LOUISIANA’S BARRIER ISLANDS: THE FIRST LINE OF DEFENSE FOR COASTAL COMMUNITIES

Conference on Ecological and Ecosystem Restoration
July 30, 2014
OVERVIEW

1. Barrier Island Restoration Projects in Plaquemines Parish

2. Plaquemines Parish Conceptual Restoration Plan: ERDC Modeling Results

3. Plaquemines Parish Sustainability Study

4. Innovative Dredging Opportunities: A Programmatic Approach

5. Questions & Discussion
Cheniere Ronquille and Shell Island West (BA-111) are proposed for NRDA Phase III Early Restoration.
EAST GRAND TERRE ISLAND RESTORATION

- 621 acres of barrier island created
- 2.8 miles of barrier shoreline restored
- +6 ft dune from 4.6 MCY of sediment

Pass La Mer to Chaland Pass

- 484 acres created including
  254 acres of back barrier marsh

Pelican Island

- Used 4.6 MCY of mixed sediment from multiple offshore borrow sources to create 192 acres of beach-dune habitats and 398 acres of marsh platform
BAY JOE WISE SHORELINE RESTORATION

- Created 350 acres of marsh platform, ~1,000 ft wide
- Dredged 3 MCY of sediment from 3 borrow sources
- Included tidal creeks, ponds and vegetation plantings

RIVERINE SAND MINING
SCOFIELD ISLAND RESTORATION

- Constructed by sand dredged from the Mississippi River via 22 mile long pipeline
- Created 238 acres of beach and dune
- Dune is 640 ft wide and crests at +6 ft
- Created 398 acres of marsh platform on the bay side of the island
SCOFIELD ISLAND
Shell Island East

- Constructed with 2.265 MCY of sand from Lower Mississippi River (Same source as Scofield)
- Created an 8 foot high dune with a crest width of 340 feet, and a 5 foot high and 1,100 foot wide beach
- 277 total acres over a project length of 1.3 miles
FUTURE PROJECTS: NRDA PHASE III
PROPOSED EARLY RESTORATION

Shell Island West
- Proposed second increment in design phase
- Aims to add 342 acres of beach stretching the island 1.5 miles further to the west

Cheniere Ronquille
Barrier Island Restoration
Goal: Expand gulf shoreline structural integrity by tying into adjacent completed projects to the east; will create 127 acres beach and dune and 259 acres of back marsh
PLAQUEMINES PARISH
CONCEPTUAL RESTORATION PLAN

Parish Boundary
Protection Levees
Fastland
Wetland Forest
Mangroves
Ridge Forest
Marsh Creation / Enhancement
Barrier Island Restoration
Barrier Ridge
Shoreline Protection
Bay Fringe Barriers
Channel Islands
Fresh Water Diversion
Sub-Delta Enhancement
Shoreline Restoration
Crevasse Splays
Freshwater Training Channel
Stabilized Passes
Sediment Dredging
Pump Station

Gulf of Mexico
MODELING

SELECTED STORM TRACKS (~100 yr)

- Track 150
- Track 126
- Track 108
- Track 25

BARRIERS PLANNED TO BE RESTORED
Demonstrated the benefits of coastal restoration projects on reducing storm surge.

Barrier islands were most effective type of project.

Reduction of storm surge by 3 to 4 ft is possible.

Benefits are related to barrier heights of 10 to 12 ft.

Barrier islands also reduce storm wave heights behind islands.
MODELING RESULTS

Maximum Surge Envelope – Storm Track 25

Base Condition

Plan 4 Condition

Difference, m

Track 25
Notes:
2. Background imagery is the USGS Landsat imagery, date flown October 2010.

Legend:
- Green: Barrier Island Projects
- Yellow: Projects to Be Examined in Detail
- Red: Other Projects
5 MONTHS LATER
FINDINGS: BARRIER ISLAND ELEVATION

- A relatively high dune cross-section (~ +14 feet NAVD) is a more sustainable barrier island design than the +6 or +8 foot NAVD dune cross-sections that have been used for previously designed or constructed projects.

- A barrier island project with a high dune cross-section is more likely survive and provide benefits after powerful Category 3 hurricane than one with a lower dune cross-section.

- The higher dune cross-sections will have, at most, minor effects on regional storm surge, wave, and salinity plume propagation.
BARRIER ISLAND – CHENIER RONQUILLE

Chenier Ronquille, Pre-Storm Bathymetry (m NAVD), Category 3 Hurricane, 08 foot NAVD Design Dune

Chenier Ronquille, Pre-Storm Bathymetry (m NAVD), Category 3 Hurricane, 14 foot NAVD Design Dune

Chenier Ronquille, Post-Storm Bathymetry (m NAVD), Category 3 Hurricane, 08 foot NAVD Design Dune

Chenier Ronquille, Post-Storm Bathymetry (m NAVD), Category 3 Hurricane, 14 foot NAVD Design Dune

+8' NAVD – Pre-Storm

+14' NAVD – Pre-Storm

+8' NAVD – Cat. 3 Post-Storm

+14' NAVD – Cat. 3 Post-Storm
Purpose: Assess efficiencies that could be achieved through alternative dredging practices.

1. Innovative contracting and bidding practices to provide for long-term leasing of dredges for coastal restoration;

2. A comprehensive approach to sediment availability and budgeting based on protection/restoration priorities;

3. A multi-project, or programmatic, approach to permitting, scheduling and construction of coastal restoration projects.
PLAQUEMINES PARISH PROPOSES A MULTI-PROJECT, PROGRAMMATIC APPROACH

- Sustainable, low-cost source of sediment via a long-term contract dredge in the Mississippi River
- Adoption of new construction methodologies, e.g. separate dredging and shaping contractors
- Coordination and streamlining of permitting multiple projects
- Sustainable source and commitment of funds to a multi-project program
QUESTIONS & DISCUSSION