

Emergency Assessment of Coastal Changes Caused by Hurricane Ian

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Coastal Protection Engineering

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COASTAL
PROTECTION
ENGINEERING

JALBTCX TOOLBOX



Quick Response

Generate & Edit Baseline & Transects
Quantify Shoreline and Volume Change
Standardized Mapping

Profile Feature Extraction

Profile Metrics
Coastal Engineering Resiliency Index

Multiple Dataset

Multiple Years
Quantify Trends

INPUTS → OUTPUTS

Inputs

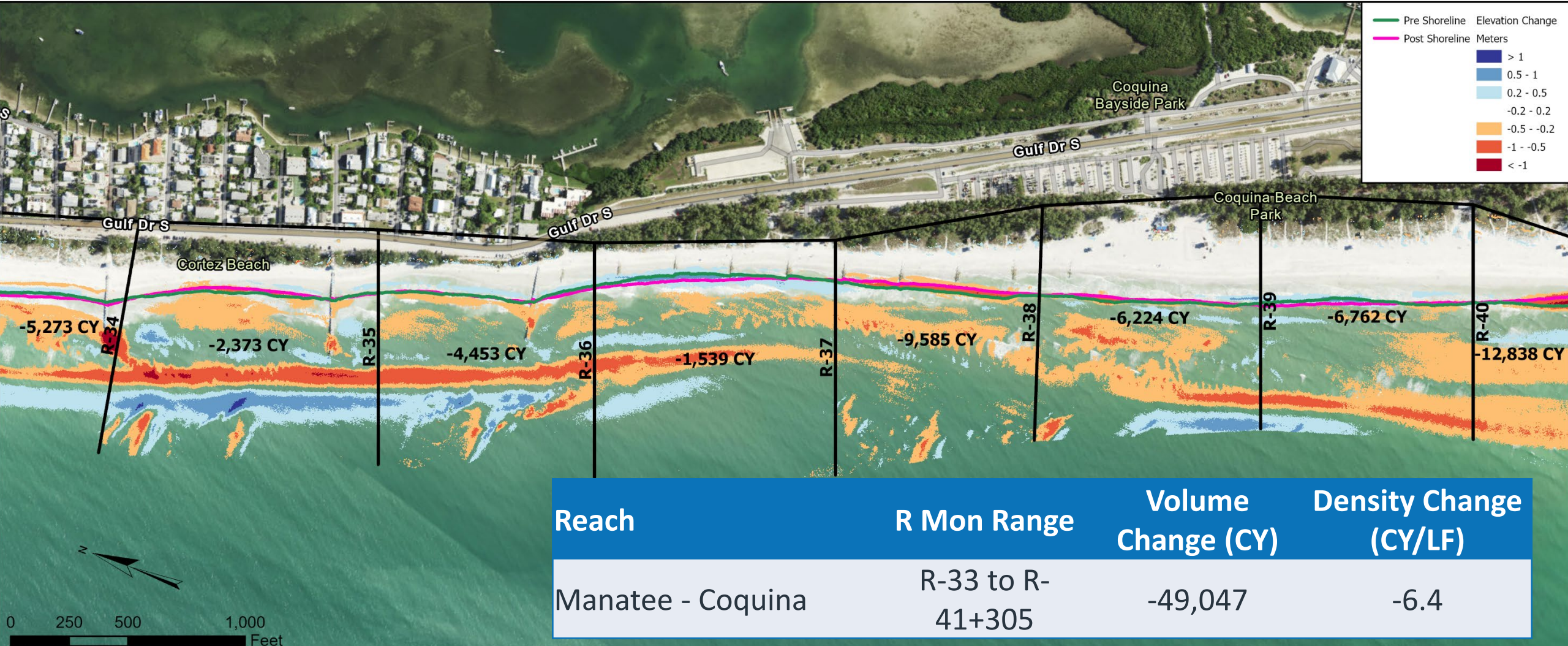
- R-Monument Location and Range
- Intermediate R-Monuments
- 990 Before Ian May-June 2022 Bare Earth DEMs
- 591 After Ian October 2022 Bare Earth DEMs



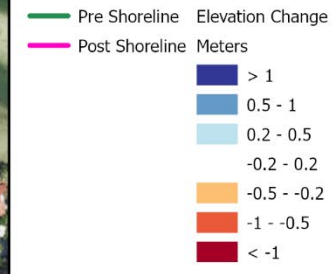
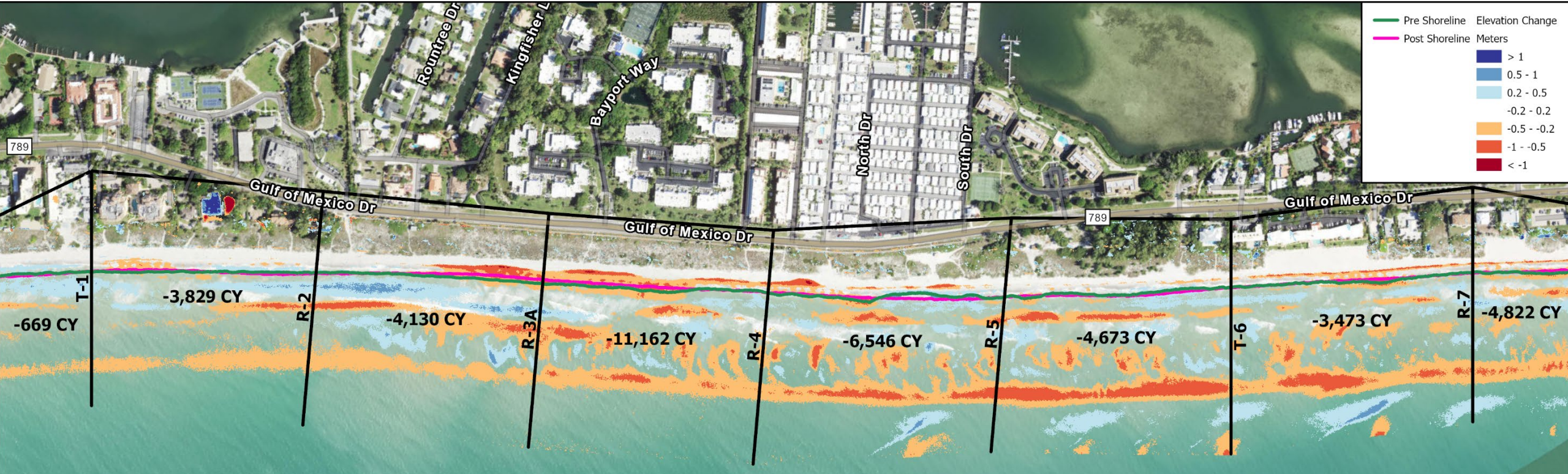
Outputs

- Baselines
- Transects
- Shorelines
- Difference Grids
- Shoreline Change
- Volume Change

MANATEE – COQUINA BEACH



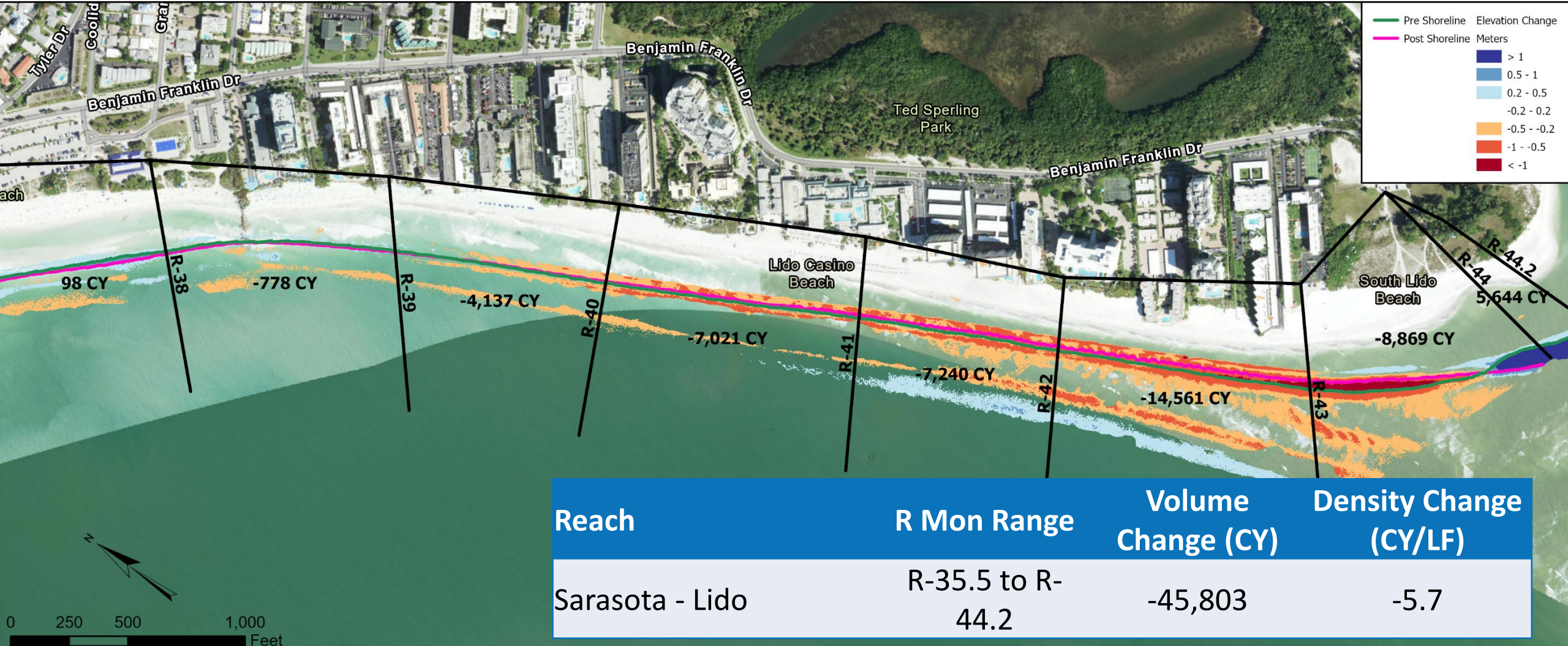
LONGBOAT KEY



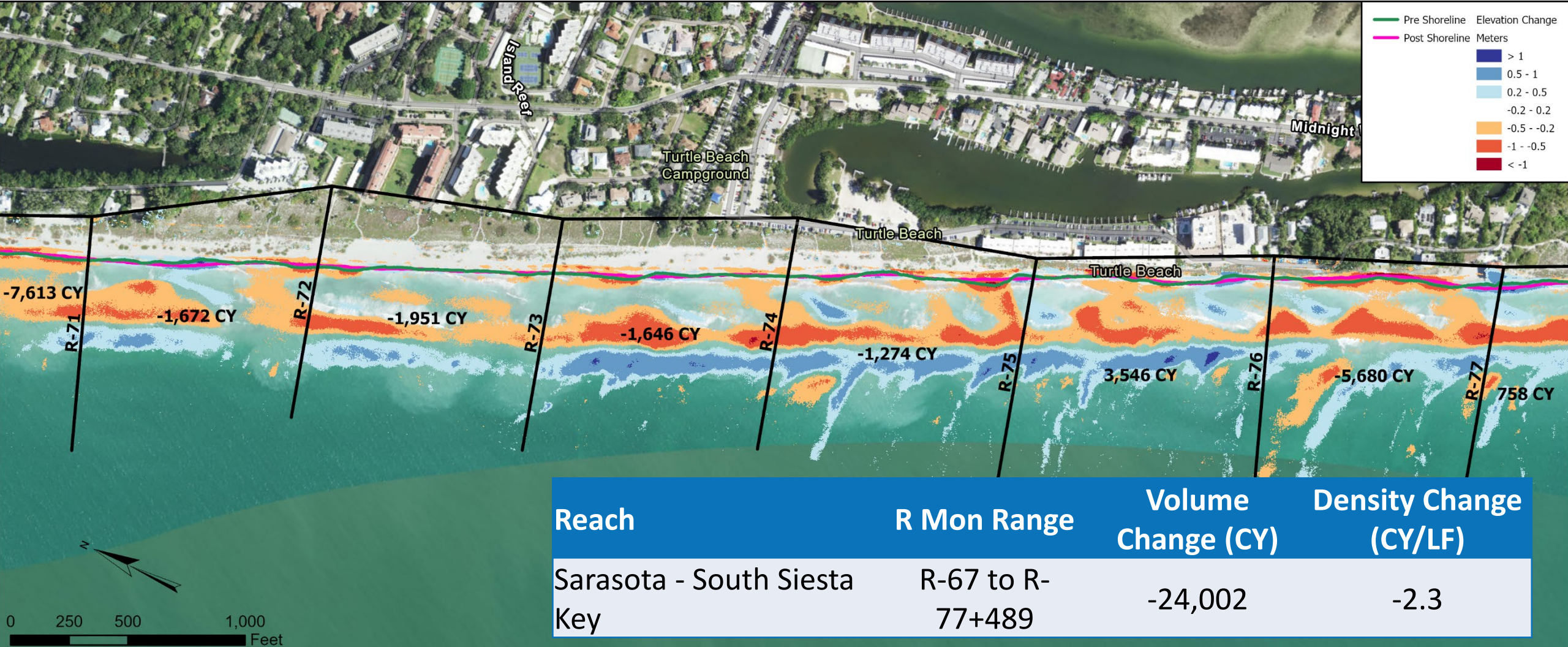
Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Longboat Key	R-42.5 to R-29+430	-296,432	-5.5



SARASOTA – LIDO KEY



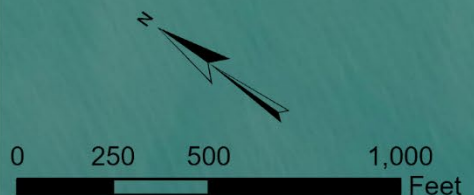
SARASOTA – SOUTH SIESTA KEY



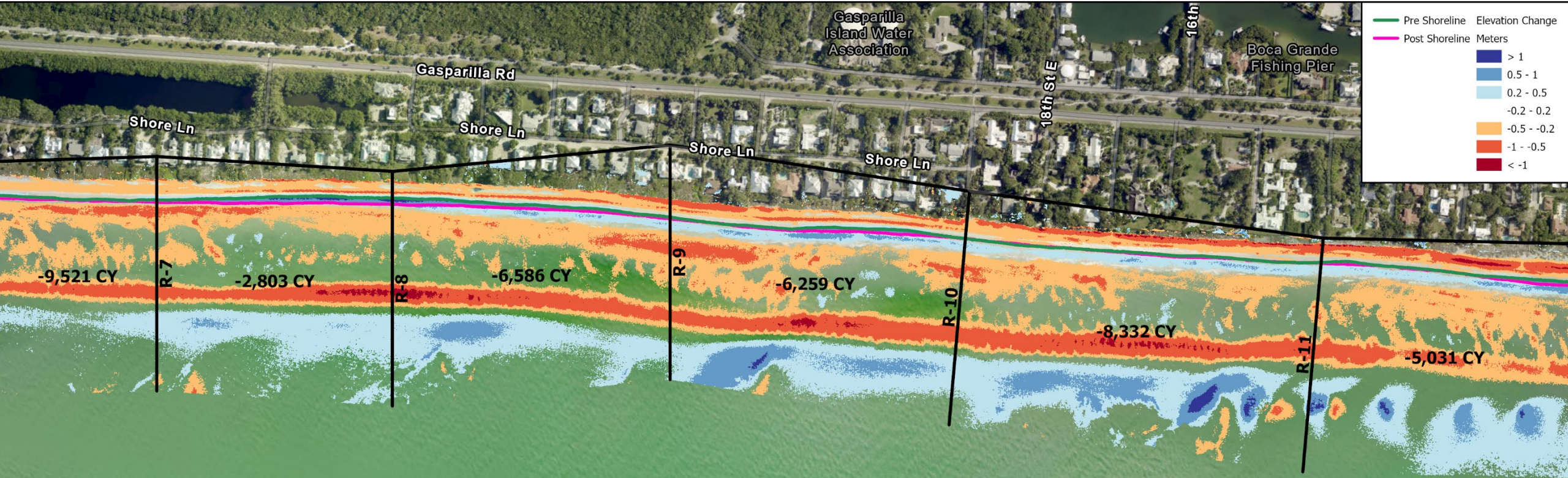
CHARLOTTE



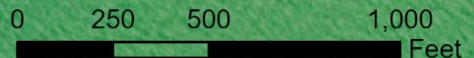
Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Charlotte - Stump Pass North	R-18 to R-21+300	-49,669	-15.3
Charlotte - Stump Pass South	R-22-1200 to R-22+600	6,958	3.9
Charlotte County	R-29 to R-40	-175,692	-16.6



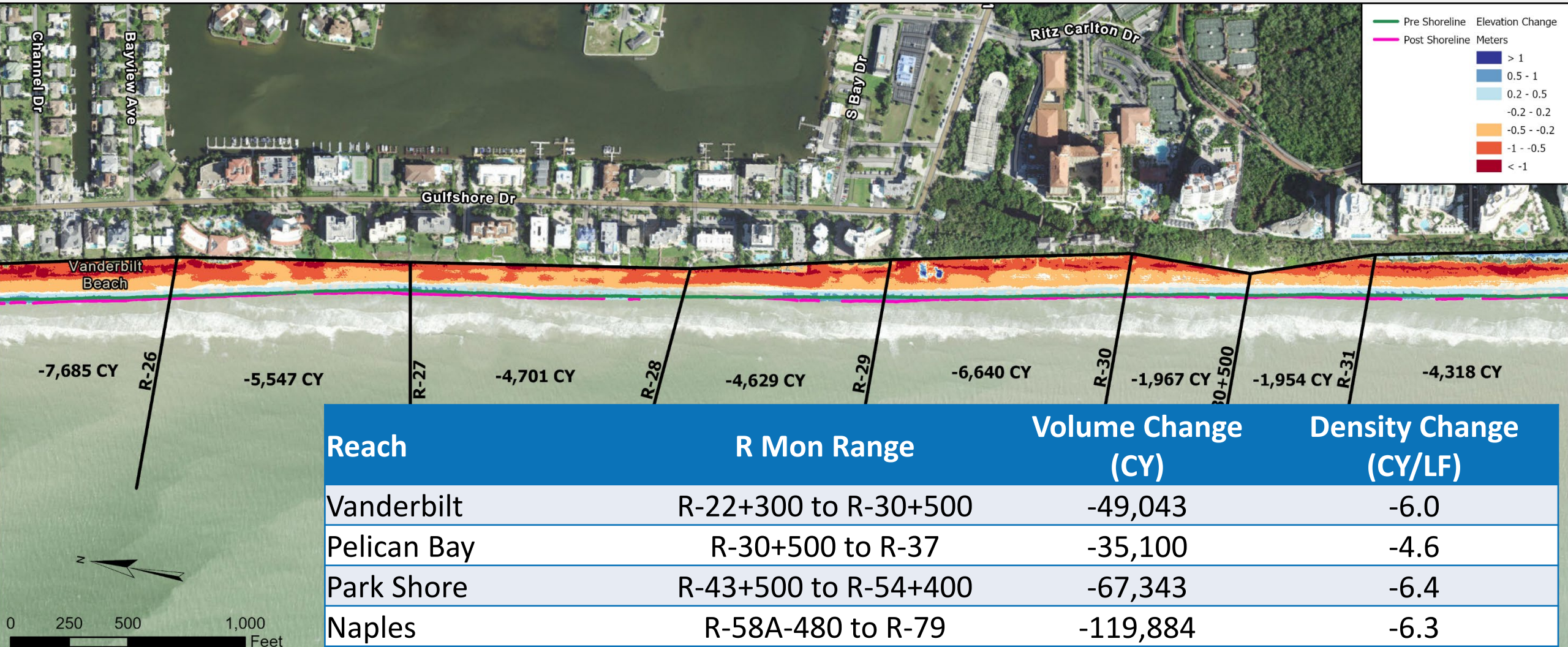
GASPARILLA



Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Gasparilla	R-58 to R-26A	-238,838	-6.8

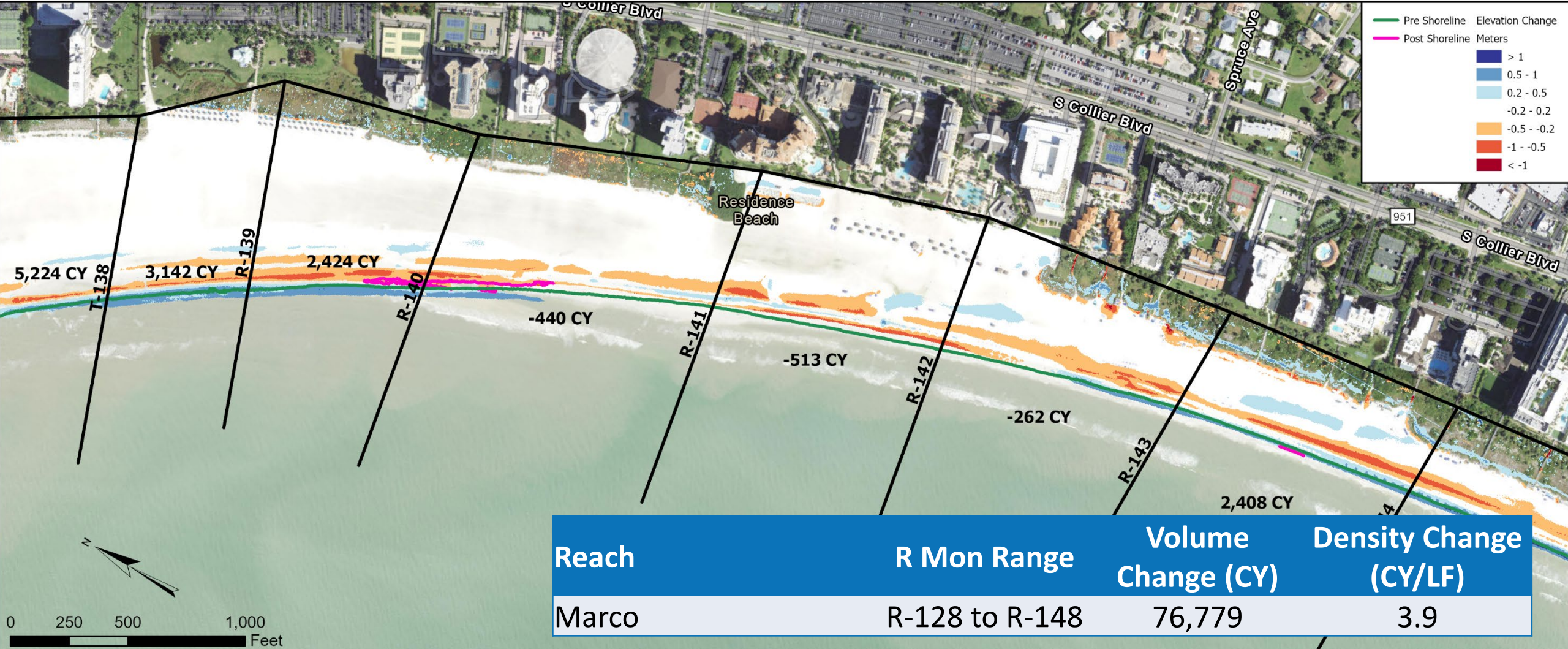


COLLIER – VANDERBILT BEACH



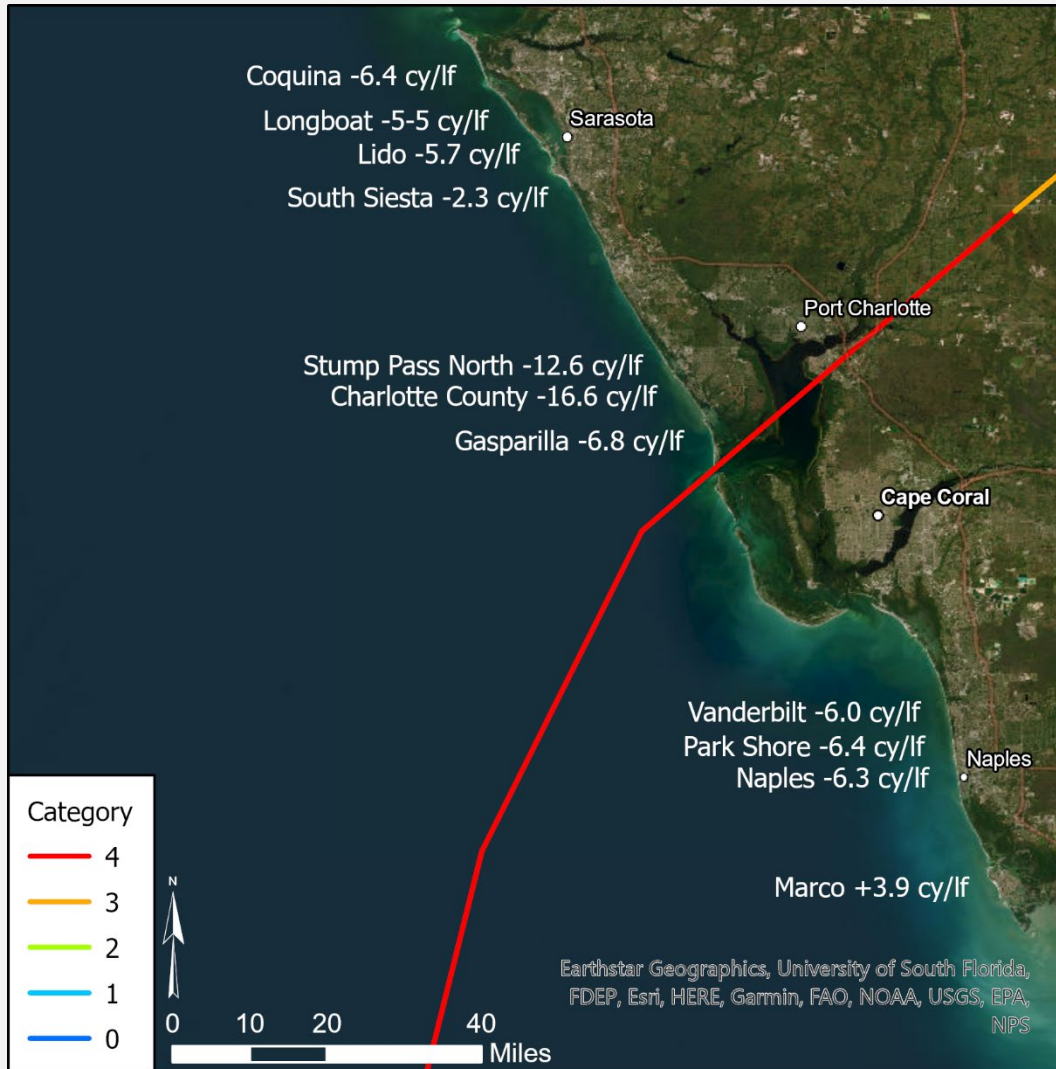
Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Vanderbilt	R-22+300 to R-30+500	-49,043	-6.0
Pelican Bay	R-30+500 to R-37	-35,100	-4.6
Park Shore	R-43+500 to R-54+400	-67,343	-6.4
Naples	R-58A-480 to R-79	-119,884	-6.3

COLLIER – MARCO



Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Marco	R-128 to R-148	76,779	3.9

REGIONAL VOLUME CHANGE

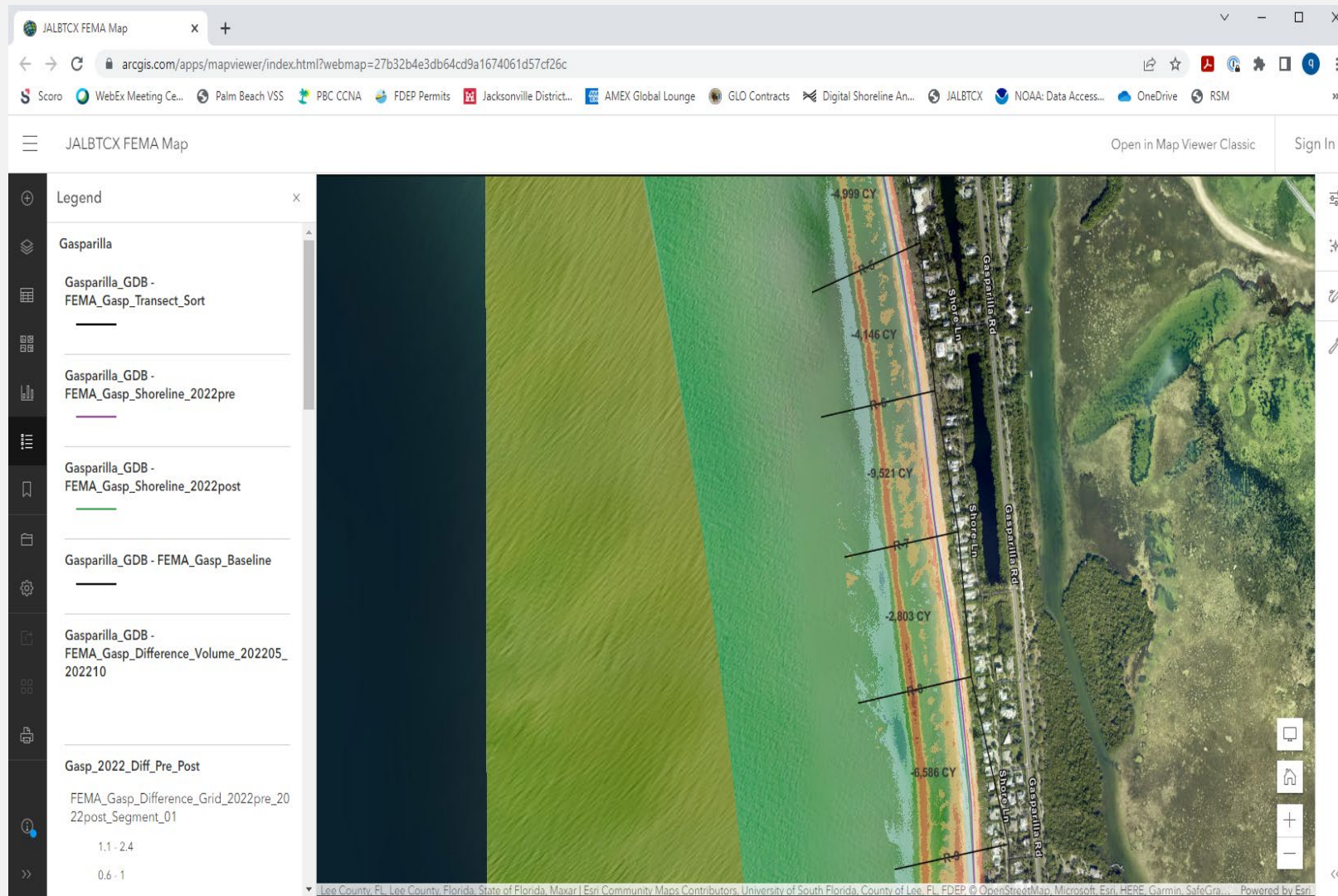


- Net Accretion
 - Stump Pass South +3.9 cy/lf
 - Accretion at tip and in channel
 - Marco +3.9 cy/lf
 - Collier topography only
- Largest Erosion
 - Charlotte County -16.6 cy/lf
 - Berm and sandbar erosion
 - Stump Pass North -15.3 cy/lf
 - Berm and sandbar, tip of Manasota Key
- All Others
 - ~ -4.5 to -6.5 cy/lf

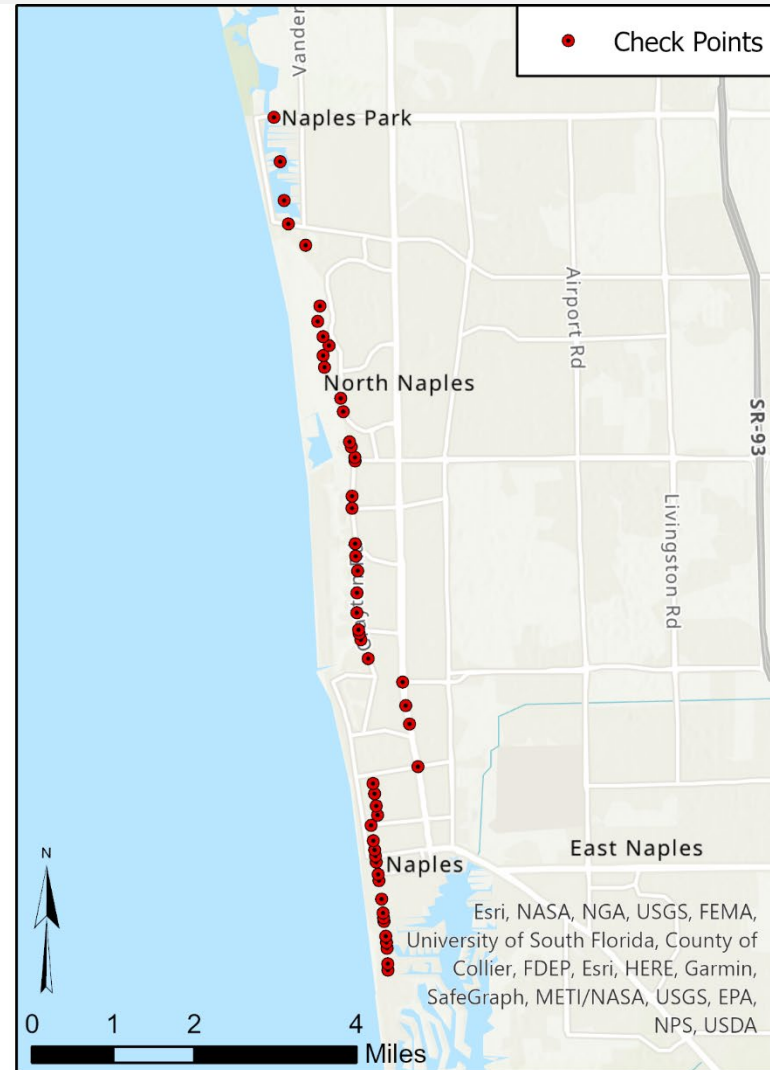
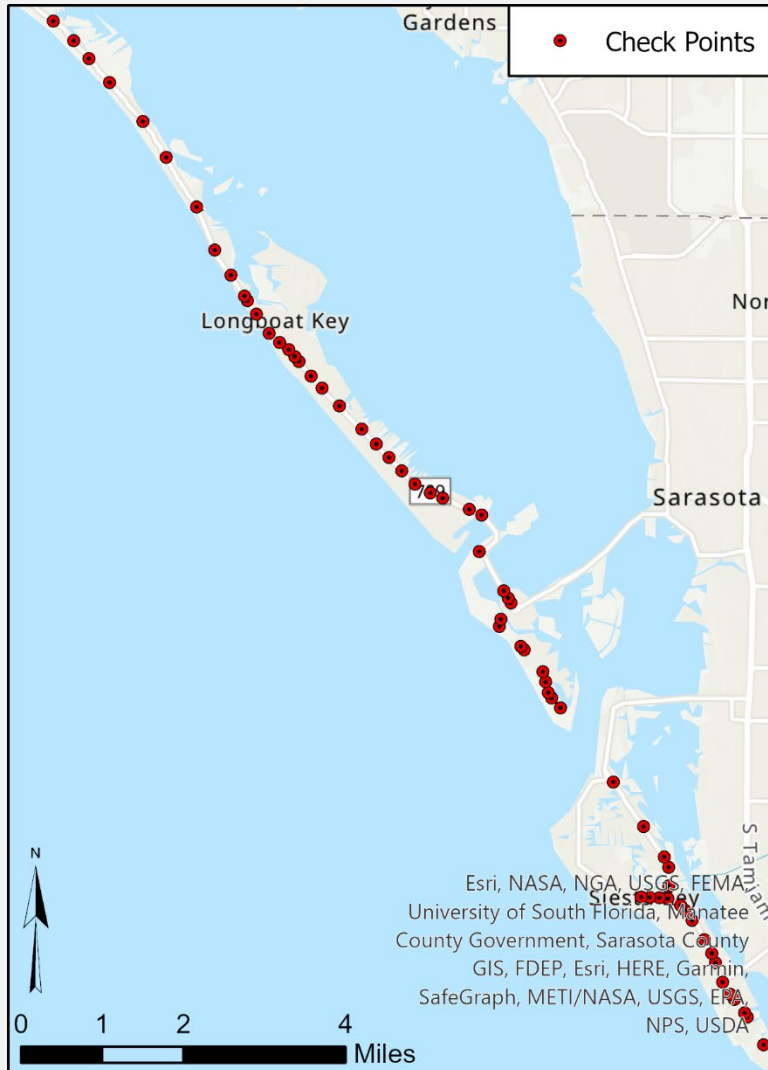
DELIVERABLES – DATA TABLES

Reach	R Mon Range	Volume Change (CY)	Density Change (CY/LF)
Manatee - Coquina	R-33 to R-41+305	-49,047	-6.4
Longboat Key	R-42.5 to R-29+430	-296,432	-5.5
Sarasota - Lido	R-35.5 to R-44.2	-45,803	-5.7
Sarasota - South Siesta Key	R-67 to R-77+489	-24,002	-2.3
Charlotte - Stump Pass North	R-18 to R-21+300	-49,669	-15.3
Charlotte - Stump Pass South	R-22-1200 to R-22+600	6,958	3.9
Charlotte County	R-29 to R-40	-175,692	-16.6
Gasparilla	R-58 to R-26A	-238,838	-6.8
Collier - Vanderbilt	R-22+300 to R-30+500	-49,043	-6.0
Collier - Pelican Bay	R-30+500 to R-37	-35,100	-4.6
Collier - Park Shore	R-43+500 to R-54+400	-67,343	-6.4
Collier - Naples	R-58A-480 to R-79	-119,884	-6.3
Collier - Marco	R-128 to R-148	76,779	3.9

DELIVERABLES – ONLINE REVIEW



VERTICAL CHECKS



- Flat, hard unchanged surfaces
 - Middle road
 - Intersections
- Difference grid

Mean 0.01

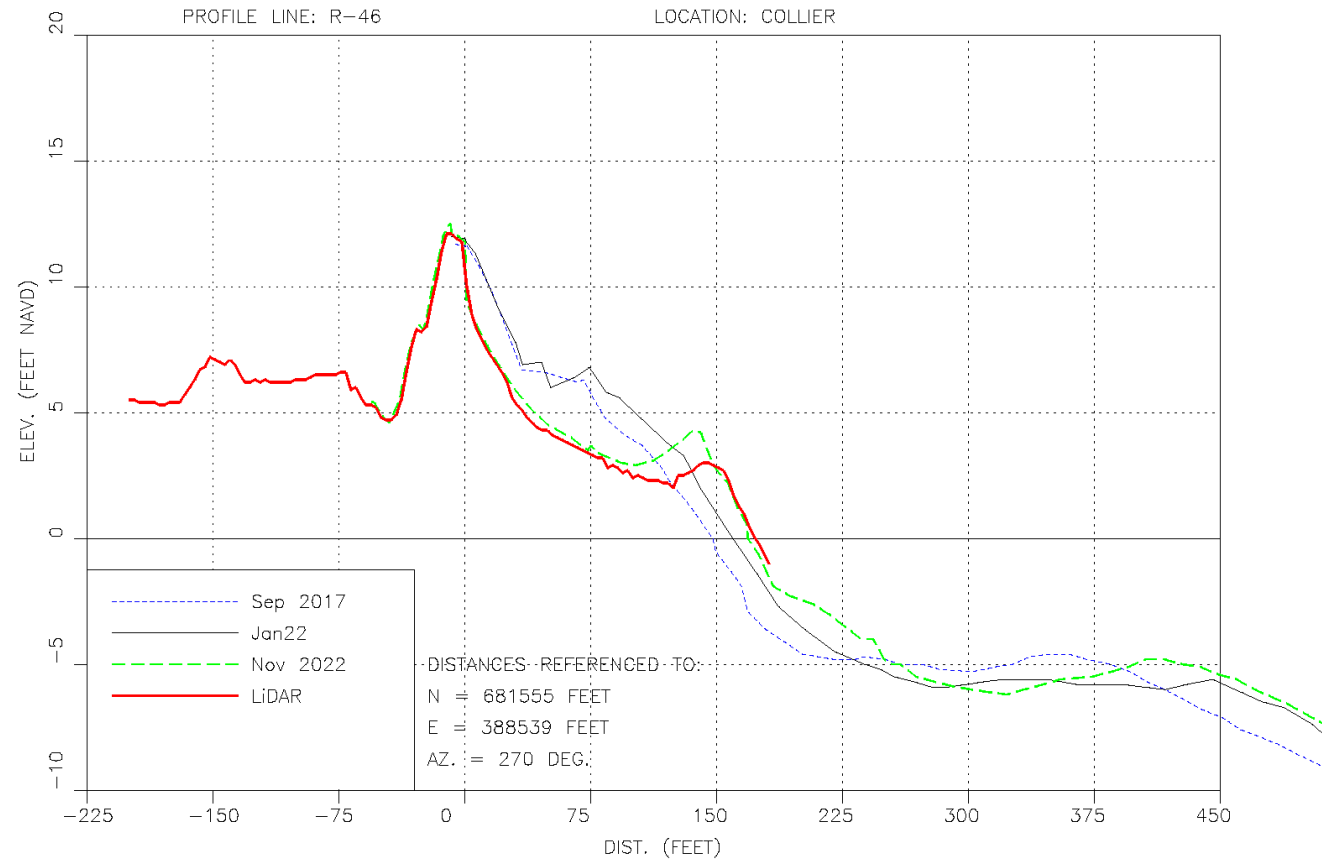
Min -0.11

Max 0.09

RMSE 0.04

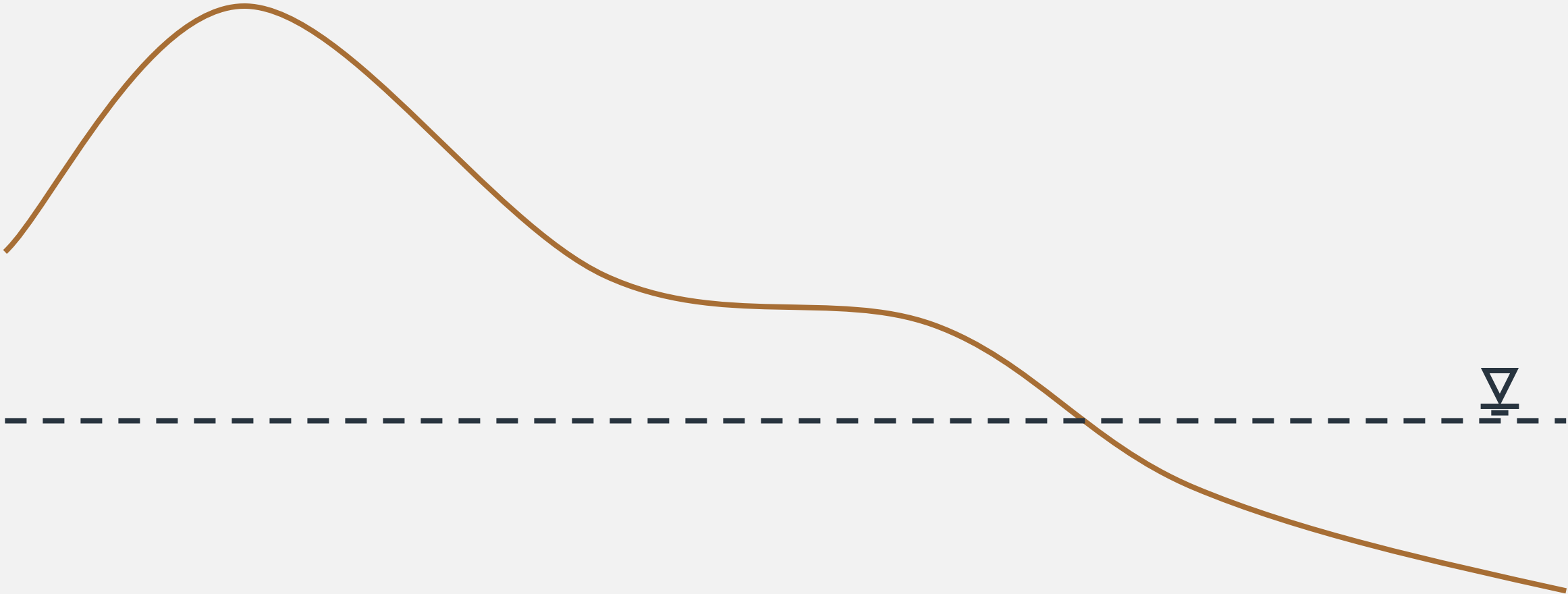
StD 0.04

BEACH PROFILES



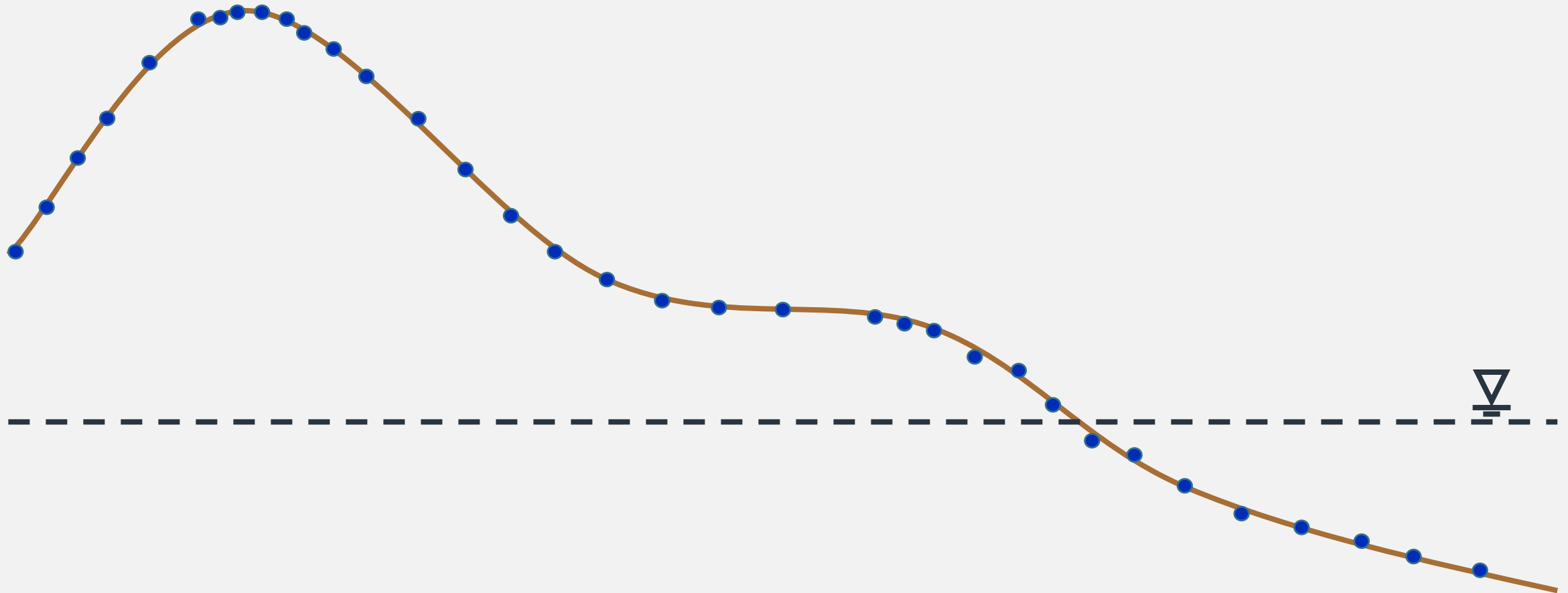
- Survey Profiles
 - September 2017
 - January 2022
 - November 2022
- Lidar
 - October 2022

BEACH PROFILE



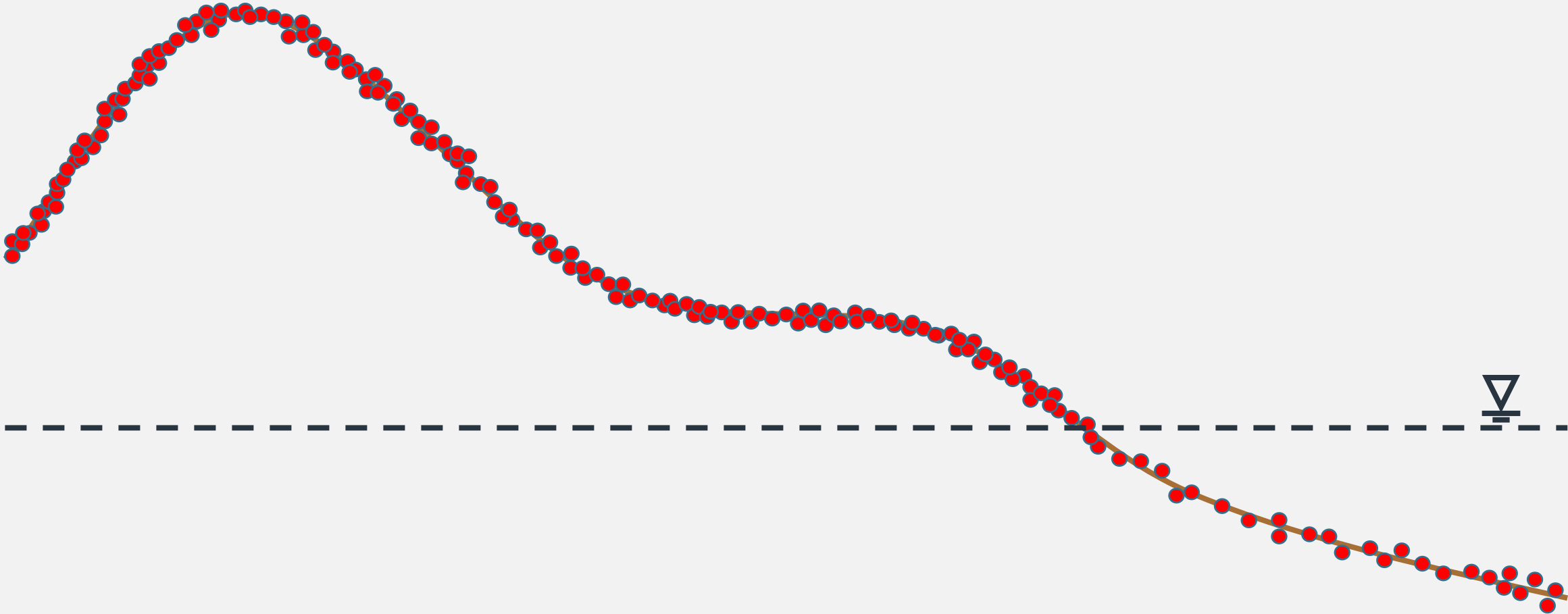
GPS SURVEY POINT CLOUD

- Beach
- GPS Points



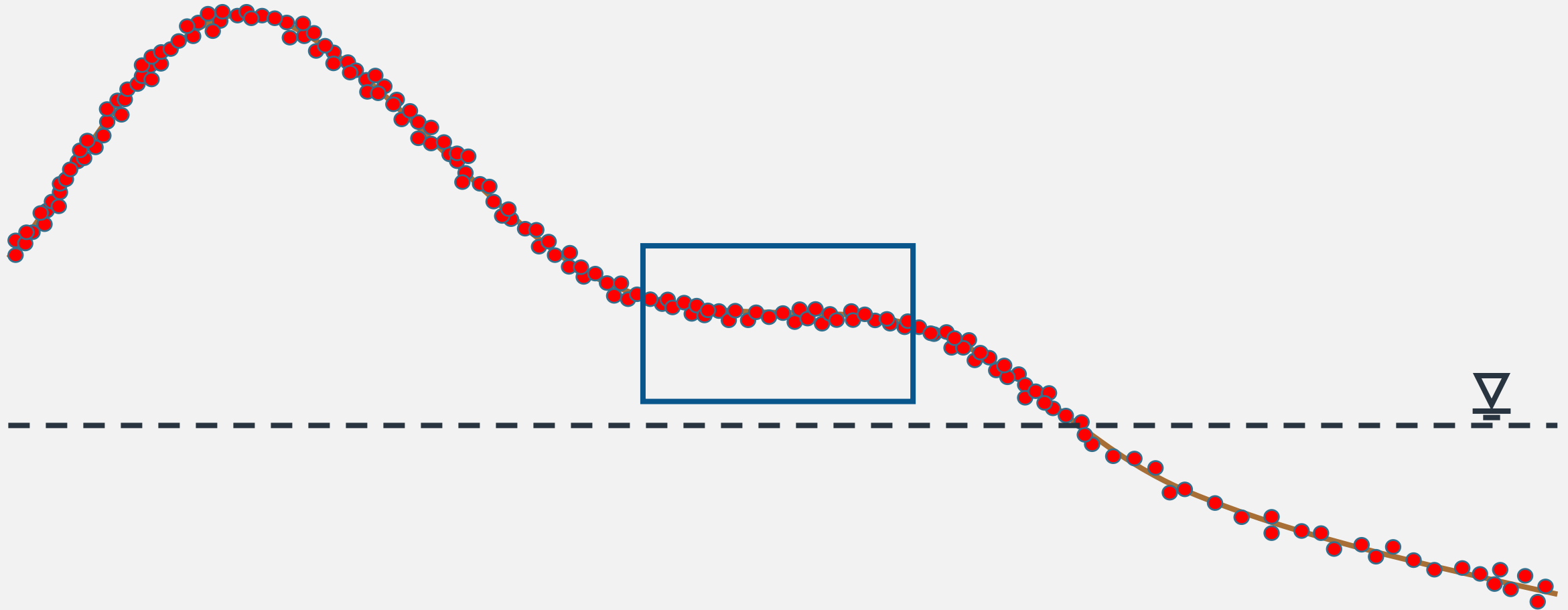
LIDAR POINT CLOUD

- Beach
- GPS Points
- Lidar Points



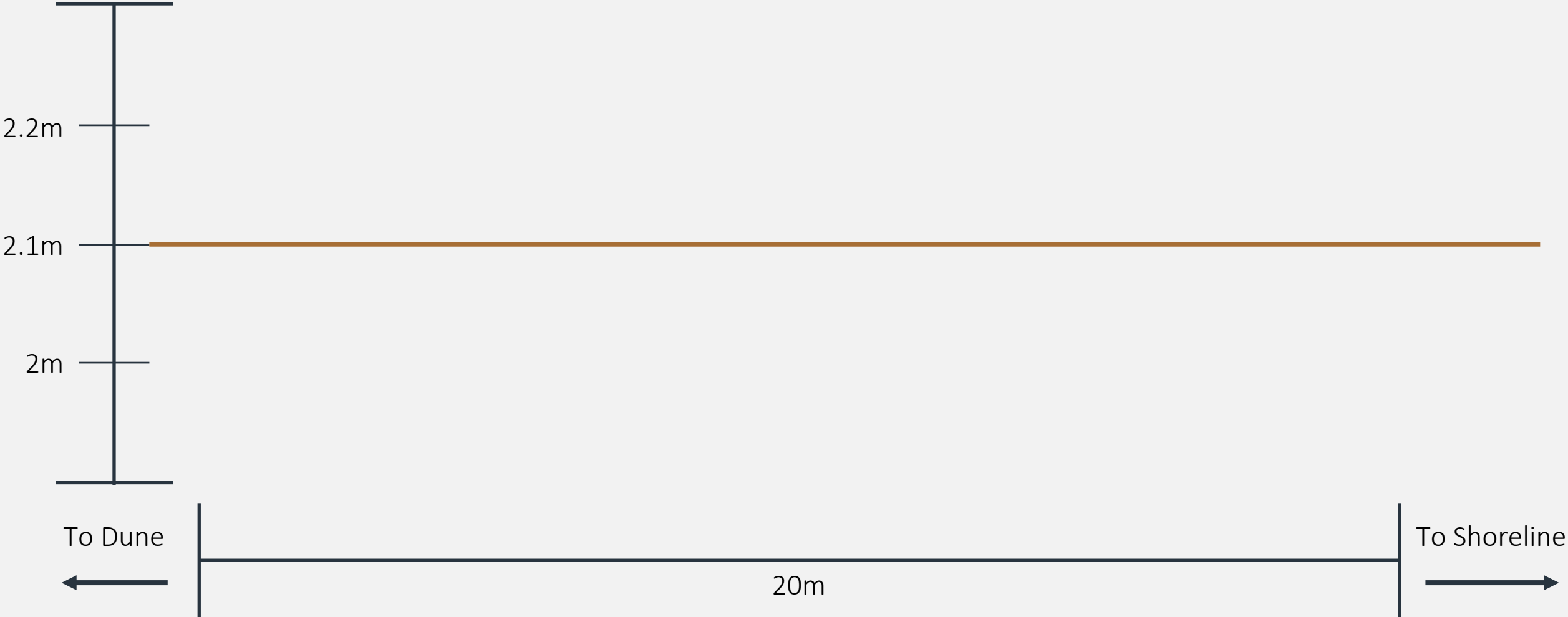
LIDAR POINT CLOUD

- Beach
- GPS Points
- Lidar Points



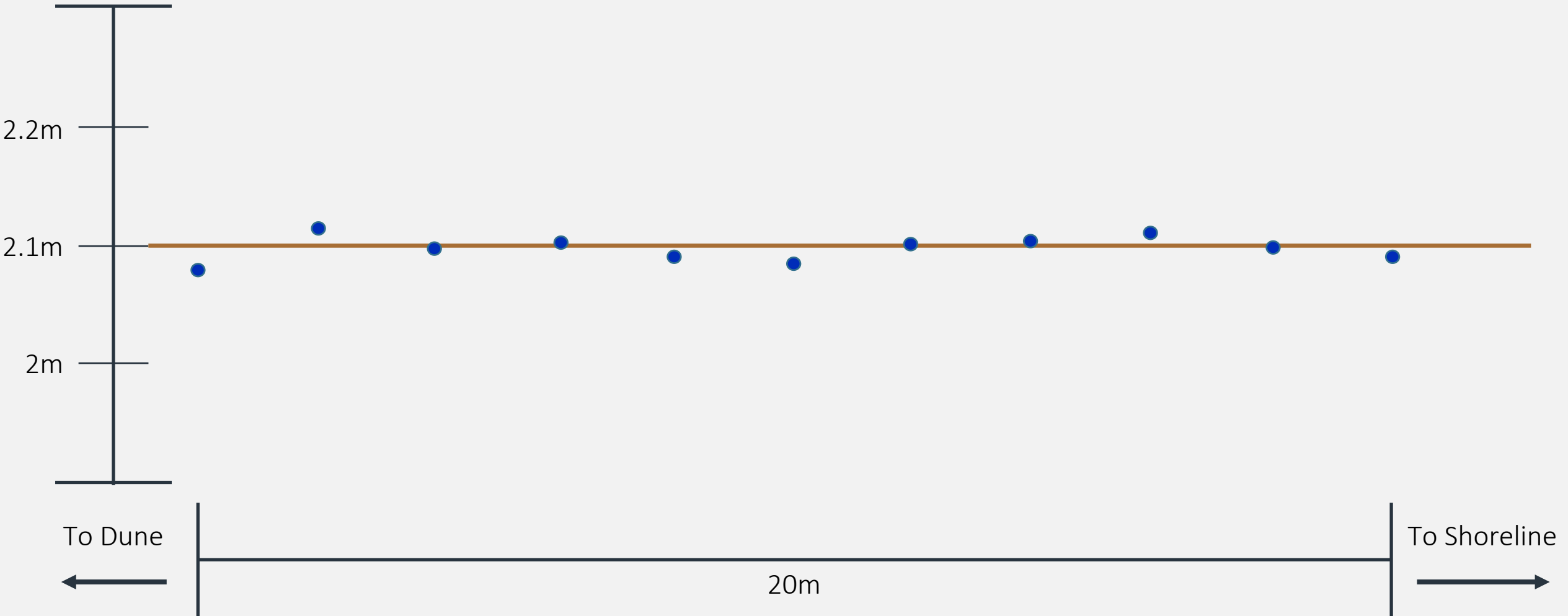
Beach

BERM PROFILE



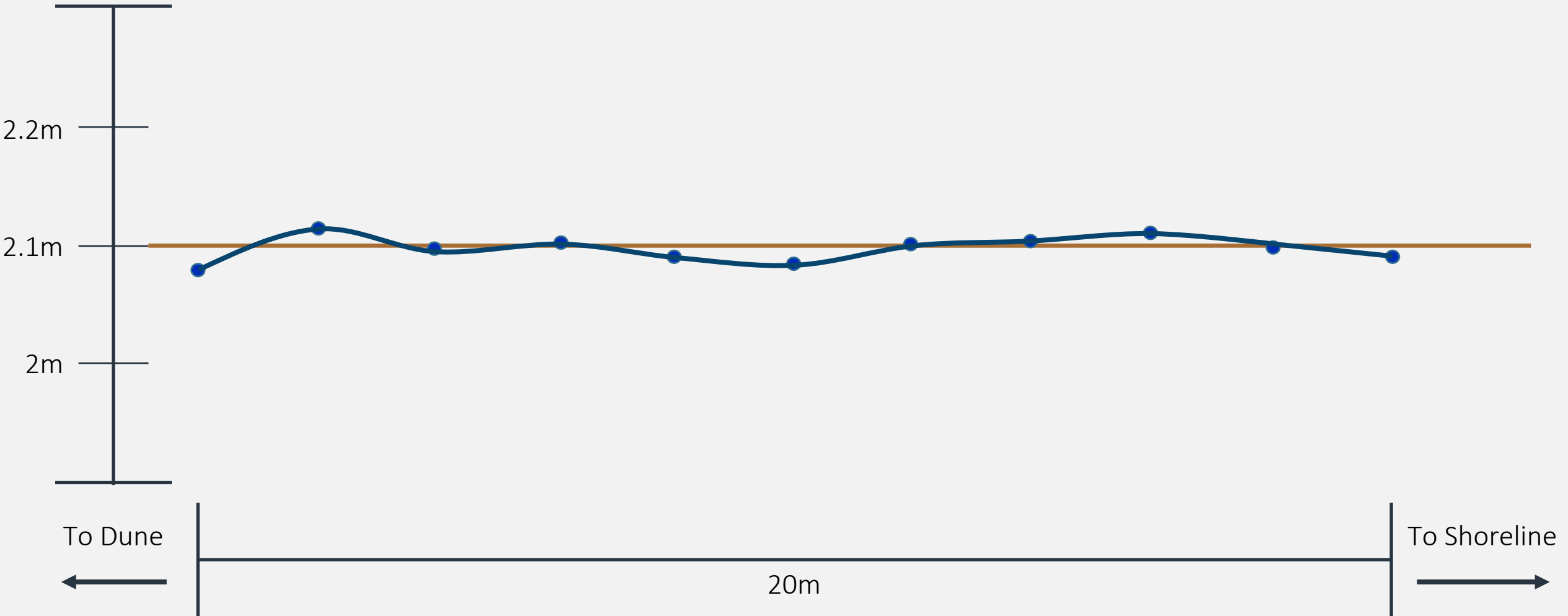
SURVEY POINT CLOUD

- Beach
- GPS Points



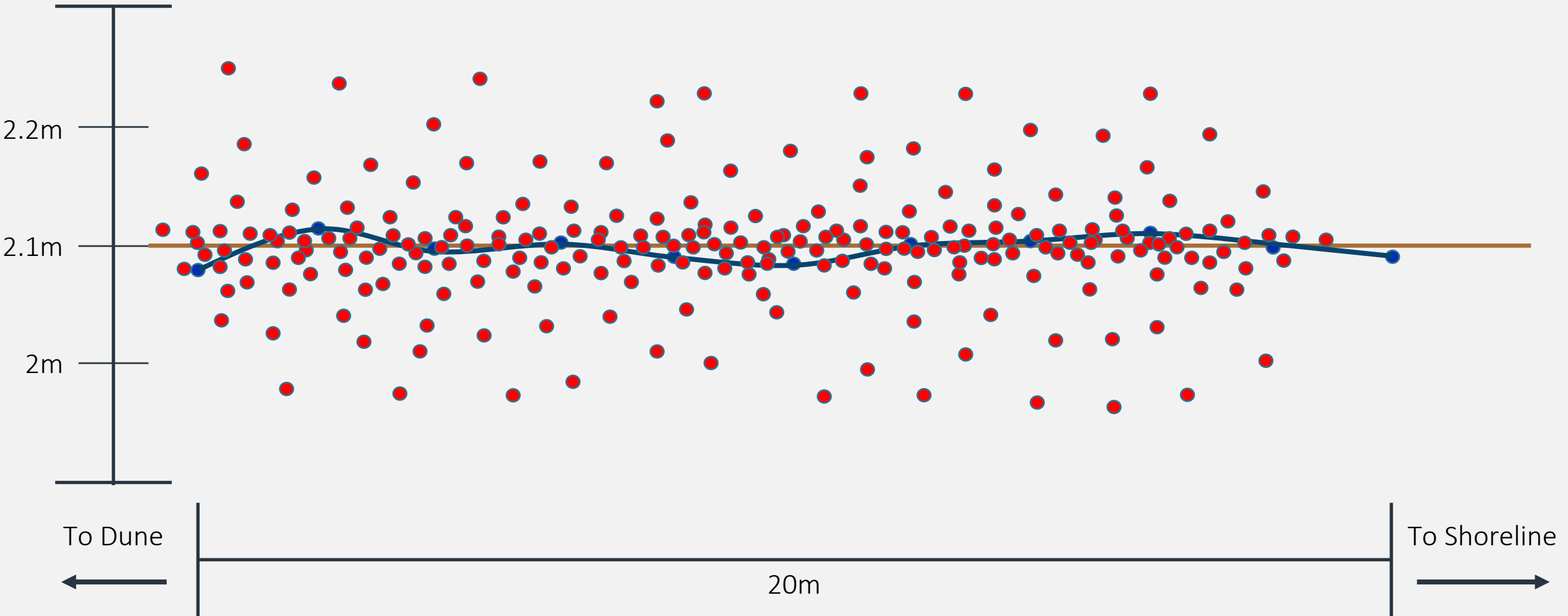
SURVEY PROFILE

- Beach
- GPS Points
- GPS Profile



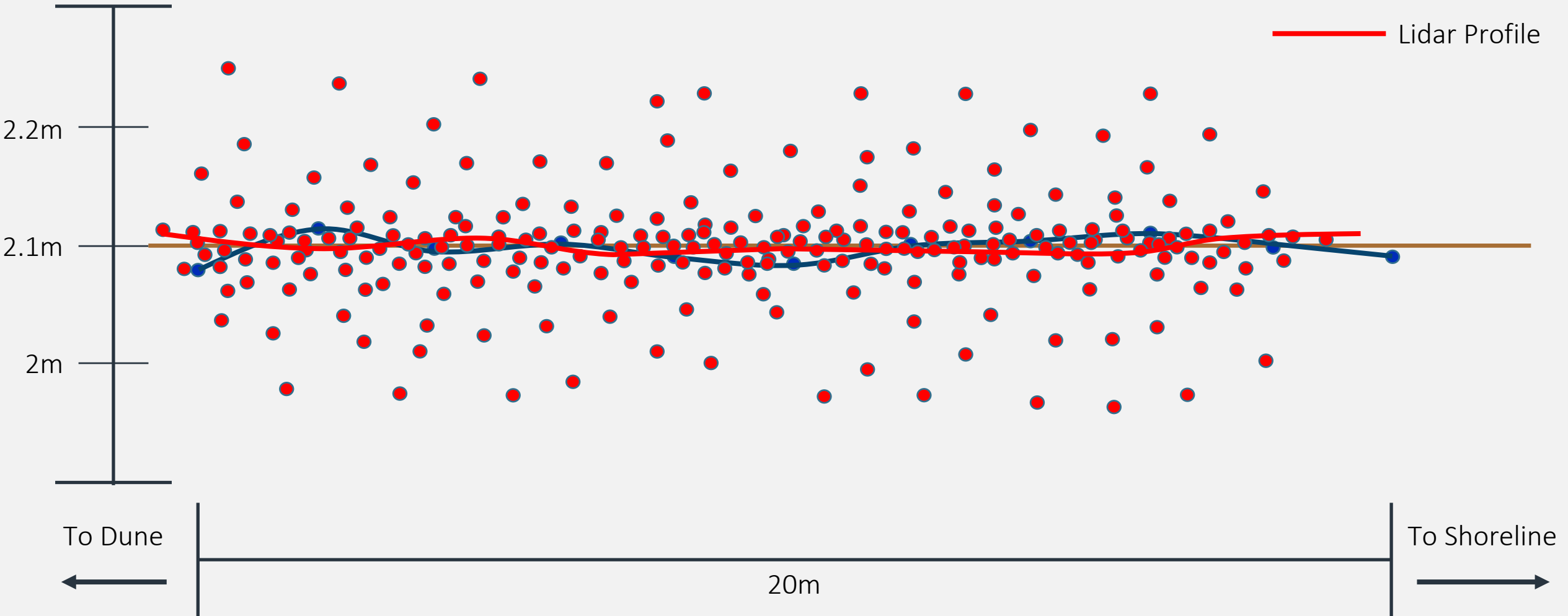
LIDAR POINT CLOUD

- Beach
- GPS Points
- GPS Profile
- Lidar Points



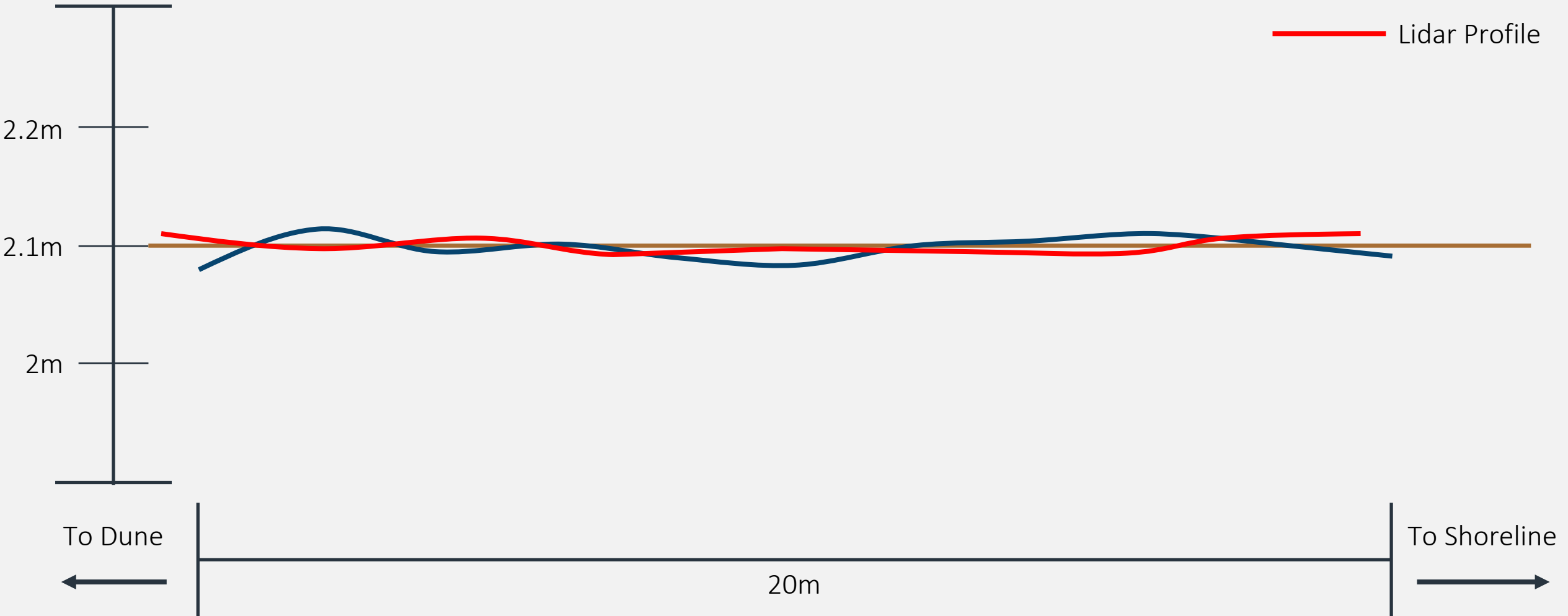
LIDAR PROFILE

- Beach
- GPS Points
- GPS Profile
- Lidar Points
- Lidar Profile



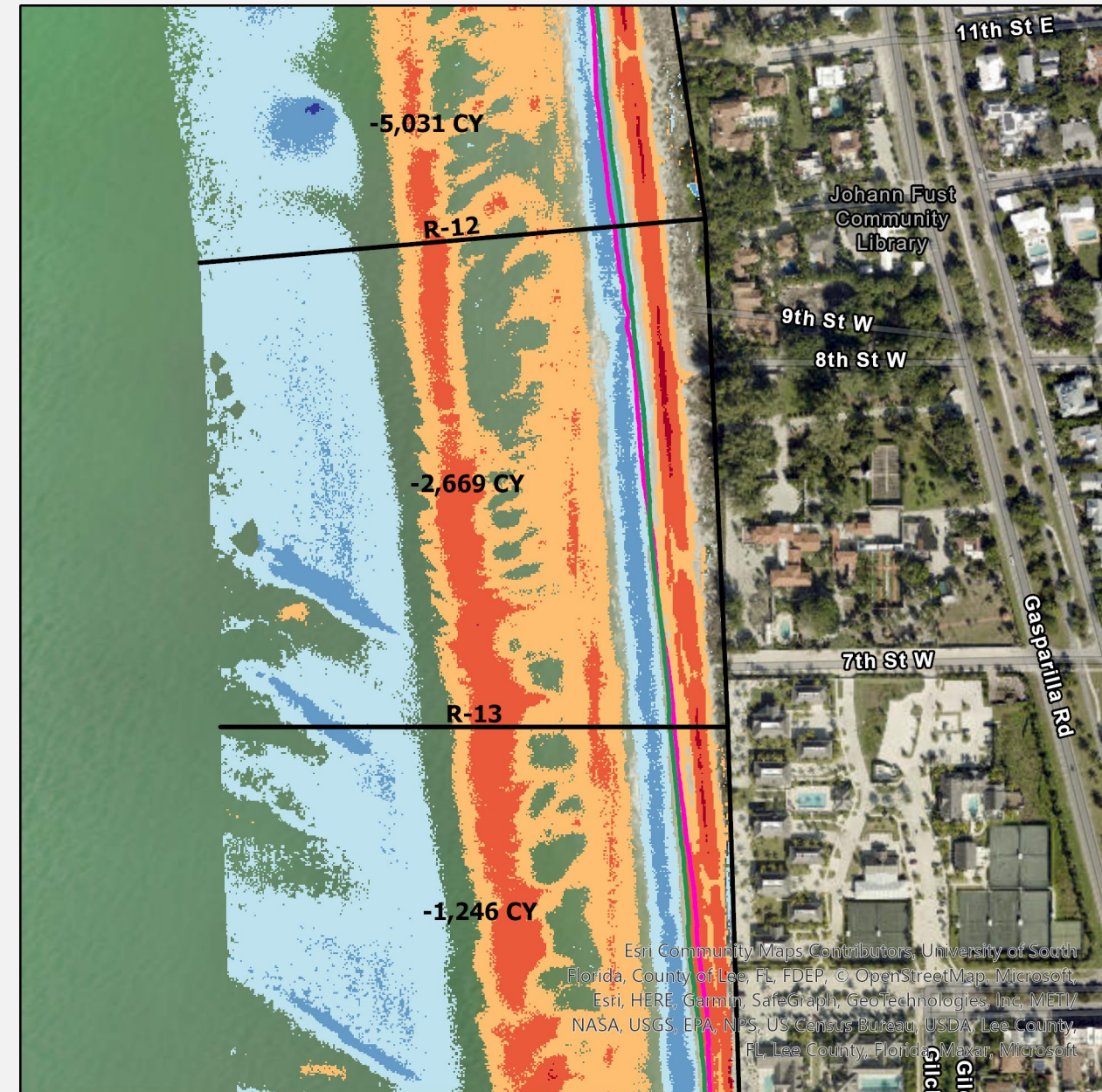
BEACH VS. PROFILES

- Beach
- GPS Points
- GPS Profile
- Lidar Points
- Lidar Profile



SUMMARY

- JALBTCX Toolbox
 - Attributed Geodatabase
 - More than 1,500 DEMs Processed
 - Shoreline Change
 - Volume Change
- > 1.0 Million Cubic Yards Eroded
 - > 195,000 linear feet
 - ~ -5.7 cy/lf
- Accuracy
 - Relative, Surveyed Profiles



Acknowledgements



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Thank you!



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