

# INDIAN RIVER COUNTY SECTOR 5 BEACH AND DUNE RESTORATION PROJECT: POST-DORIAN UPDATE AND CONSTRUCTION PROGRESS

Thomas P. Pierro, P.E., D.CE

Principal Engineer

Mobile: 561-756-2535

[tpierro@coastalprotectioneng.com](mailto:tpierro@coastalprotectioneng.com)

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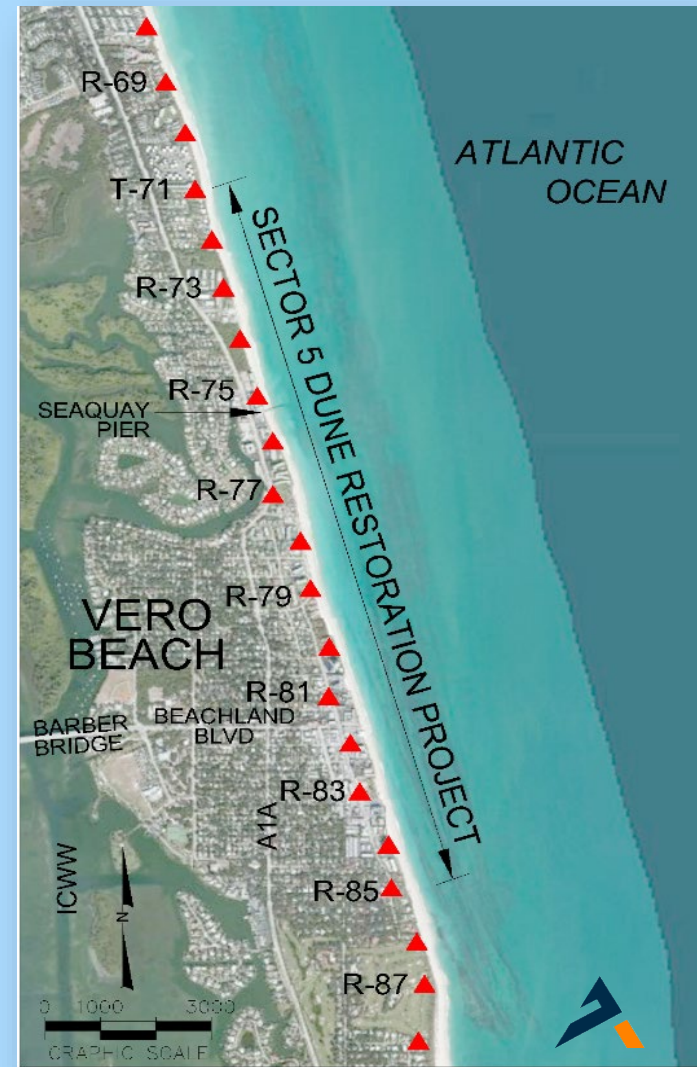
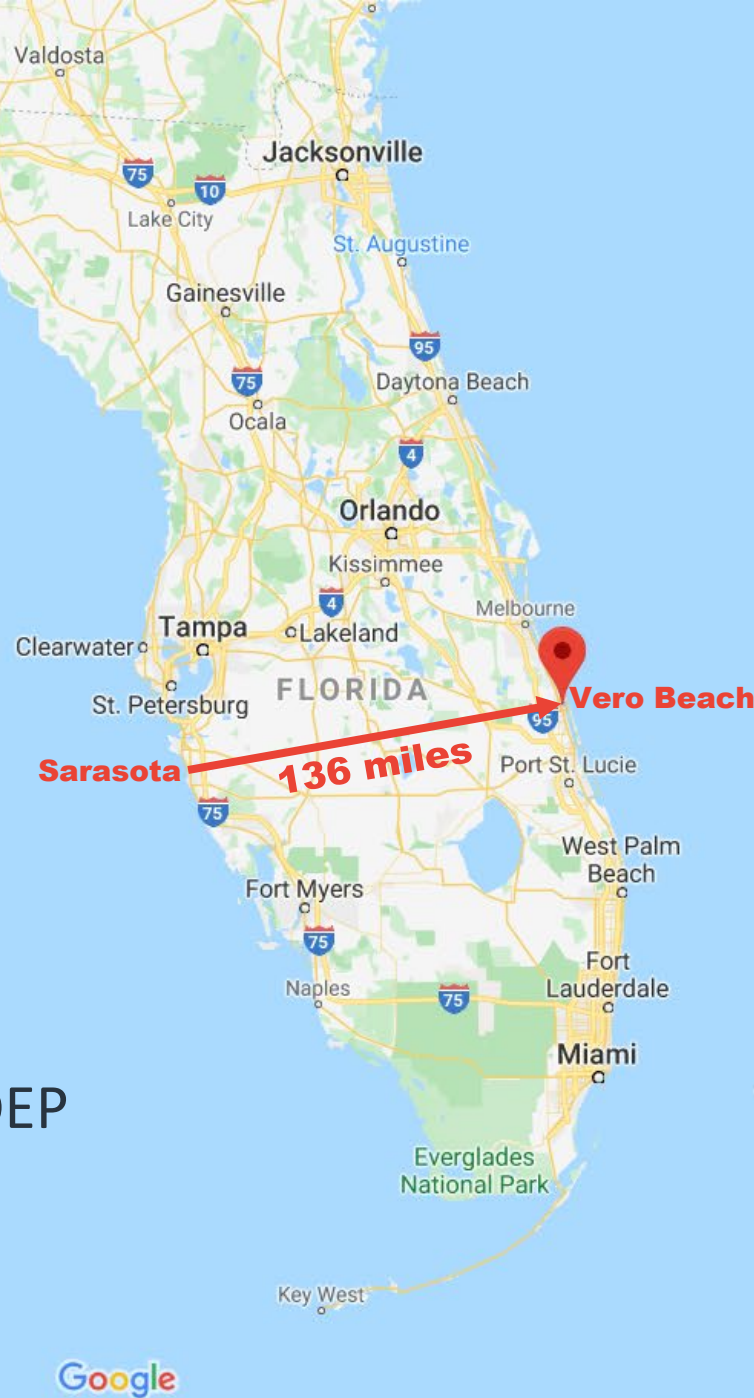


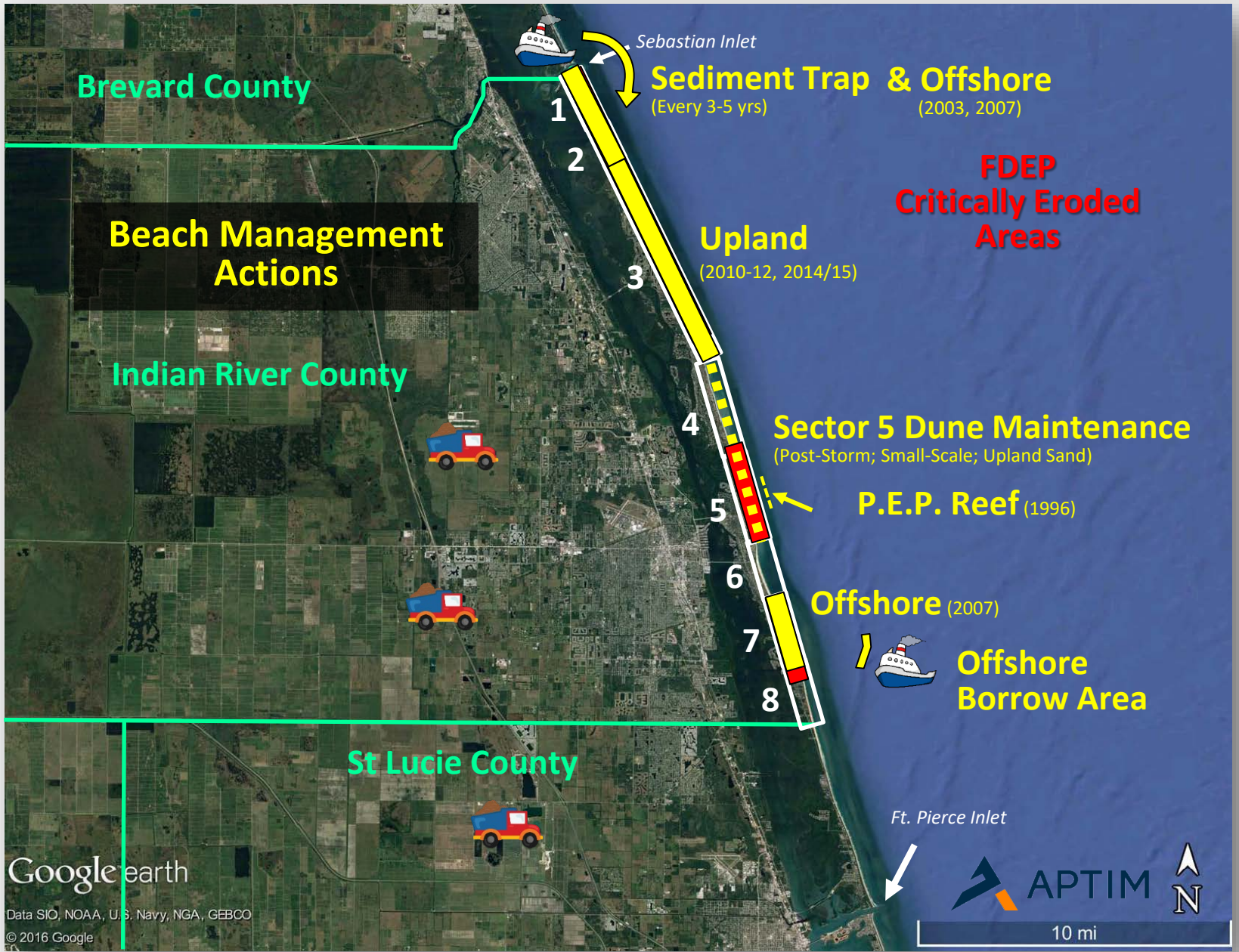
**APTIM Co-Author Acknowledgment:**

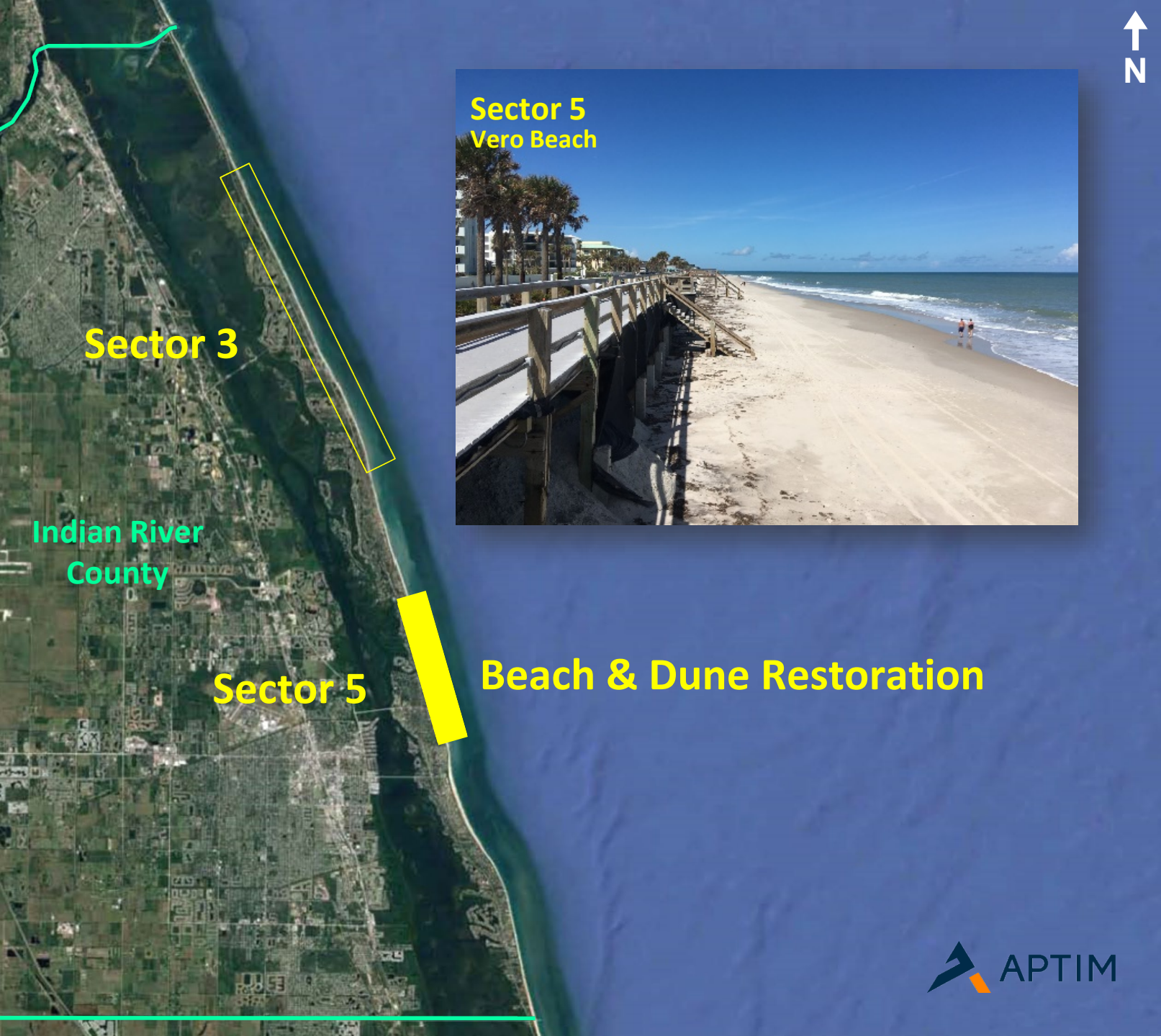
Chris Paul, P.E., APTIM, Baton Rouge, LA

## Indian River County

- Sebastian Inlet to ~6 miles north of Fort Pierce Inlet
- 22.4 miles of Atlantic coastline
- 15.7 miles listed as critically eroded by FDEP
- 8 Sectors for planning and management







# Sector 5 - Engineering Goals

- Storm protection
- Avoid hardbottom impacts
- Avoid sea turtle nesting impacts
- Restore/maintain recreation
- Restore/maintain habitat
- Constructible and cost-effective



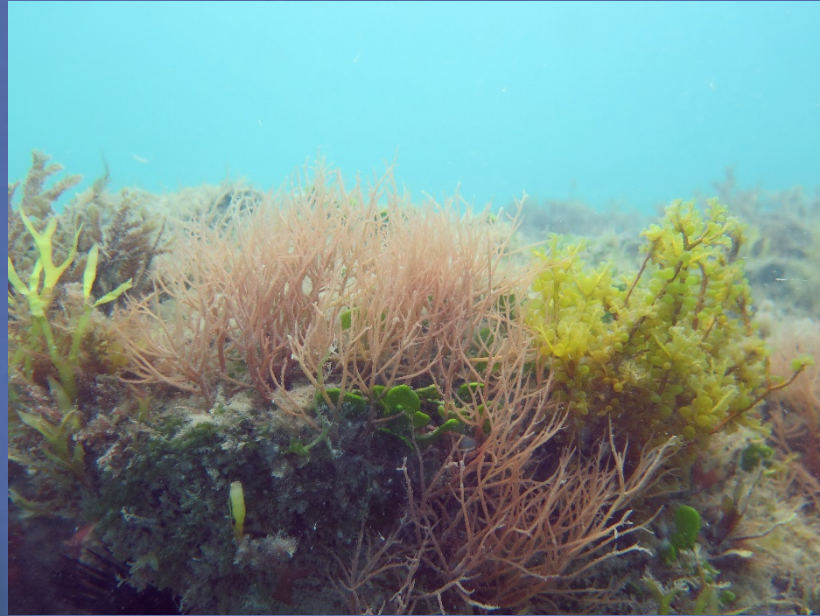


Sector 3

Indian River  
County

Sector 5

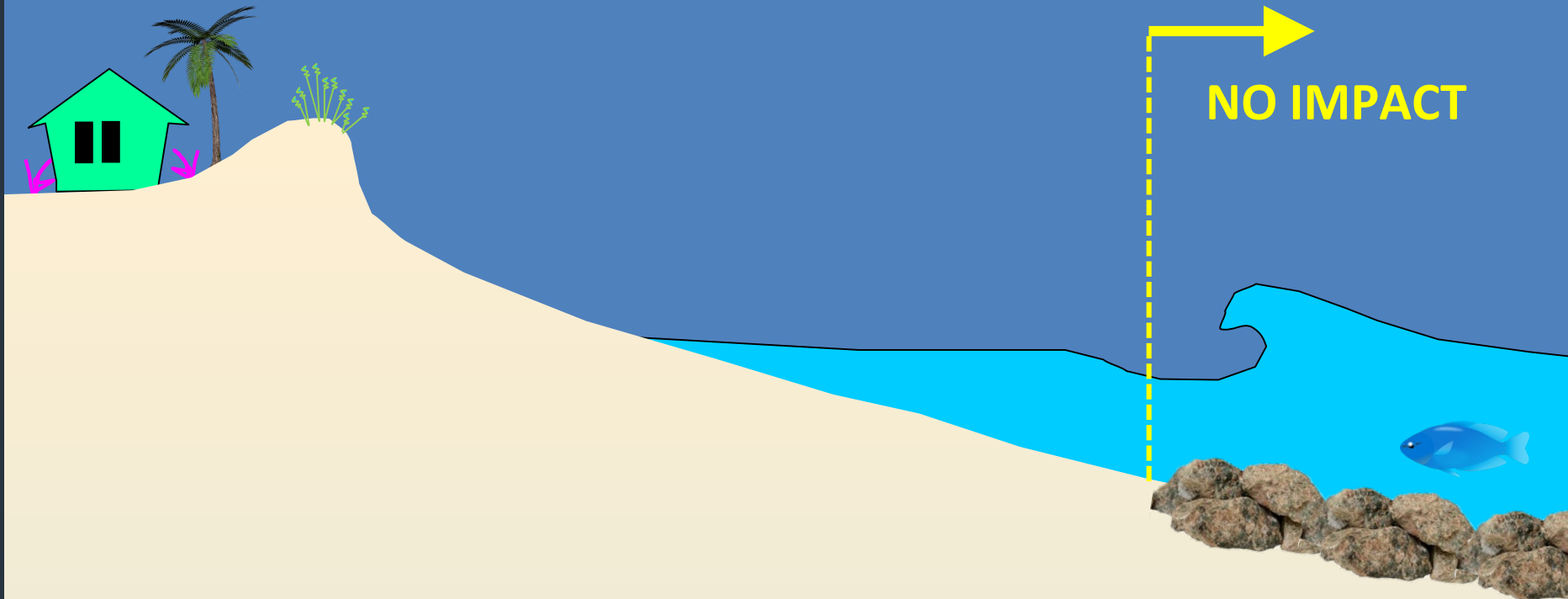
Beach & Dune Restoration



# Sector 5 - Environmental

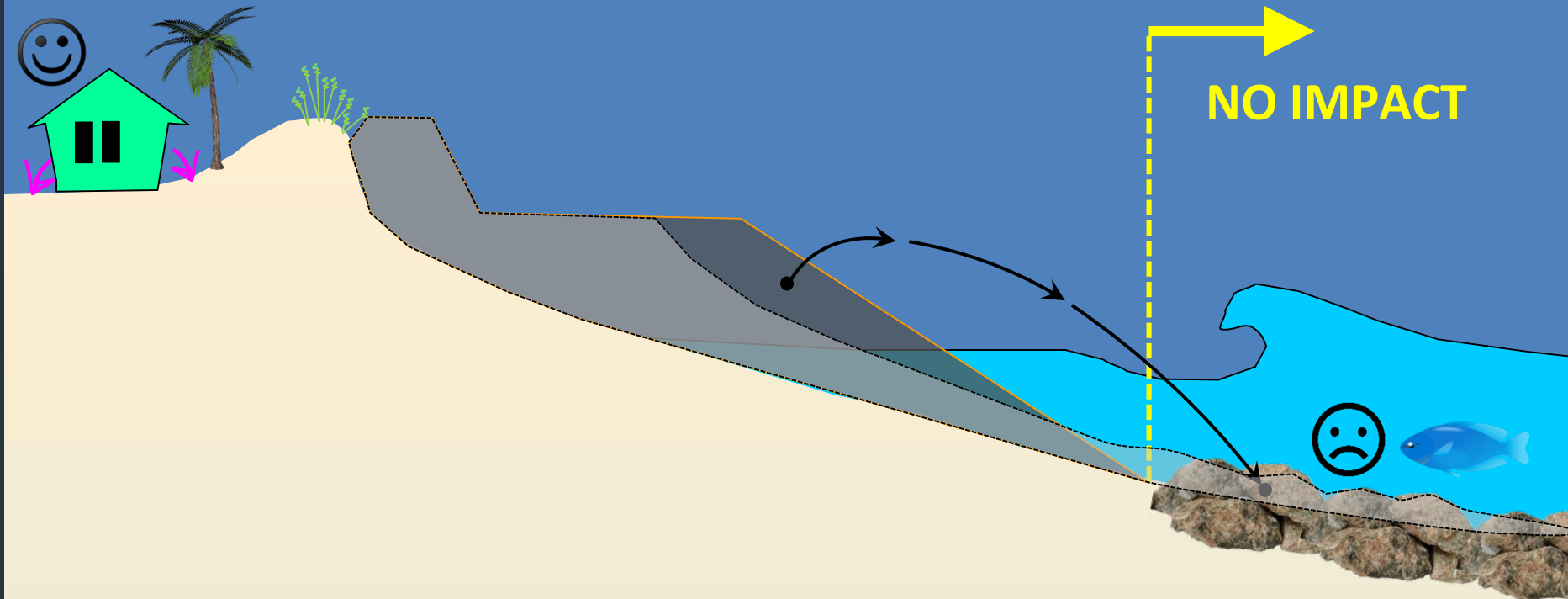


# Hardbottom Avoidance



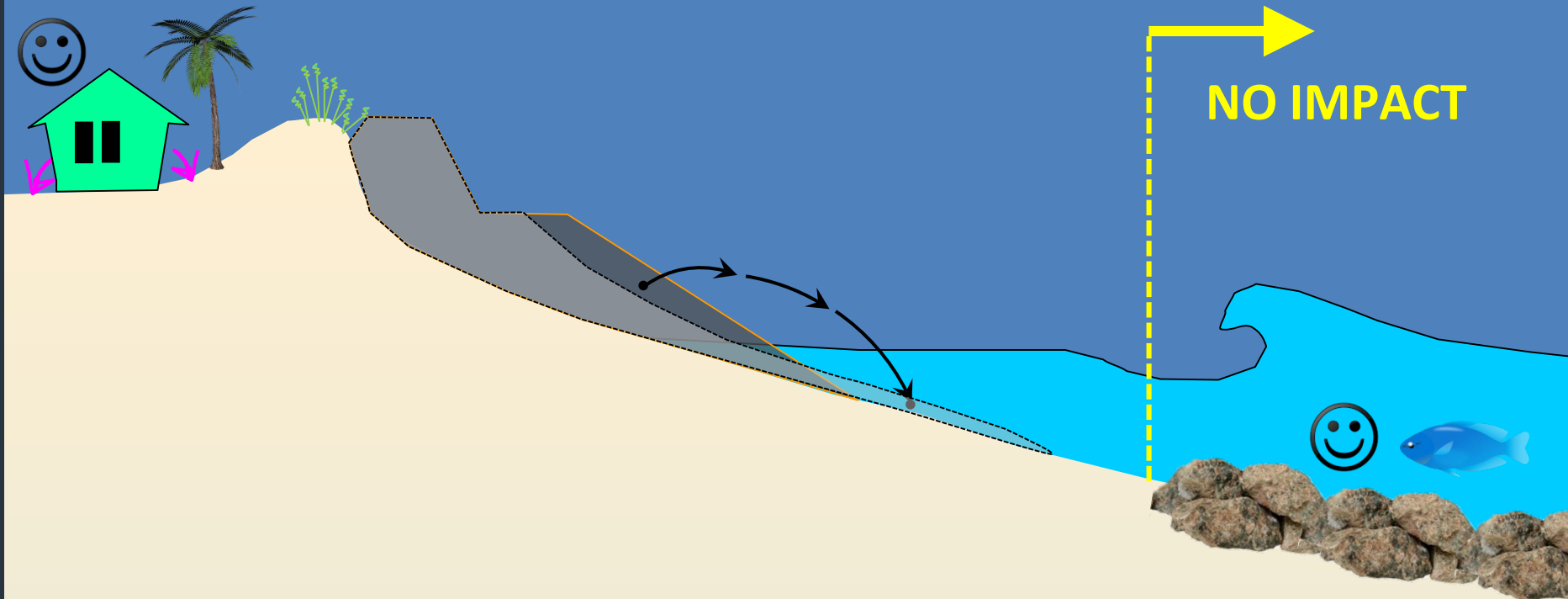
**NEARSHORE  
HARDBOTTOM  
PRESENCE**

# Hardbottom Avoidance



**POTENTIAL  
INDIRECT  
IMPACT**

# Hardbottom Avoidance

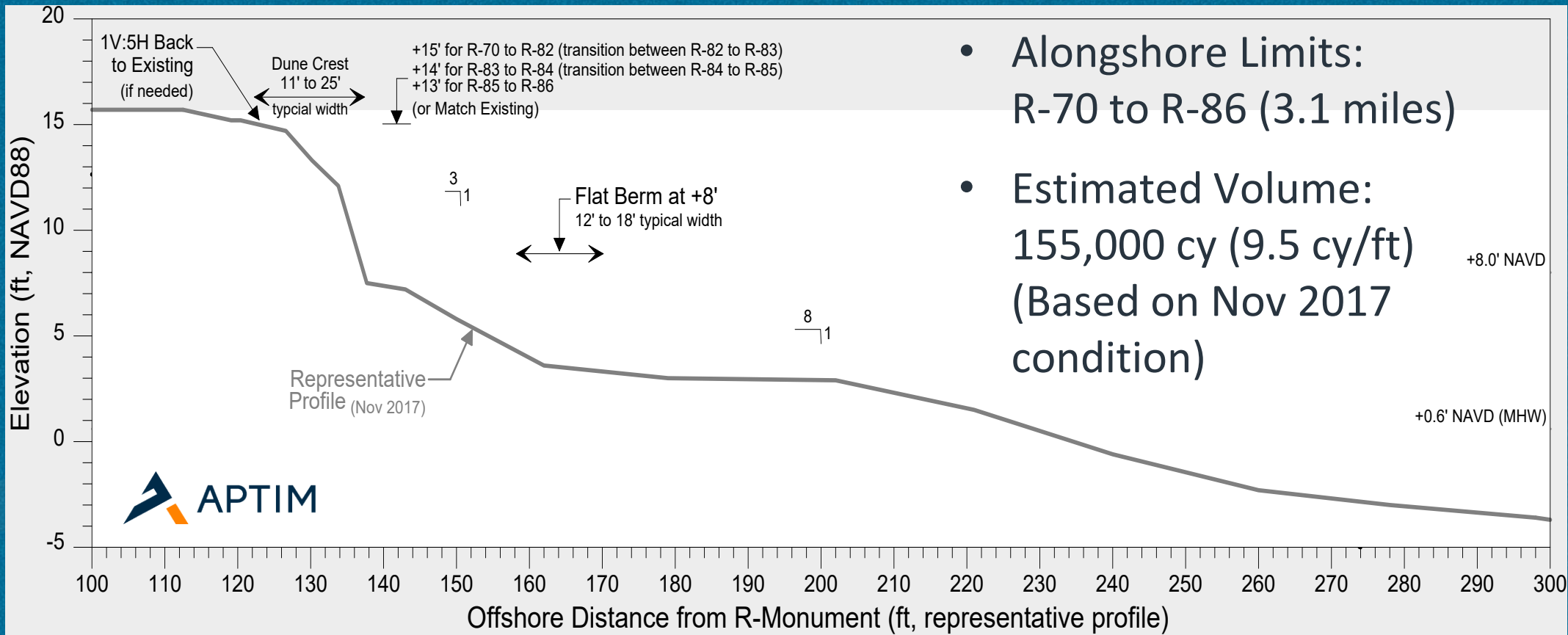


**NEARSHORE  
HARDBOTTOM  
AVOIDANCE**



# Sector 5 Feasibility Study

- New project design for increased protection
- Restore dune with narrow berm and slope to natural profile
- No-impact approach that balances/optimizes objectives



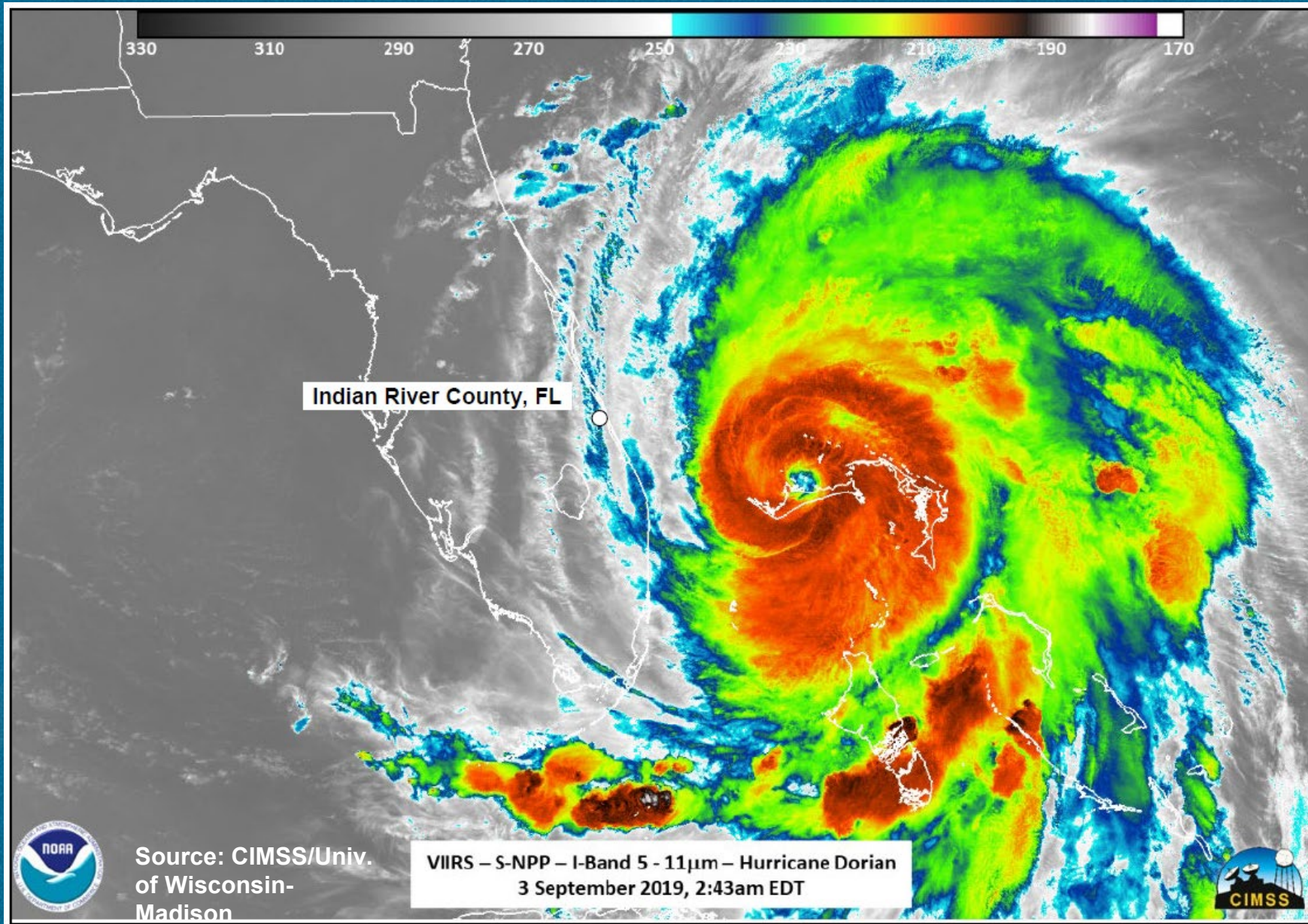
- Alongshore Limits:  
R-70 to R-86 (3.1 miles)
- Estimated Volume:  
155,000 cy (9.5 cy/ft)  
(Based on Nov 2017 condition)

# Sector 5 Design and Permitting Summary

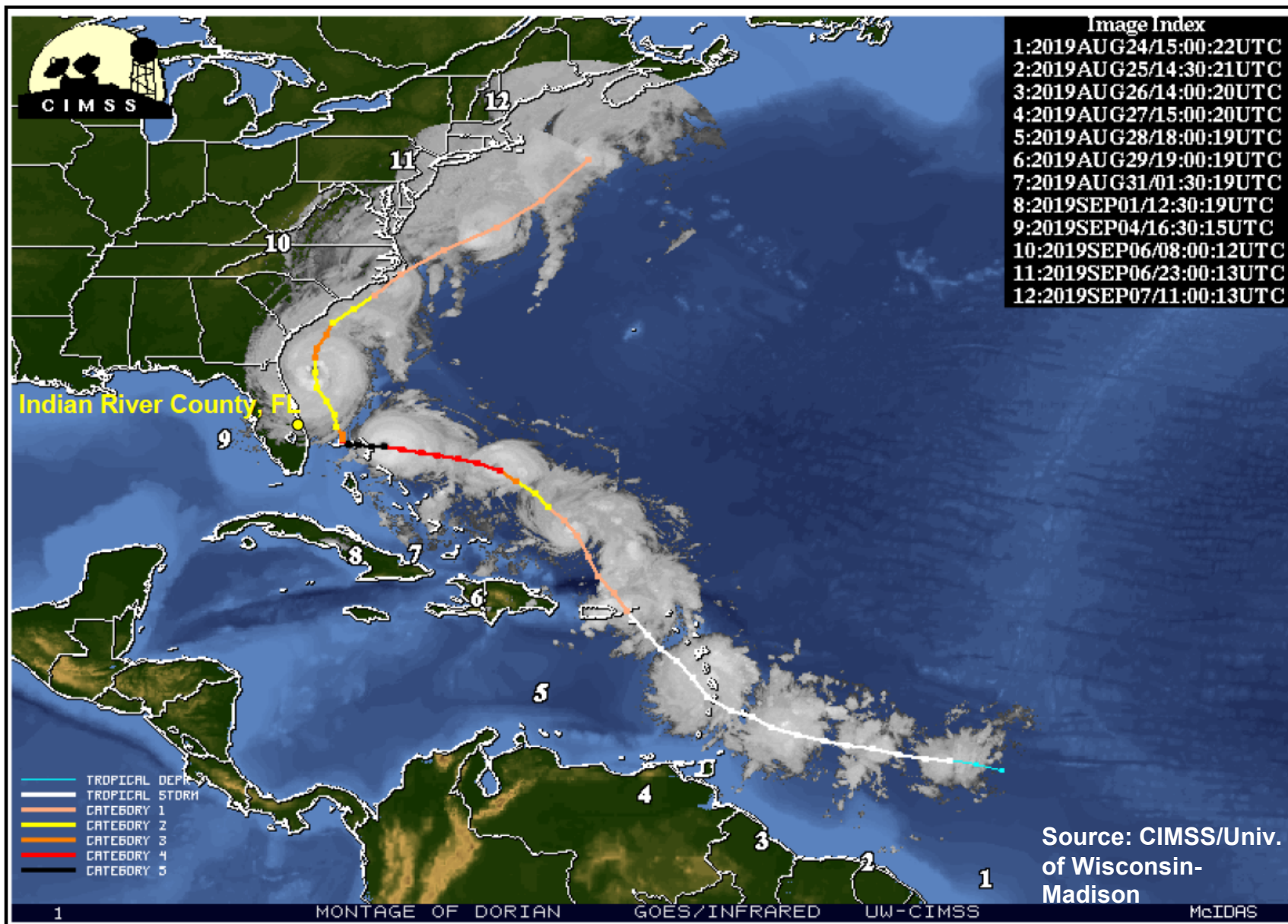
- Design and Feasibility Report
- Pre-App Meetings w/ FDEP & USACE
- Permit Applications (15 Yr Authorization)
- Coordination with other Sectors
- Erosion Control Line (ECL) Establishment
- Plans and Specifications
- Pre-Construction Biological Monitoring
- Bidding and Construction Services
- Construction Easements



# Hurricane Dorian



# Hurricane Dorian Storm Track: Aug 24 – Sep 7, 2019



- Reached Category 5 status on Sep 1, 2019
- Passed 105 miles east of County with 100 mph winds
- Hurricane force winds extended 60 miles
- 15 ft waves offshore with over 2 ft of storm surge
- Runup to dune (7.5 ft NAVD)



# Hurricane Dorian – Sector 5 Assessment

- Site Visit September 5, 2019 with County staff
- Visual Assessment (Recon Level) of dune impacts
- 5 Locations: Humiston Park, Vero Beach, Tracking Station Park, Jaycee Park and Conn Beach
- Basis for Post-Dorian profile survey conducted Sept 2019



# Post Dorian Assessment – Tracking Station



- Consistent 6 ft scarp
- Lifeguard tower stair damage
- Visual estimate: ~5 cy/lf
- Survey results (R73):
  - Above MHW: -7.5 cy/lf
  - MHW to DOC: +4.4 cy/lf
  - **Total (to DOC): -3.1 cy/lf**

# Post Dorian Assessment – Jaycee Park



- Consistent 6-8 ft scarp
- Walkover undermining
- Visual estimate: ~6-8 cy/lf
- Survey results (R77):
  - Above MHW: -5.3 cy/lf
  - MHW to DOC: -4.8 cy/lf
  - **Total (to DOC): -10.1 cy/lf**

# Post Dorian Assessment – Conn Beach



- Consistent 6-8 ft scarp
- Boardwalk undermining
- Visual estimate: ~10 cy/lf
- Survey results (R78):
  - Above MHW: -1.8 cy/lf
  - MHW to DOC: -5.8 cy/lf
  - **Total (to DOC): -7.6 cy/lf**



# Post Dorian Assessment – Vero Beach



- Inconsistent 4 ft scarp
- Ocean Grill undermining
- Visual estimate: ~2 cy/lf
- Survey results (R82):
  - Above MHW: -6.6 cy/lf
  - MHW to DOC: +0.1 cy/lf
  - **Total (to DOC): -6.5 cy/lf**

# Post Dorian Assessment – Humiston Park



- Consistent 6 ft scarp
- Boardwalk undermining
- Visual estimate: ~5 cy/lf
- Survey results (R83):
  - Above MHW: -4.0 cy/lf
  - MHW to DOC: -4.7 cy/lf
  - **Total (to DOC): -8.7 cy/lf**

# Storm Damage Report: Hurricane Dorian (APTIM, 2019)

- Pre-storm survey: **July 2019**
- Post-storm survey: **September 2019**
- Average shoreline retreat: **-0.6 ft**
- Average dune retreat: **-5.1 ft**
- Beach volume loss: **-63,100 cy (-4.5 cy/ft)**
- Pre-storm background erosion: **-2,000 cy**
- **61,100 cy of loss attributed to Dorian**
  - ✓ 50,000 cy by visual assessment 😊



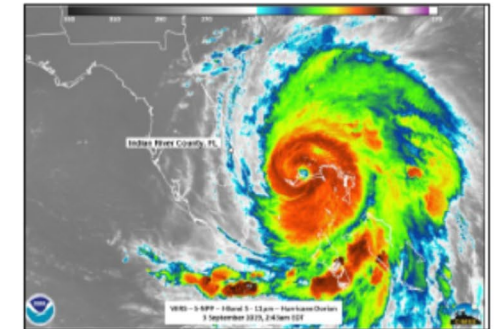
## Indian River County, FL Sector 5 Dune Restoration Project

*Storm Damage Report: Hurricane Dorian*  
September 3-5, 2019

Submitted to:  
Indian River County, FL  
Public Works Department  
Coastal Engineering Division  
1801 27<sup>th</sup> Street, Building A  
Vero Beach, FL 32960



Submitted by:  
Aptim Coastal Planning & Engineering, LLC.  
2481 NW Boca Raton Blvd.  
Boca Raton, FL 33431



December 2019

# Sector 5 Construction

## Bid volume update:

- 268,800 tons (179,200 cy)

## Start of construction:

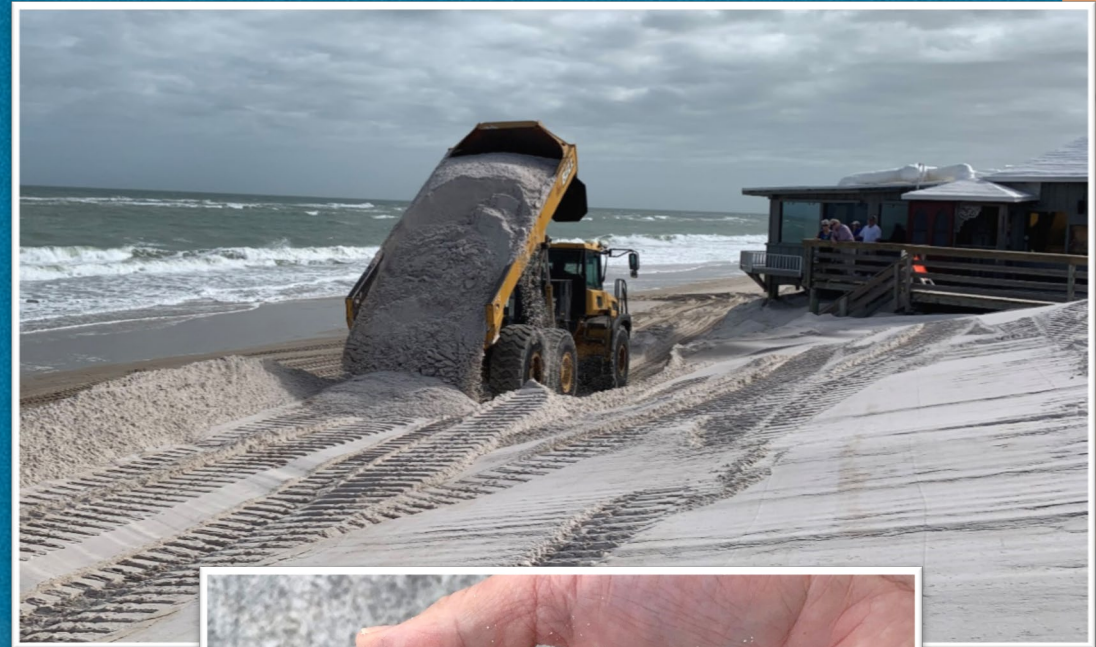
- November 1, 2019

## Contractor:

- Rio-Bak Corporation, Wellington, FL

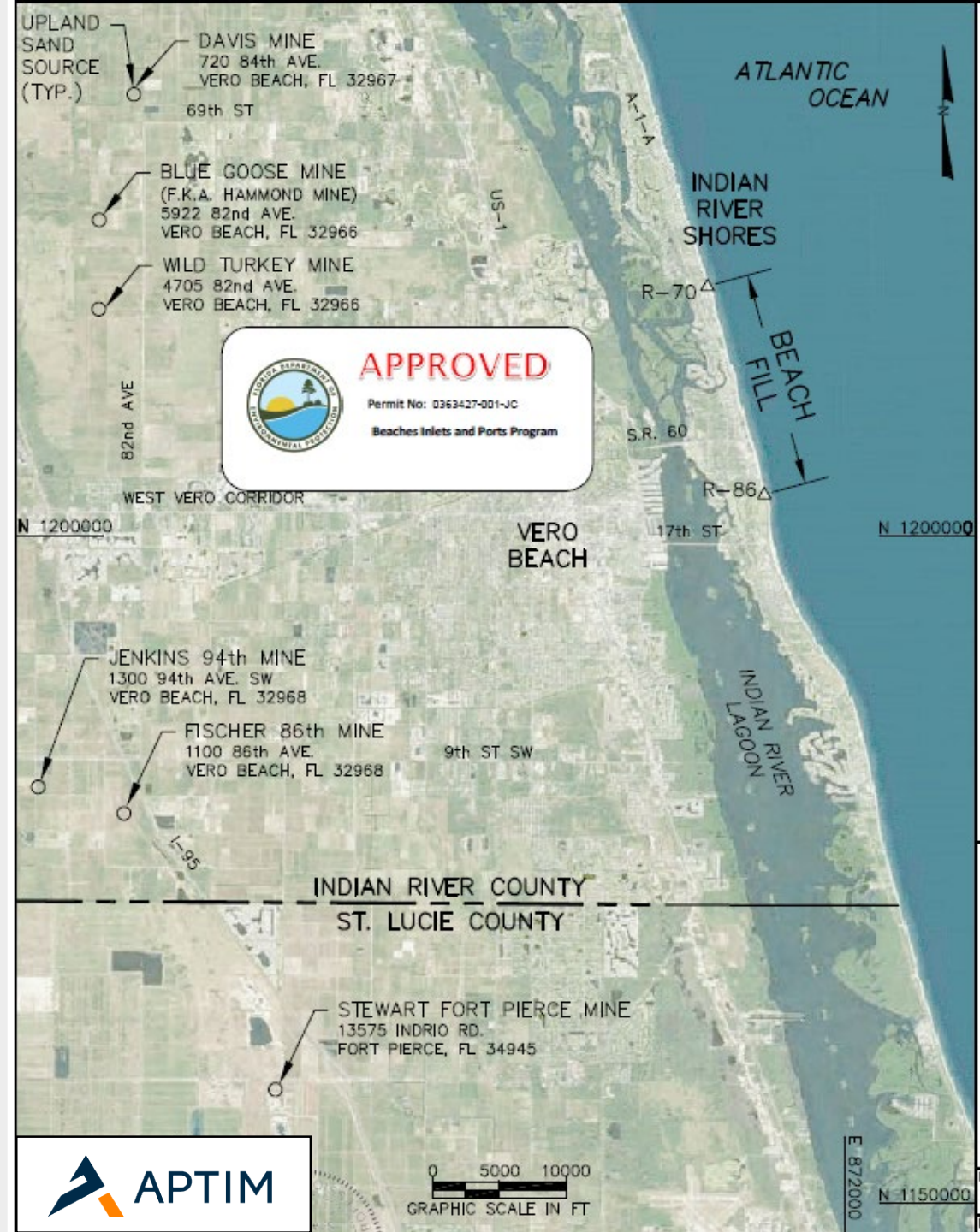
## Sand Mine:

- Stewart Materials, Fort Pierce, FL



# Upland Sand Source

- 6 mines approved by FDEP for project
- County RFP for sand sources
- Stewart Fort Pierce Mine selected by contractor for Sector 5 project
- Sand Data
  - Mean Grain Size: 0.32 to 0.38 mm
  - Silt Content: Less than 1 %
  - Munsell Color: 10YR 7/1 to 10YR 8/2



# Fill Placement Challenges & Contractor

## Approach

- Dune/berm fill timing
- Parcels without easements
- Site logistics:
  - Access locations
  - Stockpiling
  - Off-road trucks
- Site specific tie-in points & field verification



# No Easement? No Problem ...



A parcel without a signed construction easement - November 2019

Indian River County, Sector 5 Beach and Dune Restoration Project

(Photo donated by Ross Rowlinson; Courtesy of Quintin Bergman, Indian River County)

# Seawall Tie-in Example



- 1/15/2020



# Vegetation Tie-in Example



- 1/31/2020

# Post Fill – Humiston Park



- 1/31/2020

# Dune Planting

- Planting permitted to be performed during/after construction (ongoing)
- Projected to be completed ahead of schedule



# Construction Status

- Dune repair and Dune plantings in progress
- As of 1/31, 238,200 tons placed
- 90% complete by tonnage
- 98% complete by length
- Projected project completion ahead of schedule



# Concluding Remarks

- Balance protection of infrastructure with environment
- Hardbottom avoidance is achievable but challenging
- Advanced coordination is critical to success
- Clarify easement needs and purpose with public
- Assume that storms come at the worst time
- Post-storm assessments require survey to quantify losses
- Constructability relies on designer and contractor
- Anticipate and plan for project/site specific adjustments



# FLORIDA SHORE & BEACH PRESERVATION ASSOCIATION

A League of Cities and Counties on Beach and Coastal Issues



## THANK YOU!

### Contact Information:

**Thomas P. Pierro, P.E., D.CE**

Principal Engineer

Mobile: 561-756-2535

[tpierro@coastalprotectioneng.com](mailto:tpierro@coastalprotectioneng.com)

### Special Thanks

- **Indian River County:** Rich Szpyrka, James Ennis, Quintin Bergman, Chip Boyette, Molly Klinepeter
- James Gray, Kendra Cope, Will Reilly, Jordon Cheifet, Stacy Buck, Chris Paul and APTIM Staff
- FDEP, FEMA, USACE and commenting agencies