Updates on EWN Activities and Opportunities: USACE, Galveston District (SWG)

Coraggio Maglio
Hydraulics and Hydrology Branch Chief
USACE, Galveston District

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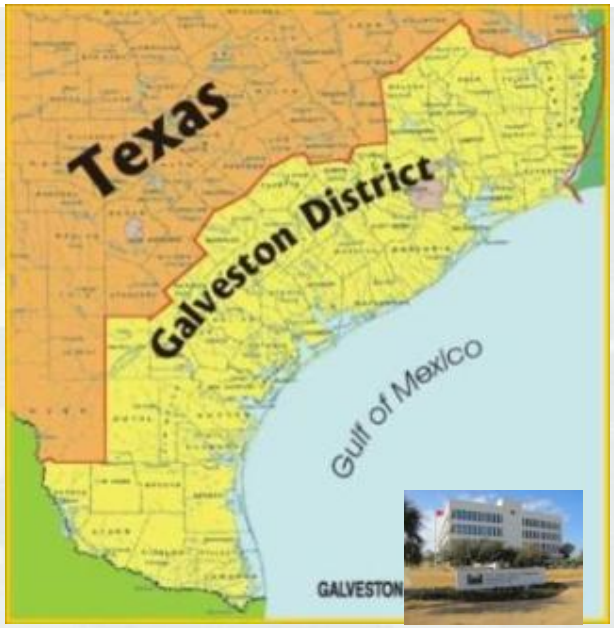
U.S.ARMY

US Army Corps of Engineers®

ERDC
Engineer Research and Development Center

USACE SWG Mission and Area of Responsibility

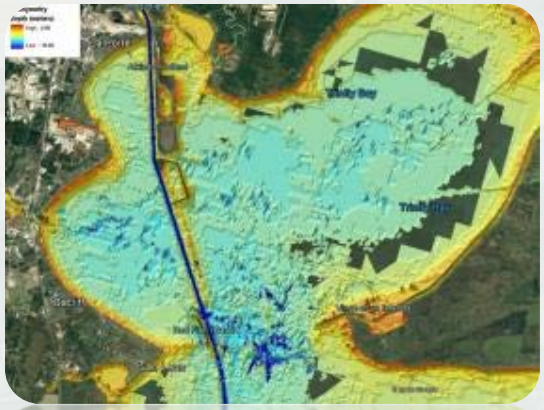


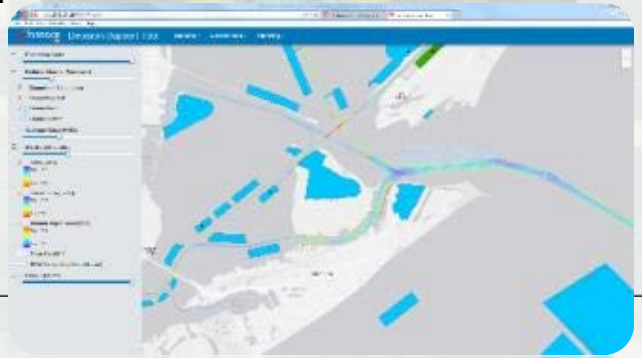
- **Navigation**
- **Flood Risk Management**
- **Regulatory**
- **Ecosystem Restoration**
- **Emergency Management**
- **Interagency & International Support**

- 50,000 square mile district boundary
- 28 ports handling 500+ M tons of commerce annually
- 1,000+ miles of channels
  - 750 miles shallow draft
  - 270 miles of deep draft
- 367 miles of Gulf coastline
- 30-40 M cubic yards/yr material dredged
- 16 Congressional districts
- 48 Texas counties
- 18 Coastal counties - bays / estuaries
- 9 watersheds
- 4 Louisiana parishes

Outline EWN-Related Projects

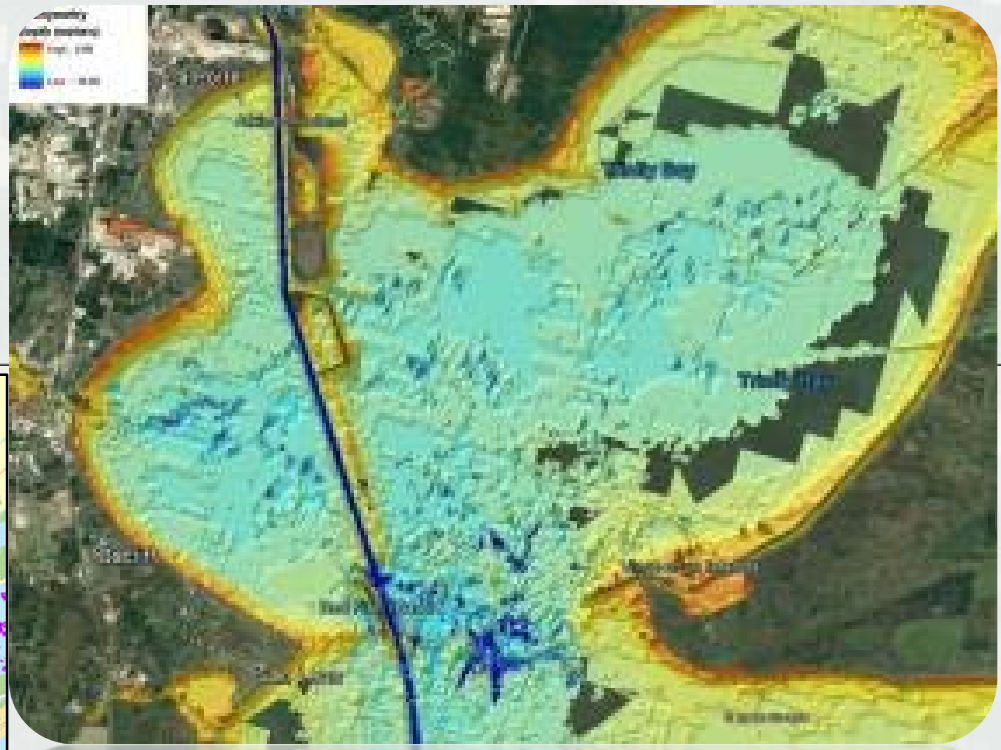
- Advanced the Galveston Bay Bottom Restoration Initiative
- Tested prototype Detailed Preliminary Assessment Tool
- Bedload collecting technology – Streamside Demo in swash zone with Galveston Park Board
- Sand Motor/ Multipurpose reef PAS
- Beneficial Use 61st (Babes Beach 2015)
- Erosion and consolidation rates of hydraulically constructed mud/clay berm – Demo plantings
- Structural evaluation of oyster substrate for stability and wave attenuation
- Storm surge environmental and navigation gates – Coastal Texas Mega-Study
- Advanced Coastal Science and Engineering Collaborative (CSEC)

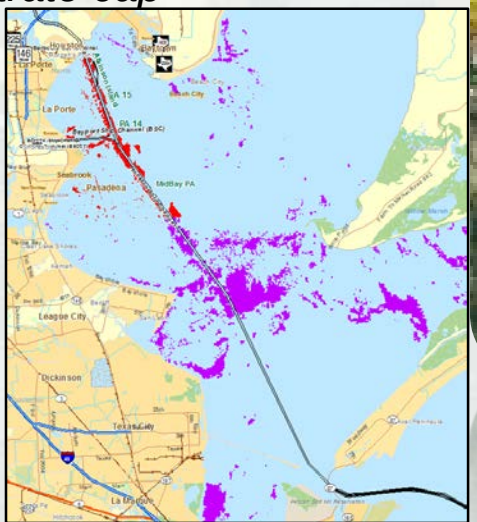




Galveston Bay Bottom Restoration

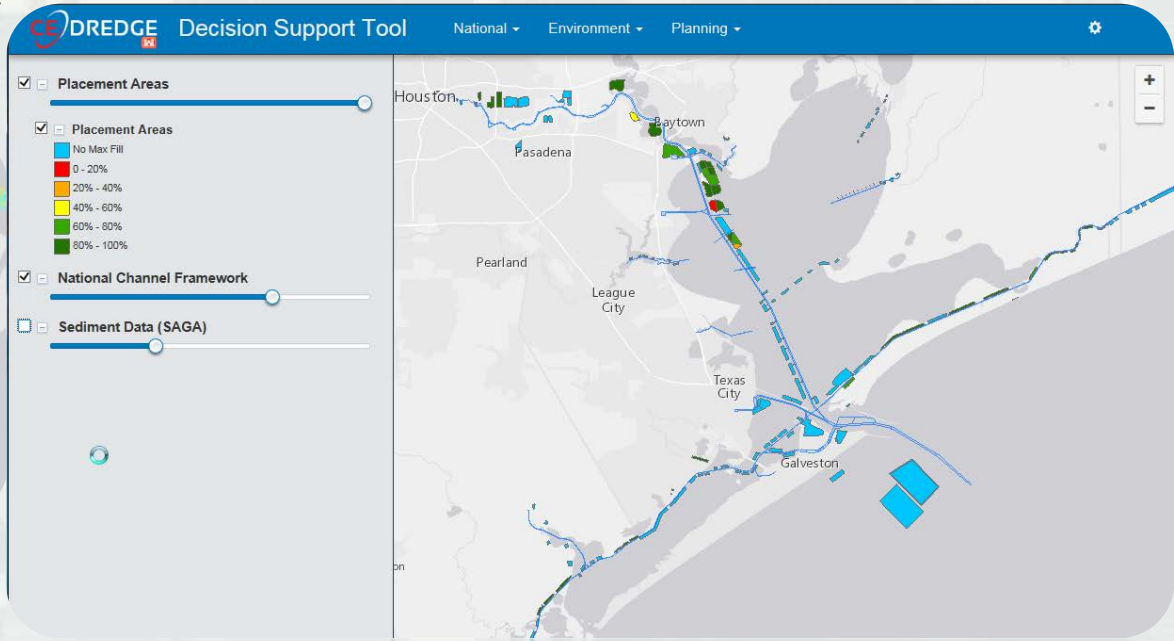
- ***Advanced the Galveston Bay Bottom Restoration Initiative***
  - *Historic oyster shell mining pits in bay*
  - *Data collected in joint initiative between SWG and ERDC using DOTS and O&M funding*
    - *17 pits surface sampled*
    - *High/Low frequency surveyed with little separation*
  - *Testing consolidation properties with Environmental Lab*
  - *Pursuing future CAP Project to construct demonstration*
  - *Port of Houston oyster mitigation*
    - *Dredge fill*
    - *Hard substrate cap*





Preliminary Assessment Tool - Tested Prototype

- ***Enterprise Geographic Information System (eGIS) database***
  - *Provides foundational spatial data for tools and products*
  - *eHydro, Channel Shoaling & Analysis Tool, CE-Dredge, D2M2, National Dredging Quality Management Program, Corps Project Notebook (CPN), Resident Management System (RMS)*
  - *The purpose is to determine quickly if only a preliminary Assessment is required or a full DMMP*
    - *Leveraging existing data*
    - *Placement area status*
    - *Shoaling rates*

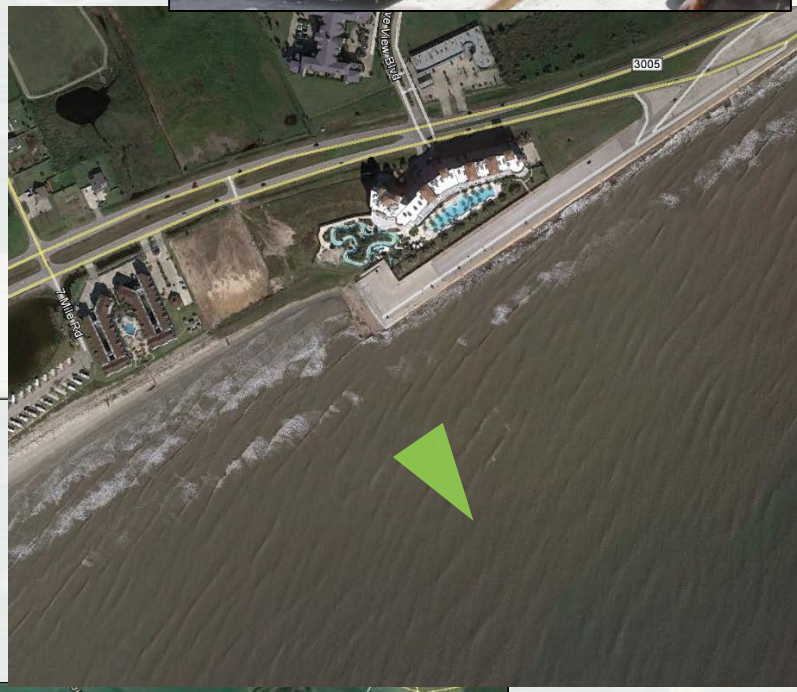


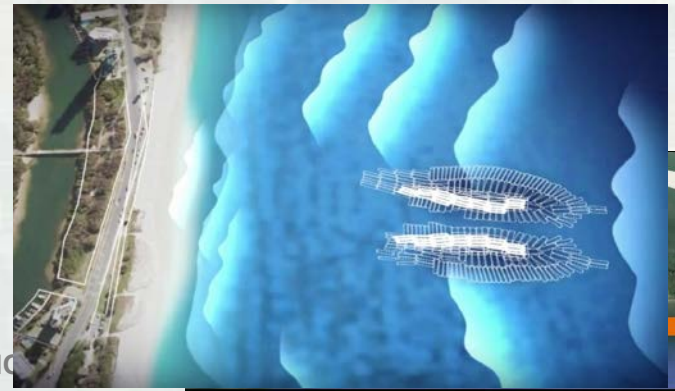
Galveston PAS – Bedload Collection Demo

- ***Sand Management Plan – work in-kind***
  - *Galveston Parks Board contract to perform bedload transport collection technology test – scaled demonstration*
    - *18 -27 July deployment: Galveston Entrance Channel, East Beach, and San Luis Pass*
  - *Freese and Nichols, Inc.*
  - *http://streamside.us/products/sediment-collector/*
  - *Independent monitoring by ERDC-CHI*

Galveston Sand Management Plan – Multipurpose Reef

- *End of seawall structural solution*
  - *Sand Motor*
  - *Multipurpose reef –submerged breakwater*
  - *Enhance fishing/surfing*
  - *SMART Reef – Bill Curtis' Reef*
  - *Geotextile sand filled monolith*





BUILDING

Galveston BU – 61st (Babes Beach)

- *Keeping sediment in the littoral system*

Galveston BU – 61st (Babes Beach)

Before

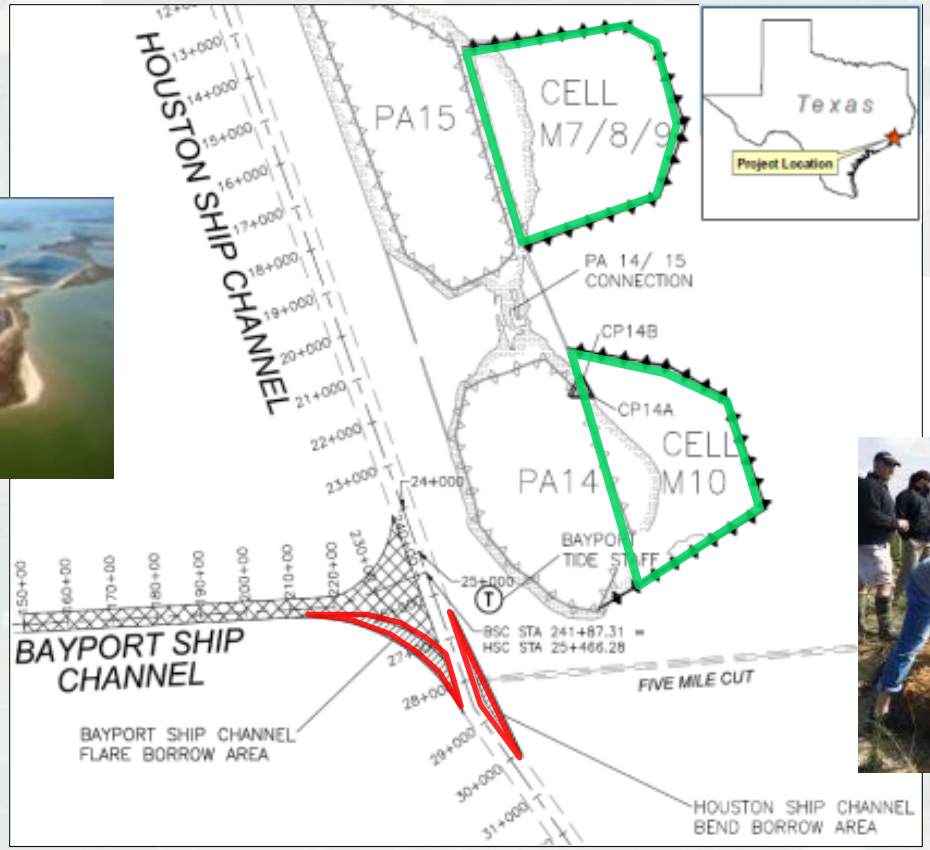
After 15 December 2015

Houston Ship Channel – Atkinson Island Marsh Cell Deferred Environmental Restoration

- ***Initiated construction of HSC Deferred Environmental Restoration Project - 2011***
  - *Project berm severely eroded*
- ***New construction contract to begin September 2017***
  - *Working with ERDC and TAMUG to monitor erosion and consolidation rates*

EWN Workshop training on native plant selection and design
Dr. Tosin Sekoni

- ***Initiated construction of HSC Deferred Environmental Restoration Project***
  - *Construction contract awarded in 2017*
  - *SWG conducting construction and post construction monitoring*
  - *Implementing CESU for additional data collection*
  - *ERDC developing complementary monitoring and analysis plan*



Houston Ship Channel – Atkinson Island Marsh Cell Deferred Environmental Restoration

Potential Structures

Oyster Castle – Diamond

Oyster Castle – Pyramid

Limestone Oyster Box

Stone Oyster Box

Crushed Concrete Oyster Box

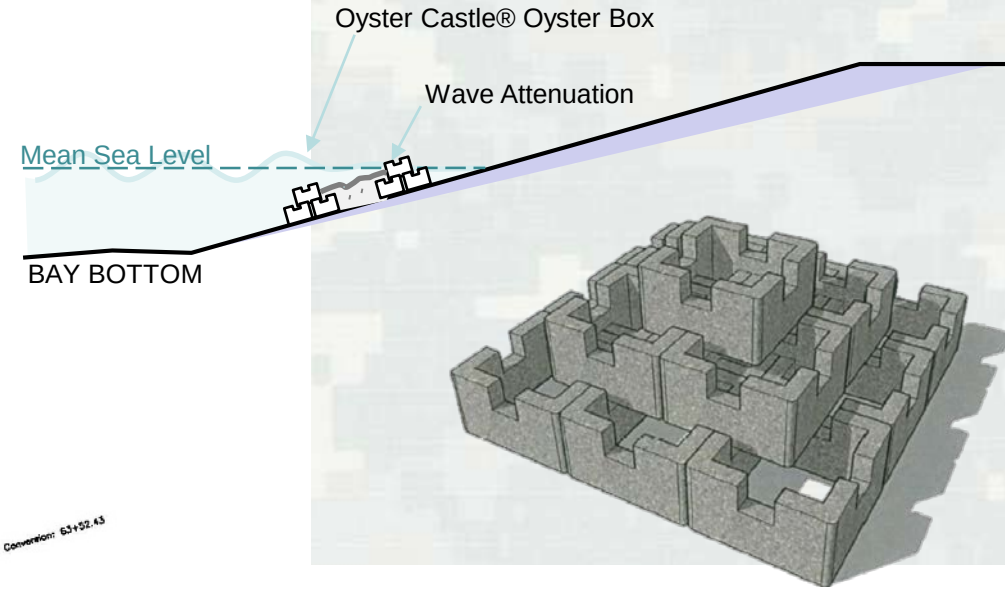
Oyster Shell Oyster Box

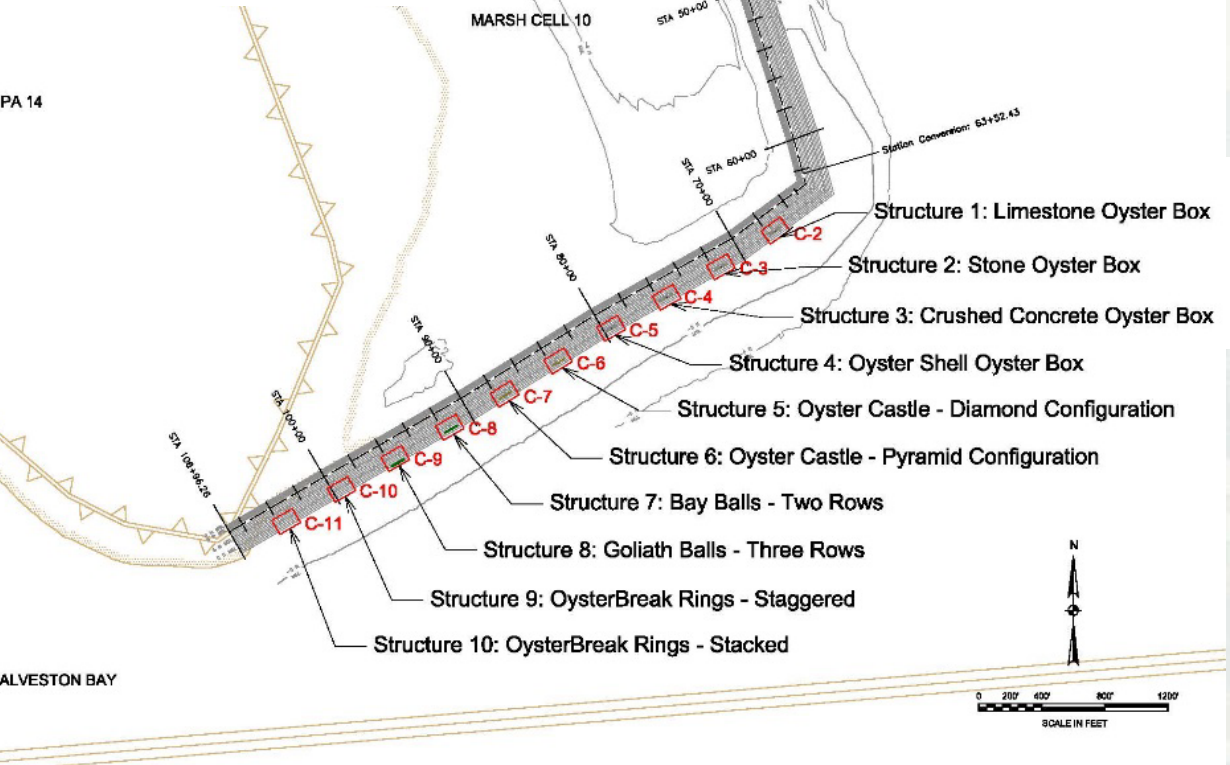
Bay Balls – Two Rows

Bay Balls – Three Rows

OysterBreak – Staggered

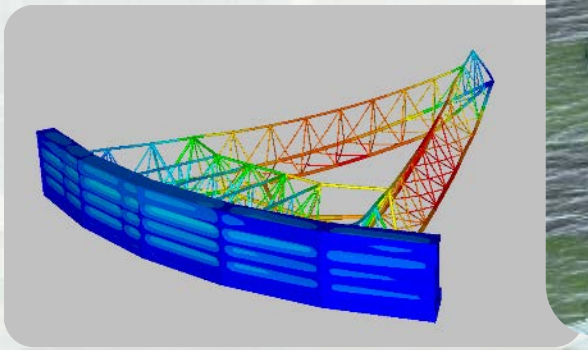
OysterBreak – Stacked





Storm surge environmental and navigation gates – Coastal Texas Mega-Study

- ***Advanced the Galveston Bay Bottom Restoration Initiative***
  - *Determination of the environmental loading (wind, wave, current, etc..)*
  - *Hydrostatic and Hydrodynamic analysis,*
  - *Structural analysis of most important components,*
  - *Geotechnical analysis for foundation or mooring system,*
  - *Detailed economic analysis and*
  - *Environmental impact*



Coastal Science and Engineering Collaborative (CSEC)

- *Transfer new science into practice faster*
  - *Deliver science and engineering to improve coastal project life cycle systems performance and cost*
- *Develop business collaboratively*
  - *Bring together capabilities, resources, and funding from multiple partners for an overall greater value than could be achieved separately*
- *Link academics to practice*
  - *Student learning experiences*
  - *Cultivate recruiting opportunities*
  - *FY 18 TAMU IPA to ERDC EL embedded at SWG on Coastal EWN initiatives*

Physical & Biological Processes

- Coastal Modeling Techniques
- NNBF Performance
  - Screening tools
  - Life cycle analysis
  - Detailed design tools

Coastal Materials

- Soil properties and geotextile structural reinforcement
- Vegetated stabilization

Construction Methods

- Deep open water sediment stabilization

Decision Support Integration

- Dredged Material Management
- Integration of Tech and Science with Practice and Policy

Expanding EWN Applications

- ***Sustainable and Resilient Regionally Integrated Infrastructure (SRRII)***
  - *Shared branding with Partners on the TX Coast and across US*
  - Build nested/networked infrastructure interoperating regionally to deliver broad spectrum of enduring economic, environmental, and social values.
- ***EWN in new work and studies***
  - *Coastal TX Study and Comprehensive Plan*
  - *Portfolio of navigation studies include many opportunities*
- ***Using CAP to demonstrate technology***
- ***Recurring O&M***
  - *Using $100M+ program to find new ways to add ecosystem and social benefit while reducing cost*
- ***Enhanced design***
  - *Implementing design quality improvement strategy*
  - *Intended to improve innovation in design by intentionally trying new techniques and driving technology where it doesn't exist*
  - *Goal: Engineers drive EWN*
- ***2016 WIIN Sec 1122***
  - *Galveston Park Board volunteered to participate*
- ***Inland Watersheds***
  - *Houston FRM*
  - *Brownsville Regional Watershed Assessment*
- ***GLO Barge Fleeting Proposal***

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