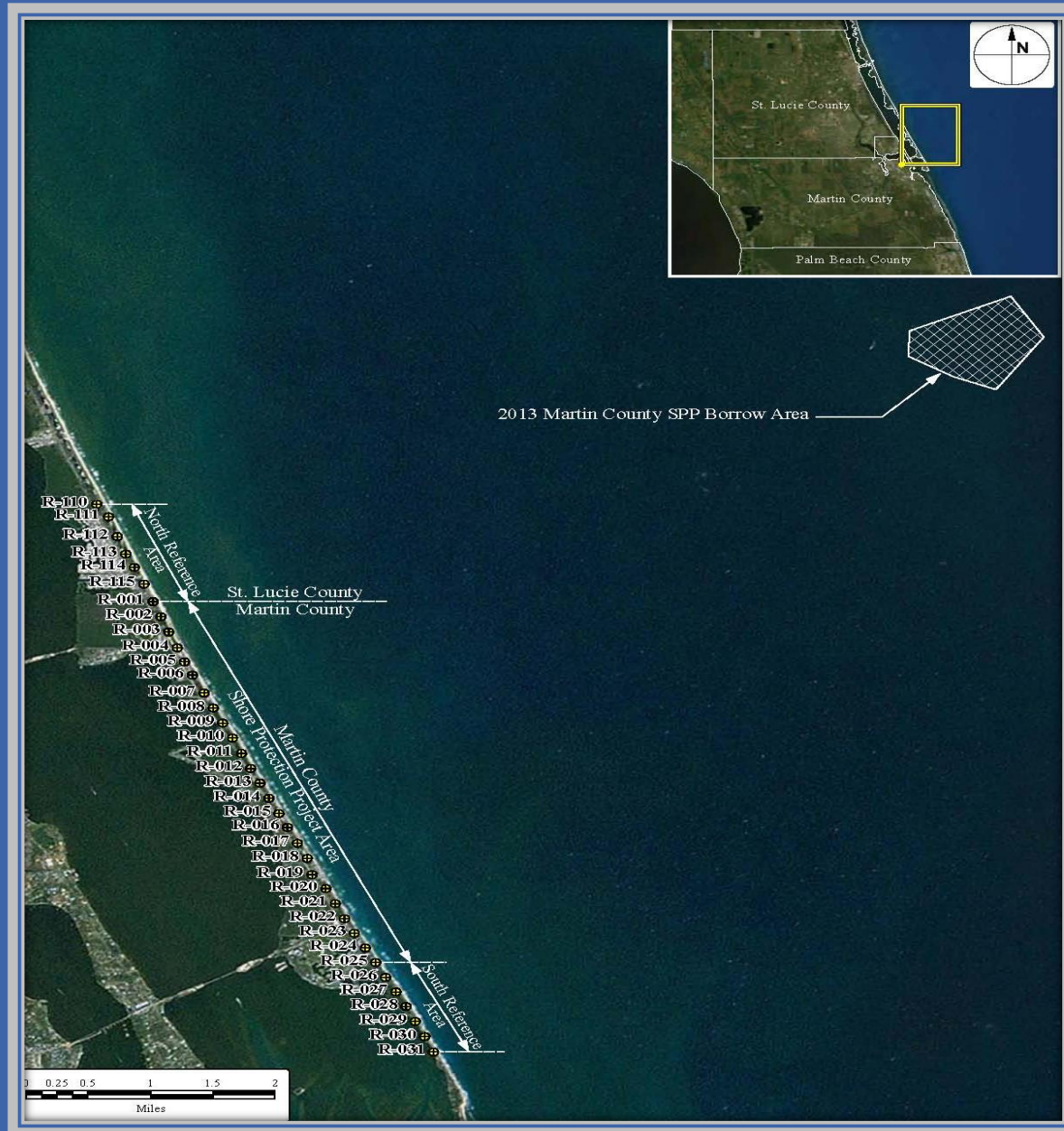




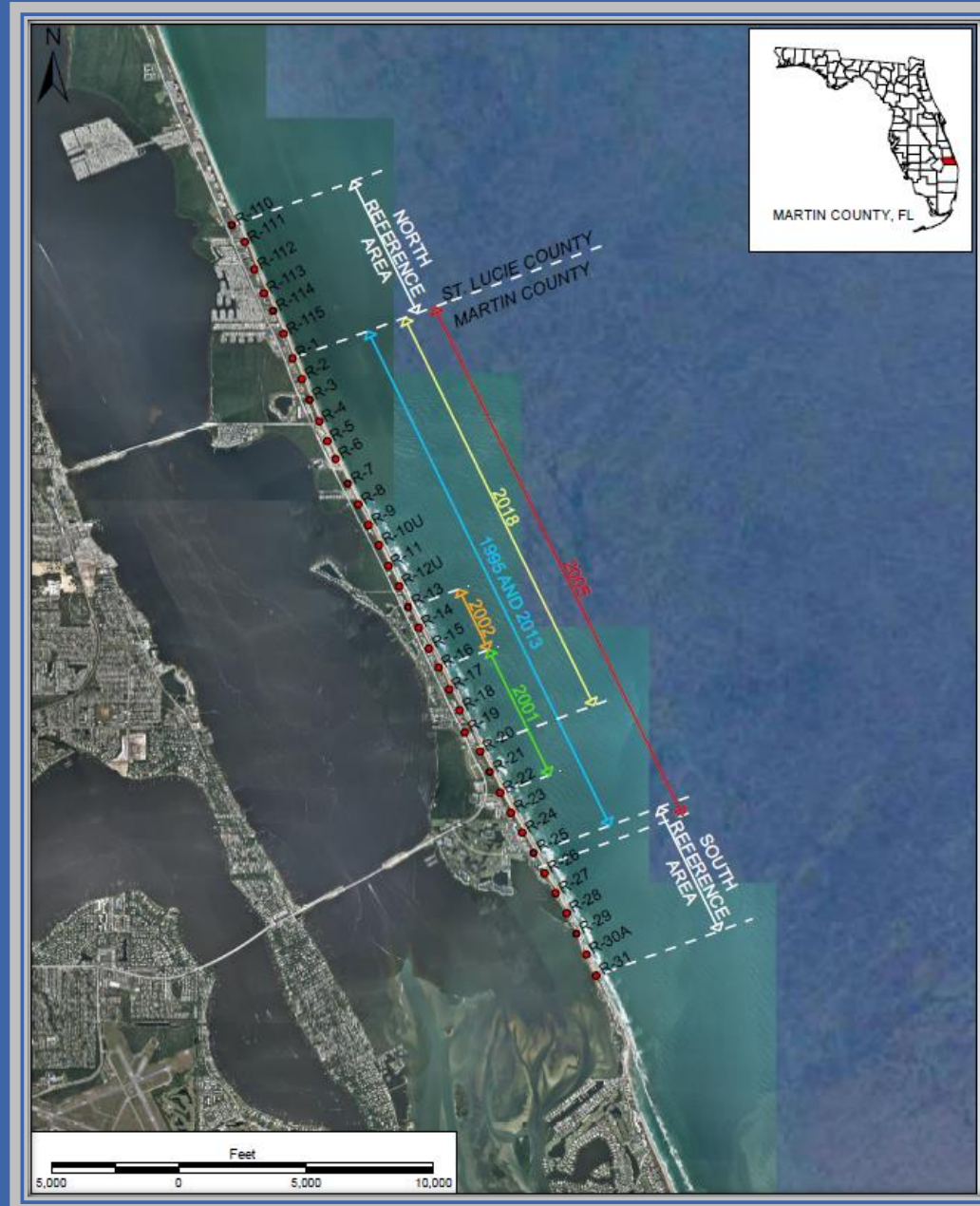
Martin County Coastal Management



Hutchinson Island Federal Storm Protection Project



Hutchinson Island Storm Protection Project



Hutchinson Island Storm Protection Project



St. Lucie Inlet Management Plan

- **1996 - St. Lucie Inlet Management Plan**
 - **First ever approved in the state of Florida**
 - **Prior to protocol development – updates, documentation**
 - **Only considered “net losses”**

- **More recently**
 - **State revised “loss” calculation**
 - **Stakeholders interest in re-visiting the IMP**

- **2016 - Revised St. Lucie Inlet Management Plan**
 - **Recognized “gross losses” north and south**
 - **Increased bypassing (mitigation) from 174,000 cubic yards/year to 195,000 cubic yards/year**
 - **161,000 to the south**
 - **34,000 to the north**



St. Lucie Inlet Management Plan Adoption

St. Lucie Inlet Management Plan

FINAL ORDER ADOPTING

ST. LUCIE INLET MANAGEMENT PLAN

WHEREAS on August 7, 1995, the Florida Department of Environmental Protection (Department) adopted the St. Lucie Inlet Management Study Implementation Plan, which established inlet sand bypassing objectives, calling for studies to modify jetties and expand the sediment basin, and calling for implementation of a comprehensive beach and offshore monitoring program and to revalidate the adopted sediment budget, and

WHEREAS the existing inlet protocol to bypass all beach compatible dredged material to downdrift beaches in eroded¹ areas was determined by the sediment budget developed in the study, *St. Lucie Inlet Management Plan* (ATM, 1995), which was conducted in partnership with Martin County, and

WHEREAS the sand bypassing objectives of the St. Lucie Inlet Management Study Implementation Plan directed the placement of the inlet maintenance dredging material on the Jupiter Island beaches south of the inlet, and

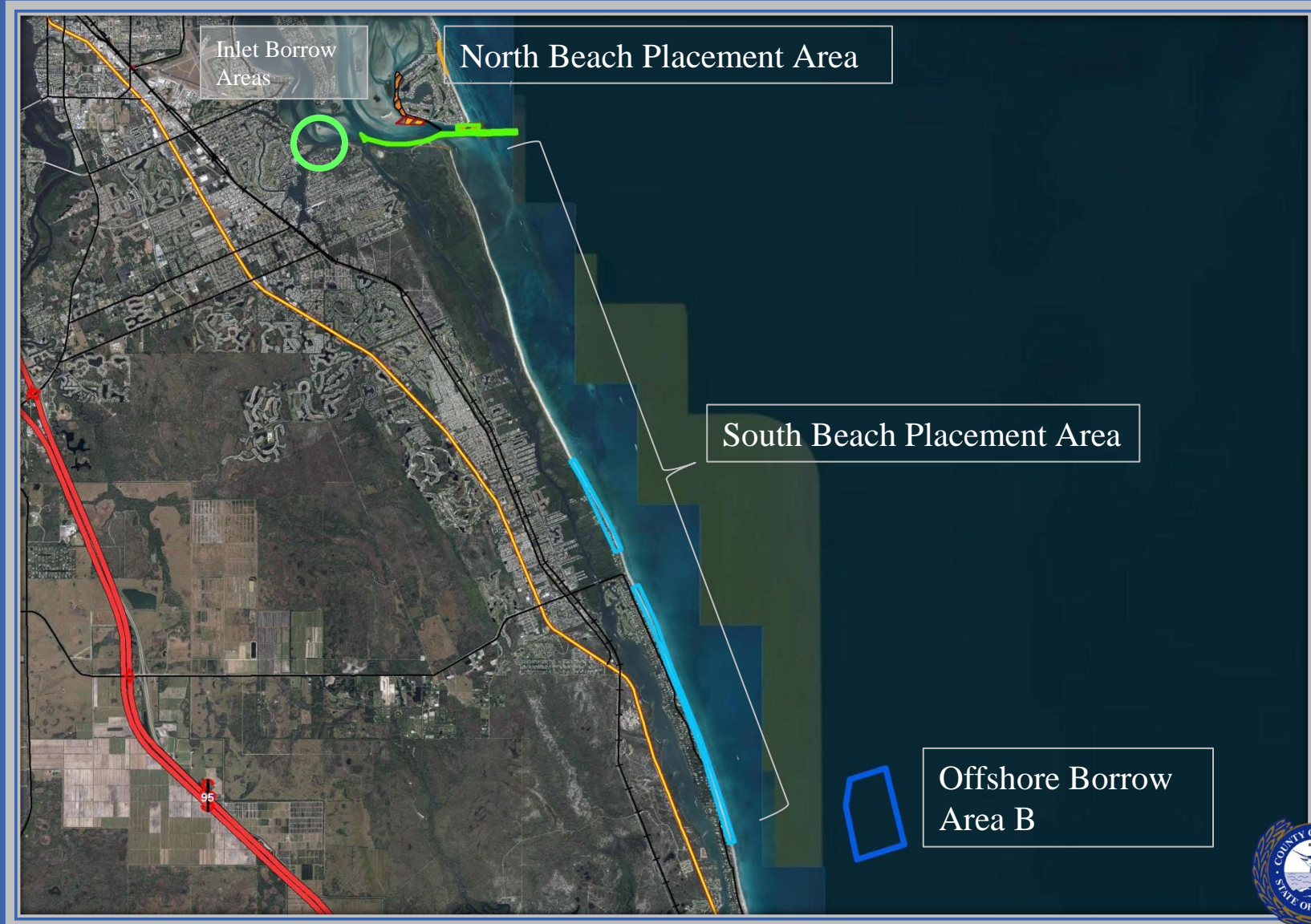
WHEREAS in 2008, the Florida Legislature amended Section 161.142, Florida Statutes, finding, "It is in the public interest to replicate the natural drift of sand which is interrupted or altered by inlets to be replaced and for each level of government to undertake all reasonable efforts to maximize inlet sand bypassing to ensure that beach-quality sand is placed on adjacent eroding beaches. Such activities cannot make up for the historical sand deficits caused by inlets but shall be designed to balance the sediment budget of the inlet and adjacent beaches and extend the life of proximate beach-restoration projects so that periodic nourishment is needed less frequently", and

WHEREAS Martin County contracted with Applied Coastal Research and Engineering, Inc., to compile new and historical data and information regarding coastal processes and inlet and shoreline dynamics, and to update the inlet sediment budget as reported in *2014 Updated St. Lucie Inlet Sediment Budget* (Ramsey et al, 2014), and

¹ As used in this document, the term "erosion" means wearing away of land or the removal of consolidated or unconsolidated material from the coastal system by wind or wave action, storm surge, tidal or littoral currents or surface water runoff. As used in this document, the term "accretion" means the buildup of land or accumulation of unconsolidated material within the coastal system caused by wind and wave action, storm surge, or tidal or littoral currents. The description of coastal processes in this document are not intended to affect title to real property or real property boundaries.



St. Lucie Inlet Management - Project Areas



St. Lucie Inlet Maintenance History and Improvement Milestones

1892	St. Lucie Inlet, located at the south end of Hutchinson Island, reported to have been cut through the barrier island by local residents. Initially the inlet was 30 feet wide and 5 feet deep.
1913	The 1913 River and Harbor Act provided initial appropriation of funds for experimental dredging of a channel 18 feet deep across the reef and ocean bar.
1916	Federal construction of the channel seaward from the mouth of the inlet began.
1929	Local interests build a 3,325-foot coquina stone jetty on the north shoreline of the inlet between 1926 and 1929.
1948	A 10 by 200-foot channel about 750 feet across the seaward bar and reef was constructed under authorization of the 1945 River and Harbor Act
1966	Federal legislation was passed modifying the St. Lucie Inlet project to include maintenance of a 6 by 100-foot channel along the best natural deep water alignment between the Federal bar-cut channel and the Intracoastal Waterway.
1974	Extension of the north jetty and modification for a weir section, excavation of impoundment basin, construction of a south training jetty with fishing walkway, a 10 by 500-foot channel through the bar-cut tapering to 150 feet through the inlet, and a 7 by 100-foot channel to the Intracoastal Waterway were authorized by Congress.
1982	Construction of the project was carried out with a 650 foot dogleg extension added to the north jetty, a 1,400 foot long south jetty, a 400 foot long detached breakwater, an entrance channel 16 feet deep by 300 feet wide, an inlet throat channel 10 feet deep by 150 feet wide, an interior channel 7 feet deep by 100 feet deep by 150 feet wide, an interior channel 7 feet deep by 100 feet wide, and the dredging down to rock of a 2,500 foot long by 450 foot wide impoundment basin.
1994	Construction by non-Federal interests of a sand tight groin about 450 feet long at an elevation of about 4 feet NGVD located about 50 feet north of and parallel to the north jetty.
1998	Martin County Flood Shoal Removal project, removing 714,000 cy placed on Jupiter Island Beaches. Material was barged down the ICW and pumped to beaches from two offloading sites
2000	Corps Emergency Maintenance Dredging with nearshore disposal of ≈ 220,000 cy sand
2002	Deepening of the Impoundment Basin and Maintenance Dredging with ≈ 292,000 cy of sand placed in the nearshore and 300,000 cy of rock placed offshore to create a 40 acre artificial reef site.
2007	Maintenance Dredging with ≈ 600,000 cy placed on the beaches of the Hobe Sound National Wildlife Refuge, R-59 to R-69
2009	North Jetty Improvements raising the seaward 450 feet of the north jetty
2012	Maintenance Dredging with ≈ 474,000 cy placed on the beaches of the Hobe Sound National Wildlife Refuge R-60 to R-72
2014	Maintenance Dredging with ≈ 373,974 cy placed on the beaches of the Hobe Sound National Wildlife Refuge R-60.9 to R-70
2016	Martin County Bathtub Beach/Sailfish Point Joint project to remove ≈325,401 cy of material from Borrow areas A&C as well as the impoundment basin and navigation channel.
2017	Martin County Bathtub Beach/Sailfish Point Joint project to remove ≈72,106 cy of material from Borrow area A as well as the Sailfish Point Navigation Channel.
2017-2018	Maintenance Dredging with ≈ 546,539 cy placed in the offshore Borrow area B.



St. Lucie Inlet Maintenance Projects

- over 4 MCY and counting.....

Date	Volume	Location	Construction/Method
1996	625,000	R-59 tp R-56 and R-75 to R-82	ICW & Crossroads
1998	714,000	R-73 to R-84 and R-92 to R-103	Mechanical – barged down ICW
2000	221,000	Nearshore	Mechanical – split hull scows
2002	292,000	Nearshore	Hydraulic/spider barge to split hull scows
2007	560,000	R-59 to R-69	Hydraulic pipeline
2012	474,000	R-61 to R-70	Hydraulic pipeline
2014	373,974	R-60 to R-70	Mechanical – barge down ICW
2016	325,401	R-34 to R-49.5	Hydraulic pipeline
2018	500,000+	Offshore Borrow Area “B”	Mechanical – split hull barge

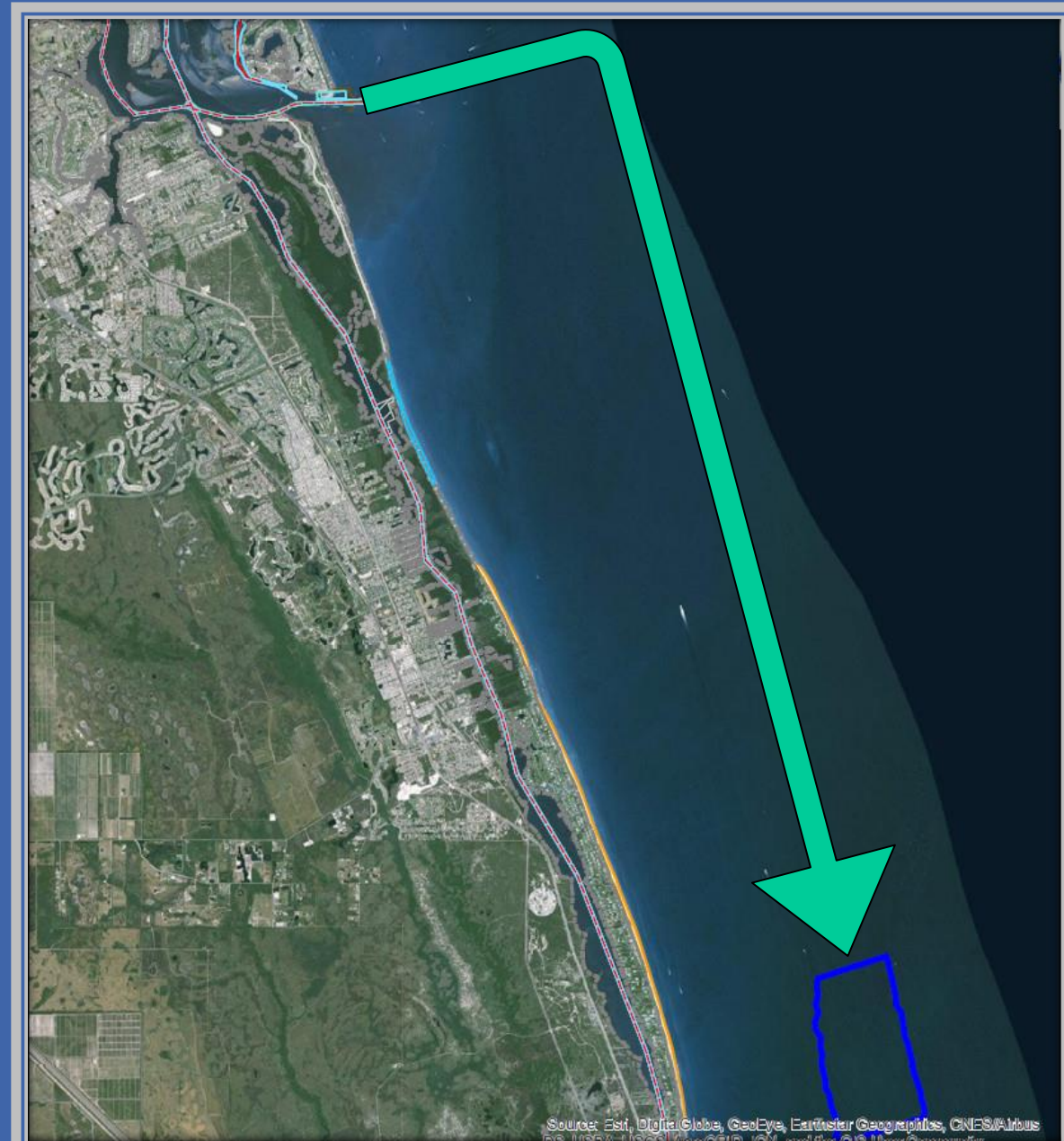


St. Lucie Inlet Management – South Projects

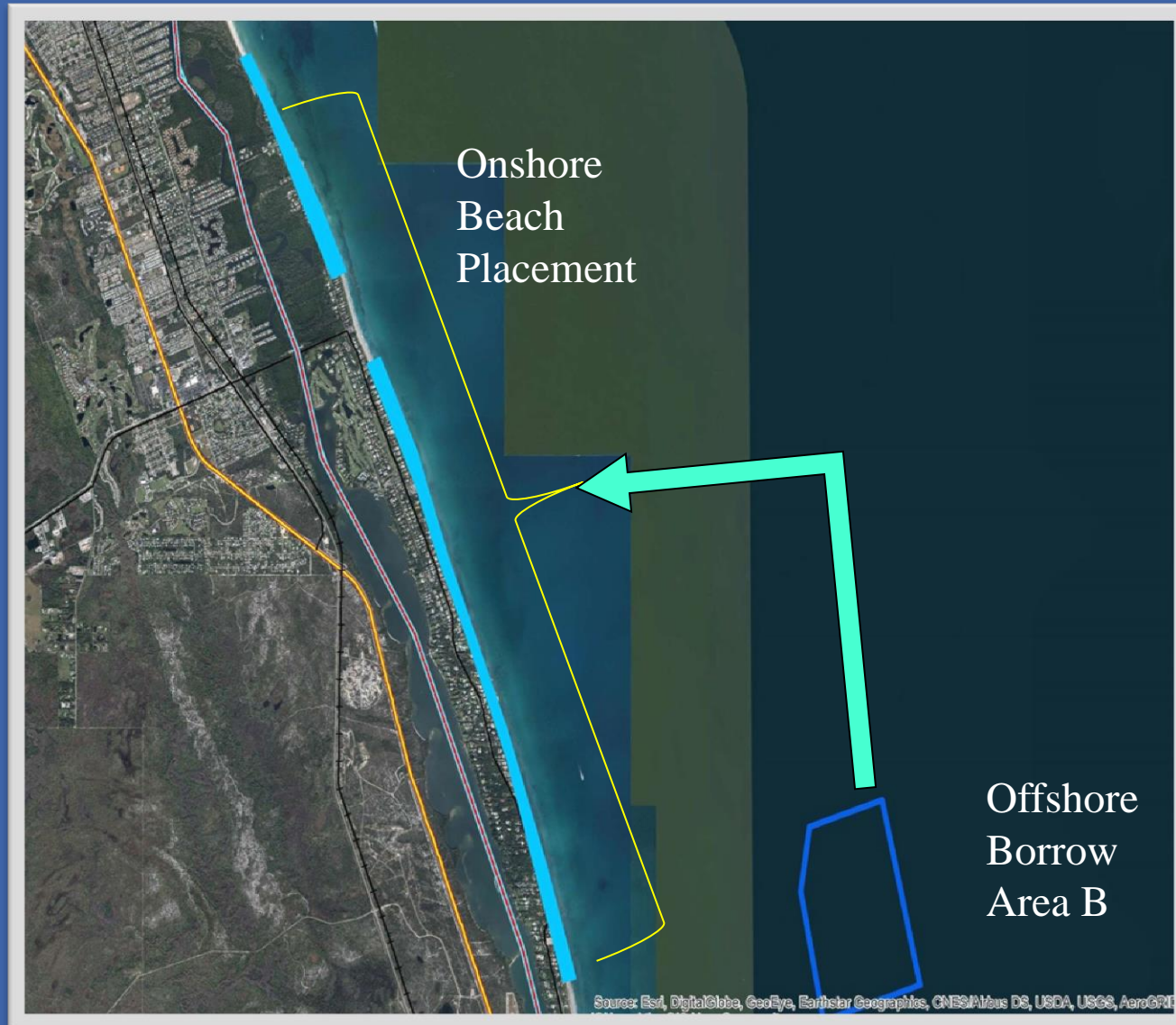
August 2017 & May 2018

- **Project Partners: USACE, and Martin County**
- **Material to be placed in Offshore Borrow Area B from the Impoundment Basin.**

546,539 cy



St. Lucie Inlet Management - South Projects



2019

➤ **Project Partners
Town of Jupiter
Island, Martin
County, and
FDEP**

➤ **Placement of
sand from
Offshore Borrow
Area B**

1,133,000cy



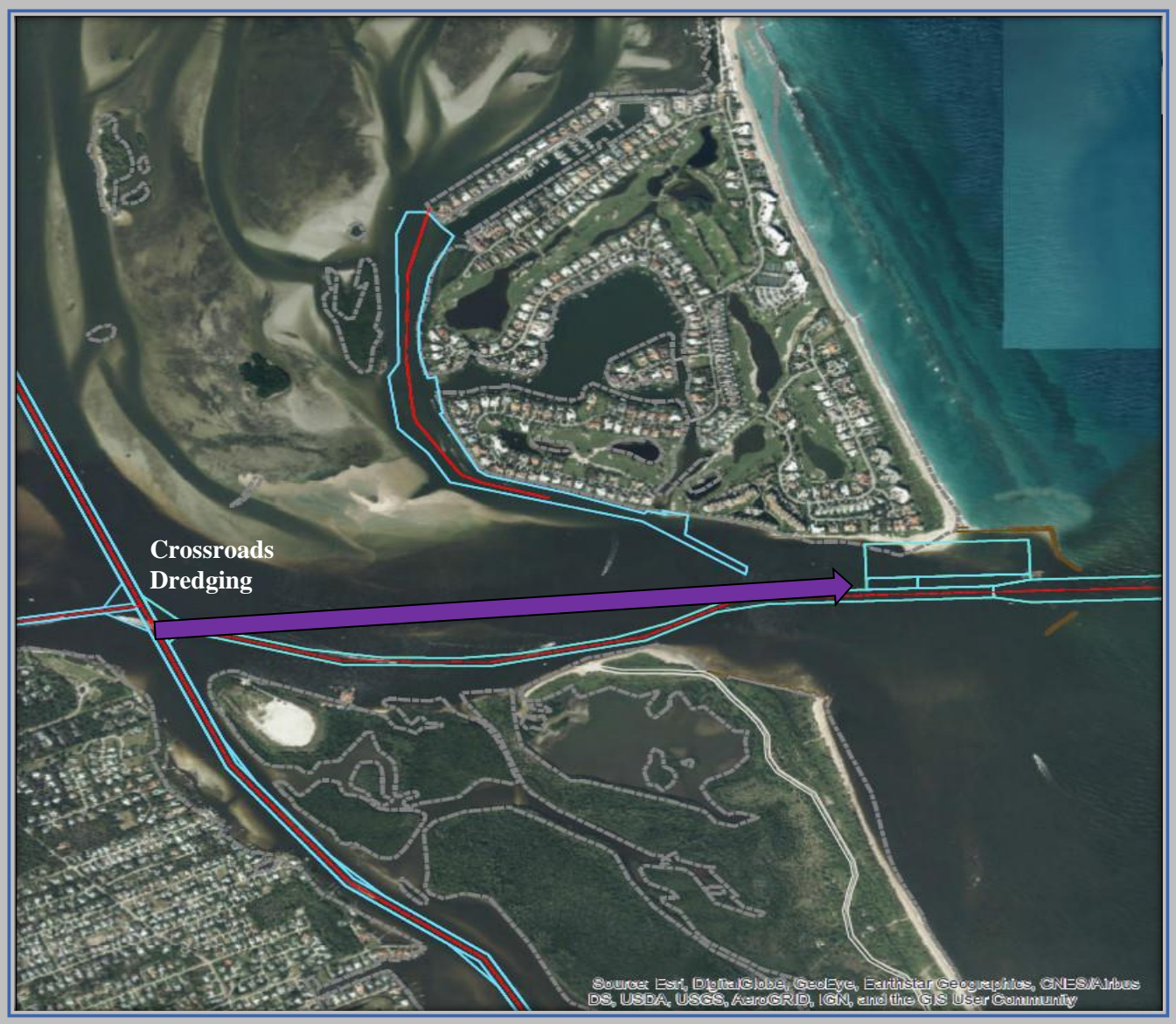
St. Lucie Inlet Management - Projects

2019

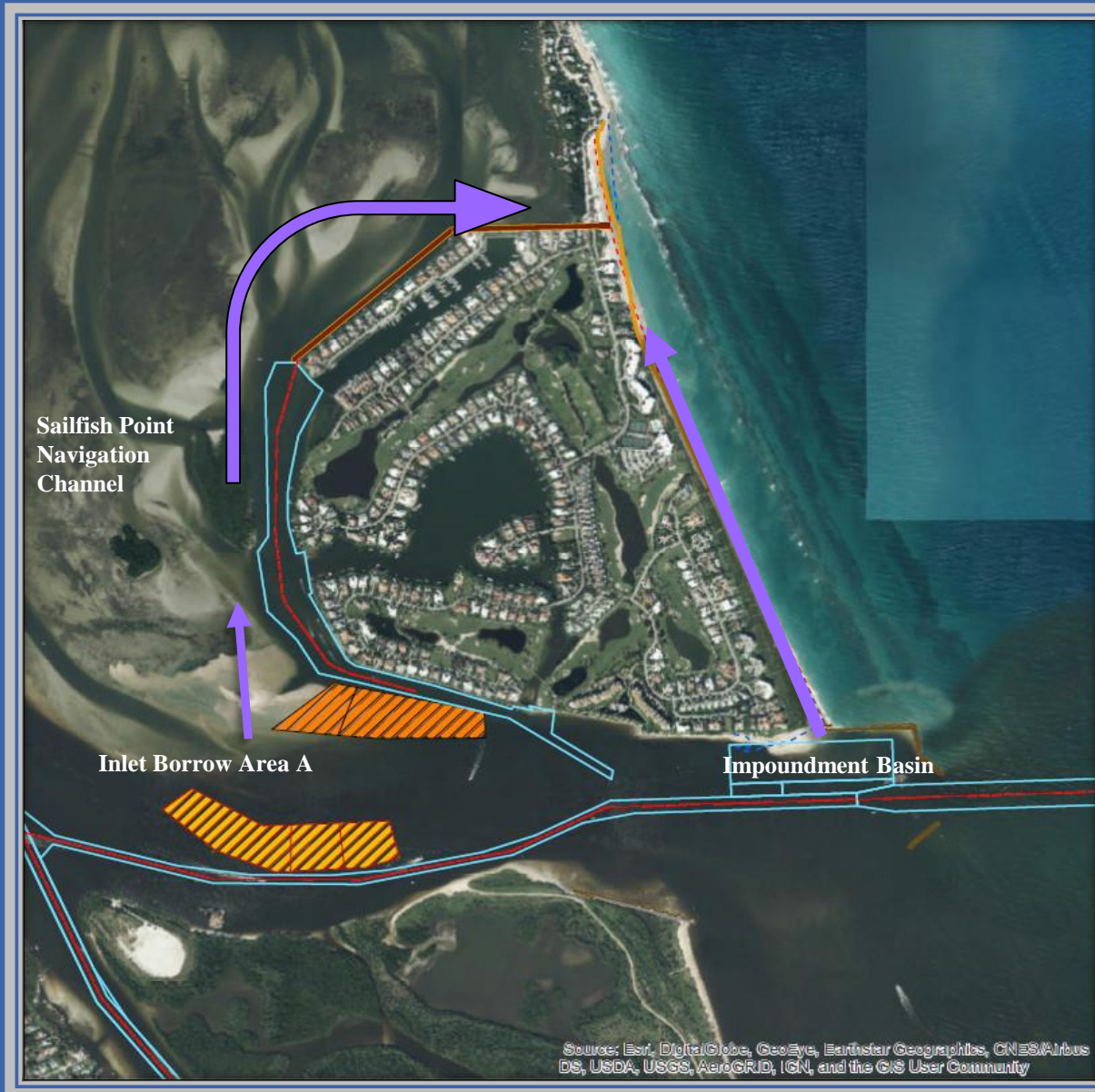
➤ **Project Partners:
USACE, FIND
and Martin
County**

➤ **Material
transferred from
the Crossroads to
the Impoundment
Basin**

40,000cy



St. Lucie Inlet Management Plan - North Projects



- **Project Partners:
FEMA, FDEP,
Martin County
and Sailfish Point
POA**
- **Material placed,
from Inlet Borrow
Area A,
Impoundment
Basin and the
Sailfish Point
Navigation
Channel**



Bathtub Beach-Sailfish Point Joint Projects

WHY?

Because....

Change happens – in just a few days!



Bathtub Beach-Sailfish Point Joint Projects

- **Project Timeline**
 - **1st joint project with Sailfish Point was in 1999 after Hurricane Floyd**

Bathtub Beach Project Timeline							
Project Year	Task	Total Project Cost	Project	Period	Dredging Area	Disposal Area	Volume Placed (CY)
1999	BTB Beach Project	\$200,000.00	Beach Disposal R-35 south to R-37	Mar-99	SFP Navigation Channel	R-35 to R-37	20,000
2005	MacArthur Dune Restoration	\$1,585,221.00	MacArthur Dune Restoration	02/14/05 - 07/28/06	Trucked material	R-27 to R34.5	66,000
2010	BTB Beach Project	\$1,157,440.00	Bathtub Beach Renourishment		St. Lucie Flood Shoals	R-34.5 to R-35.5	49,017
2016	BTB/SFP Project	\$5,372,511.71	Bathtub/Sailfish Renourishment	02/16-05/16	Borrow Area A (49,260 cy) & C (107,290 cy), Impoundment Basin and Channel (173,240 cy)	R34.5 to R40	325,401
2017	BTB/SFP Project	\$3,499,569.00	Bathtub/Sailfish Renourishment	03/17-05/17	Borrow Area A (43,100) & Sailfish Point Navigation Channel (20,650)	R34.5 to R38	72,106
2018	BTB/SFP Project	\$3,396,519.00	Bathtub/Sailfish Renourishment	02/18-04/18	14,520 cubic yards (from SFP Channel) 80,200 cubic yards (from Borrow Area "A") 71,100 cubic yards (Impoundment Basin)	R34.5 to R37.4	157,607 cubic yards (total placement), 142,843 cubic yards (pay volume)

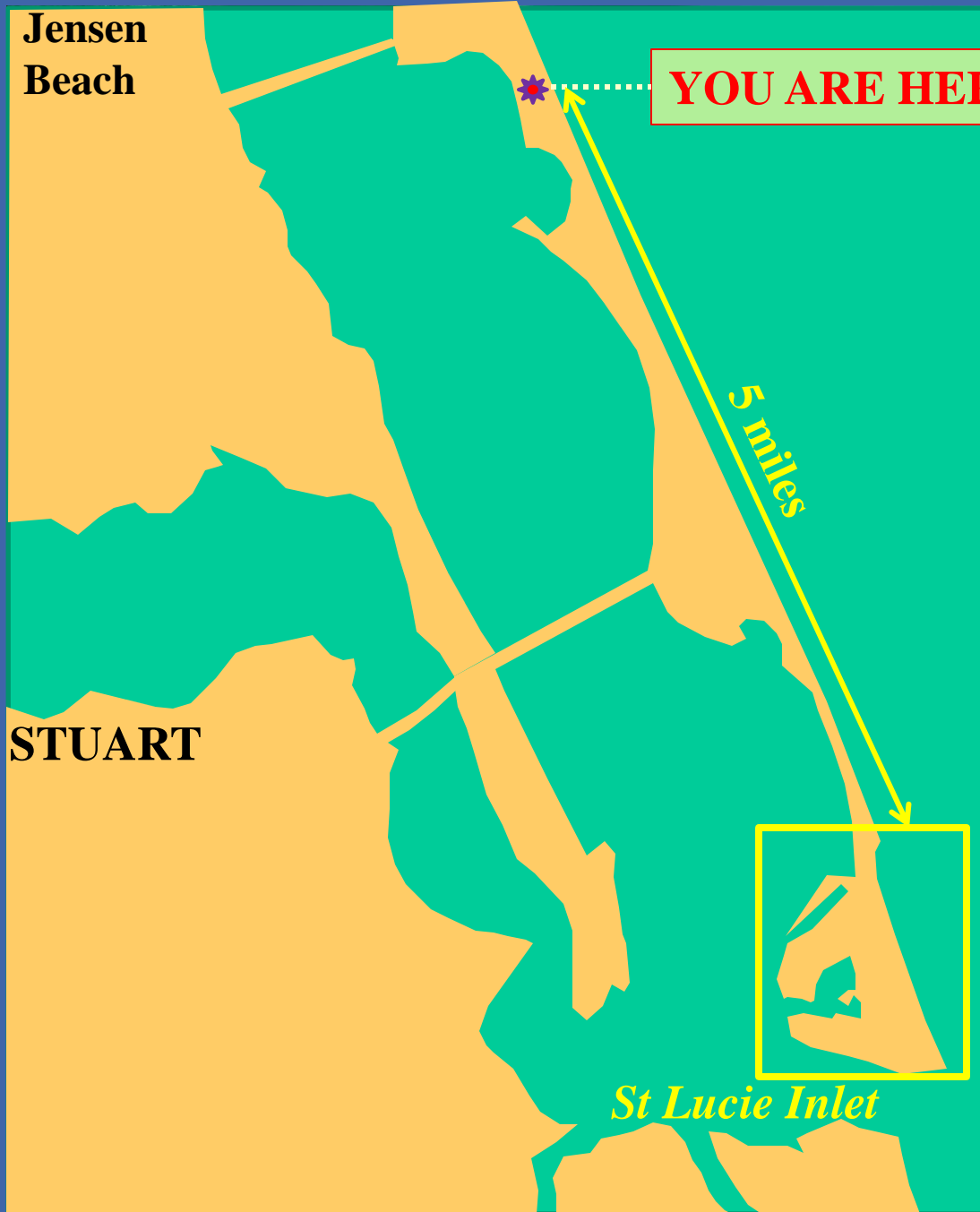
	Total Sand tons	Cost for Sand
2008 trucking	3,426.00	\$23,982.00
2010 trucking	7,852.80	\$63,495.53
2011 trucking	7,997.39	\$59,483.28
2012 trucking	27,139.94	\$428,682.03
2013 trucking	3,065.12	\$49,041.92
2014 trucking	1,554.40	\$24,870.40
2017 trucking	32,972.64	\$625,536.43
Trucking total	84,008.29	\$1,275,091.59

- **Emergency Trucking Projects**



Bathtub Beach-Sailfish Point Joint Projects





YOU ARE HERE

5 miles

**Jensen
Beach**

STUART

St Lucie Inlet

Bath Tub Beach Park

Sailfish Pt

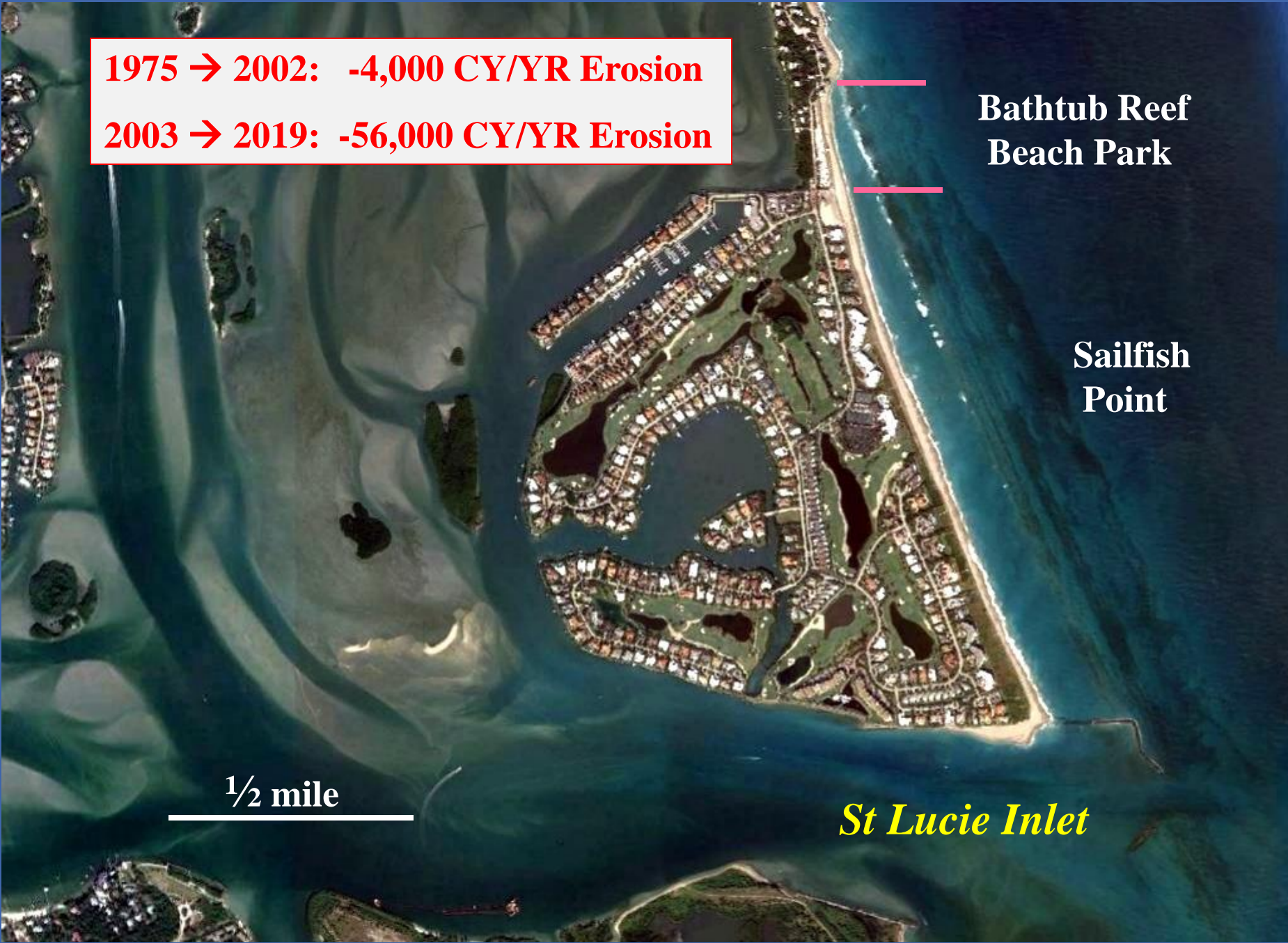
1975 → 2002: -4,000 CY/YR Erosion
2003 → 2019: -56,000 CY/YR Erosion

**Bathtub Reef
Beach Park**

**Sailfish
Point**

1/2 mile

St Lucie Inlet





**Bathtub Beach
Nov 2011**



**Sailfish Point
March 2013**

Spring 2016: 325,000 CY initial constrxn

2017-18: 260,000 CY storm repair

Bathtub Reef
Beach Park

**BEACH
PROJECT**

Sailfish
Point

1/2 mile

St Lucie Inlet







Bathtub Reef Beach Park





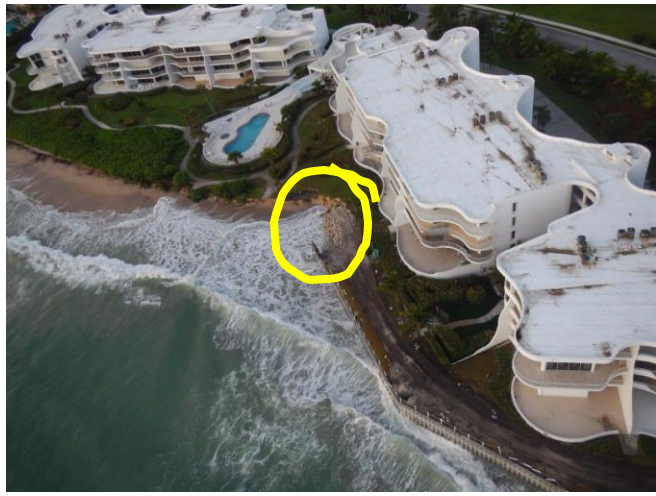
Sailfish Point

Bathtub Beach

Feb 2012







THIS IS A MUTUAL PROBLEM.

YES!

HEY, GET A ROOM!

Breeding
shorebirds.





YO, TURTLE: YOU DONE WITH MY PEN?

SO, WHEN DO WE GO TO THE BEACH?



2016 Initial Fill



Bathtub Beach / Sailfish Point Beach Nourishment Project
April 2016 – Initial Construction: 325,000 CY



2017, 2018 -- Post-Hurricane Renourishment: 260,000 CY

17 October 2012

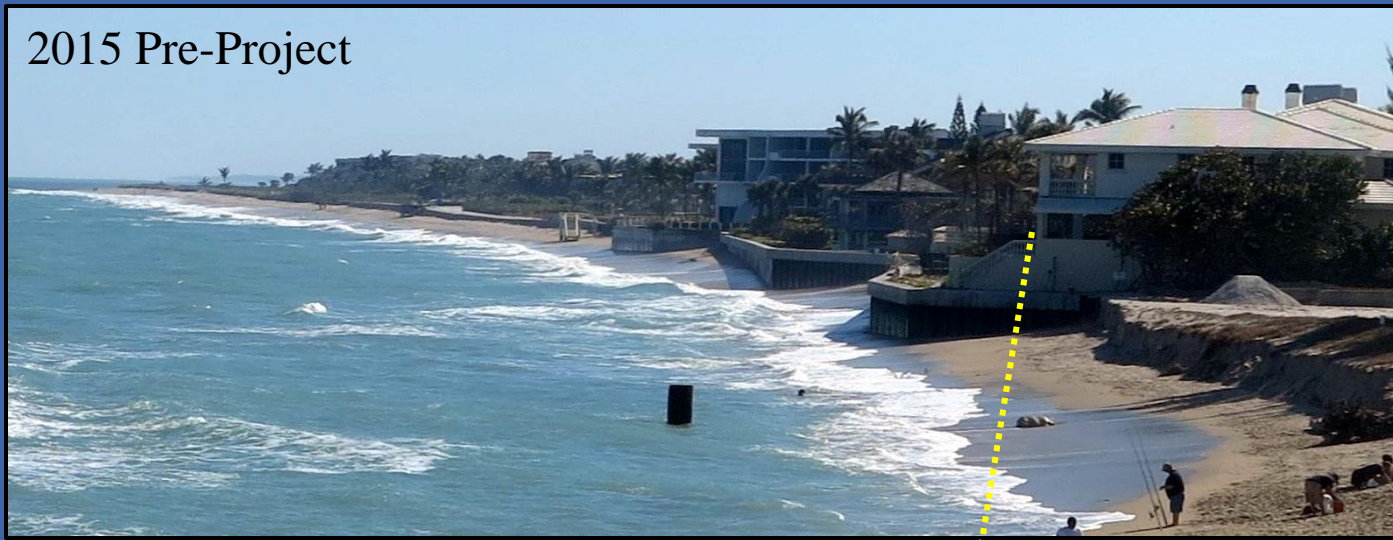


**Bathtub Reef
Beach Park**

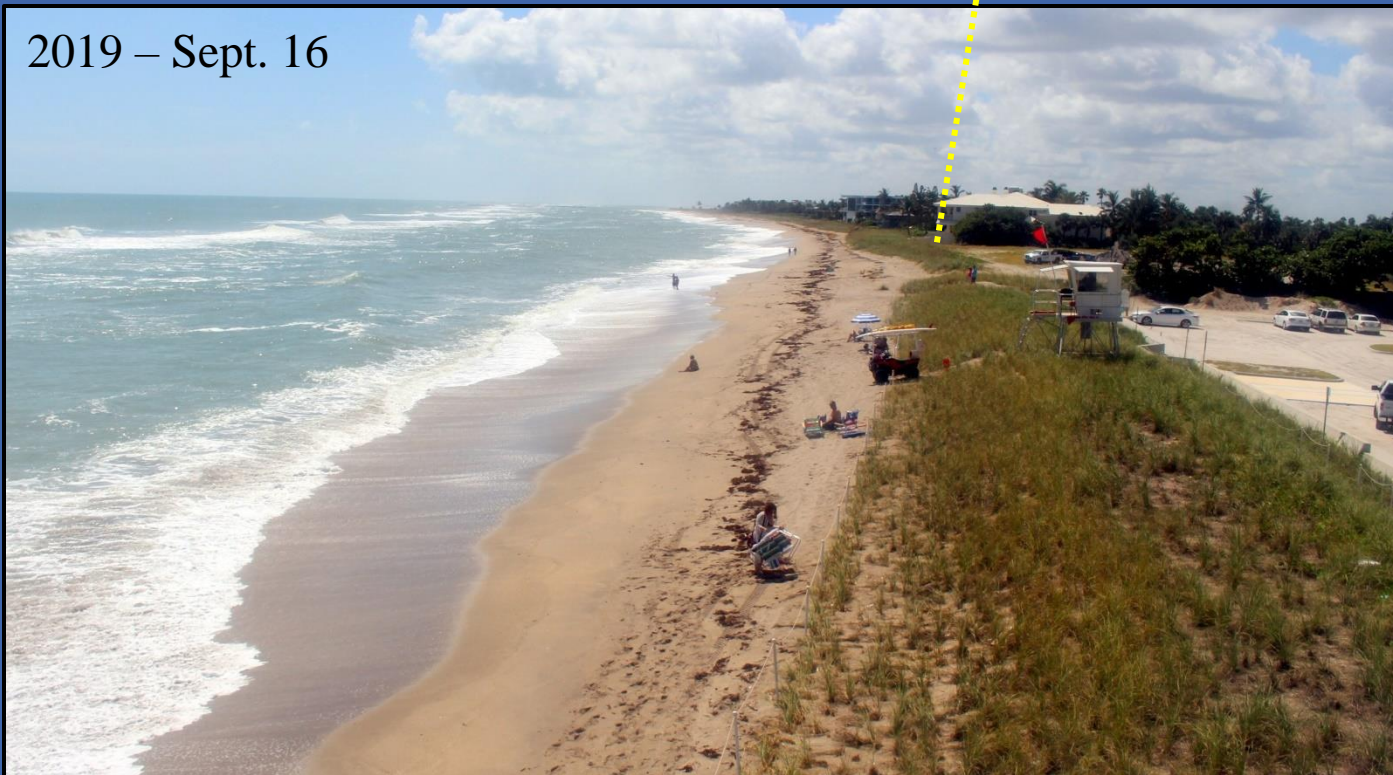
16 September 2019



2015 Pre-Project



2019 – Sept. 16









TAYLOR ENGINEERING, INC.

Martin County's Hutchinson Island Shore Protection Project

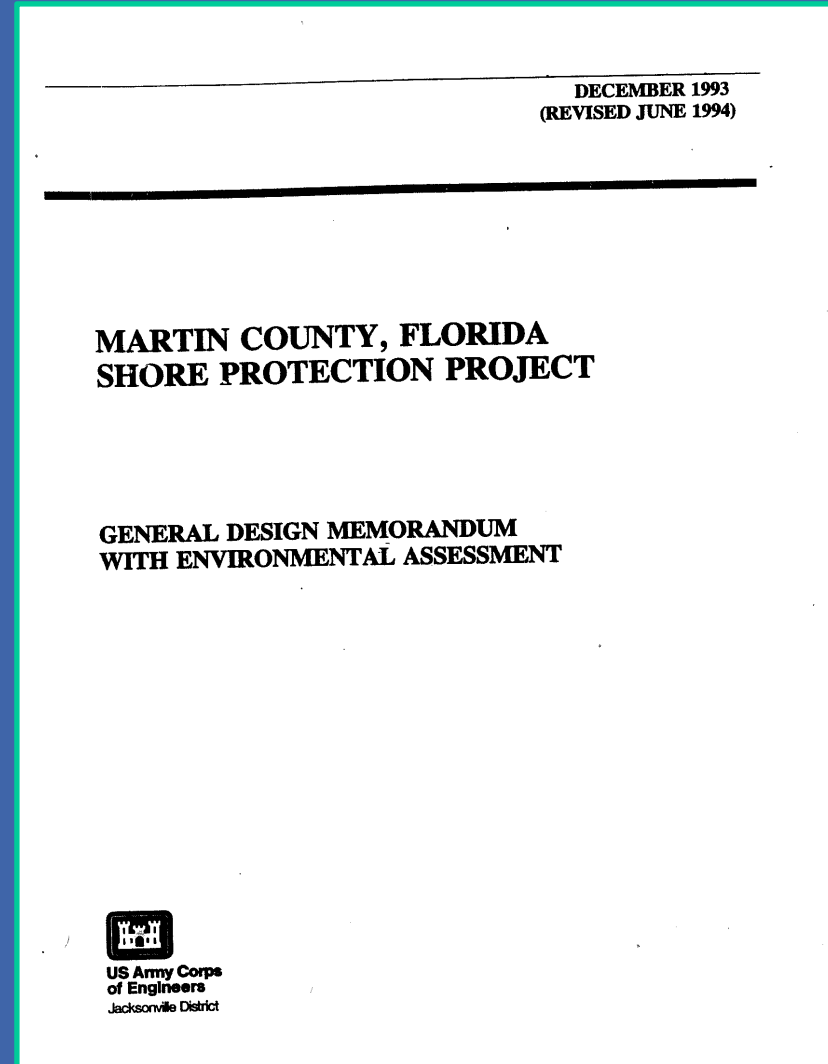
Florida Shore & Beach
Preservation Association
2019 Annual Meeting



Ken Craig, P.E.
September 18, 2019

Project Basics

- Northern Martin County on Hutchinson Island
- Authorized by WRDA 1990
- Martin County, Florida, Shore Protection Project
- General Design Memorandum (1993/94)
- Federal participation expires in 2045



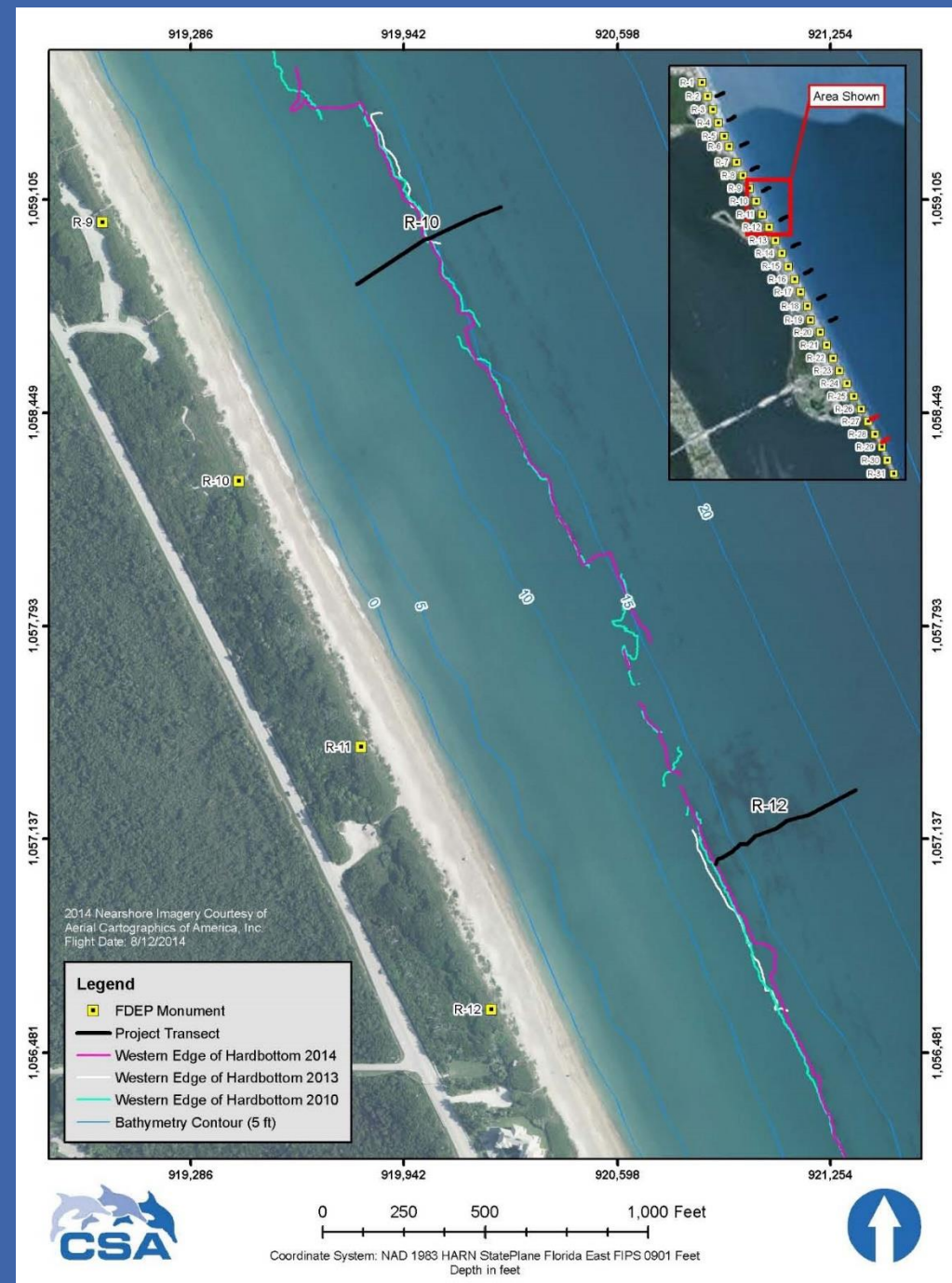
Project Basics

- 1995 Initial construction
- Periodic maintenance
- Performance monitoring



Project Basics

- Extensive, high quality offshore hardbottom

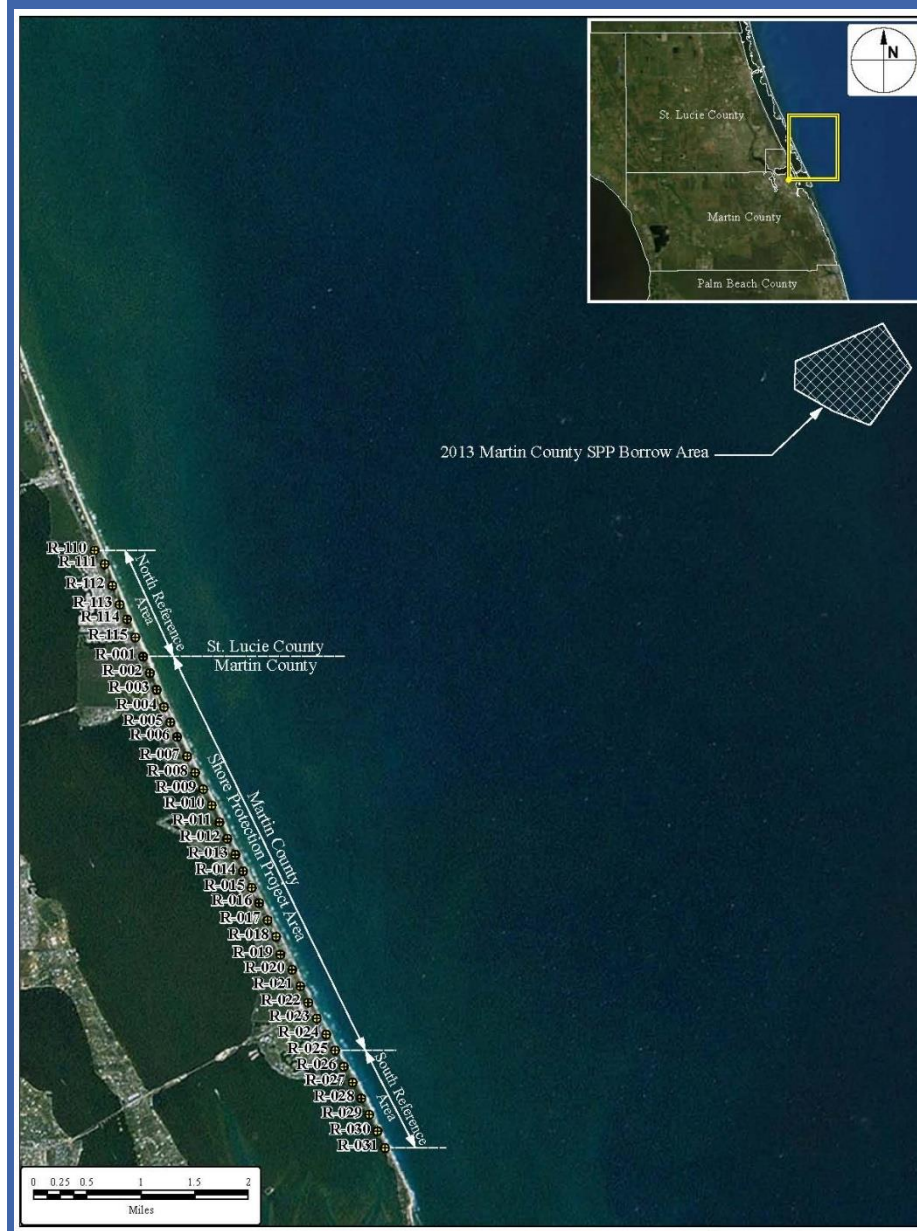
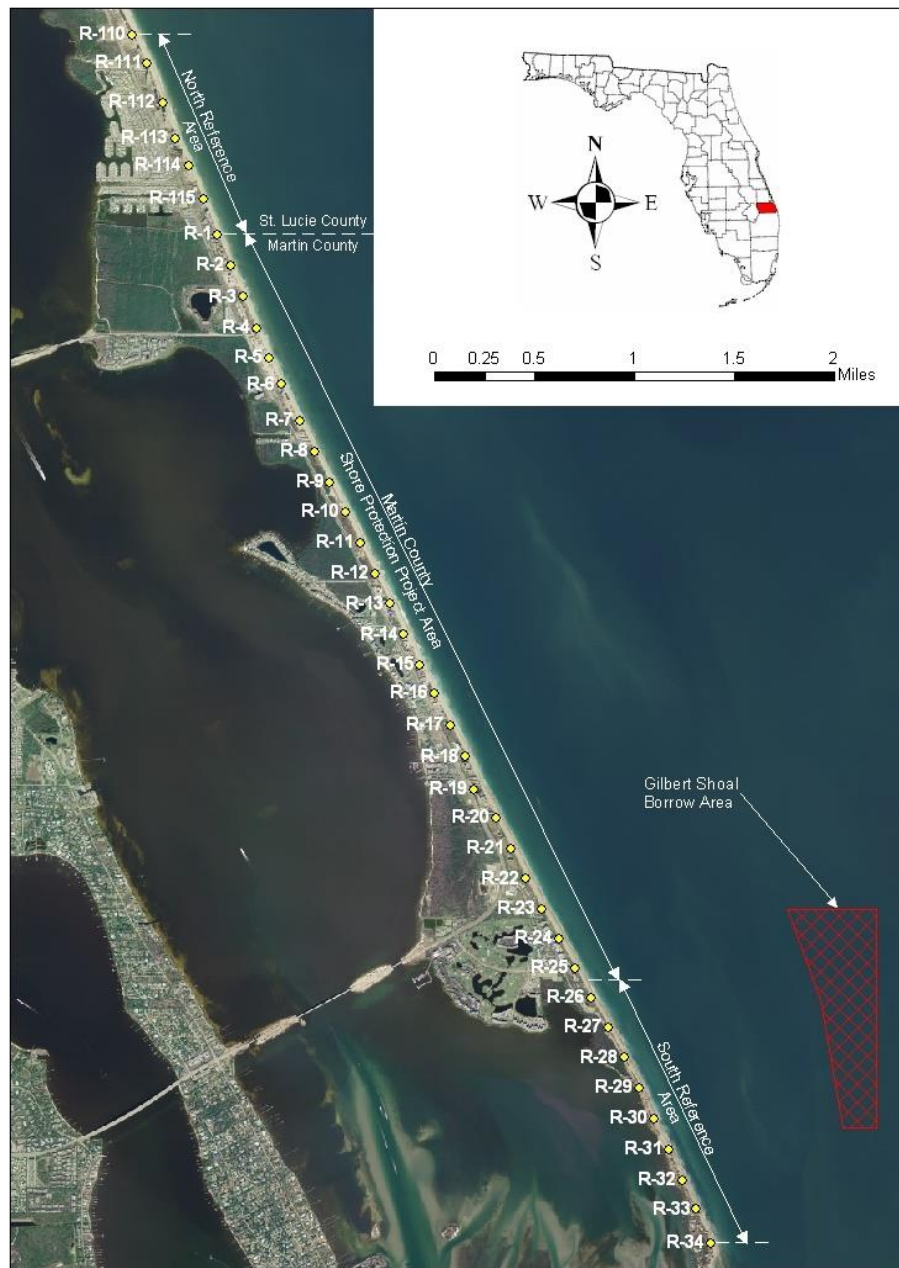


Construction

- 1995-96 → 1,340,000 cy
- 2001-02 → 304,000 cy
- 2005 → 885,000 cy
- 2013 → 613,000 cy
- 2018 → 428,000 cy

Total to date: 3,570,000 cy

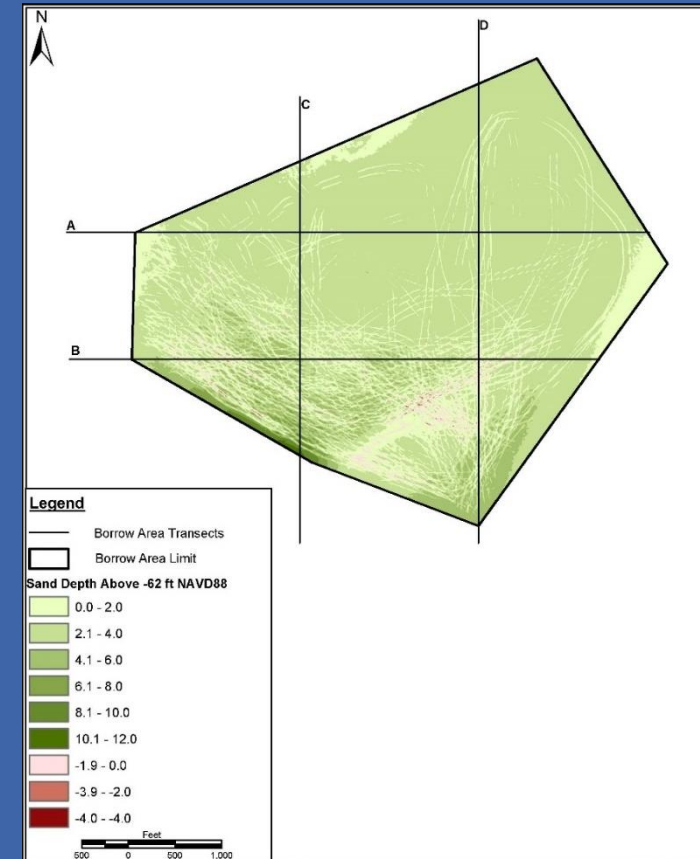




Federal Martin County SPP,

Hutchinson Island

- USACE 1994 GDM
 - 11-year nourishment interval;
589,600 cy per project
- USACE 2011 LRR
 - Economically optimized 13-year nourishment interval; 787,800 cy per project
 - Storm events and budget requests/funding availability dictate actual nourishment frequency
- Borrow Area
 - 434,000 – 1.7M cy remaining in template
 - Sufficient for a 290,000-cy project
 - Offshore shoal contains 11,500,000 cy
 - Permitting challenges — NMFS

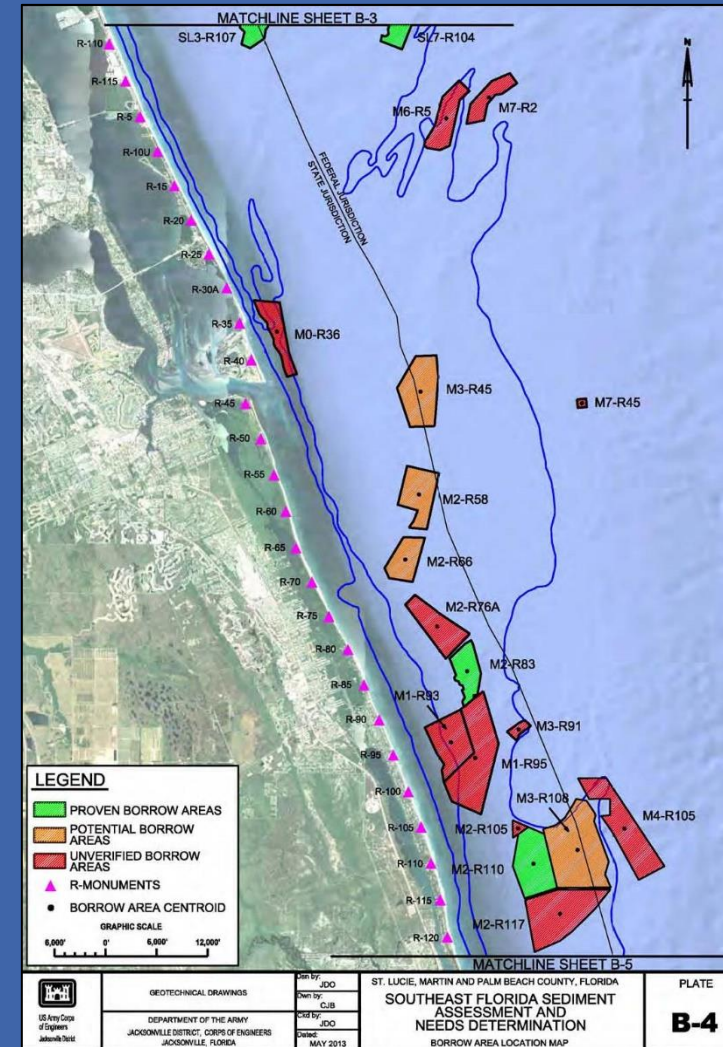


USACE Sand Study

- Martin County SPP — 8.2 Mcy
- Bathtub Beach/Sailfish Point — 1.4 Mcy
- Jupiter Island SPP — 12.5 Mcy

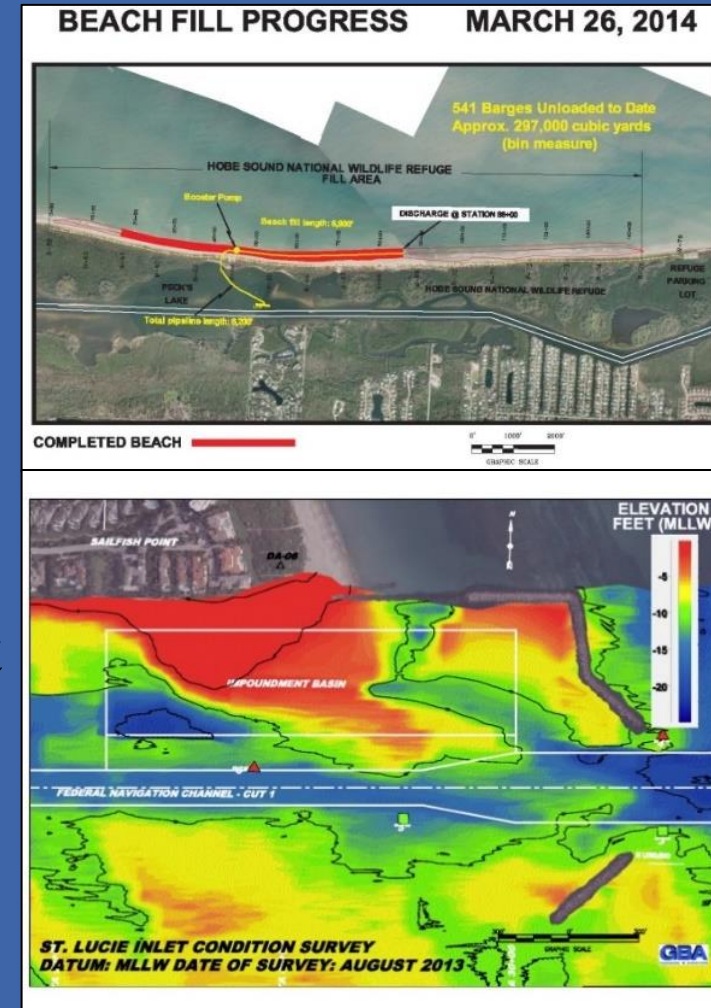
Martin County 50-year needs
22.1 Mcy

- See Clay McCoy's talk @ 4:05PM



Coastal Geodatabase Development

- County data standards → GIS database
- Consolidated historical and current data
- Holistic view of entire County with all engineering, physical, and natural resources data easily accessible
- Integrated project management through data visualization
- Time and cost savings for the County via expedited and informed decision making

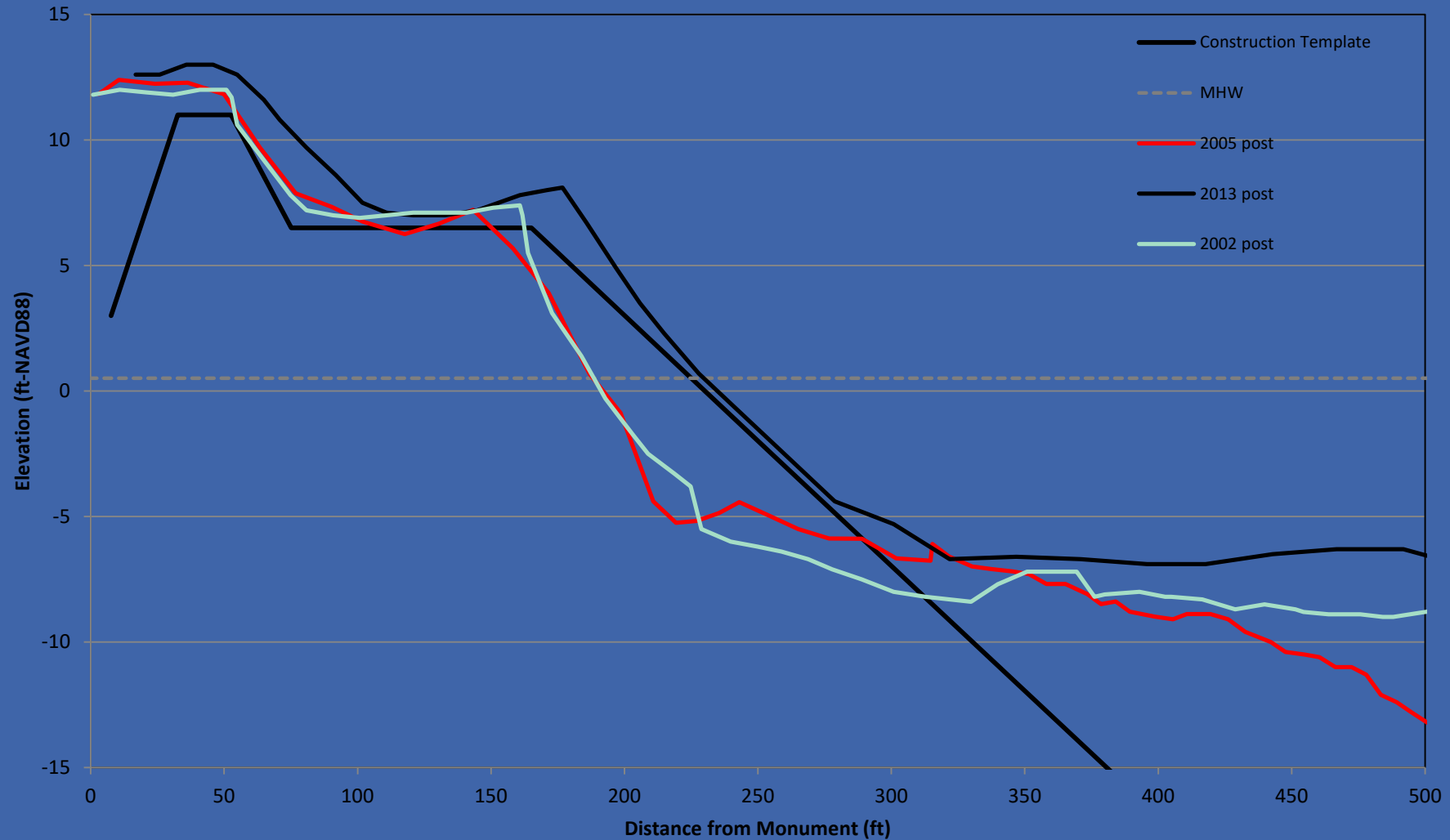


Storms of note

Date	Type/Name
March 11-13, 1996	Nor'easter
October 4-8, 1996	Nor'easter
November 15-18, 1996	Nor'easter
February 2-6, 1997	Nor'easter
August 23-31, 1999	Hurricane Dennis (cat 2)
September 14-16, 1999	Hurricane Floyd (cat 4)
October 15-17, 1999	Hurricane Irene (cat 1)
September 2004	Hurricane Frances (cat 2)
September 2004	Hurricane Jeanne (cat 3)
October 25-29, 2012	Hurricane Sandy (cat 1)
October 3-8, 2016	Hurricane Matthew (cat 4)
September 9-12, 2017	Hurricane Irma (cat 3/4)

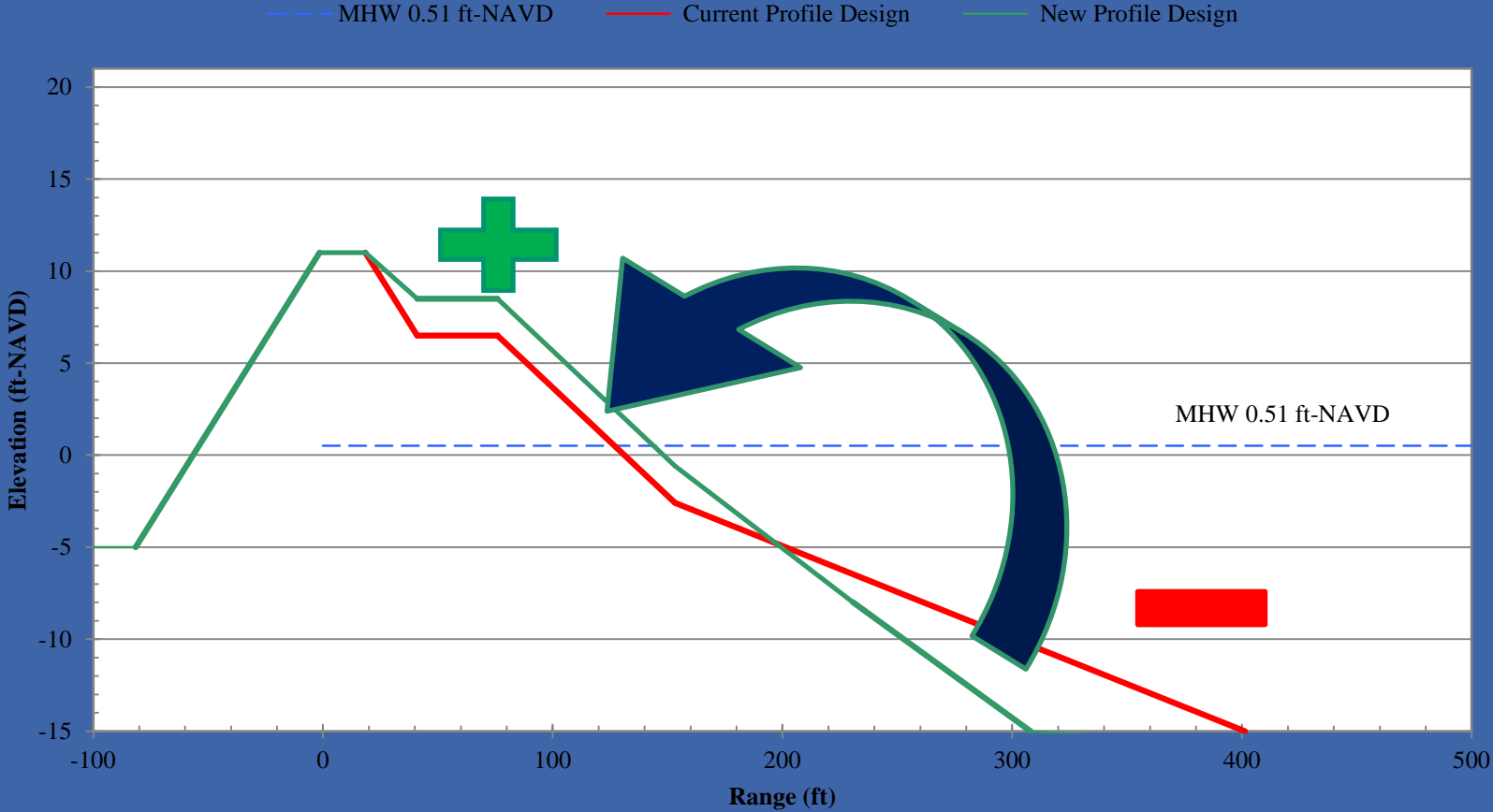
Observed Profile Evolution

R-14



Potential Template Modifications

Profile Template Comparison



Partnerships

