Construction Challenges in Restoring Louisiana’s Barrier Islands
Master Plan Overview

Following Hurricanes Katrina and Rita in 2005, the Louisiana Legislature created the CPRA and tasked it with coordinating the local, state, and federal efforts to achieve comprehensive coastal protection and restoration. To accomplish these goals, the CPRA was charged with developing a Coastal Master Plan to guide our work toward a sustainable coast.

Developed using the best available science and engineering, the Coastal Master Plan focuses our efforts and guides the actions needed to sustain our coastal ecosystem, safeguard coastal populations, and protect vital economic and cultural resources.
Scofield Island fractured & eroded
Scofield Island - Berm footprint after BP oil spill
Scofield Island – Complete restoration concept

- 151 Acres of Dune
- 278 acres of Marsh
- 12,700 linear feet of Dune
- 4.2 MCY of material required
COASTAL RESTORATION

Pre-Isaac

Post-Isaac

Pre-Isaac Post-Isaac
Scofield Island project overview
Typical barrier island design cross-section
Major challenges to consider when estimating barrier island restoration projects

> Nature of insitu conditions at barrier island
  - Island access and equipment needs to properly manage placement area
  - Rate of consolidation and/or subsidence of materials during placement process

> Characteristics of borrow materials
  - Wear rates
  - Magnitude of losses during hydraulic placement process
  - Optimizing payable dredge quantity

> Exposed open Gulf conditions
> Tropical weather events
> Logistics for remote work sites
Mobilizing and placing many miles of 30” dredge pipe

- In the case of Scofield Island:
  - 6 miles submerged in the MS River
  - 1 mile across 2 levees, 2 highways, and marsh
  - 9 miles submerged along Empire Waterway
  - 5 miles submerged in open Gulf to the island
Pipeline crossing MS River & Hurricane levees

- Timber mat base to protect levee
- Import fill to construct roadway around pipeline crossing for ongoing levee inspections
- Air valve at highest points to prevent floating submerged pipeline
COASTAL RESTORATION

Crossing beneath Parish Hwy 11 and LA Hwy 23

- Highway 11 crossing ~ 110’+
- Highway 23 crossing ~ 400’+
- Well point dewatering in tidal influence area
- Jack and auger bore of 48” casing attempted, but materials too fluid
- Converted to microtunneling of 42” PermaLok casing
- 30” dredge pipe then jacked through casing
MS River navigation coordination

- Thorough planning and communication imperative to ensure safety
- Daily status updates to US Coast Guard, MS River pilots, and key navigation interests
Dredge California & boosters = HORSEPOWER

- Dredge California 8300 pump hp
- Dredge Alaska converted for use as a booster at 8000 pump hp
- Boosters 8 & Erin at 3600 pump hp each
- Booster Jack at 7200 pump hp
- 30,700 pump hp total!
- 25,000+ gal of diesel fuel per day
Sand on the hill!

- ~ 2:20 hours for a grain of sand to transit the pipeline
- ~ 5,000 CY of sand suspended in slurry over the total pipeline length
  - That quantity fills GLDD’s largest hopper dredge or
  - = 3’ thick over area of a football field!
Scofield Island restoration in progress
Does a project ever go smoothly and as planned?

- We believed the most challenging part of the project was done
- Beachfill is complete and marsh fill is 1 week from completion
- Foundational failure of the containment dike causes breaches in 2 locations
- Repairs needed, but how do you rebuild a dike out of gumbo?!
With giant hay bales, of course ~

- Placed geogrid mesh fabric on best available foundation materials
- Placed hay bale bundles on top of geogrid
- Placed material over hay bale bundle core to accomplish desired elevation
- Breach closures accomplished with minimal loss of marsh acreage
COASTAL RESTORATION

And then on to Shell Island...
Barrier island restoration is critical for Louisiana coastal recovery.
More than 10 miles of Louisiana coastal barrier islands RESTORED!

- Scofield Island
- Pelican Island
- Shell Island East
Questions?

Thank you!
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