Jupiter/Carlin Nourishment
A Case of Adaptive Management, Cooperation and Innovative Applications

Michael Stahl and Kelly Martin
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February 4, 2016
Jupiter/Carlin Nourishment

Project Overview

- 1.1 mile length of shoreline immediately south of the Jupiter Inlet (R13-R19)

- Initially constructed in 1995, re-nourished in 2002

- 2nd re-nourishment 2015

- Planned/permited as a 822,000 CY dredge and fill utilizing an offshore borrow area

- Built utilizing 467,300 CY from multiple sand sources
  - PBC – Truck Haul
  - USACE – FCCE
  - JID – Inlet Sand Trap Dredging
Comprehensive Effort of Individual Projects

3 contractors, 3 sand sources, 3 methodologies

• **PBC** – 282,000 CY
  • Truck haul from an upland sand source
  • R15.5 - R19
  • 11/12/14 – 3/27/15
  • 2800 CY/day

• **USACE** – 140,000 CY
  • Hopper dredge from an offshore borrow area
  • R13 – R15.5
  • Pumping 12/28/14 – 1/6/15
  • 17,500 CY/day

• **JID** – 45,300 CY
  • Cutter head dredge from Inlet sand trap
  • South jetty – R15
  • 3/27/15 – 4/19/15

April 19, 2015
Adaptive Management

Bids for original dredge project exceeded engineers’ estimate and project funding

IFB to Annual Contract in 3 Months

• Bids opened on 6/10/14

• Revise fill template for a reduced volume

• Approval of an upland sand source

• Permit modifications

• Coordination with Town of Jupiter

• Annual Contracting

• BCC Approves Work Order on 9/9/14
Annual Contract Development

• Prior to 2010, dune restoration was conducted through multiple term contracts
  • PM acted as GC
  • Inefficient
  • Difficult to budget

• 1st Dune Restoration Annual Contract Awarded in 2010
  • Primary contractor responsible for coordination with subcontractors
  • Unit prices based on volume, not time
  • Project costs are easily calculated
Compensating Slope

- Reduces material below MHW, reduces hydraulic losses during placement
- Ensure proper distribution of volume throughout the project area
- Reduces turbidity during placement
DATA COLLECTED ON MARCH 2015.
DISTANCE IN FEET.
ELEVATION IN FEET NAVD.

- R-18
- R-14

MHW= +0.37 NAVD
Event Planning

Jupiter Beach Resort
Construction Access/Staging
Jupiter Civic Center

71 Special Events
95 Days of Active Construction
Innovative Measures

- Efficient deployment from the project area
- Facilitated sampling in shallow depths
- PWC for turbidity monitoring
Innovative Measures
UAS Monitoring and Integration of Photogrammetry

DJI Phantom 2 Vision Plus
Orthophoto 8/28/15
Digital Elevation Model

Credit: Conor Maguire; Agisoft Photoscan
Considerations

• Refine Annual Contract to facilitate large scale placements
• Independent materials contract directly with the mines
  • Stockpile sand prior to mobilization
• Availability of resources
Cooperation and Coordination

Special Acknowledgement to PM – Tracy Logue
Sea Turtle Activity
Sea Turtle Activity

- Palm Beach County - 65.5 km of monitored coastline
- 5% of the statewide total coastline
- 22% of statewide nesting
Sea Turtle Activity

- Palm Beach County has the densest loggerhead nesting in the state of FL
- Over 1,500 crawls per mile
- 2014
  - 24,951 loggerhead nests
  - 1,884 green turtle nests
  - 511 leatherback nests
Jupiter

- 2.5 km of monitored beach
- 4 different sand types
- Standard surveys
  - Species
  - Crawl Type
  - Location
  - Obstructions
  - Reproductive Success
Jupiter

2015

- 5,623 total crawls
- 1,463 Cc nests
- 727 Cm nests (record)
- 37 Dc nests
Jupiter

- Is there any difference in activity or success?

- Use standard surveys, data loggers, and sand analysis to look further.
Jupiter

Nesting Success

The inlet area typically has escarpments that can contribute to a decrease in nesting success.

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<tr>
<td># Nests</td>
<td>623</td>
<td>1,184</td>
<td>205</td>
<td>215</td>
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<td>Nests/Km</td>
<td>884</td>
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- There is a decrease in hatch success and an increase in the number of washouts.
- There are many factors that could contribute to these fluctuations.

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**Average Temp**

- **Native**: 89.39
- **Mined**: 85.57
- **Corps**: 87.33
- **Inlet**: 87.89

*Graph showing the average temperature comparison between Native, Mined, Corps, and Inlet.*
Jupiter

- The largest variation from native temperature produced similar success rates.
- There are many factors influencing nest success.
Jupiter

- Sand sources and beach profile affect nest site selection, nest success, emergence success and sex ratios.

- There are many factors that go into each of these parameters.

- Over the next year or two we will begin to statistically analyze the hundreds of thousands of data points that we’ve collected on this beach.
Thank you!

This project was funded in part by a grant awarded from the Sea Turtle Grants Program. The Sea Turtle Grants Program is funded from proceeds from the sale of the Florida Sea Turtle License Plate. Learn more at www.helpingseaturtles.org.
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#### Bar Chart
- **Beach Width**
- **Distance Crawled**

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![Average Temp Graph](image)

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