

Inlet Management Study of the John's Pass – Blind Pass Dual-Inlet System, Pinellas County, Florida

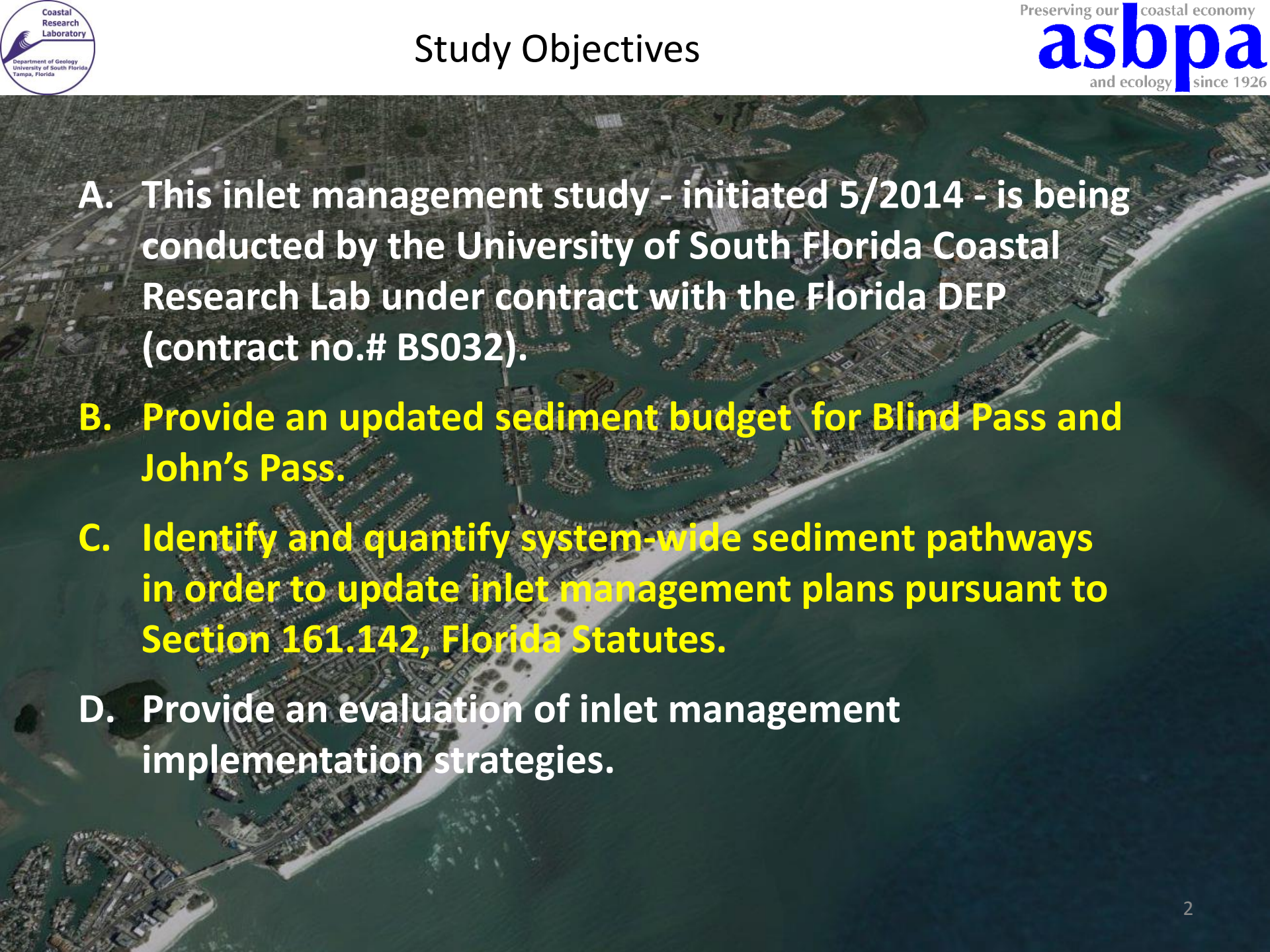
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School of Geosciences
University of South Florida**

American Shore & Beach Preservation Association

2015 National Coastal Conference, New Orleans, Louisiana

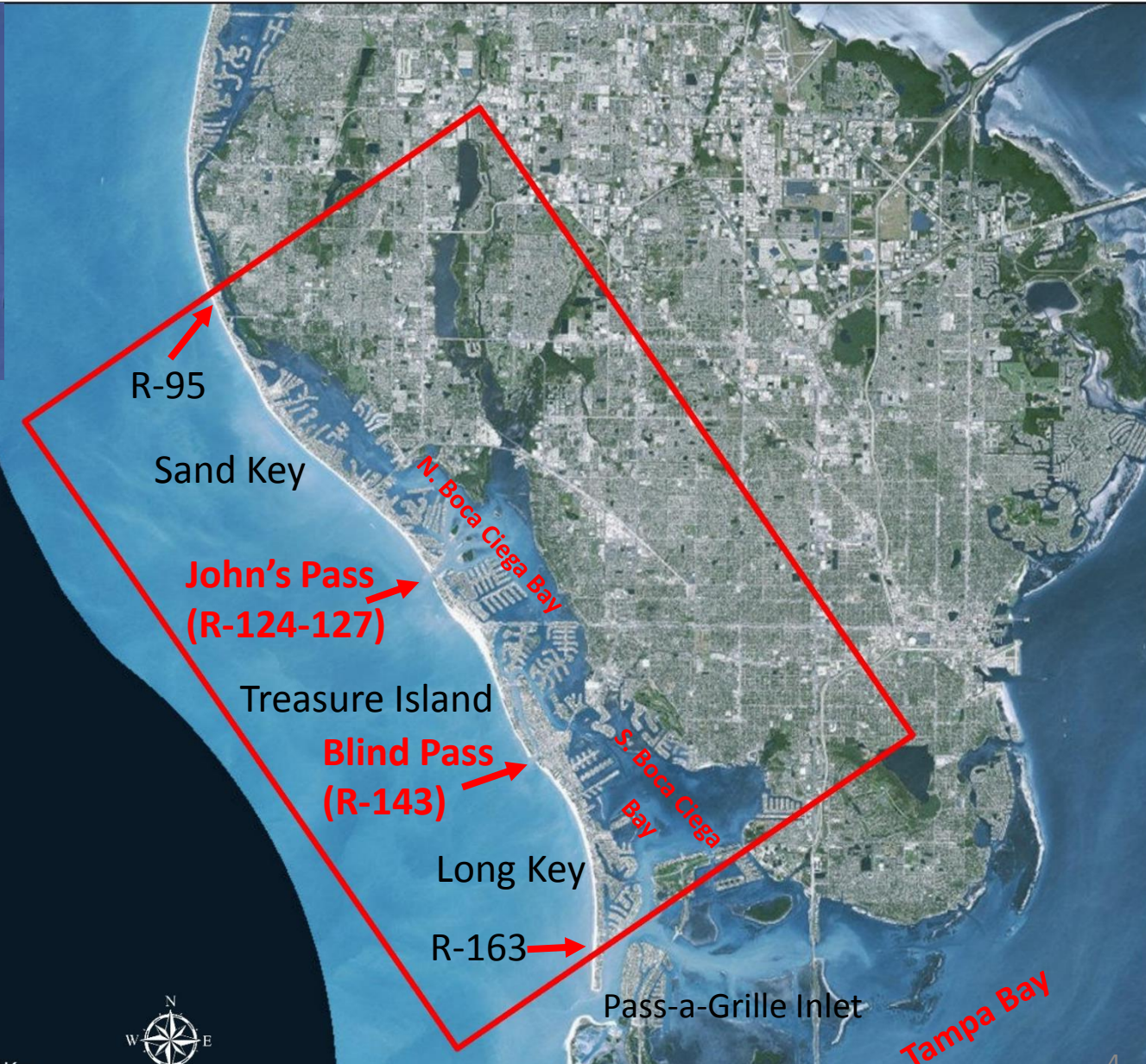
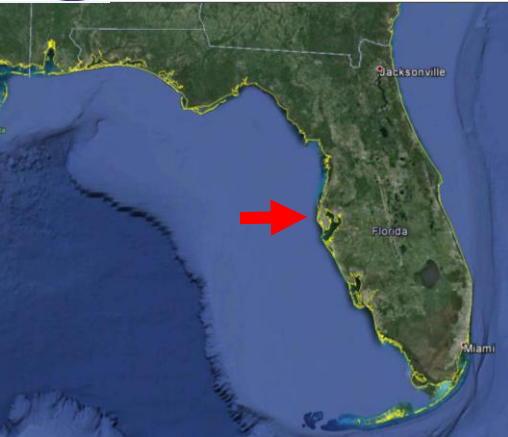
October 2015



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- A. This inlet management study - initiated 5/2014 - is being conducted by the University of South Florida Coastal Research Lab under contract with the Florida DEP (contract no.# BS032).**
 - B. Provide an updated sediment budget for Blind Pass and John's Pass.**
 - C. Identify and quantify system-wide sediment pathways in order to update inlet management plans pursuant to Section 161.142, Florida Statutes.**
 - D. Provide an evaluation of inlet management implementation strategies.**

1. Introduction/Background
 - a) Study area
 - b) Regional hydrodynamic conditions
 - c) Sediment characteristics
2. Sediment Budget and Sediment Pathways
 - a) Sediment budget
 - b) Sediment pathways
3. Concluding remarks

Study Area



Legend

 SMS Model Domain

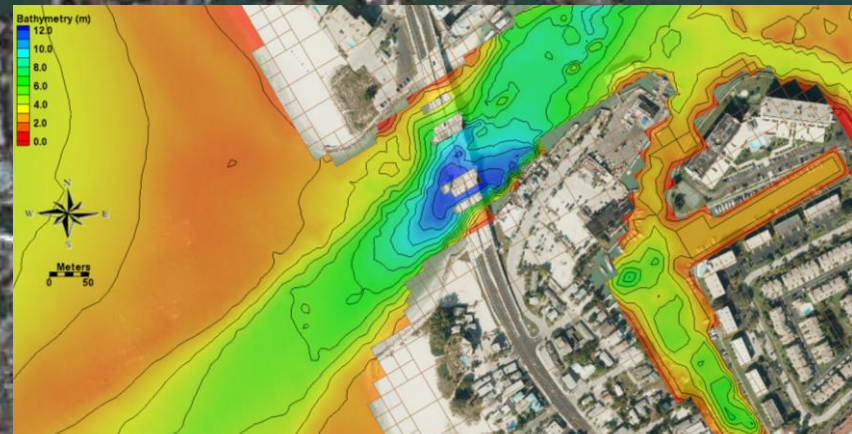
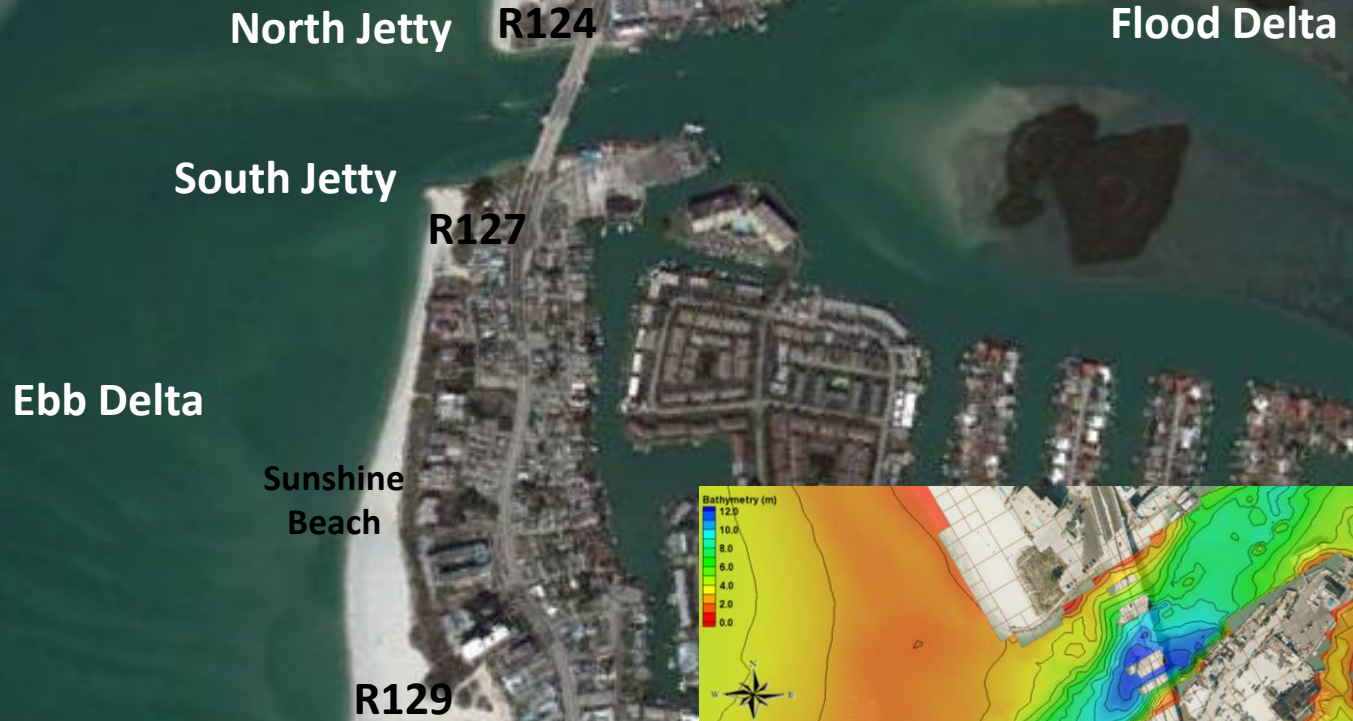
8

 Km



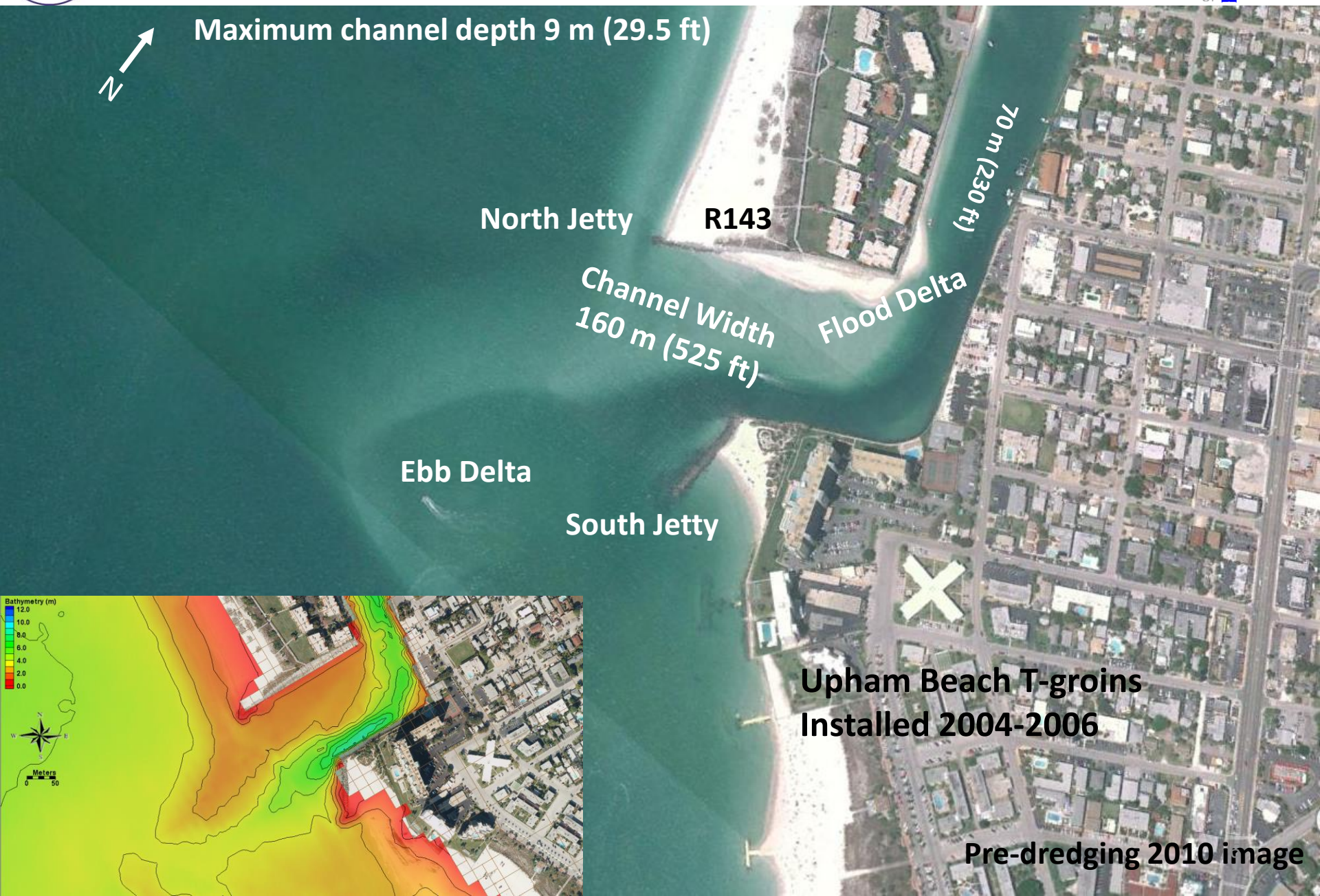
John's Pass Mixed Energy Tidal Inlet

Channel Width – 185 m (607 ft)
Maximum channel depth 12 m (39 ft)

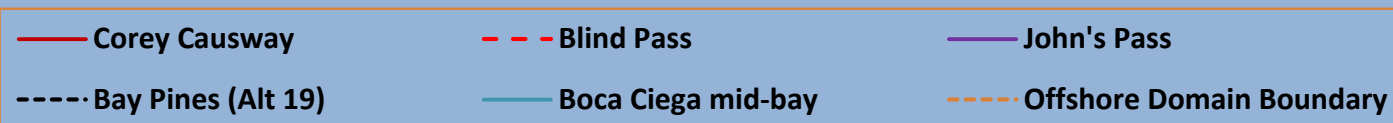
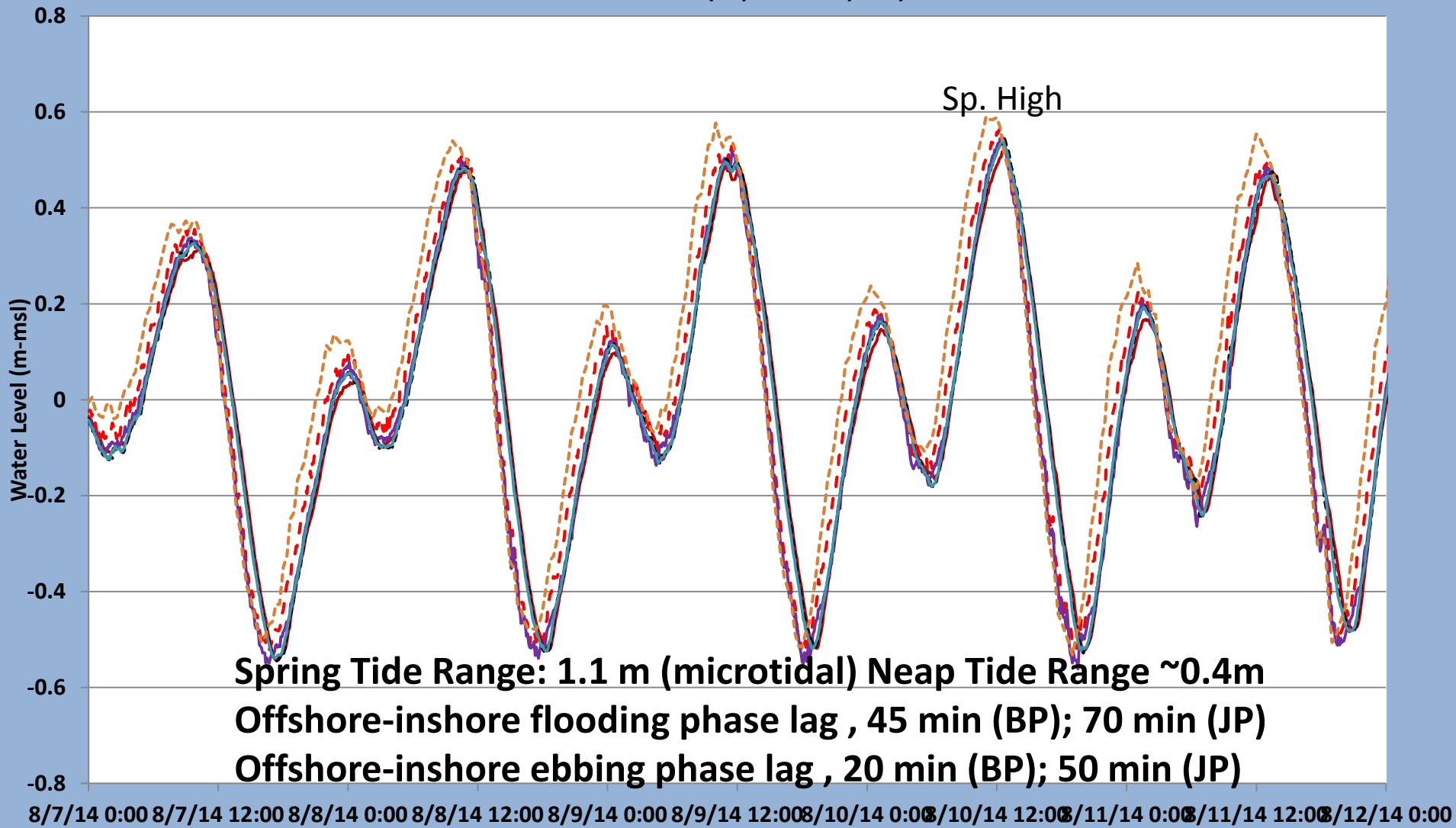


2014 image

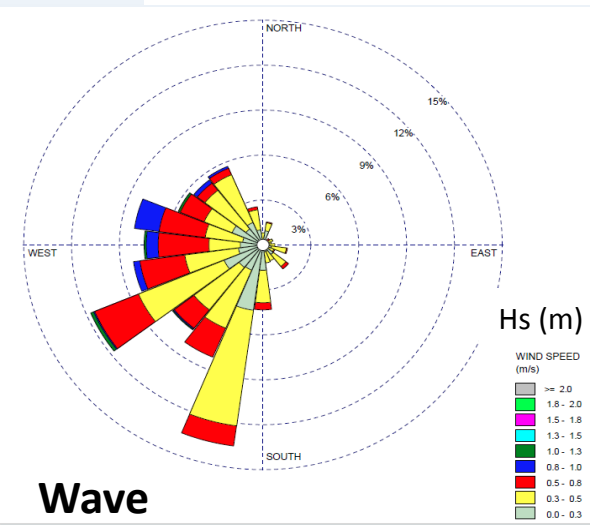
Blind Pass Wave Dominated Tidal Inlet



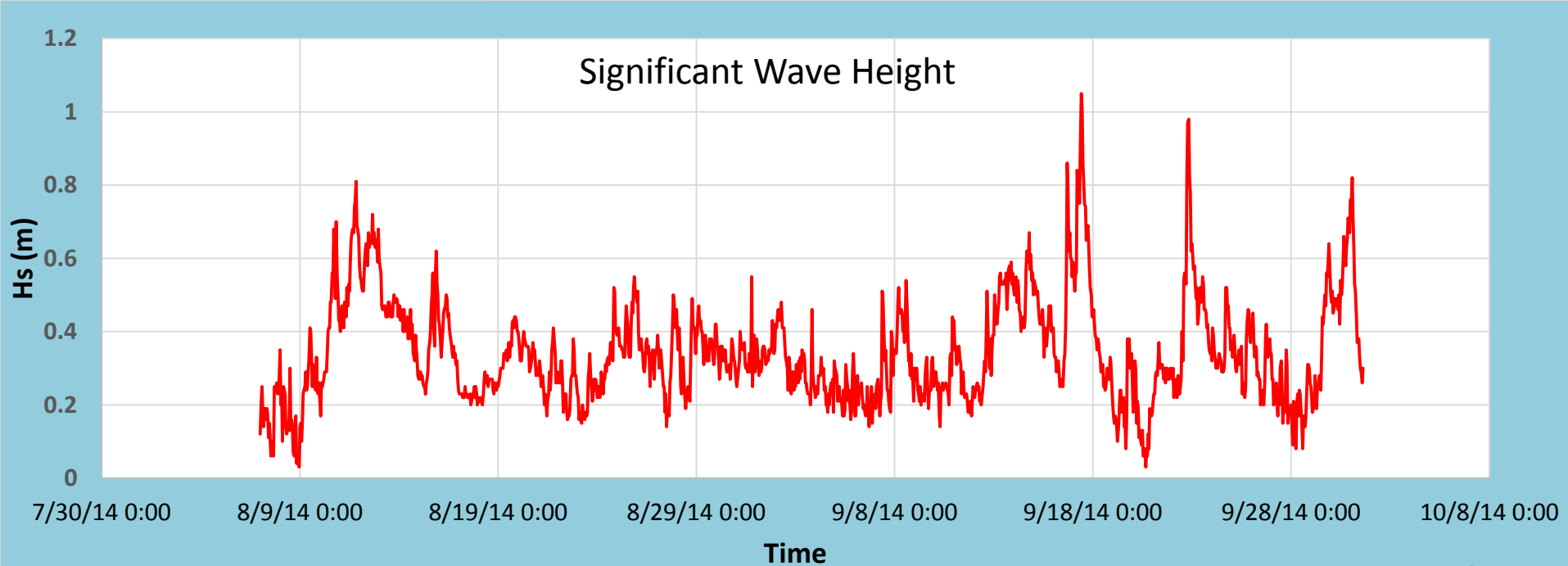
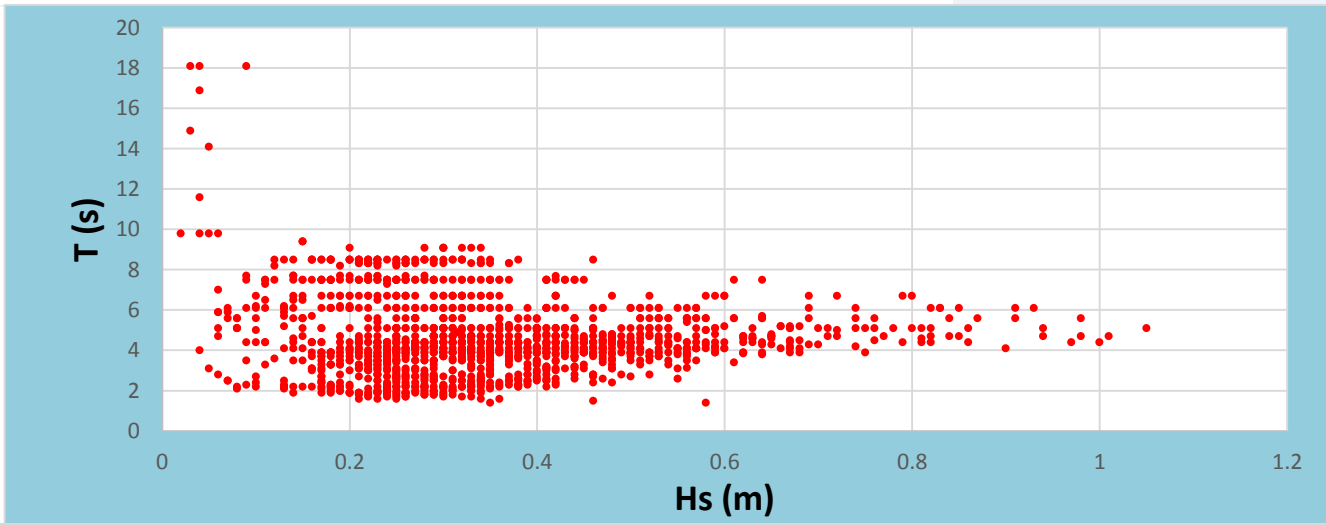
Tide record 8/7/14 – 8/12/14



Domain Boundary Measured Wave 8/8/2014 – 10/7/2014

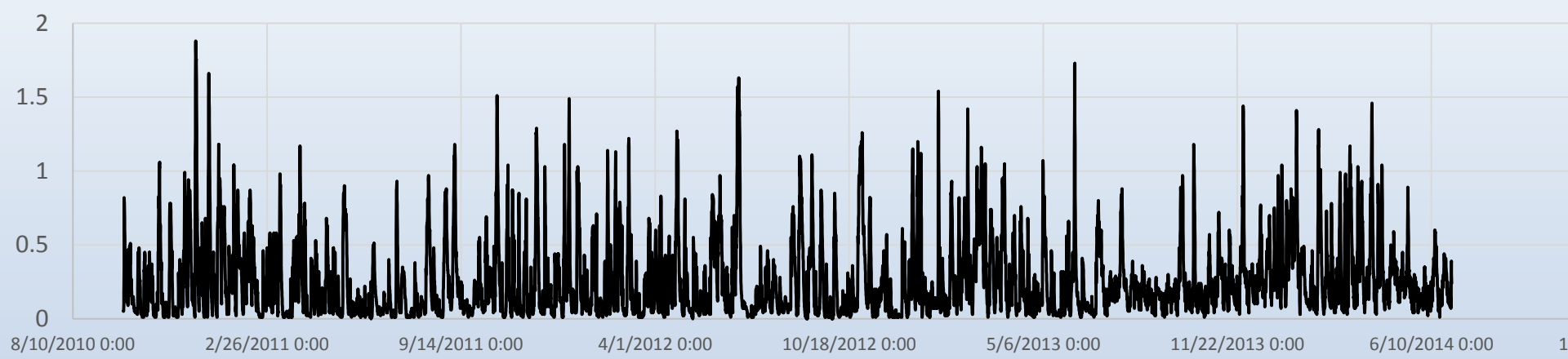


Wave

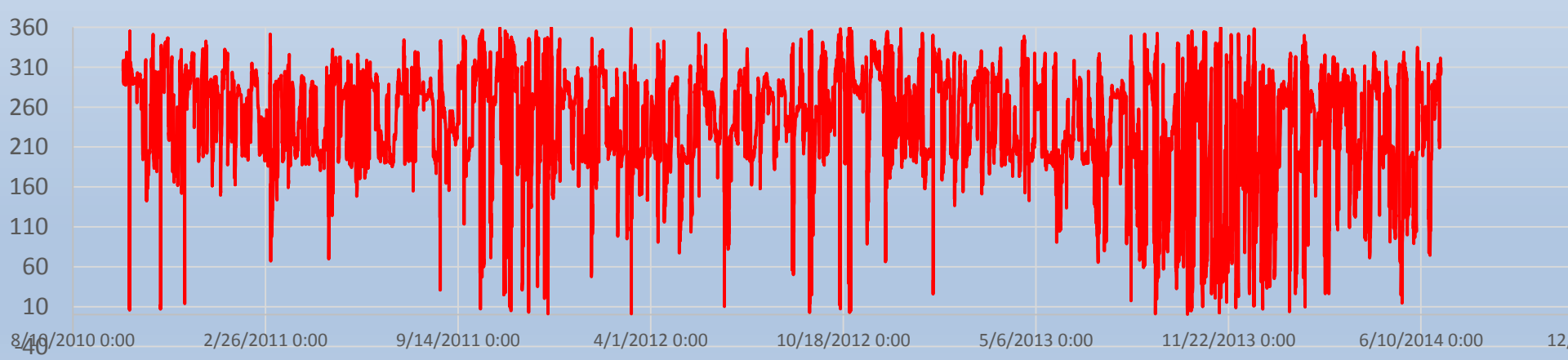


Domain Wave Conditions

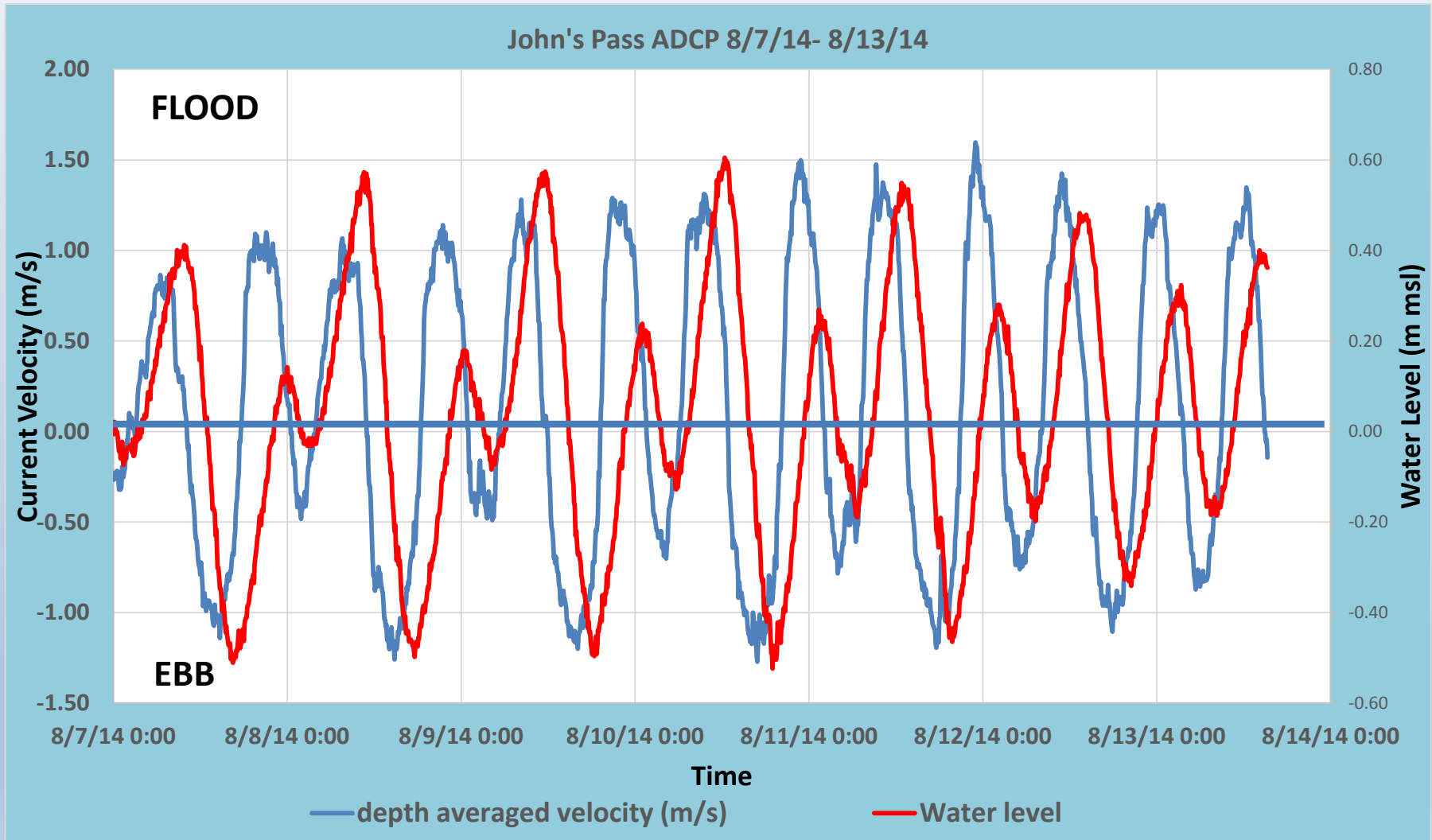
WW Hs 10/2010 - 7/2014



WW Hs Direction 10/2010 - 7/2014

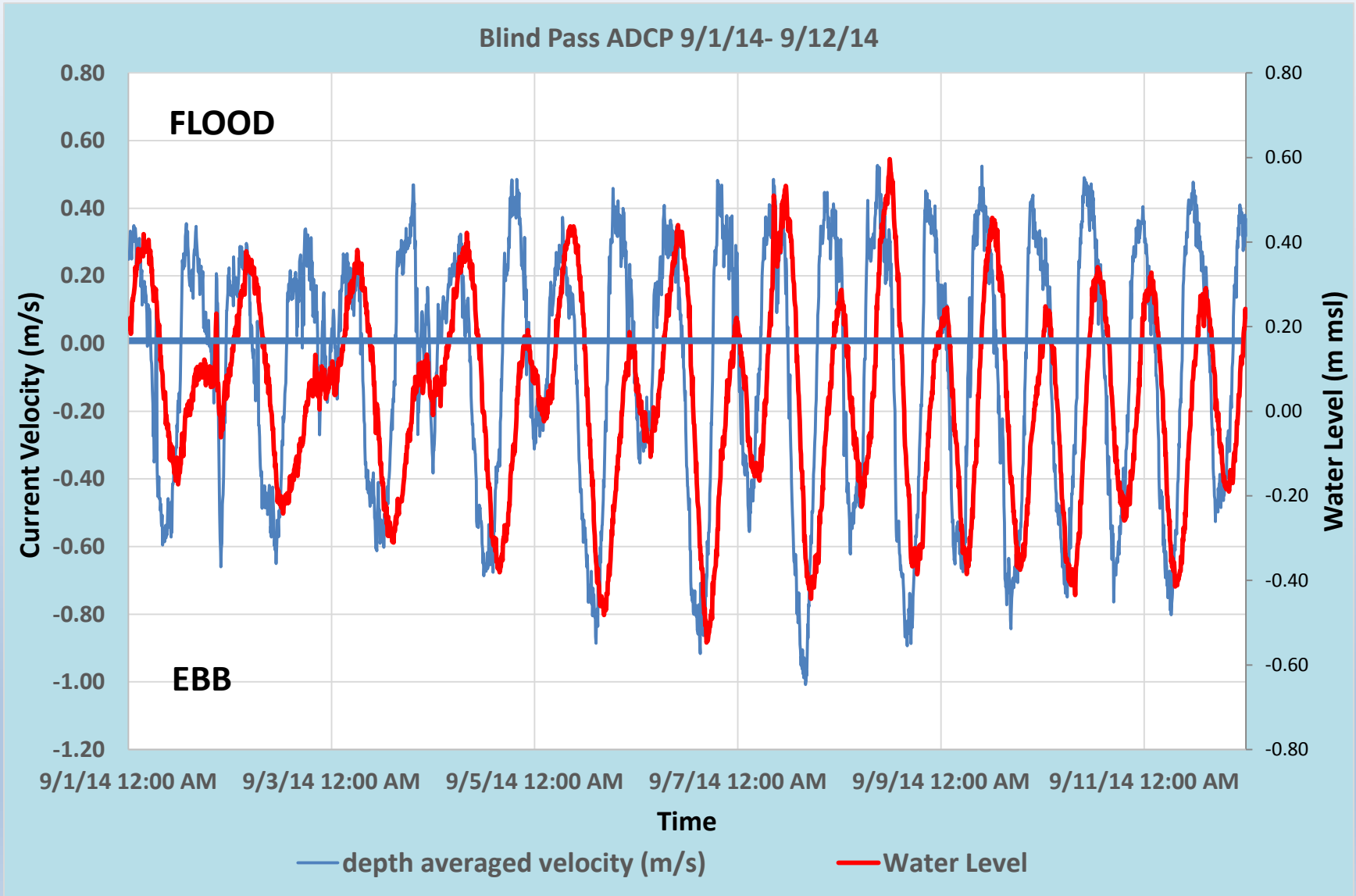


John's Pass V-ADCP Current Measurement – Deployed 7/22/14 – 8/13/14



Blind Pass Current Measurement – Deployed

8/14/14 – 9/11/14

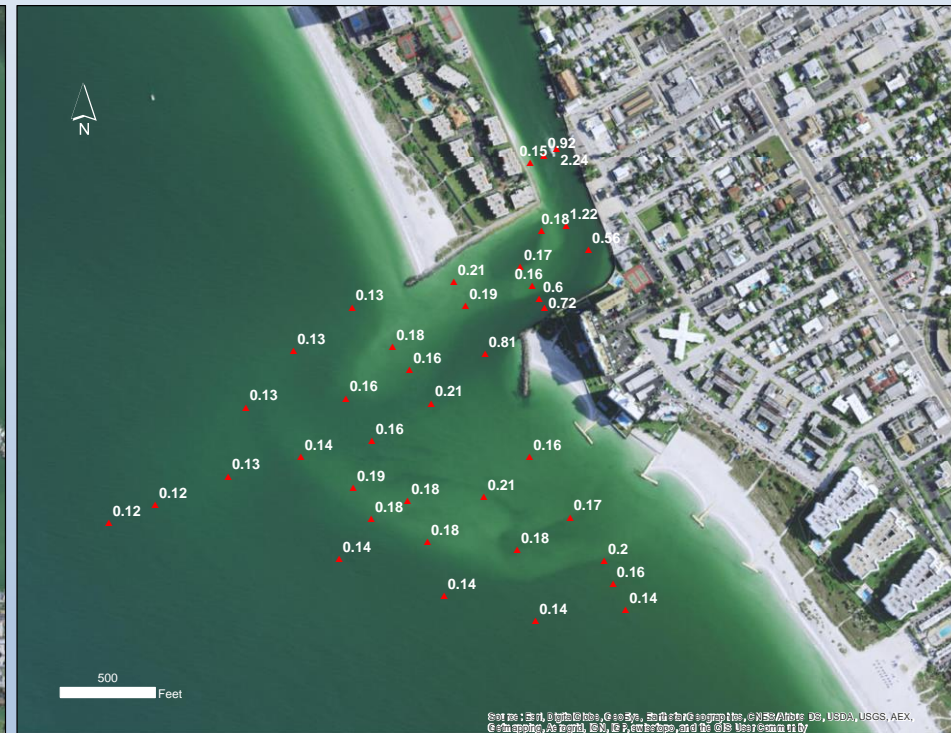


Distribution of sediment mean grain size (in millimeters)

John's Pass



Blind Pass



Overall mean grain-size (D_{50}) 17 mm

D_{10} 0.08

D_{50} 0.17

D_{90} 10.0

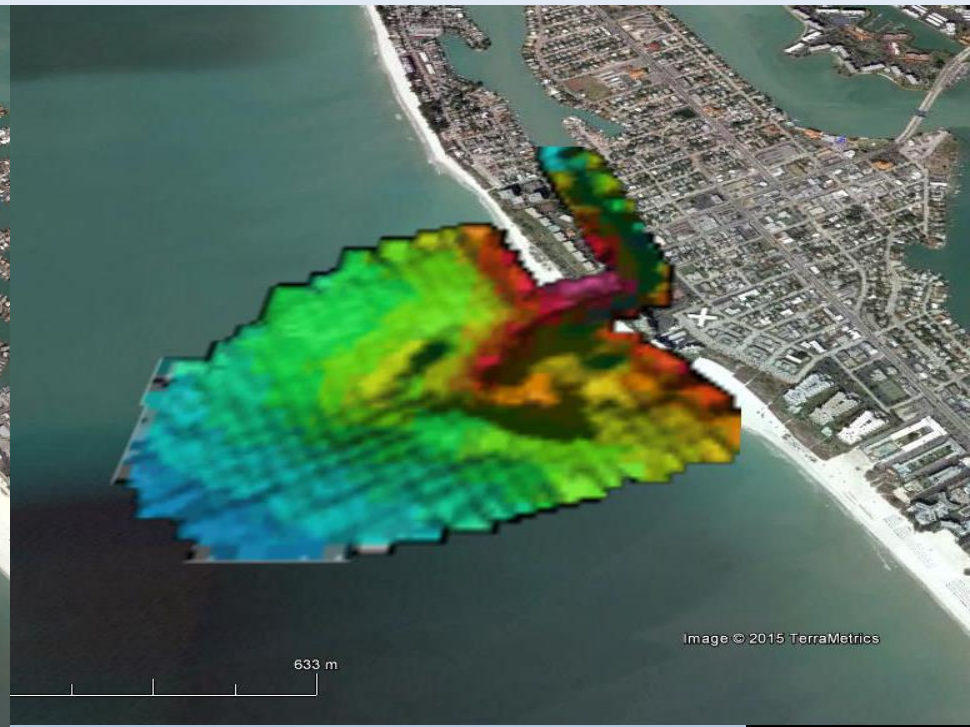
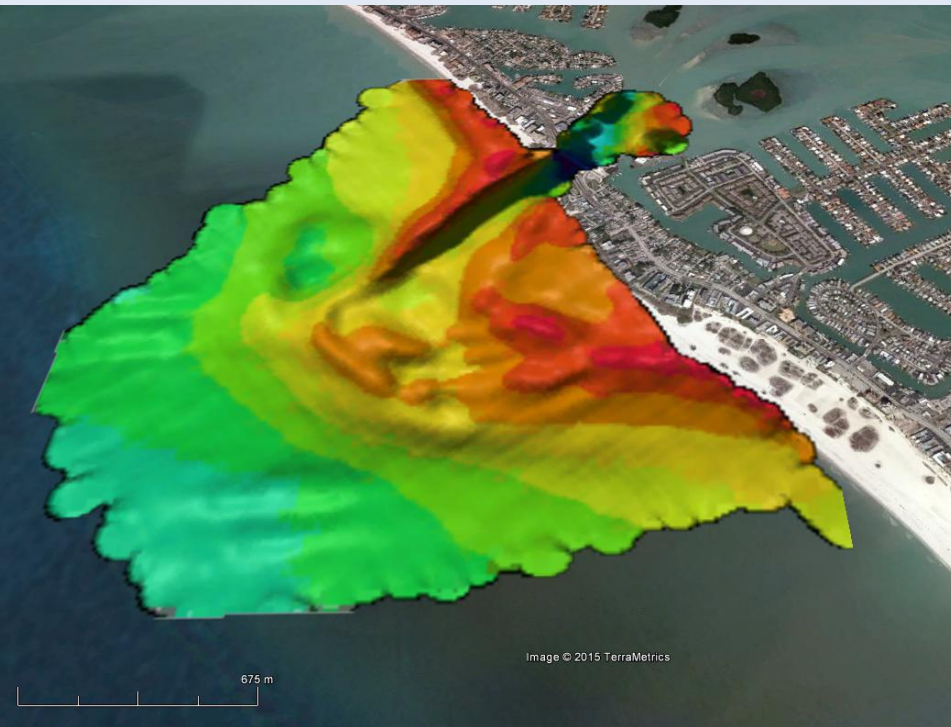
Section 2

- **Ebb Shoal Volumes**
- Sediment Budget
- Sediment Pathways

Ebb Shoal Volume Changes

John's Pass 6/2010

Blind Pass 6/2010

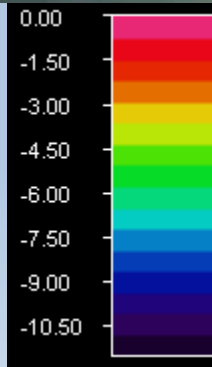


Time series bathymetric surveys:

- 6/2010 pre-dredging (single beam)
- 10/2010 post-dredging (single beam)
- 1/2011 (single beam)
- 10/2011 (single beam)
- 7/2012 (single beam)
- 7/2014 (multi-beam)

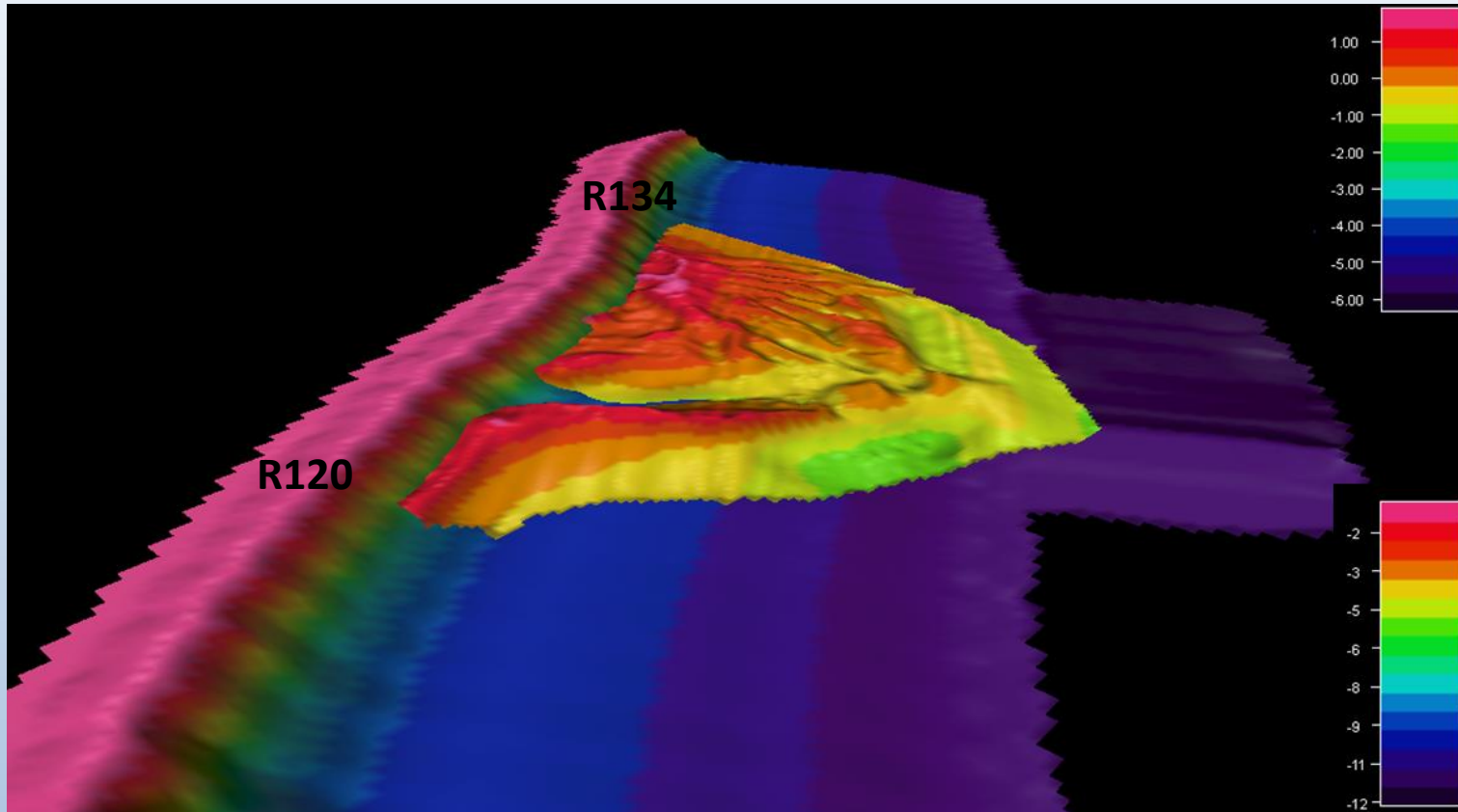
Beach Survey Data:

- USFCRL R-monument monthly to bi-monthly surveys of SK, TI, LK 2006-present.
- USFCRL annual bathymetric offshore survey extensions of R-monument surveys.



Ebb Shoal Volumes

John's Pass Ebb Shoal - 2014

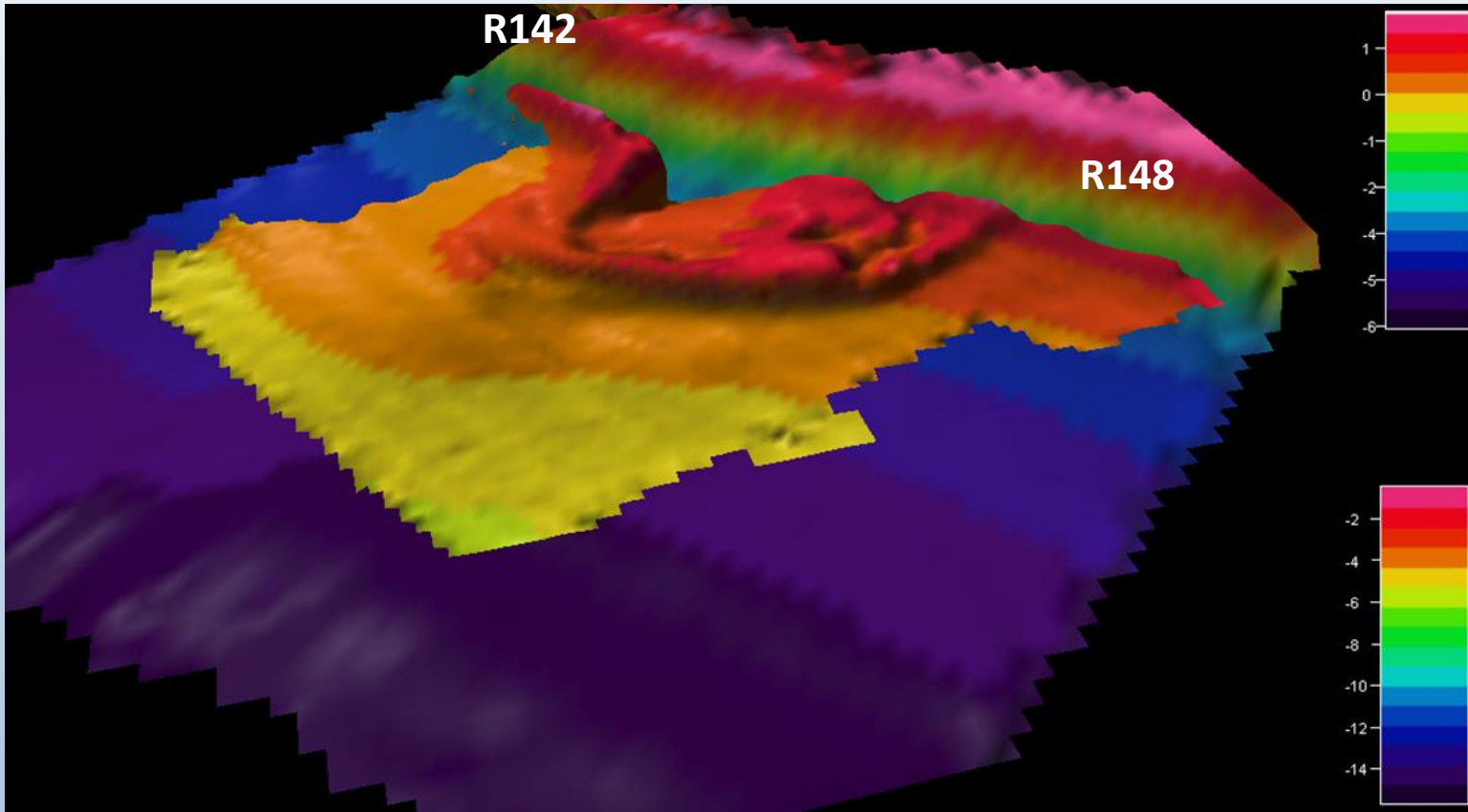


The John's Pass ebb shoal, July 2014, overlaying synthetic bathymetry, with 20X vertical exaggeration. Different color scales are used for the two bathymetry images to more clearly illustrate the ebb shoal.

Area of ebb shoal is 2,043,000 m²
Volume = 3,286,000 m³ (4,298,000 yd³)

Ebb Shoal Volumes

Blind Pass Ebb Shoal - 2014



The Blind Pass ebb shoal, July 2014, overlaying synthetic bathymetry, with 20X vertical exaggeration. Different color scales are used for the two bathymetry images to more clearly illustrate the ebb shoal.

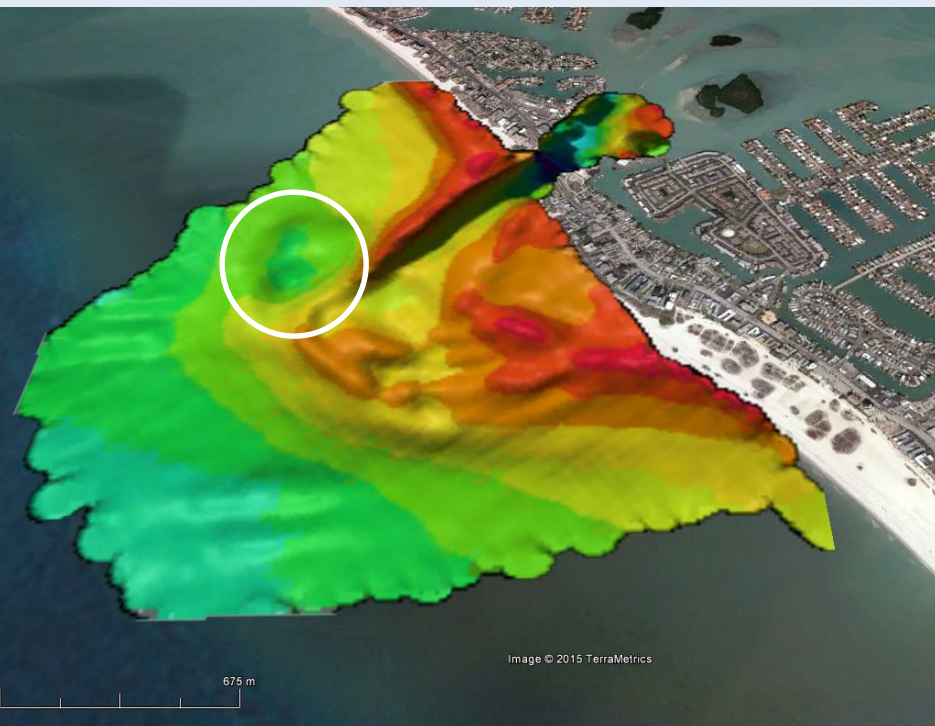
Area of the ebb shoal is 899,000 m²

Volume 515,000 m³ (673,000 yd³)

Ebb Shoal Volume Changes

Survey Data: 6/25-30/2010 (pre- 7/2010 dredging) single beam survey of JP ebb shoal and channel.

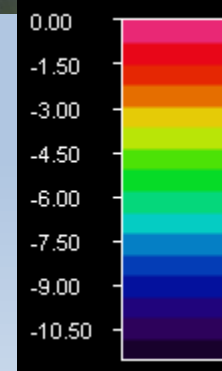
Survey Data: 10/24-26/2010 (post 7/2010 dredging) limited single beam survey of JP ebb shoal focused over dredged regions.



1988 dredge pit ~405,000 m³ (529,200 c.y.)
(CTC, 1993)
base of dredge pit -5.1 m NAVD

Infilling rate 6/2010 -7/2014 gained 9,000 m³
Annualized 300 m³/yr

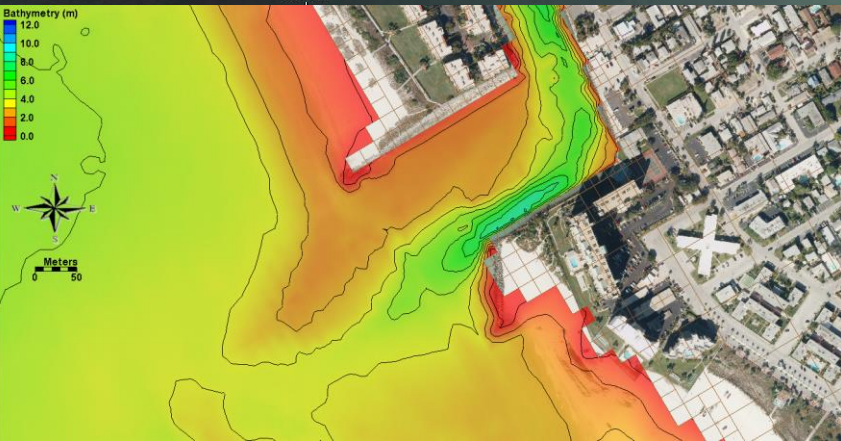
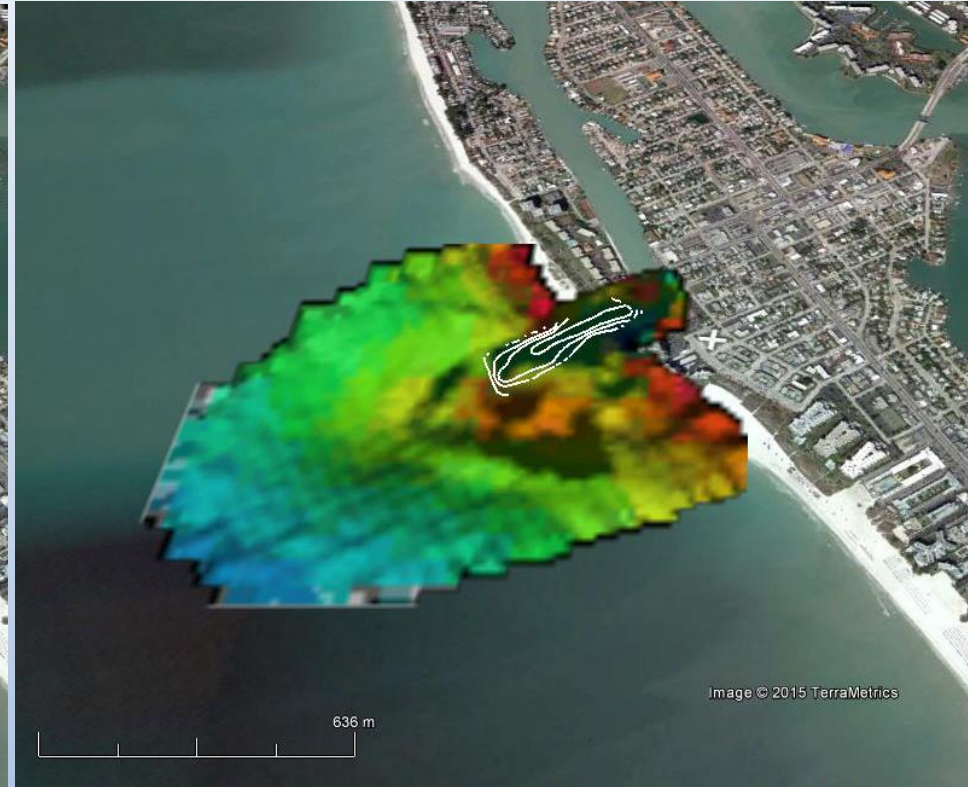
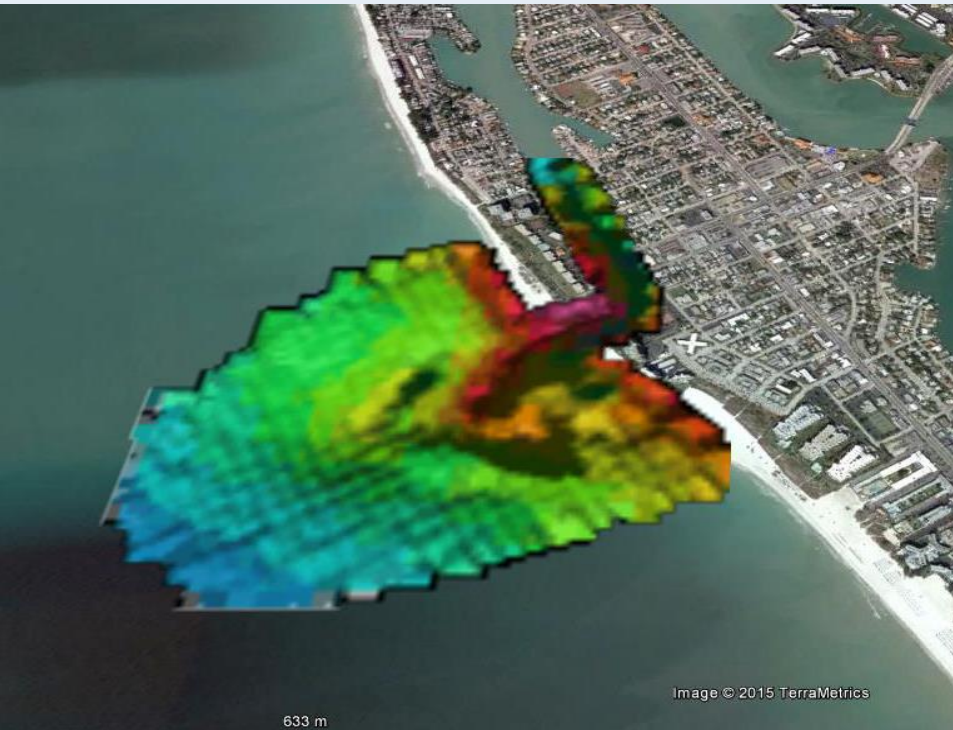
2010 dredge pits
Terminal lobe -west pit -4.25 m
NAVD; 153,000 m³ (200,000 c.y.)
Channel margin linear bar -4.5 m
NAVD; 130,000 m³ (170,000 c.y.)
TOTAL- 280,000 m³ (366,000 c.y.)



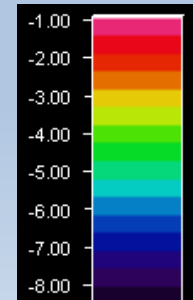
Ebb Shoal Volume Changes

Survey Data: 6/28-29/2010
 single beam survey

Survey Data: 10/22-23/2010
 single beam survey



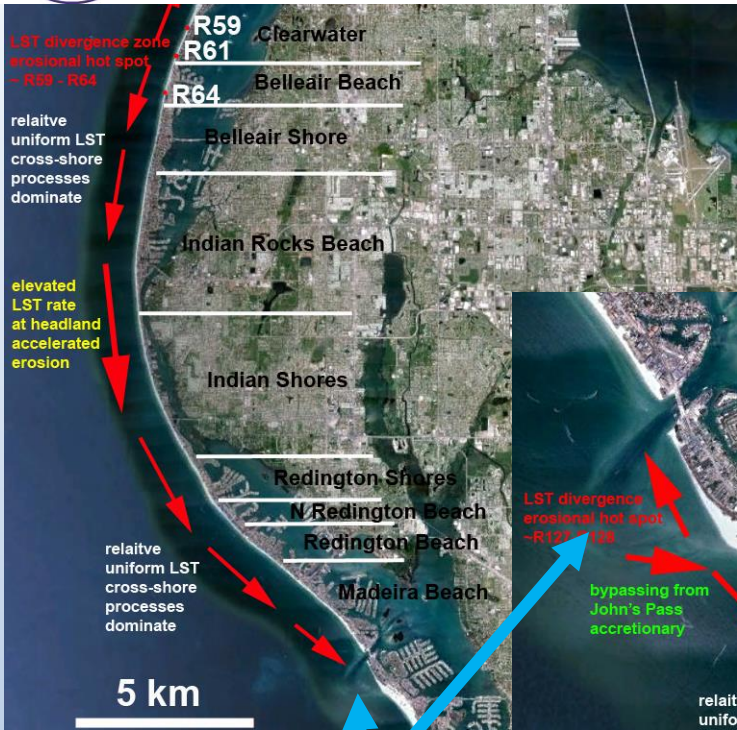
2010 dredge pit (-4.7 m NAVD)
 120,000 m³ (157,000 c.y.)



Section 2

- Ebb Shoal Volumes
- Sediment Budget
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SK-TI-LK Longshore Transport Vectors



John's Pass

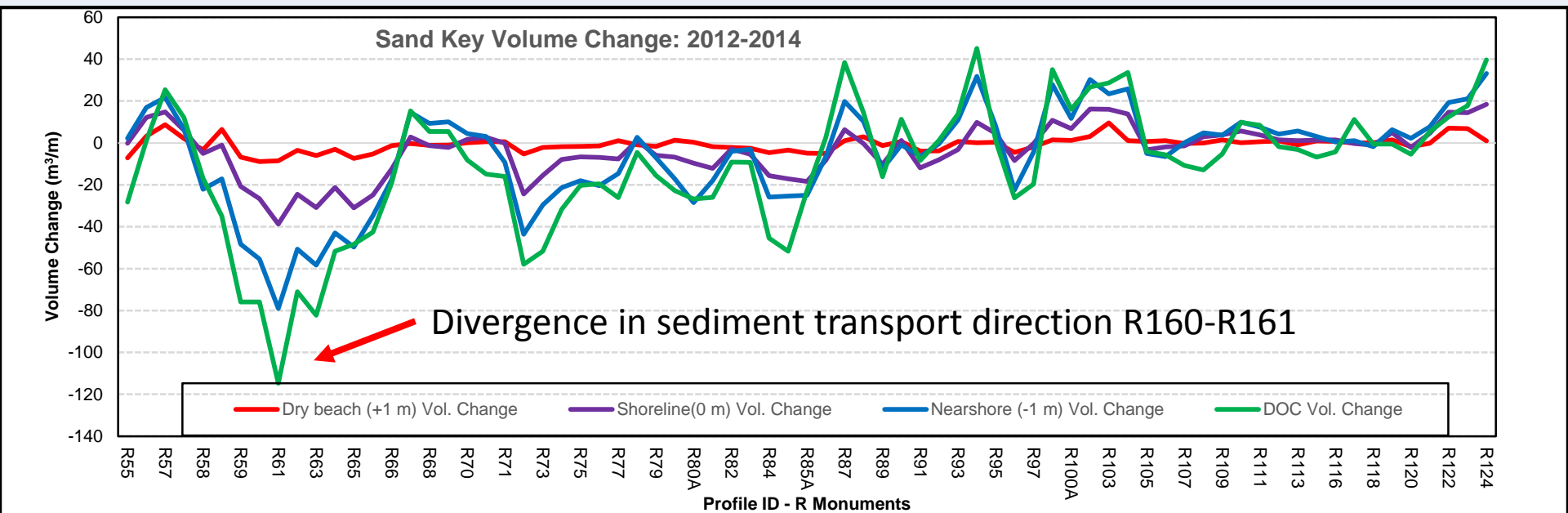


Blind Pass



Clearwater Pass

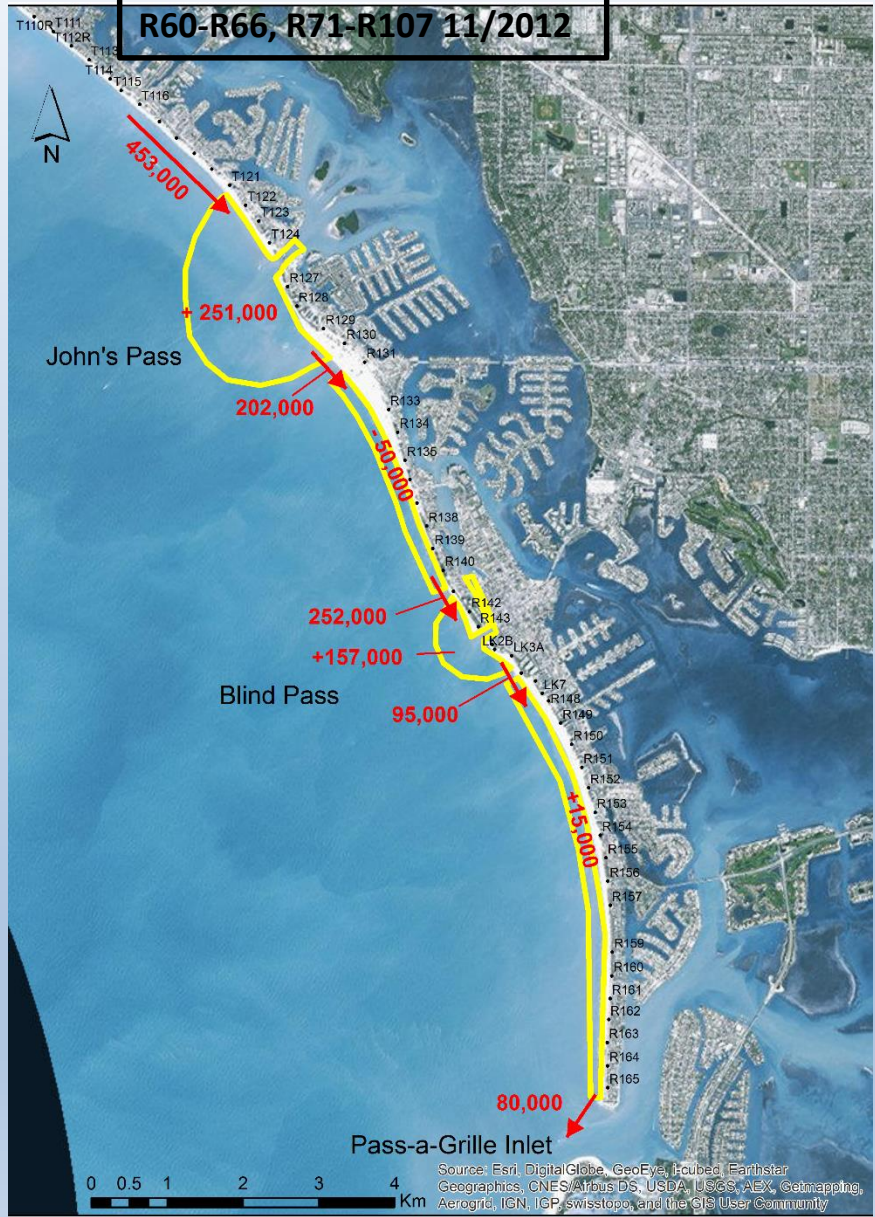
John's Pass



Regional Sediment Budget
10/2010 – 6/2014
R60 – R165

Regional Sediment Budget 10/2010-6/2014

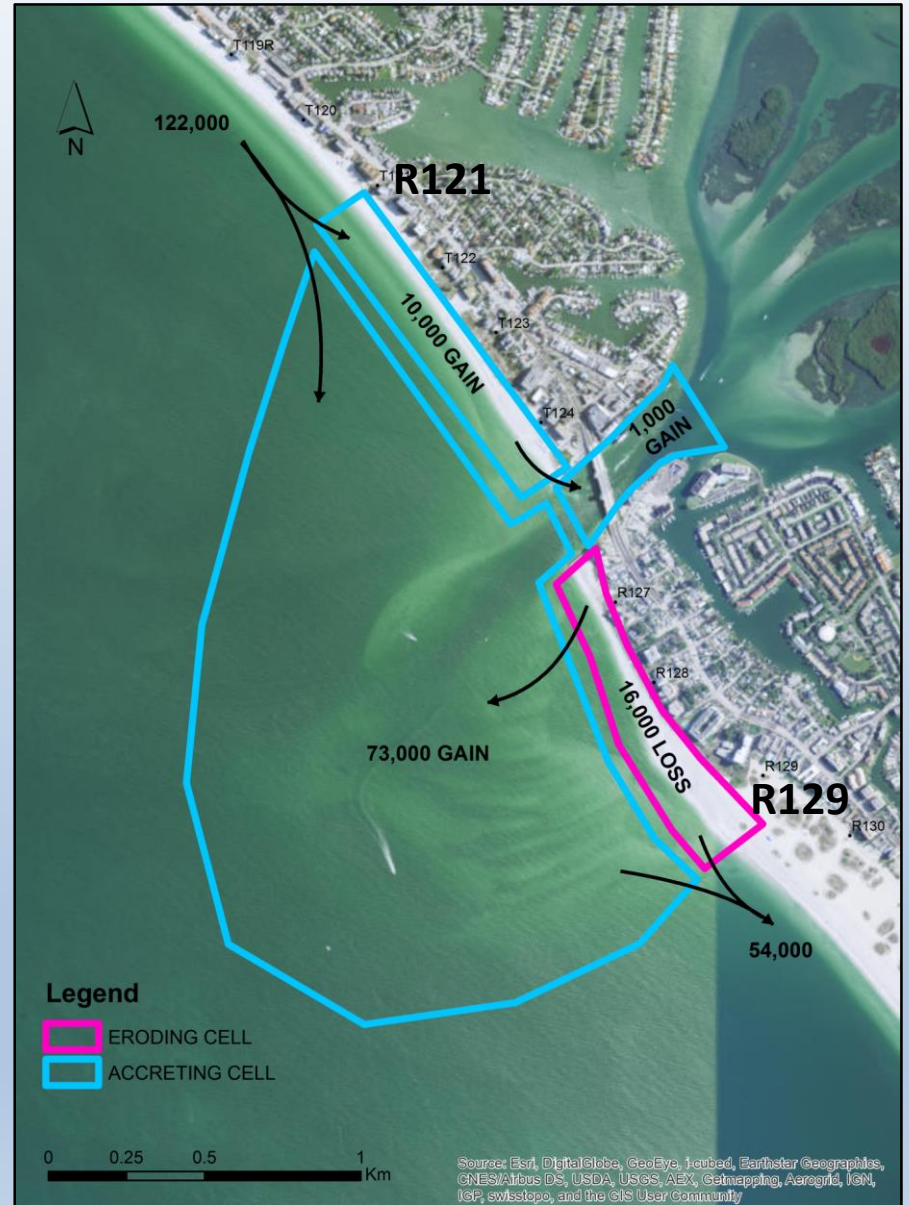
887,000 m³ placed on SK
R60-R66, R71-R107 11/2012



Sediment Budget 10/2010-6/2014

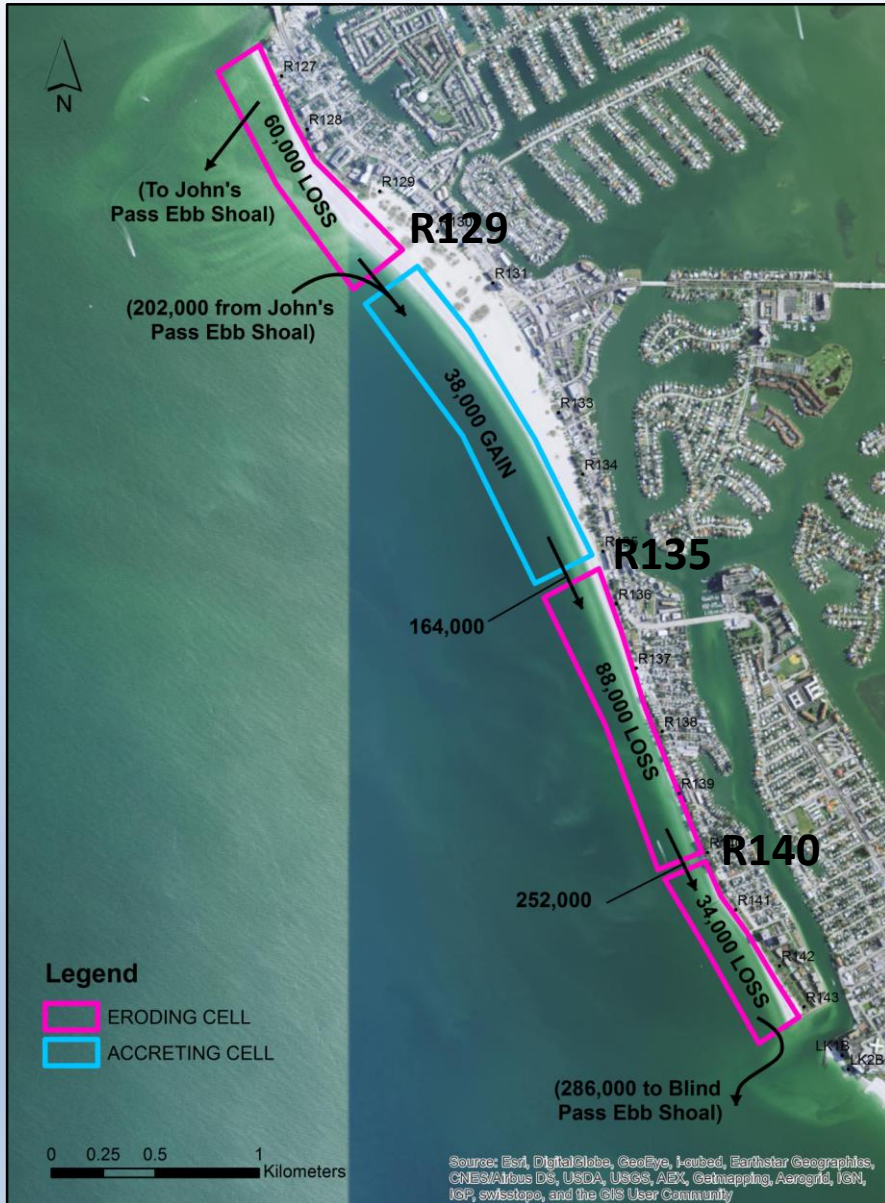


3.7 years

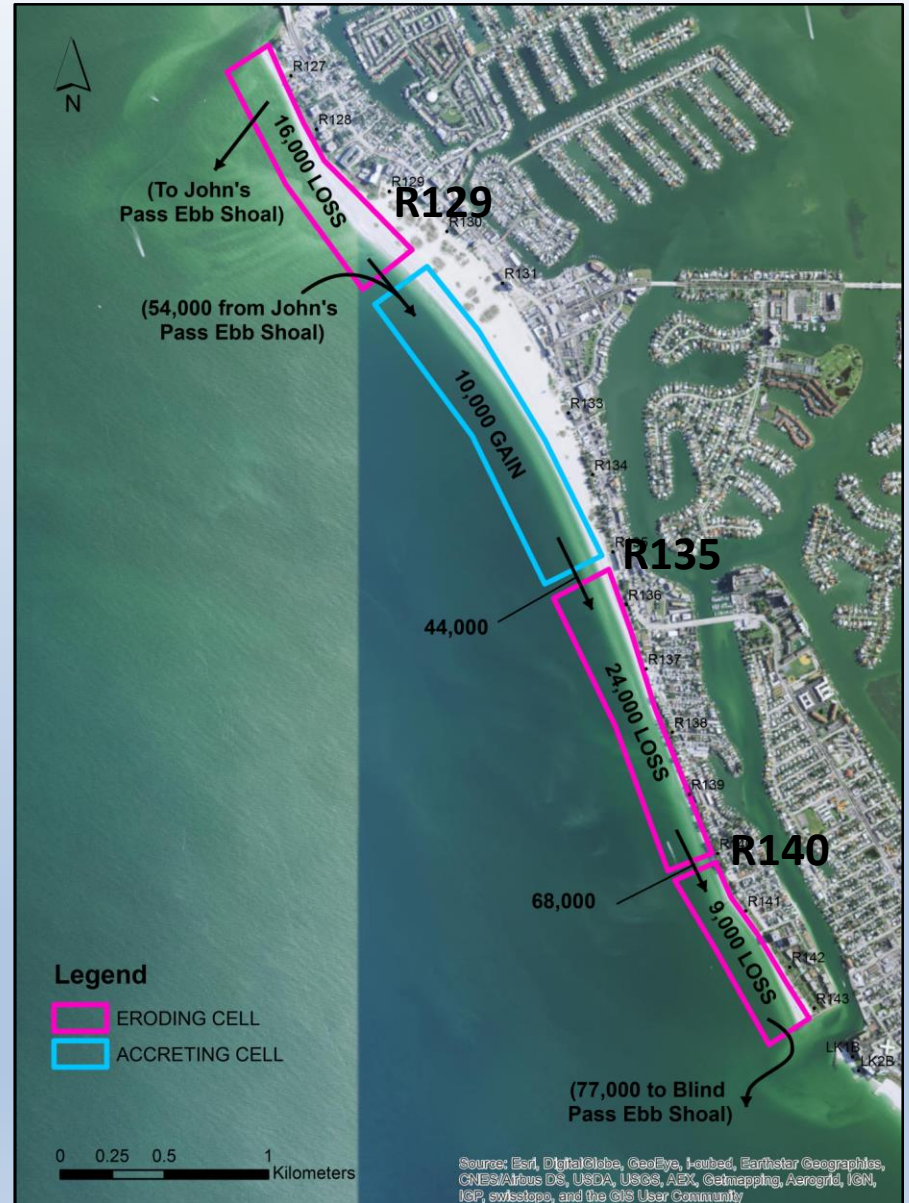


Annualized

Sediment Budget 10/2010-6/2014

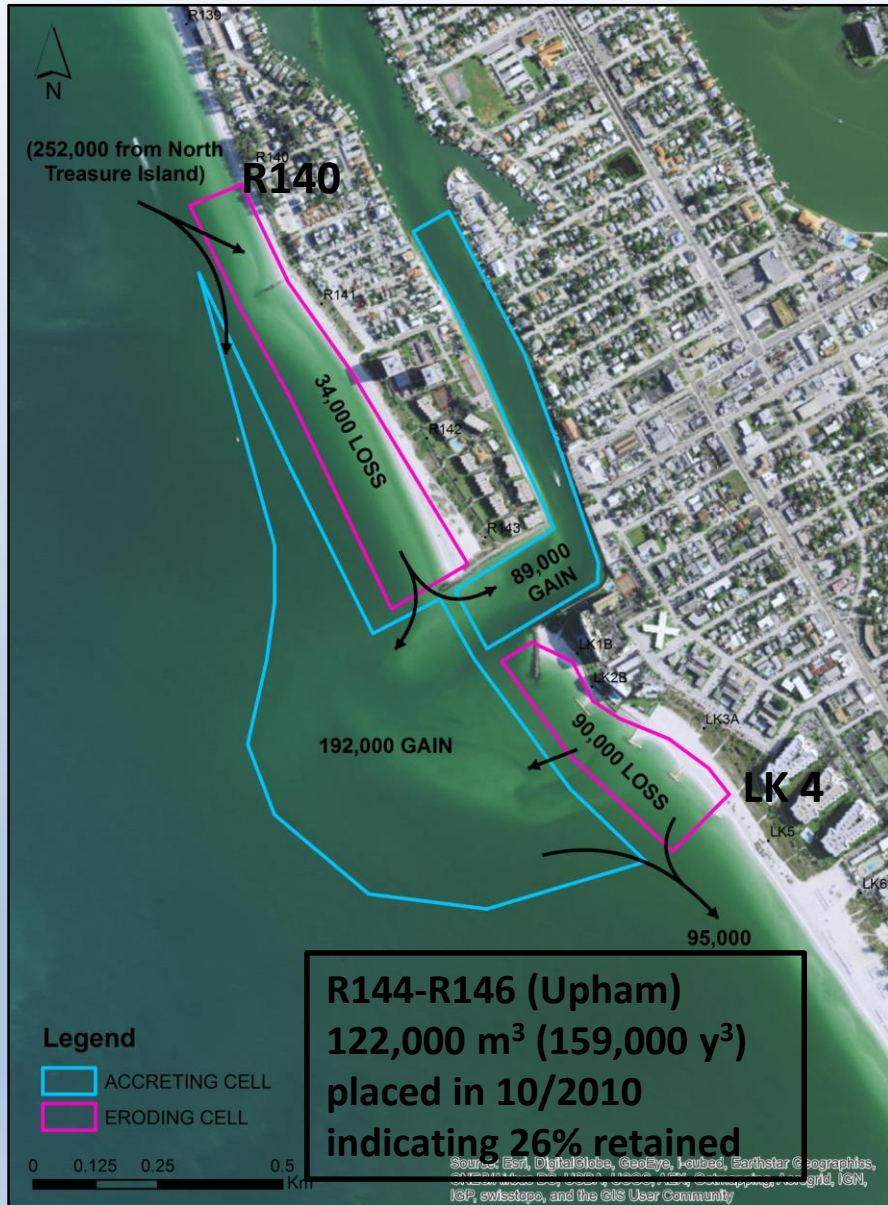


3.7 years

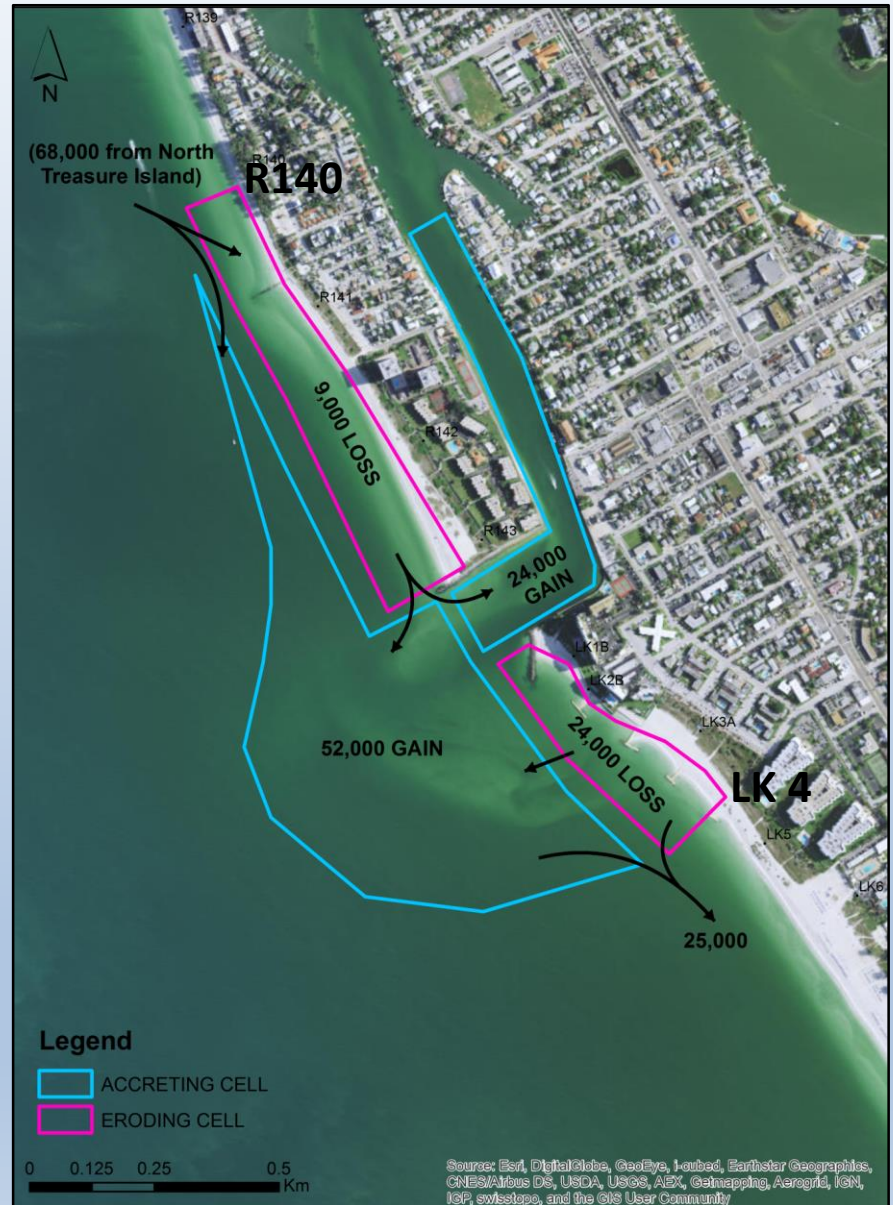


Annualized

Sediment Budget 10/2010-6/2014

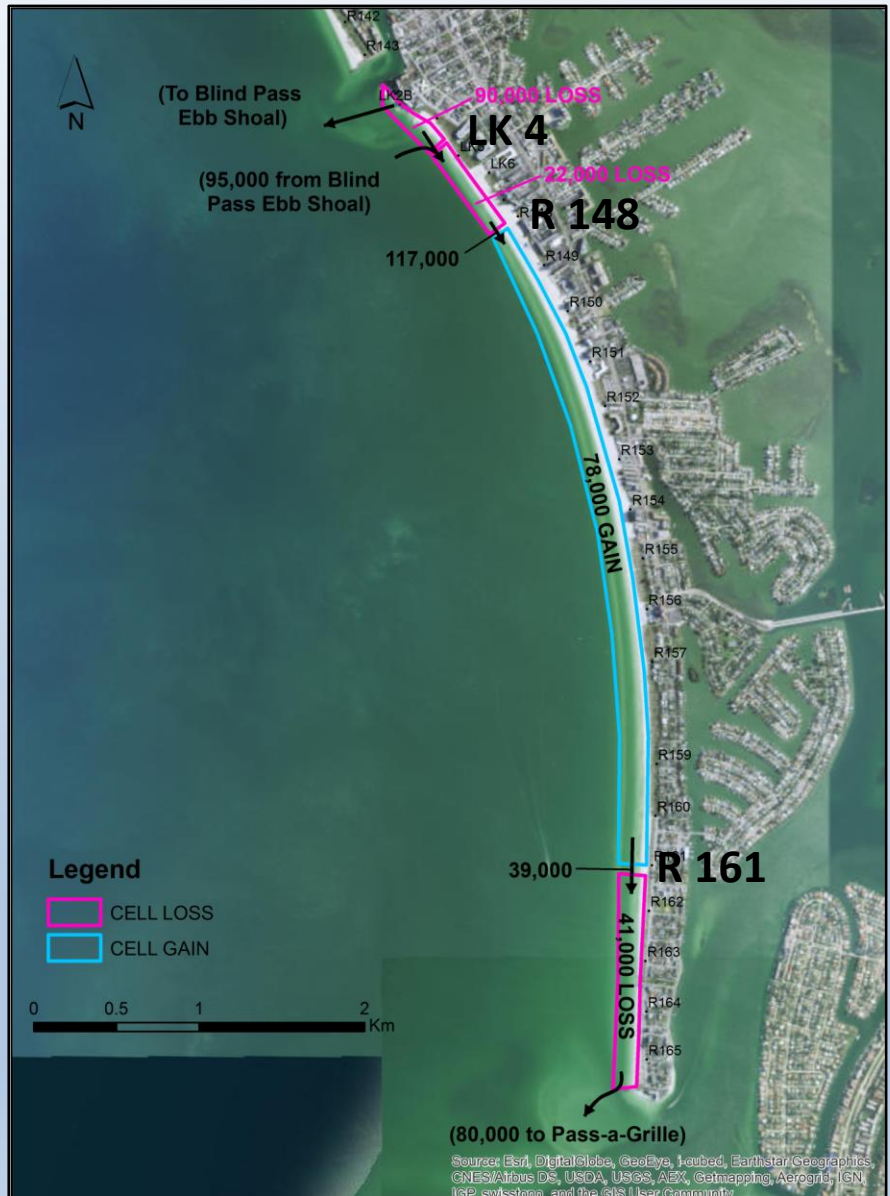


3.7 years

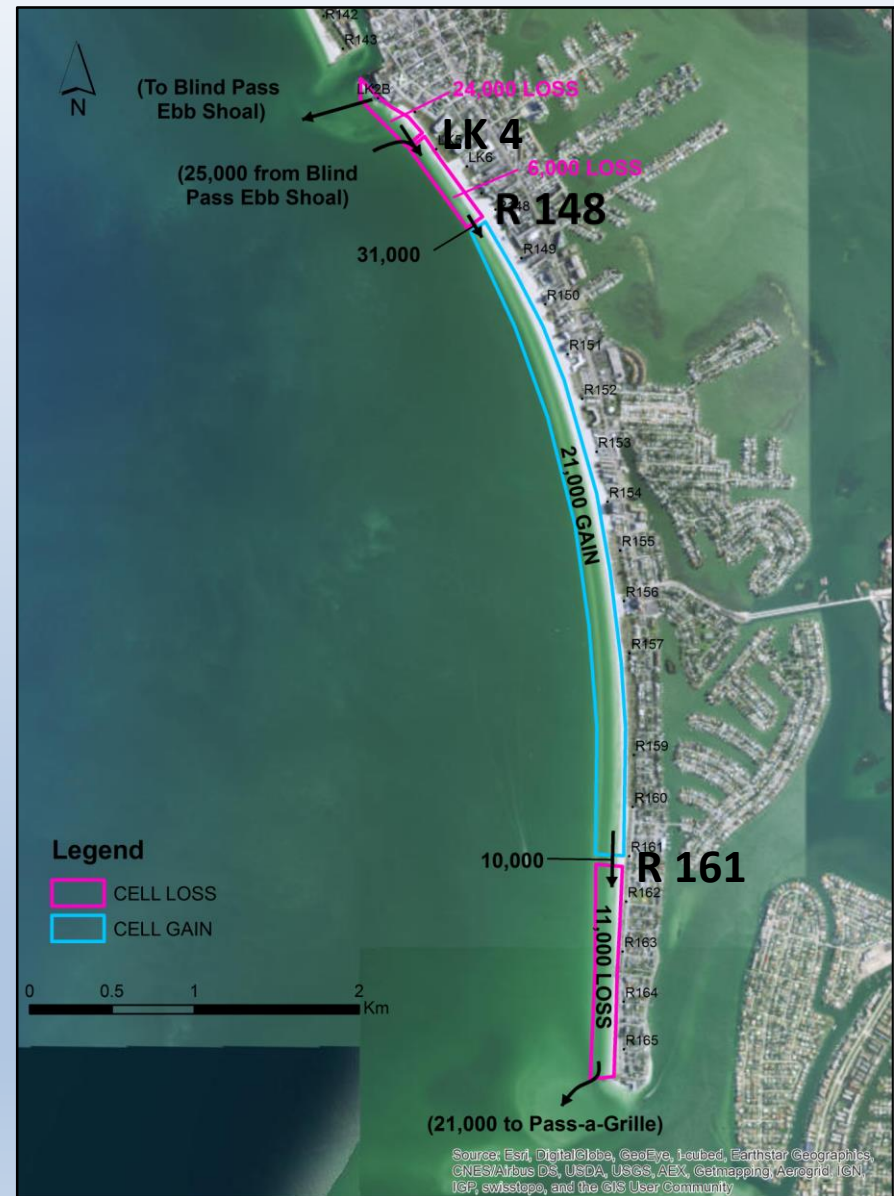


Annualized

Sediment Budget 10/2010-6/2014



3.7 years

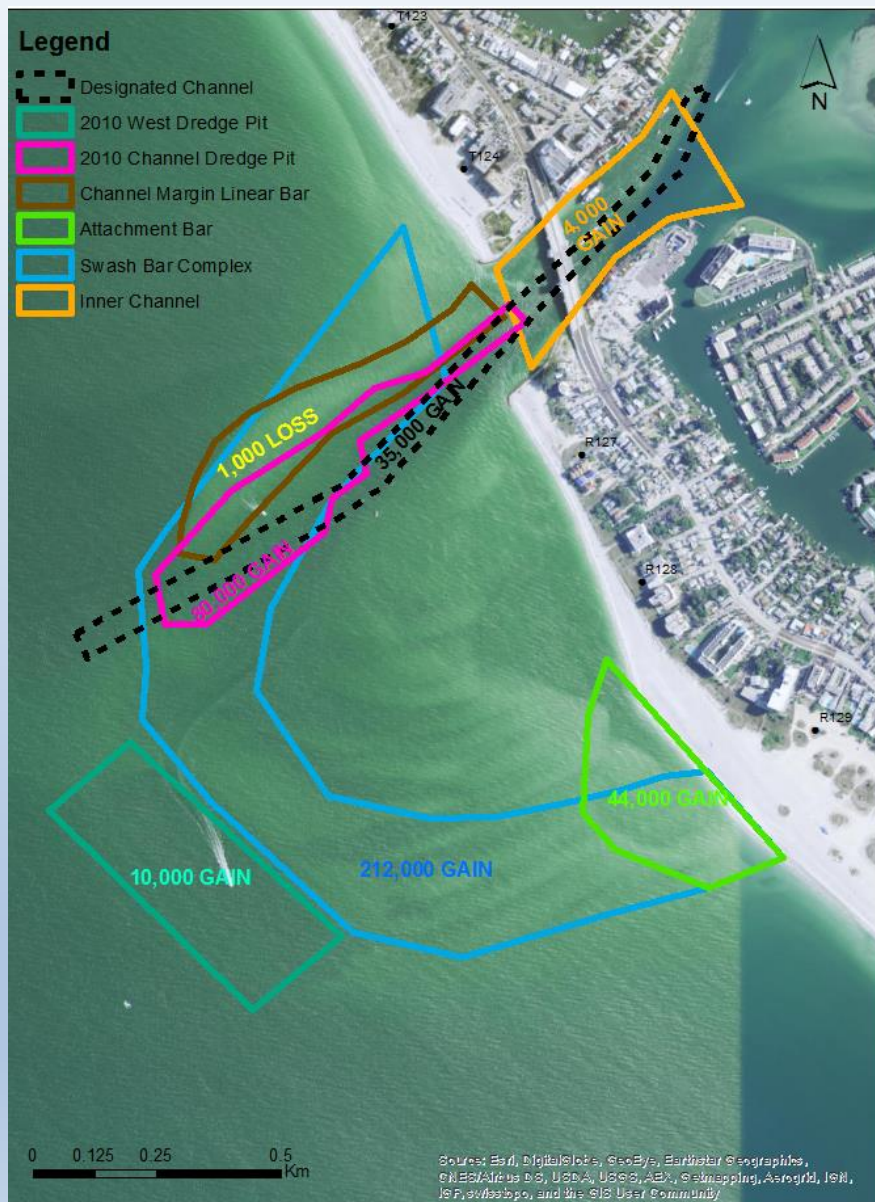


Annualized

Section 2

- Ebb Shoal Volumes
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Sediment Pathways John's Pass

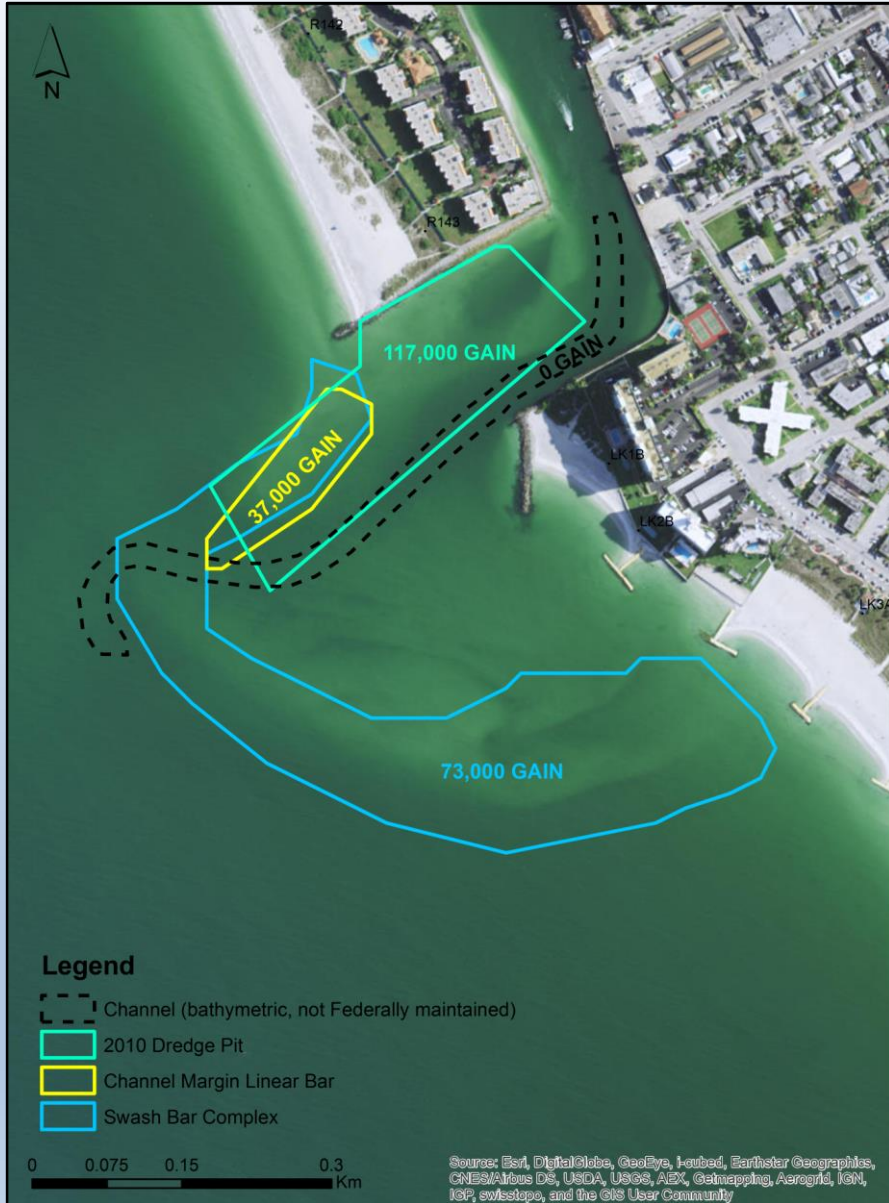


3.7 years



Annualized

Sediment Pathways Blind Pass



3.7 years



Annualized

- Infilling of the JP 2010 terminal lobe dredge pit (below -5 m NAVD) will take ~ 15 to fill.
- Infilling of the John's Pass channel dredge pit will take ~ 8 years.
- Infilling of the Blind Pass inner shoal dredge pit will take ~ 4 years.
- Dredging of the Blind Pass inner shoal inhibits development of the ebb delta and sand bypassing to the downdrift beaches

- The majority of the sediment placed on and eroded from the beaches immediately downdrift of the inlets migrates onto the downdrift bypass bars of the adjacent ebb deltas (ie. Sunshine beach on TI and Upham on LK).
- 30% or less of the sediment placed on Upham beach in 2010 was transported to the south end of Long Key and Pass-a-Grille inlet.

- Florida Department of Environmental Protection (Bob Brantly, Ralph Clark, Guy Weeks)
- Pinellas County (Andy Squires, John Bishop)
- Ping Wang, the co-author of this talk
- And ASBPA for providing the forum here today



The End

Questions?