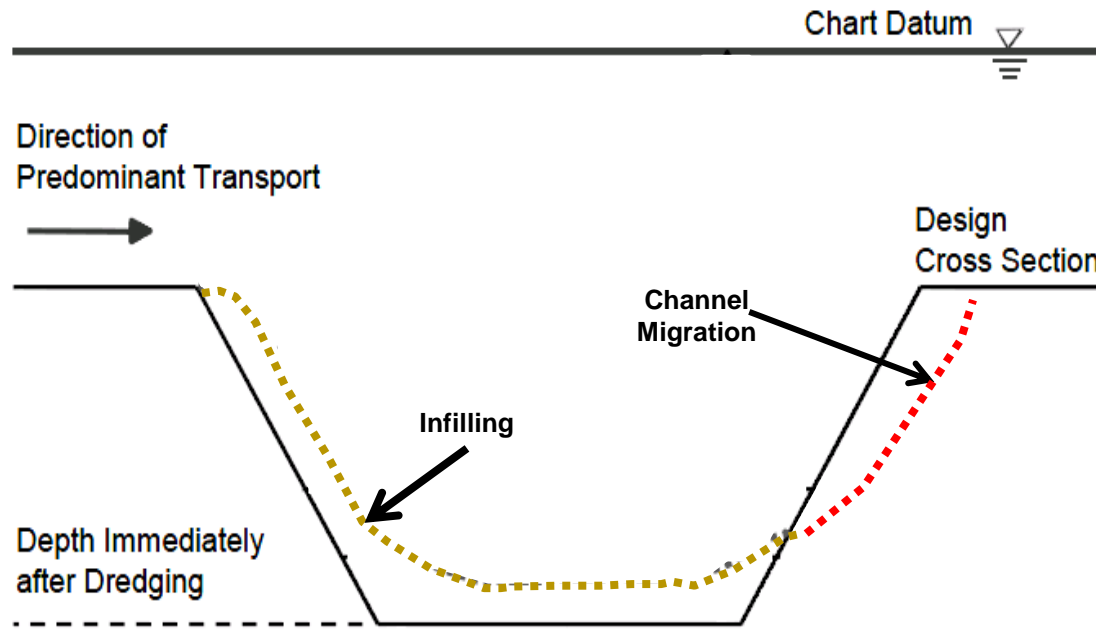
## Opening Forces:

1. Flow through the Pass 
2. Connection to Vinson Slough 
3. Northern winds
4. River inflow into the bay system

## Closing Forces:

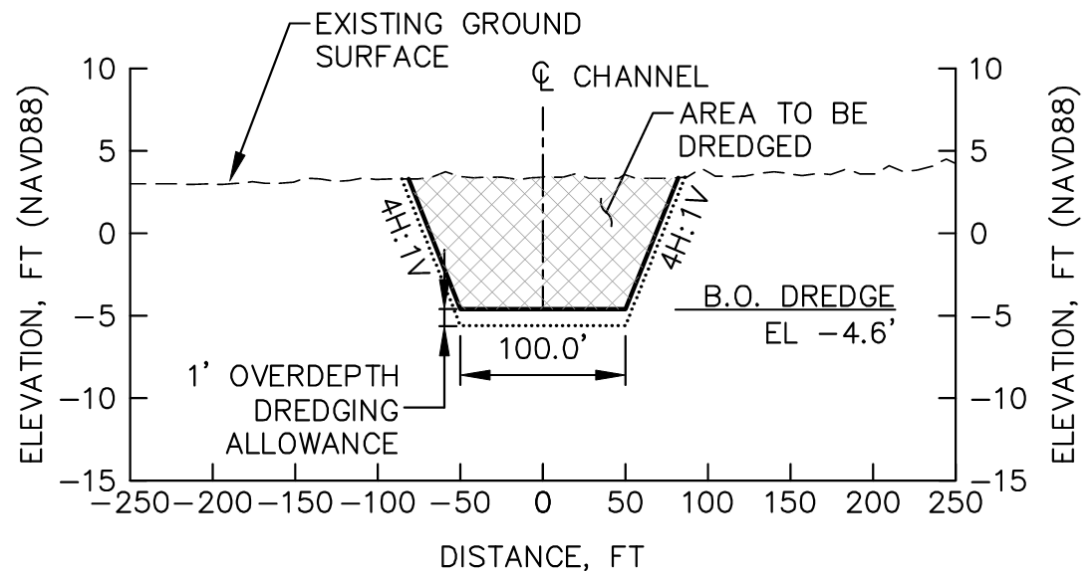
1. Cedar Bayou Meandering
2. Waves and coastal sediment intrusion into the Bayou 
3. Flow and circulation reduction in the bay system
4. Disposal of dredged materials 

# Dredged Channel Dimensions

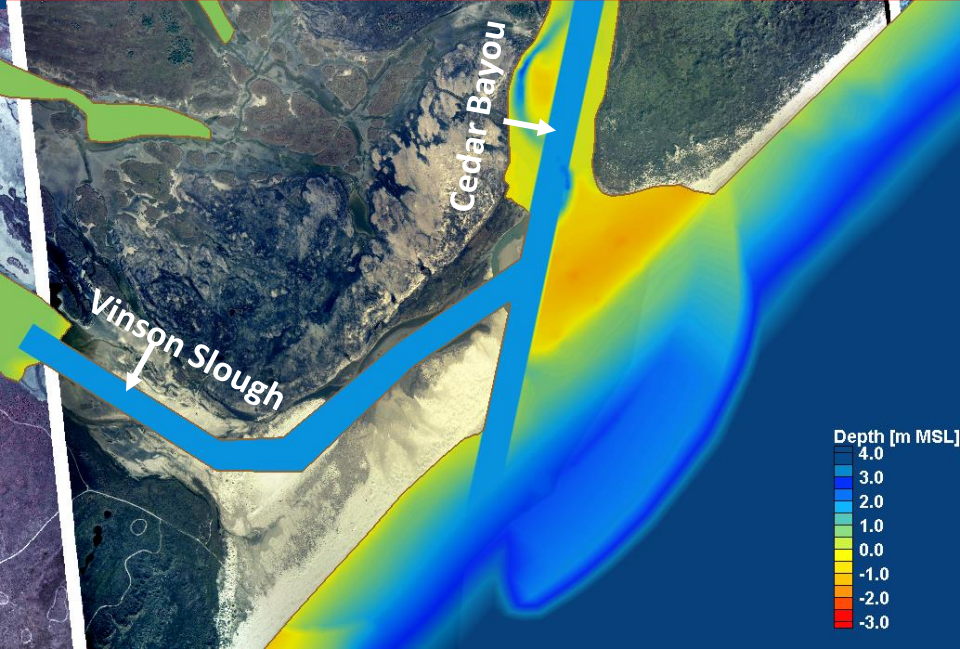
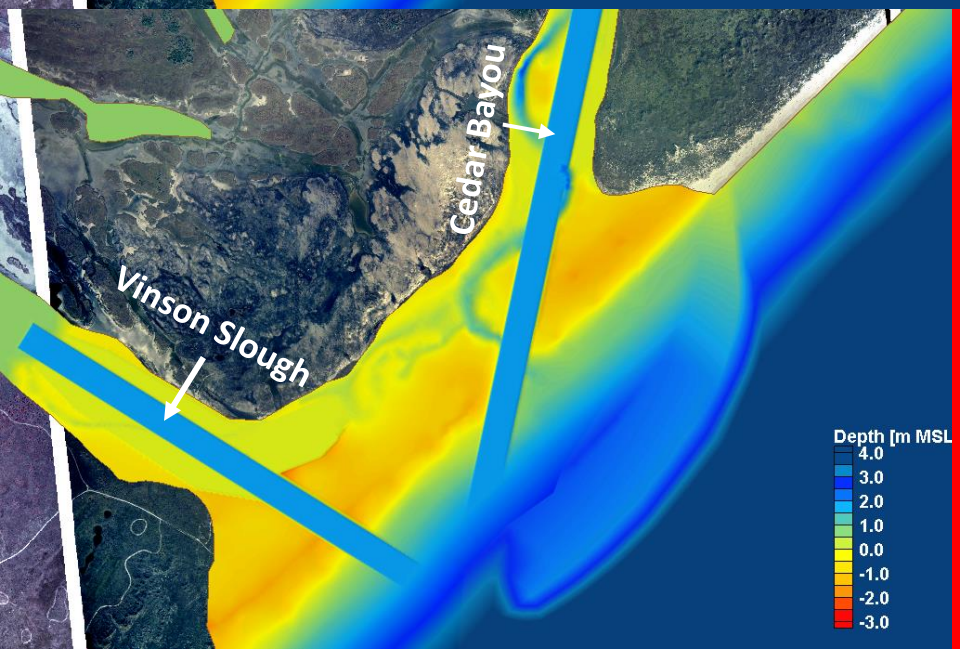
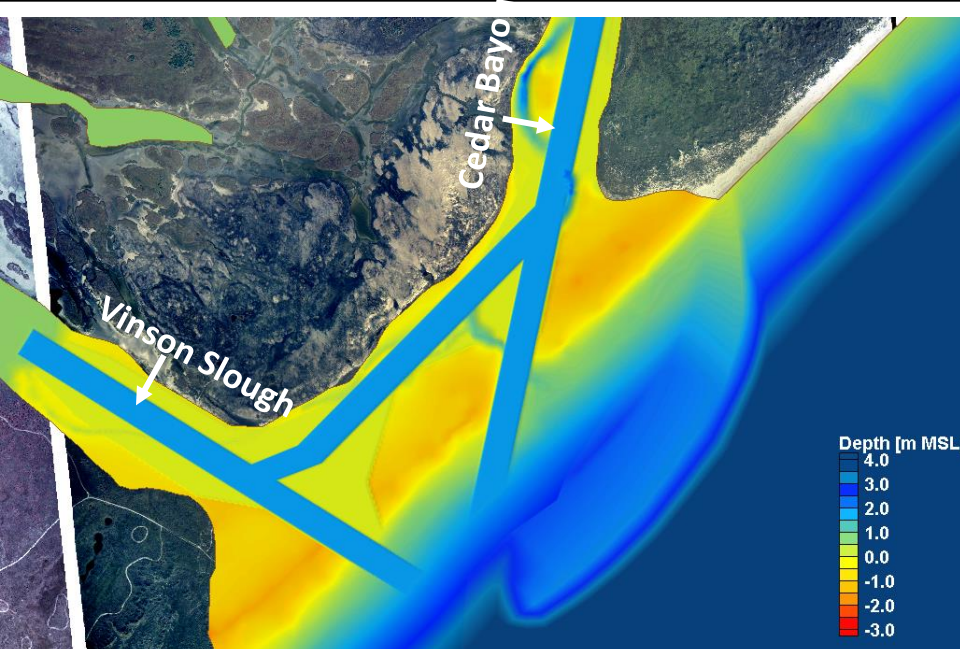


- Channel must be wide enough to withstand infilling rates
- Optimized Cross sectional area.

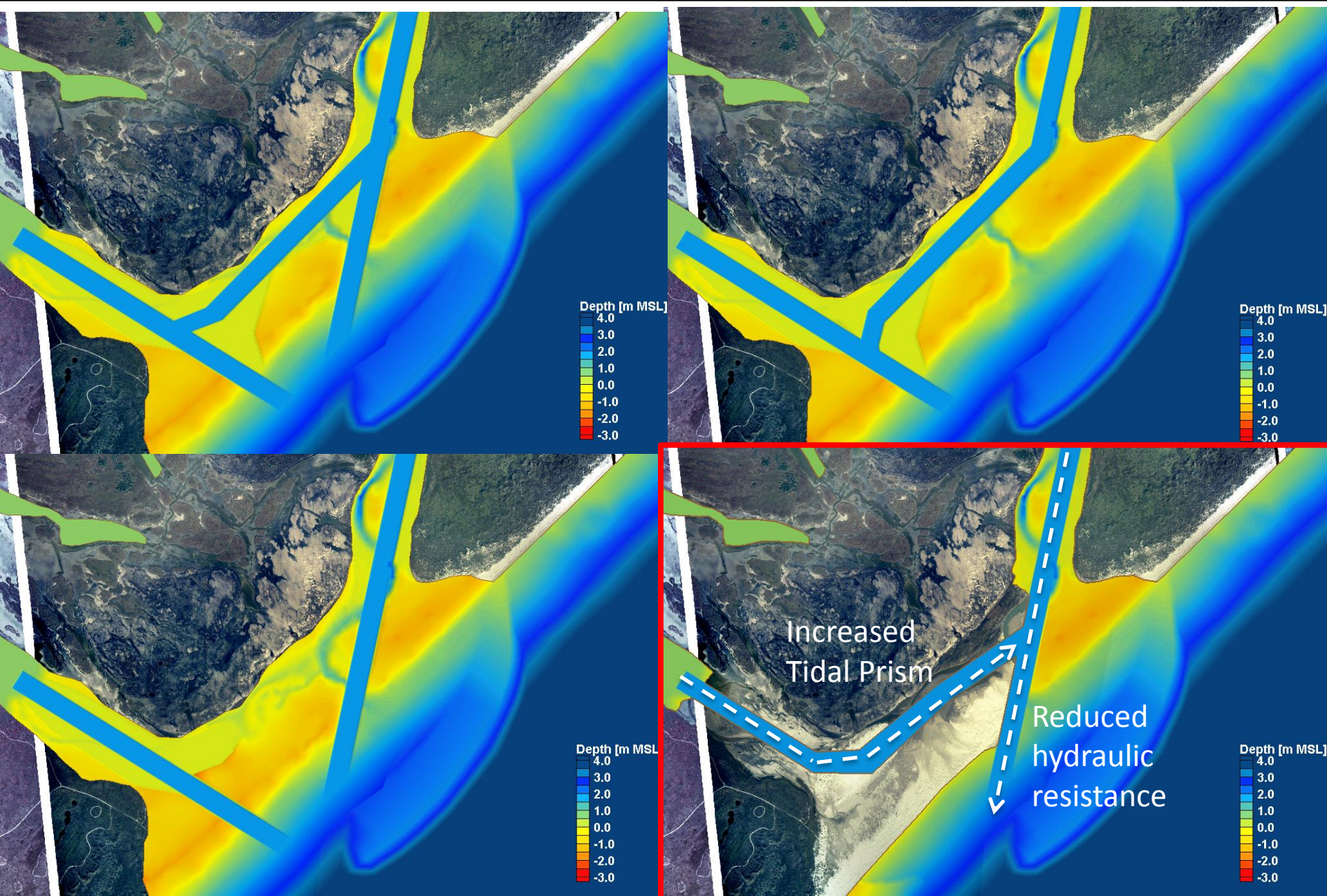
## Representative Section



# Preferred Alternative



# Preferred Alternative

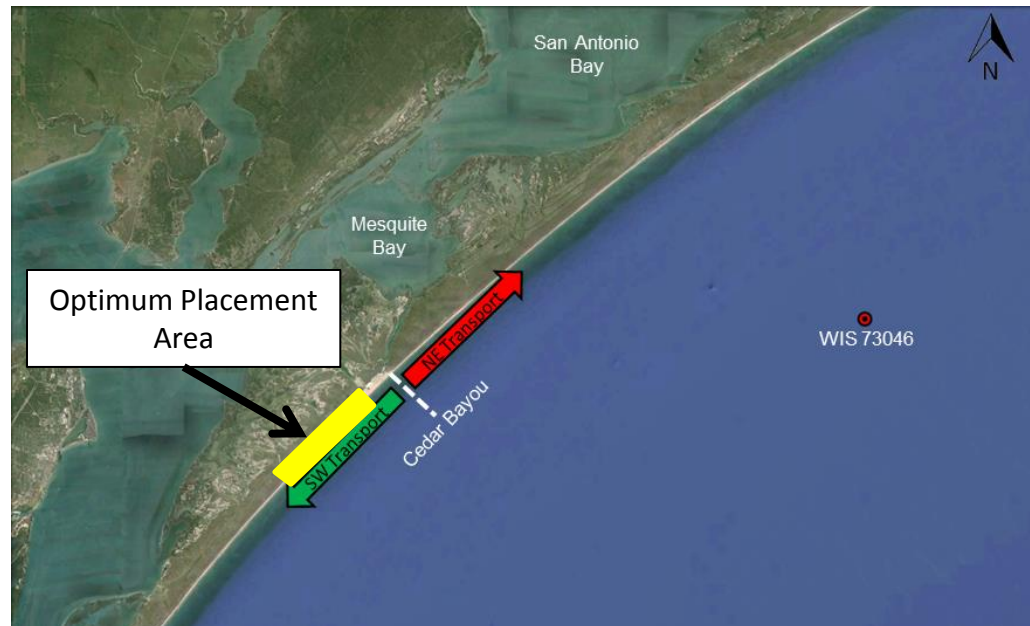
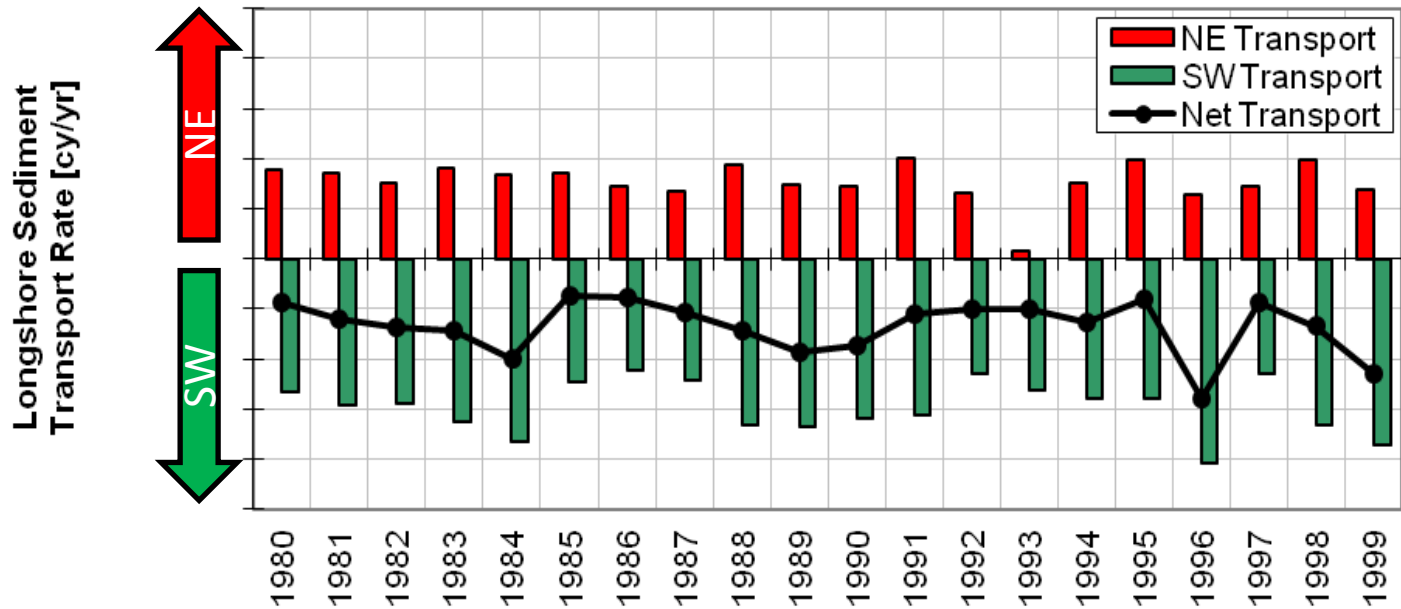


# Analysis/Design Procedure

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- Where to dredge?
- Dredged channel configuration and dimensions?
- Where to place material?
  - Direction of net sediment transport
  - Migration rates
  - Erosion rates

# Sediment Transport: Yearly

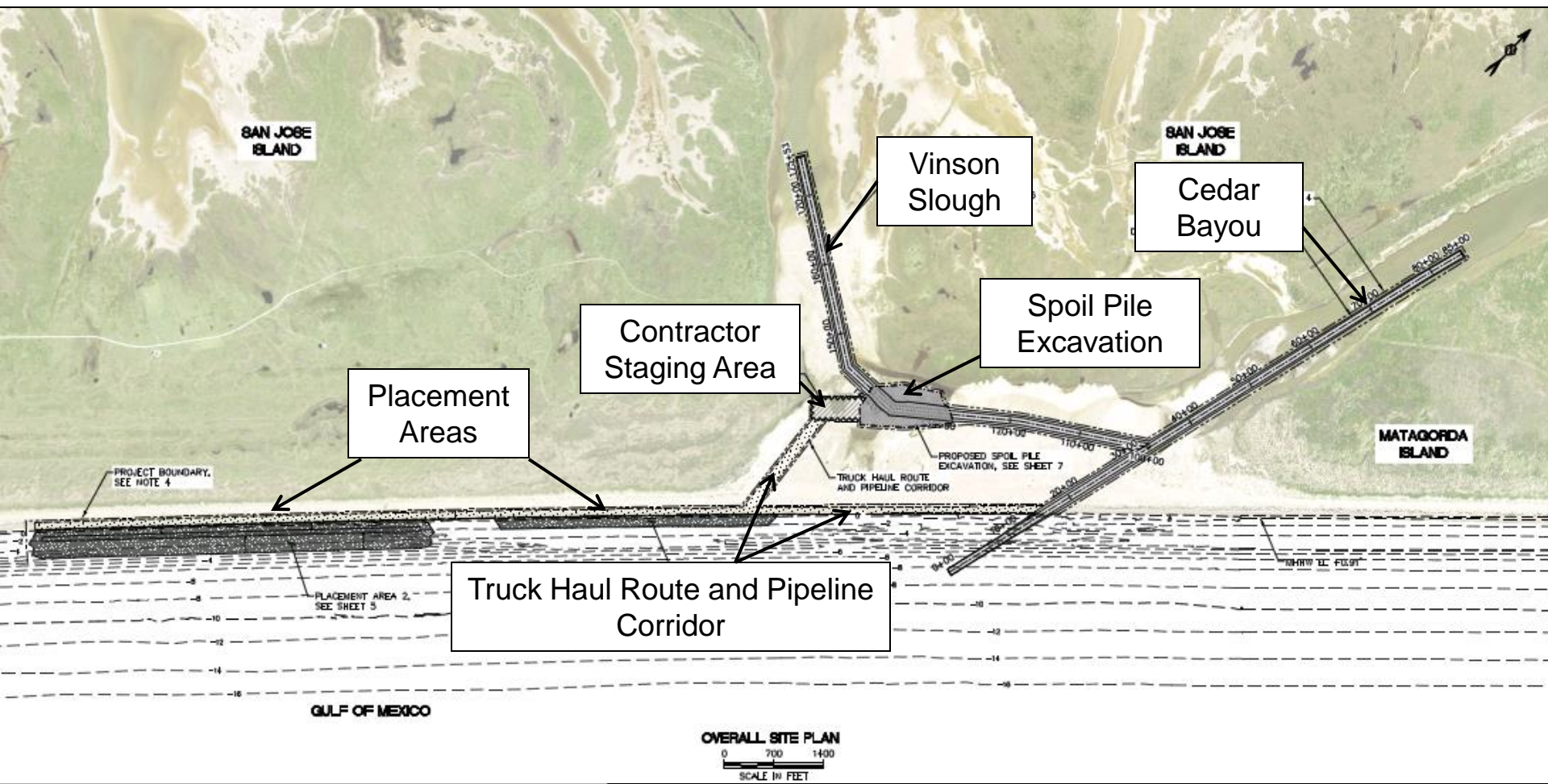


# Shoreline Change Rate



- Optimal Placement downdrift of inlet
- Beneficial use of dredged material
- Protection of sensitive inland areas.

# Final Dredge Cut Design





# Analysis and Design Summary

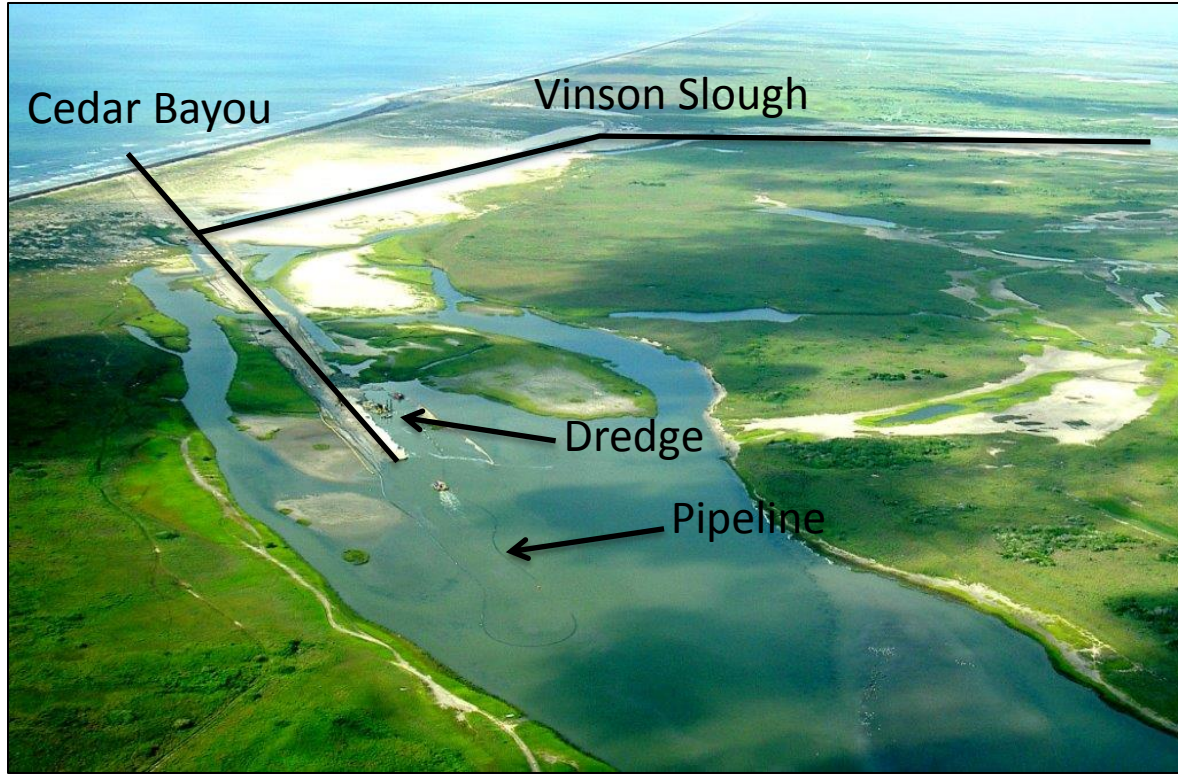
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- Where to dredge?
  - Straight Cedar Bayou Channel, singular connection to Gulf.
  - Connect with Vinson Slough
- Dredged channel configuration and dimensions?
  - Stable cross section (100 ft bottom width)
  - Connection to Vinson Slough
- Where to place material?
  - SW of Cedar Bayou mouth.
  - Outside of inlet migration zone.
  - Placed in area of high erosion

# Construction

## Commencement Dates:

- Mobilization April 22, 2014
- Mechanical Excavation May 5, 2014.
- Dredging May 9, 2014.

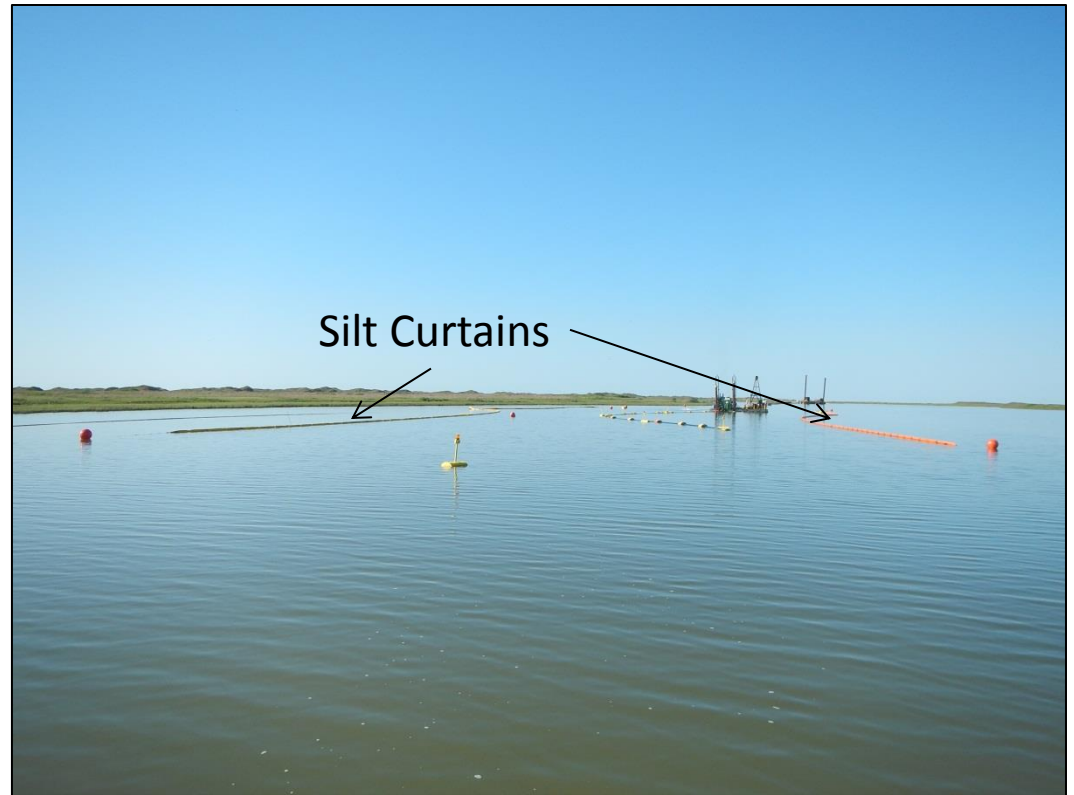


Progress Aerial June 2014

# Environmental Requirements

## Environmental Requirements:

- Dredging: Silt Curtains.
- Monitoring: piping plover, migratory bird, turtle monitoring.
- Mitigation site.

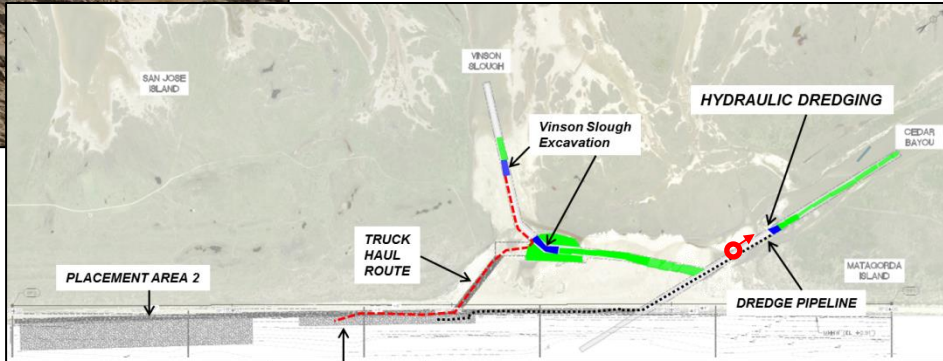


# RLB contracting – Port Lavaca

- 2 Excavators
- 9 off-road trucks
- 1 Hydraulic 12” Dredge
- 12,000 feet pipeline
- 1 Booster Pump
- 1 Bulldozer



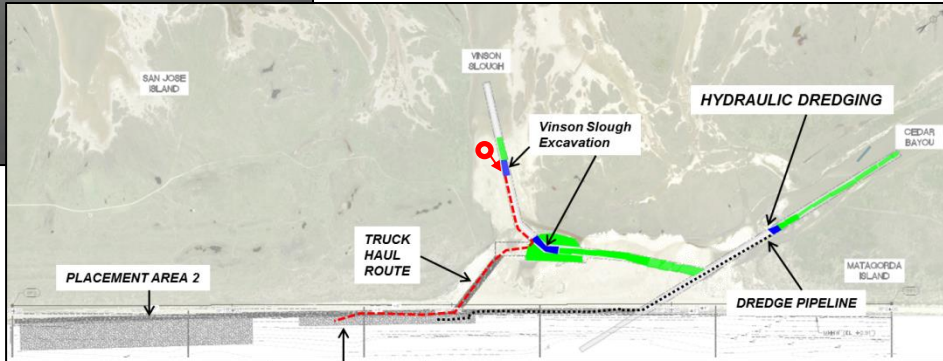
# Dredging Operations



**ADVANCE 7/14 to 7/20**

**DREDGING/EXCAVATION COMPLETED**

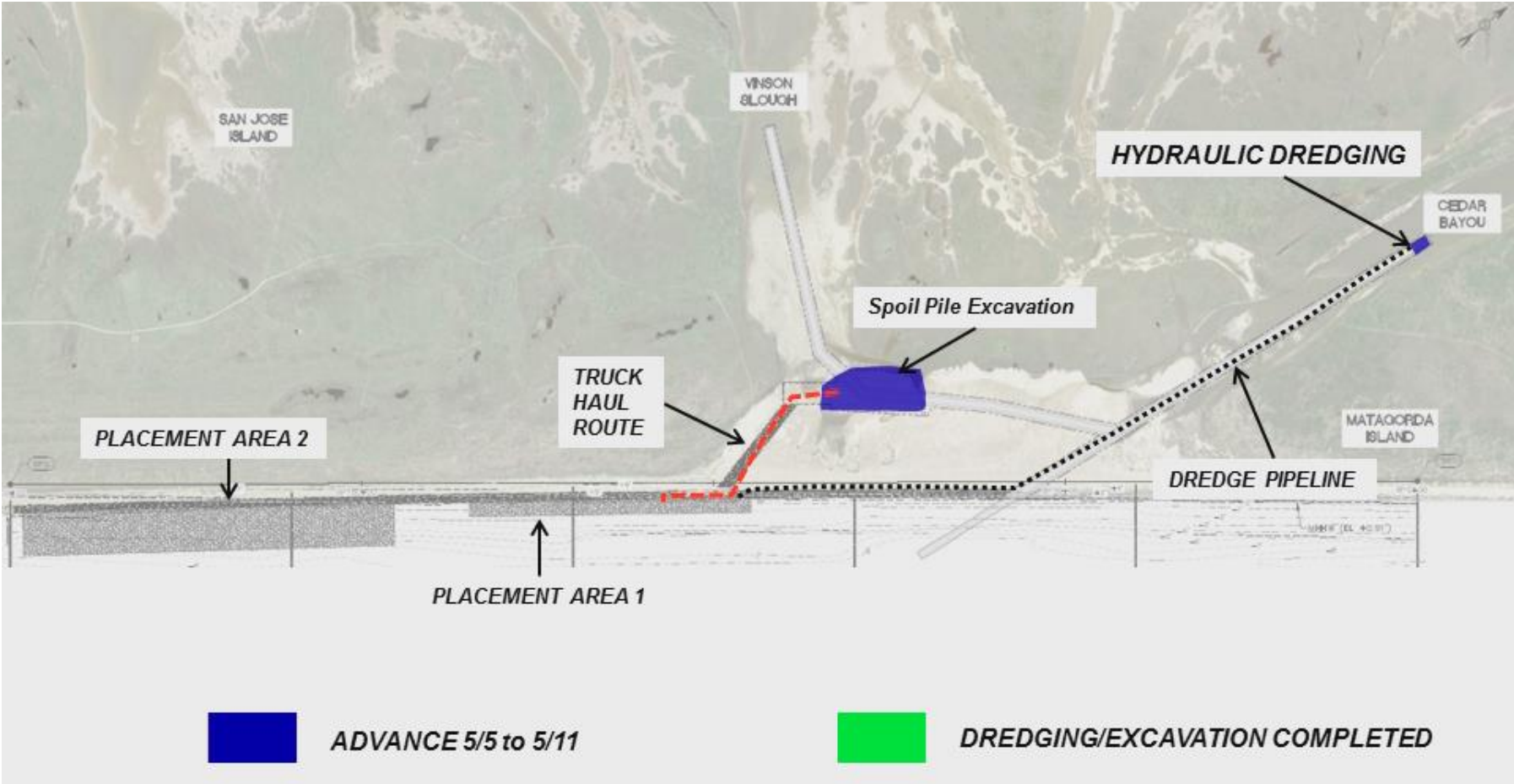
# Excavation Operations



ADVANCE 7/14 to 7/20

DREDGING/EXCAVATION COMPLETED

# Construction Sequencing

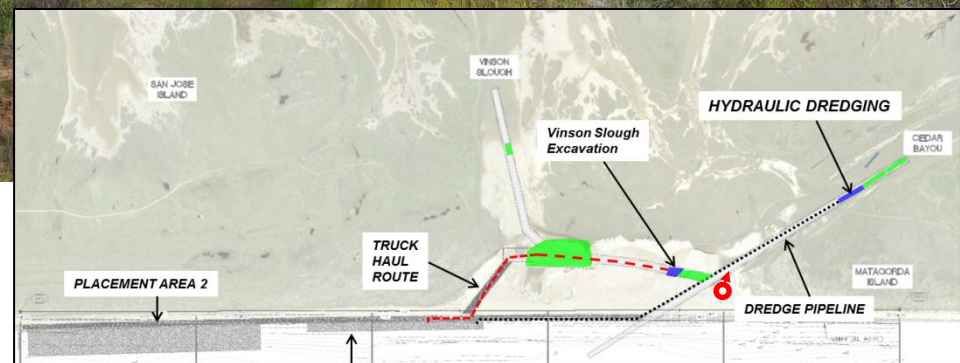


# April

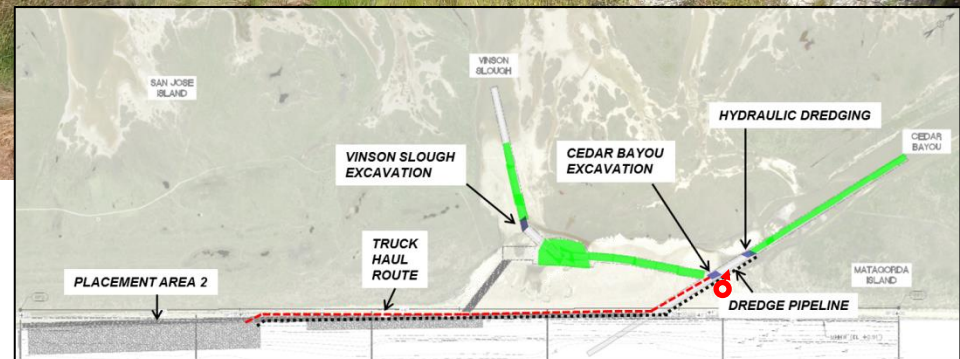




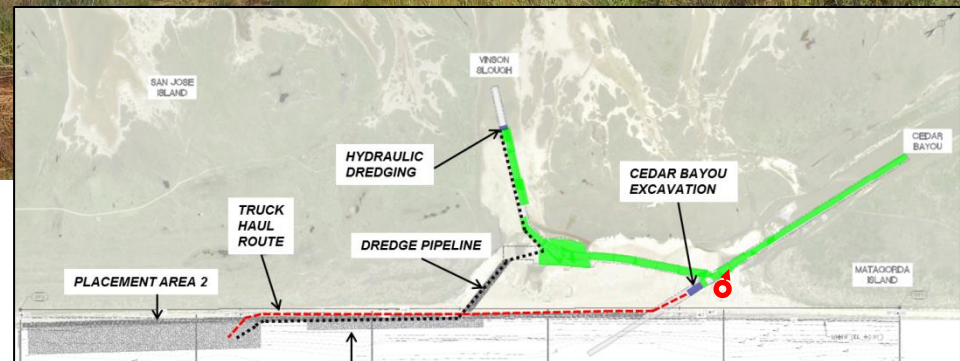
# May



# August



# September



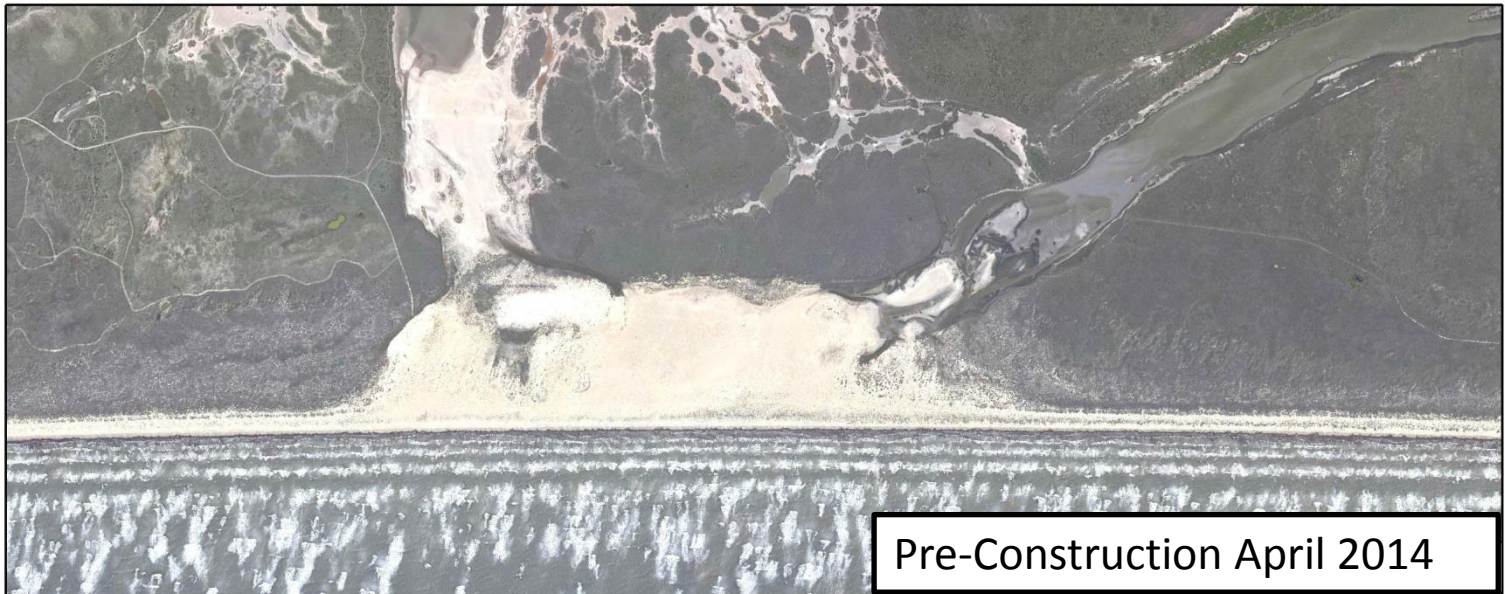
 ADVANCE 9/01 to 9/07

 DREDGING/EXCAVATION COMPLETED

# Opening to the Gulf



Cedar Bayou / Vinson Slough Restoration Project



# Latest Cedar Bayou Video 6/14/2015



Video Courtesy of David Schlorlemer

# Summary

- Complex environmental and permitting restrictions.
- Dredge cut design
- 553,000 cubic yards of material
- Complex sequencing in order to complete construction.
- Ongoing monitoring and dredge plan development



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