Things Learned Truck-Hauling over 1 Million Cubic Yards of Sand for Emergency Beach and Dune Projects

Mike McGarry
Brevard County
Natural Resources Management Office
Watershed Management Program

01/19/2009
CAPE CANAVERAL

PORT CANAVERAL ENTRANCE

Canaveral Harbor Sand Bypass
Fed. Shore Protection Project
NORTH REACH
(9.4 Miles)

Patrick Air Force Base
(4.1 Miles)

MID REACH
(7.8 Miles)

Fed. Shore Protection Project
SOUTH REACH
(3.8 Miles)

SOUTH BEACHES (Archie Carr National Wildlife Refuge)
(14.5 Miles)

SEBASTIAN INLET

Brevard County
Beach Project Areas
(~40 miles)
FDEP Critical Erosion Area in Brevard County

**Non-Critical Erosion Areas**
- V020-V066
- V117-V136
- R001-R202

**Critical Erosion Area (R1-R202)**
- Canaveral Harbor
- Crowne Plaza
- Barrier Island Ecosystem Center
Things Learned Truck-Hauling over 1 Million Cubic Yards of Sand for Emergency Beach and Dune Projects

Mike McGarry
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Watershed Management Program
1. Project Background 2005-2009
2. Project Logistics
3. Staging Site Logistics
4. Oversight
5. QA/QC
6. Funding FEMA/State/ Local
How did we get started?
Hurricane Jeanne et al 2004
2005 – 559,500 cy

Why not dredge?
Average fill density only 5-6 cy/ft
Included “gaps”
<table>
<thead>
<tr>
<th>Year</th>
<th>Volume CY</th>
<th>Weeks</th>
<th>CY/Day</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>559,500</td>
<td>17</td>
<td>4700</td>
<td>multiple contractors and staging sites</td>
</tr>
<tr>
<td>2006</td>
<td>175,354</td>
<td>8</td>
<td>3650</td>
<td>H. Wilma, single contractor, 6d/wk</td>
</tr>
<tr>
<td>2008</td>
<td>126,725</td>
<td>8</td>
<td>2600</td>
<td>TS Noel, slow pace by choice - sand source</td>
</tr>
<tr>
<td>2009</td>
<td>160,954</td>
<td>9</td>
<td>3575</td>
<td>Single contractor, 5d/wk</td>
</tr>
</tbody>
</table>

**TOTAL**: 1,022,533
Sand Source Options

- Source left to discretion of contractor, as approved
- Multiple sources provide advantage, but require mixing
- Commercial vs. opportunistic vs. DMMA
Opportunistic
Staging Sites
 +/- 1.25 miles
Staging Sites Through Public/Private Partnership
Staging Sites

$Q_{in} = Q_{out}$
Sand Measurement
By Truck Volume
Not in place surveys
Field Storm Damage Volume Measurements by Eye, Tape and GPS
Elevated Inspection Platform
Assure Sand Quantity and Quality
Before source is authorized, samples must be approved by FDEP and pass the “T-test.”
Toaster Oven Test

“Free from components prone to cause cementation”
Construction Oversight and Engineering

- QA/QC Inspections
- QA/QC Samples & Processing
- Volume documentation
- Before & after pictures every lot
- Completion Reports by P.E.
- Summary Report
- Witness every action

Cost 5-14% (6-9% typical)
Oversight team baby sitting, but primary focus is QA/QC of sand and shaping
"Dual Slope" good for turtle and physical performance

1:1.5 slope ± (V:H)

1:4 slope ±

Scarp height is 3’ – 8’
Before the “T-test” some tilling of slope required
Dune Re-vegetation
Over 1.3 million plants
80% sea oats + Panic Grass
Railroad Vine
Salt Joint Grass
Beach Elder
Beach Cordgrass
Sea Purslane
Funding: Local, State and FEMA

FEMA

- Category B vs. G
- Separate PW future year monitoring
Desoto Parkway

2004

2009
Would I do this again?