

# 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

**Brevard County  
Beach  
Project Areas  
(~40 miles)**

**PORT CANAVERAL ENTRANCE**

Canaveral Harbor Sand Bypass

Fed. Shore Protection Project  
**NORTH REACH**  
( 9.4 Miles )

Cocoa Beach

Patrick Air Force Base  
( 4.1 Miles )

**MID REACH**  
( 7.8 Miles )

Satellite Beach

Crowne Plaza

Fed. Shore Protection Project  
**SOUTH REACH**  
( 3.8 Miles )

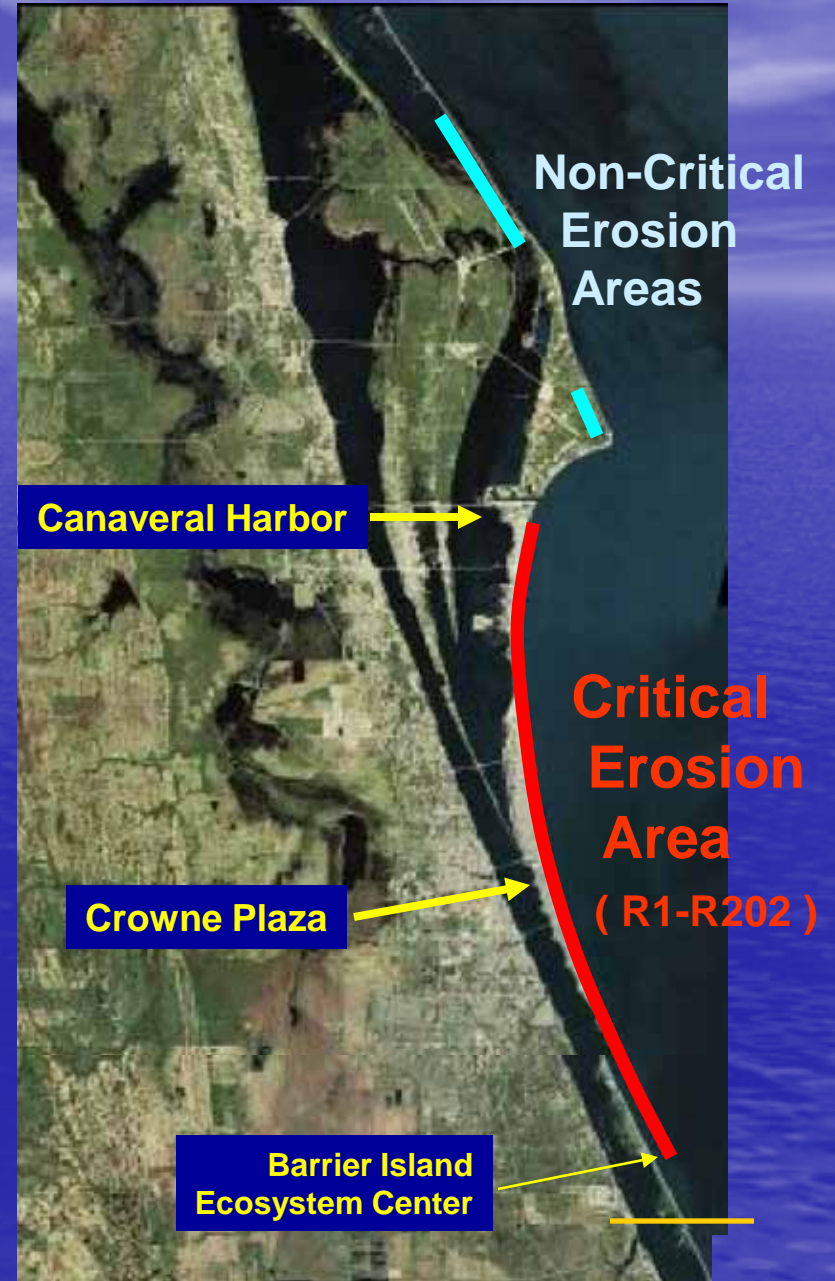
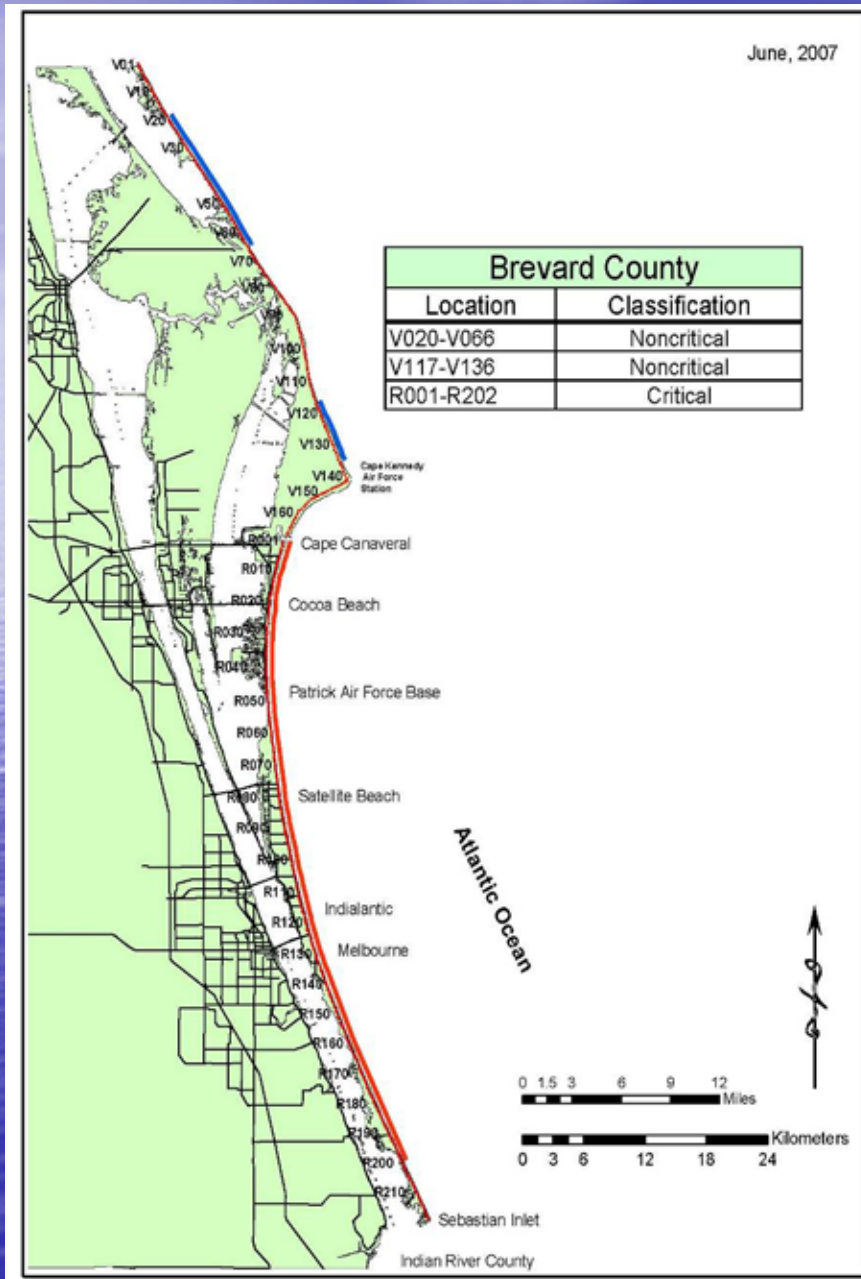
Indialantic

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

**SEBASTIAN INLET**



# FDEP Critical Erosion Area in Brevard County





CAPE CANAVERAL

PORT CANAVERAL ENTRANCE

Canaveral Harbor Sand Bypass

Fed. Shore Protection Project  
**NORTH REACH**  
( 9.4 Miles )

Cocoa Beach

PIER  
Lori Wilson  
Park

Patrick Air Force Base  
( 4.1 Miles )

Satellite Beach

**MID REACH**  
( 7.8 Miles )

Crowne Plaza

Indialantic

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)



December 2000

# COCOA BEACH PIER PRE AND POST CONSTRUCTION



April 2001



April 2003

# 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

1. Project Background 2005-2009
2. Project Logistics
3. Staging Site Logistics
4. Oversight
5. QA/QC
6. Funding FEMA/State/ Local



03/23/2009

**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”**

09/26/2004



## Volume Summary

Year	Volume CY	Weeks	CY/Day	Notes
2005	559,500	17	4700	multiple contractors and staging sites
2006	175,354	8	3650	H. Wilma, single contractor, 6d/wk
2008	126,725	8	2600	TS Noel, slow pace by choice- sand source
2009	160,954	9	3575	Single contractor, 5d/wk

**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



04/01/2008

# Staging Sites

+/- 1.25 miles



# Staging Sites Through Public/Private Partnership



02/20/2008



07/04/

# Staging Sites

$$Q_{in} = Q_{out}$$

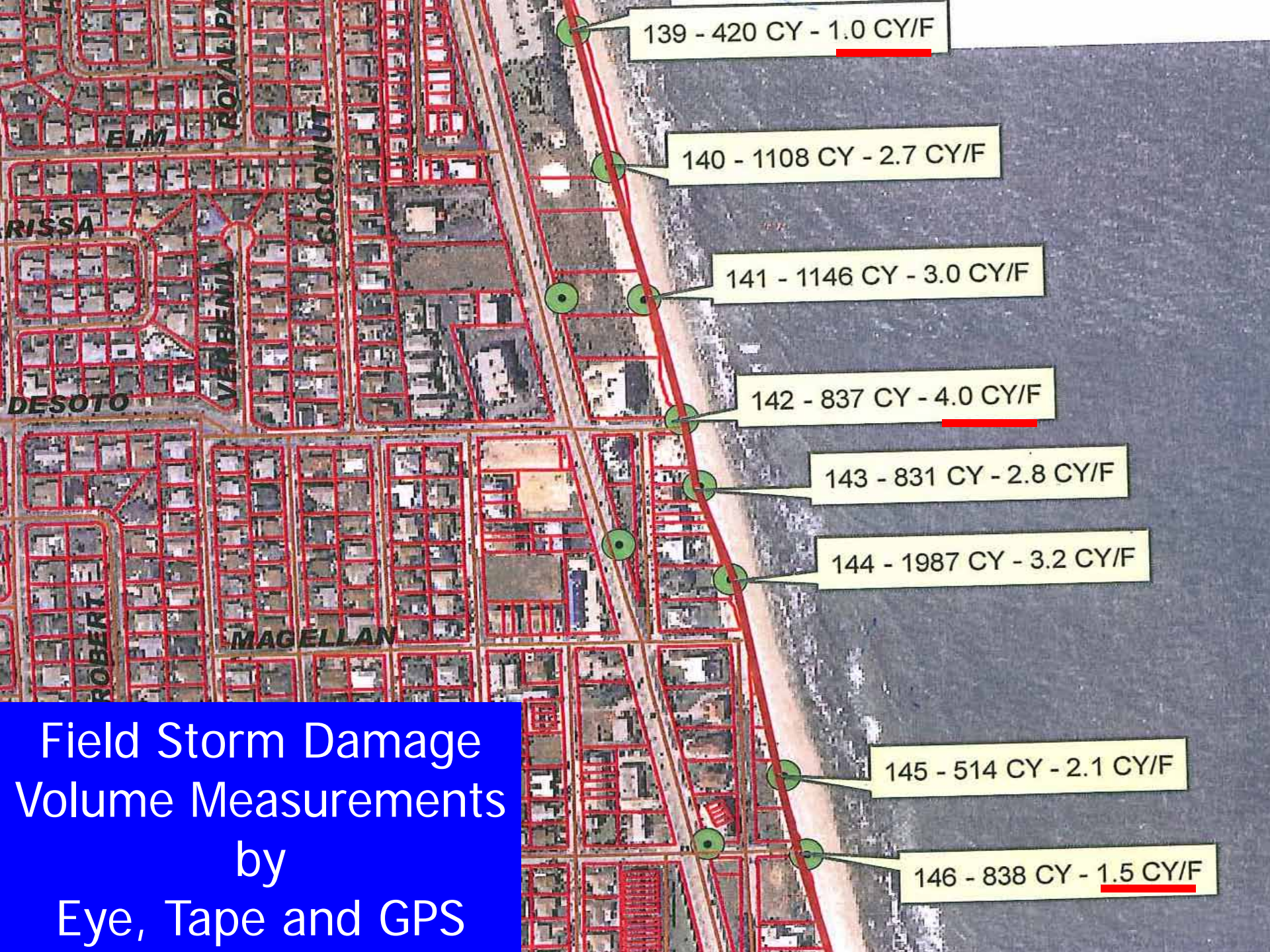




# Sand Measurement By Truck Volume Not in place surveys



03/23/2009



139 - 420 CY - 1.0 CY/F

140 - 1108 CY - 2.7 CY/F

141 - 1146 CY - 3.0 CY/F

142 - 837 CY - 4.0 CY/F

143 - 831 CY - 2.8 CY/F

144 - 1987 CY - 3.2 CY/F

145 - 514 CY - 2.1 CY/F

146 - 838 CY - 1.5 CY/F

Field Storm Damage  
Volume Measurements  
by  
Eye, Tape and GPS

# Elevated Inspection Platform

Assure Sand Quantity and Quality



# Sand QA/QC Inspection (not approval)

By Eye vs. Benchmark



**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

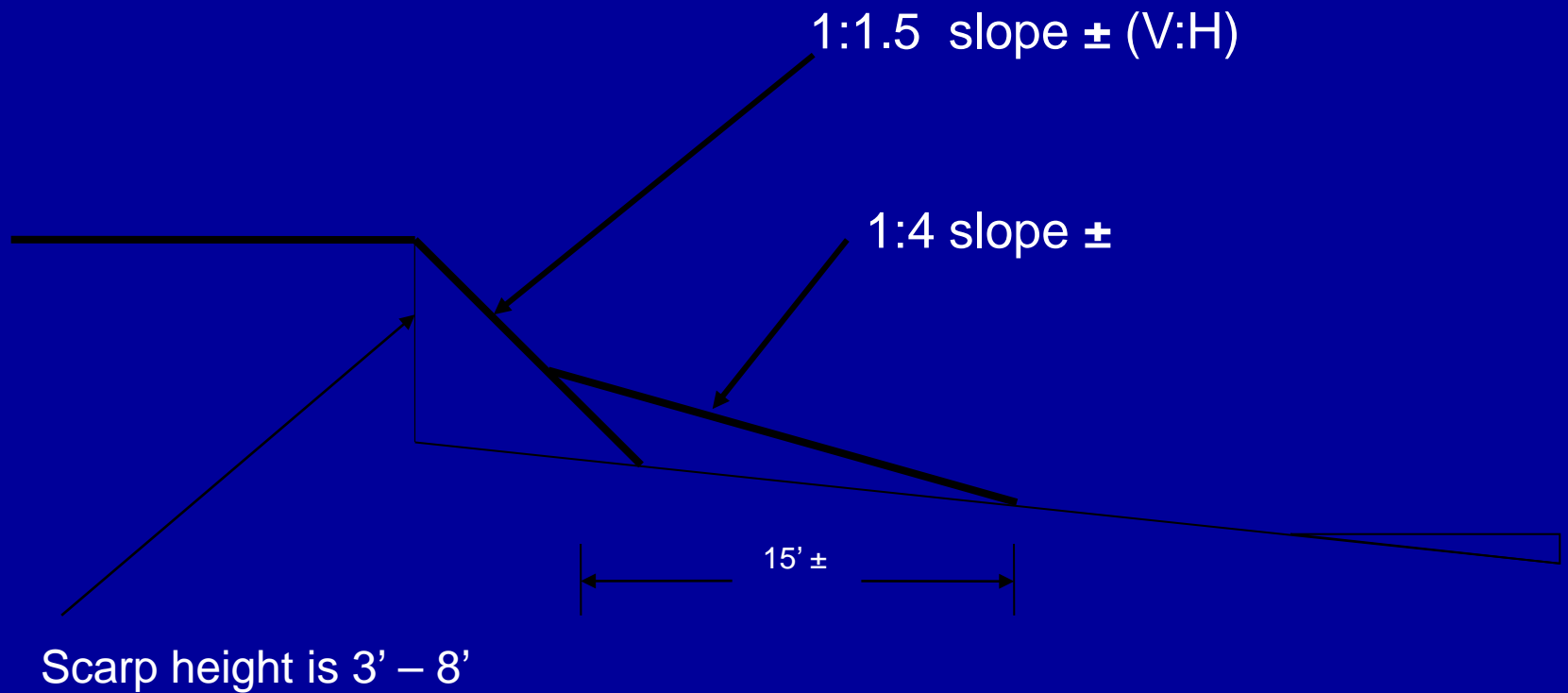
Cost 5-14% (6-9% typical)

01/21/2009 14:27



Oversight team baby sitting, but primary focus is QA/QC of sand and shaping

“Dual Slope” good for turtle and physical performance







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

03/19/2007

# Funding: Local, State and FEMA

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





# Desoto Parkway

2004



2009



# Shell Street

2004



2009





Would I do this again?



