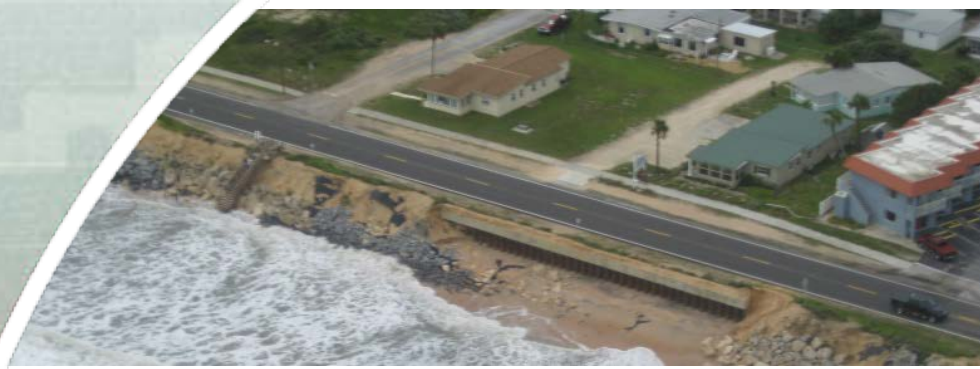
FLAGLER COUNTY, FLORIDA

HURRICANE AND STORM DAMAGE REDUCTION (HSDR) STUDY

Civil Works Review Board Presentation

Presented by:
Colonel Alan Dodd
U.S. Army Corps of Engineers
Jacksonville District

August 26, 2014



FLAGLER COUNTY HSDR
AN INVESTMENT IN THE NATIONAL INTEREST

- BCR: 1.9
- Average Annual Net Benefits: $1,168,000
- Total Federal Cost: $24,608,300
- Total Non-federal Cost: $20,353,700

- Protects/maintains continuity of community's only major emergency evacuation route
- Protects/maintains continuity of a National Scenic Byway
- Consistent with Engineering Regulations (ER) and Corps policy for HSDR
- ER 1165-2-130: "Benefits from prevention of damages to **transportation facilities** are considered as storm damage reduction benefits."
- Establishes a 10-foot or more width of continuous suitable nesting habitat for threatened and endangered species along the entire 2.6-mile length of shoreline (~3.15 acres)

- 2.6 mile 10-foot dune and beach profile extension
- 11-year average nourishment interval (initial + 4 renourishments)
- 320,000 cubic yards/average nourishment
- Borrow area (7 miles offshore) with compatible sand for 50-year project life

FLAGLER COUNTY HSDR

ADDRESSING THE FOUR P&G ACCOUNTS

NATIONAL ECONOMIC DEVELOPMENT

Efficient means of protection from storms versus emergency funding for temporary repairs

OTHER SOCIAL EFFECTS

Protection of community's evacuation route (SR A1A)

ENVIRONMENTAL QUALITY

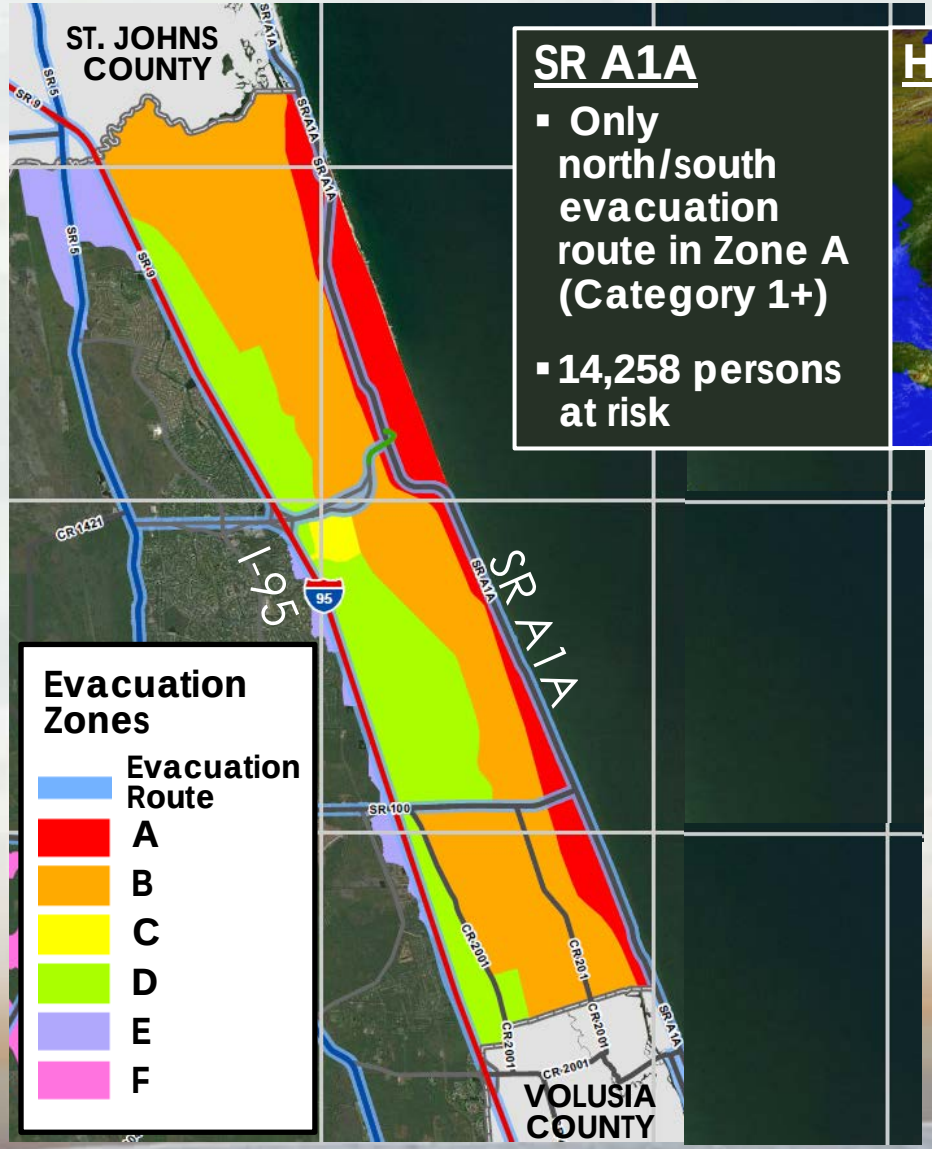
Restoration of dunes re-establishes biodiversity & enhances wildlife habitat

REGIONAL ECONOMIC DEVELOPMENT

Protection of a national & state designated scenic byway, advancing tourism

FLAGLER COUNTY HSDR

THE RISK OF NOT ACTING



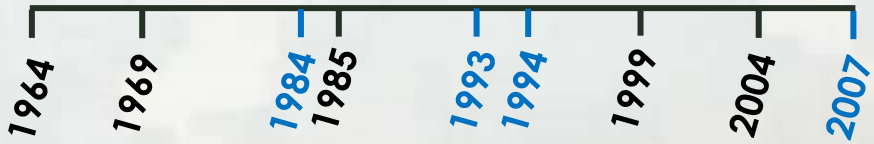
SR A1A

- Only north/south evacuation route in Zone A (Category 1+)
- 14,258 persons at risk

HURRICANE FLOYD

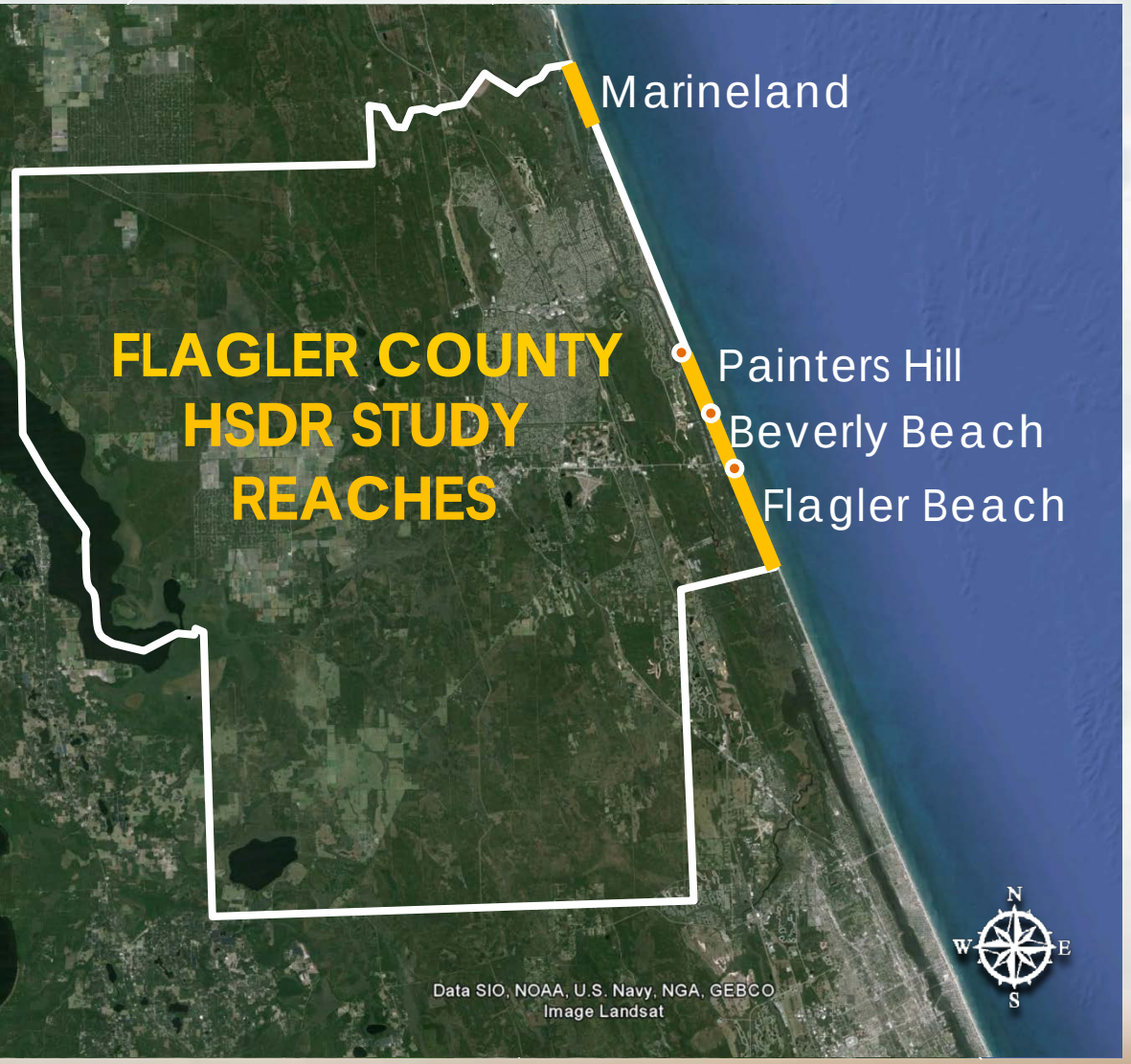
STORM EROSION

HURRICANES/NORTHEASTERS WITH SIGNIFICANT IMPACTS IN FLAGLER COUNTY



FLAGLER BEACH SR A1A SIGNIFICANT REPAIRS:

- 1964 Hurricane Dora: first coquina rock revetment (SR A1A)
- 1999 Hurricane Floyd: FDOT 10,000-foot granite revetment
- 2000 to 2007: FDOT costs ~ $1.25 million/year
- 2007: 15 FDOT emergency/temporary repairs



STUDY AUTHORITY

House Resolution 2676 adopted May 22, 2002:

"Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that in accordance with Section 110 of the Rivers and Harbors Act of 1962, the Secretary of the Army is requested to review the feasibility of providing shoreline erosion protection, hurricane and storm damage reduction, and related purposes to the shores of Flagler County, Florida."

PROBLEMS

- Erosion, storm surge (inundation) and wave attack
- Damage to coastal structures and infrastructure including SR A1A evacuation route *
- Loss of natural coastal habitat (beach and dunes)
- Threatened recreational and tourism opportunities

OPPORTUNITIES

- Reduce storm damage to coastal structures and infrastructure
- Protect the hurricane evacuation route capability
- Restore dunes to function naturally
- Protect natural habitat
- Improve community resilience
- Maintain recreation and tourism opportunities

* Also a National Historic Byway and State Scenic Highway


Erosion at Flagler Beach


Loss of habitat (Beverly Beach)


Armoring at Painters Hill

FLAGLER COUNTY, FLORIDA

Craig Coffey, County Administrator

August 26, 2014

COMMUNITY IMPORTANCE

- Primary Hurricane Evacuation Route for thousands of residents on Barrier Island Recovery- Rebuilding
- Protection of People, Property, Infrastructure
- Tourism and Economic Concerns
- Environment-Significant Turtle and Bird Nesting Area
- 72 mile Nationally Designated Scenic Byway
- Quality of Life - Recreation
- Only one of two Florida coastal counties without a completed study/federal protection

LOCAL ECONOMY

- 100,000+ population – Fastest Growing
- 1st-2nd Highest State Unemployment Rate over last 4 years
- One of the Highest Foreclosure Rates
- Previously - Most Economically Distressed Community East of the Mississippi River
- Lost 50% of property valuation
- Cannot afford unprotected impacts

TOURISM

- Tourism Key Economic Driver
- Over a Million visitors every year – International Destination
- Closest Beach to I-95 - 3 miles
- Flagler Beach Downtown District and Business Center
- Six Miles of Scenic View of water
- Highest Occupancy In Summer

Community Support

- Fully support recommended Plan
- Financially behind the plan
- Past projects have been a bandaid approach
- Looking forward to Corps expertise and comprehensive approach
- Grateful for the opportunity and Thankful for assistance to date


MARINELAND REVETMENT


PAINTERS HILL SINGLE-FAMILY HOMES


BEVERLY BEACH RV PARK


FLAGLER BEACH SR A1A EVACUATION ROUTE & SCENIC ROUTE: EROSIVE WAVES/FDOT ARMORING

R1
R4
MARINELAND
Shoreline Change: -0.58 feet/year

IWW
SR A1A

STUDY AREA REACHES

Storms:

- Tropical systems (e.g., hurricanes): summer/fall
- Northeasters: late fall/winter/spring
- Northeasters, generally, have greater impact due to their longer duration/greater frequency)

Historic Sea-level Rise Rate: 2.4 mm/year

FLAGLER COUNTY

R50
PAINTER'S HILL
Shoreline Change: -0.64 feet/year

R60
BEVERLY BEACH
Shoreline Change: -0.11 feet/year

R67

I-95

SR 100

IWW

FLAGLER BEACH
Shoreline Change: **-0.67 feet/year**

R101

N
W
E
S
NOT TO SCALE

Volusia County

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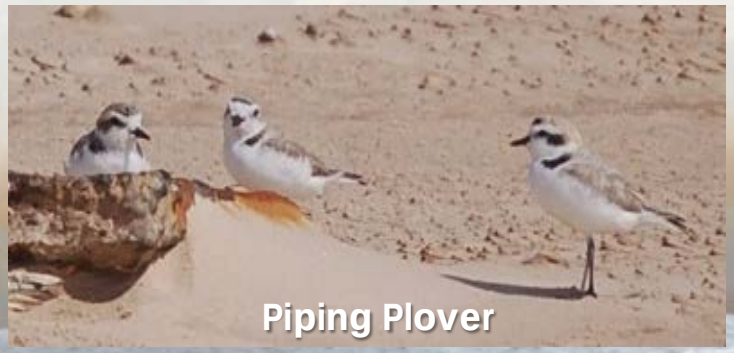
ENVIRONMENTAL CONDITIONS

NATIONAL HISTORIC BYWAY AND STATE SCENIC HIGHWAY (SR A1A OCEAN SHORE SCENIC HIGHWAY) AT RISK

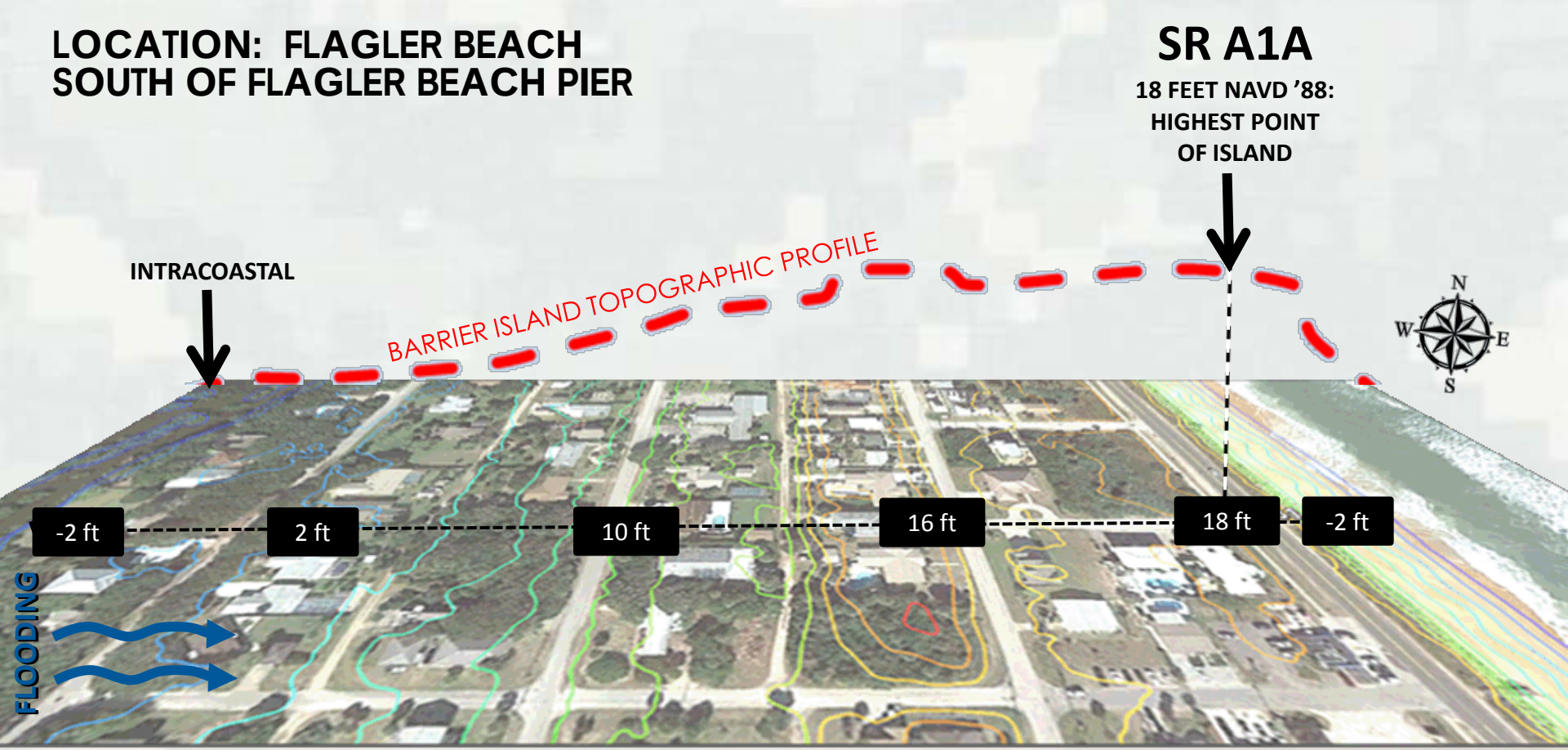
UNIQUE SAND CHARACTERISTICS (BORROW SOURCES 7 MILES OFFSHORE)

ROCK OUTCROPPINGS: MARINELAND

LOSS OF WILDLIFE HABITAT AND BIODIVERSITY



LOCATION: FLAGLER BEACH SOUTH OF FLAGLER BEACH PIER



SR A1A ELEVATION PROVIDES ESSENTIAL EVACUATION CAPABILITIES

NOTE: STORM SURGE IMPACTS FROM THE BACK SIDE OF THE BARRIER ISLAND

FLORIDA DEPARTMENT OF TRANSPORTATION (FDOT) RIGHT OF WAY CONSTRAINTS

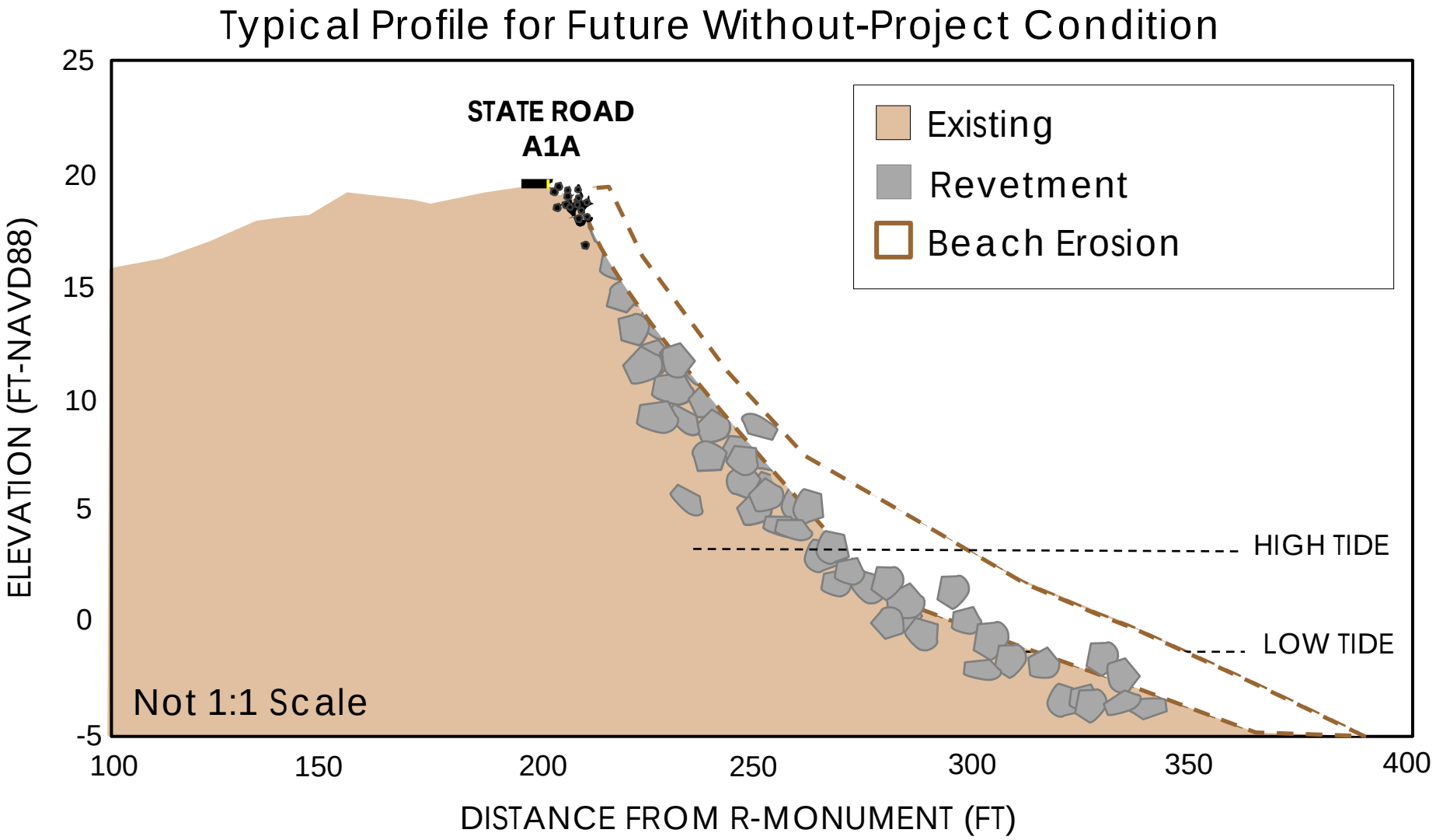
EMERGENCY/TEMPORARY PROTECTION

- Non-designed (not a comprehensive/cohesive fix)
- Reactive approach and not sustainable
- Degrades environment (cumulative impacts)

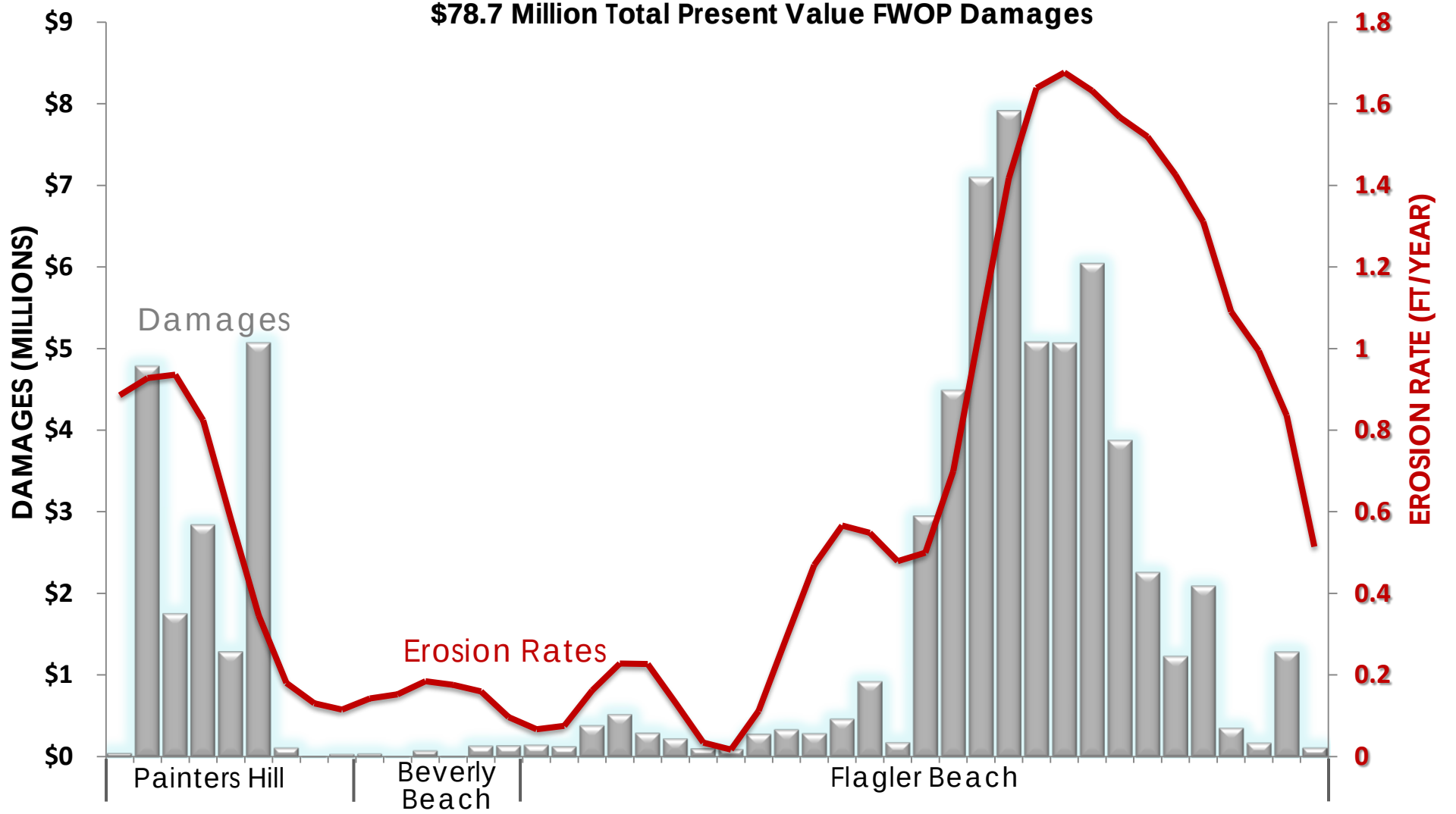
Reactive FDOT emergency repairs

Emergency sheet pile

FWOP CONDITION OF THE DUNE AND BEACH PROFILE



BEACH-FX MODELING OF FUTURE DAMAGES/EROSION RATES BY REACH



Note: Marineland Damages Negligible

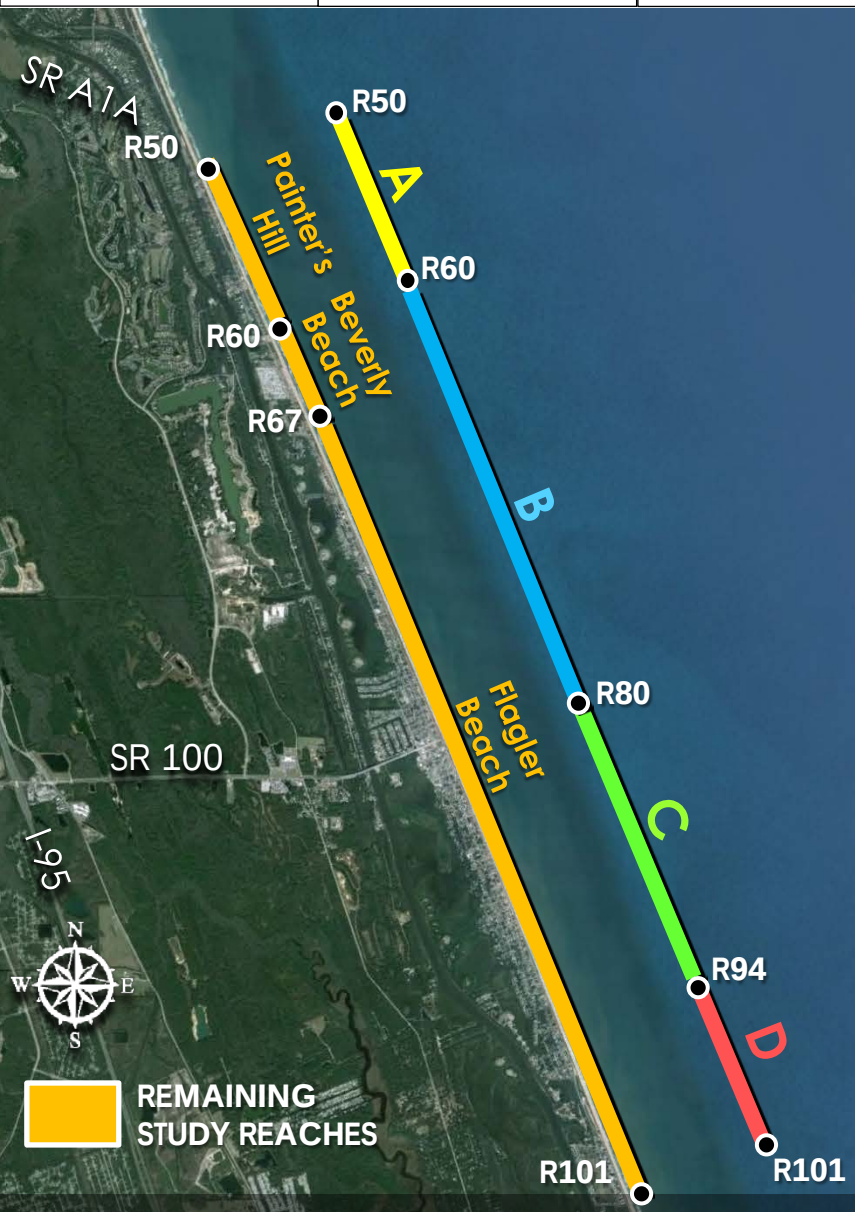
OBJECTIVES

1. Reduce storm damages to structures and infrastructure
2. Maintain a safe and reliable hurricane evacuation route
3. Maintain environmental quality
4. Maintain recreational opportunities

CONSTRAINT

Comply with all Federal and state regulations

(as stated in Federal law, USACE regulations, executive orders and State of Florida statutes)



REACH A (1.7 miles): Unarmored Single Family Residences

REACH B (3.5 miles): Unarmored SR A1A

REACH C (2.6 miles): Armored SR A1A

REACH D (1.1 mile): Unarmored SR A1A & Park

DEVELOPMENT OF DESIGN REACHES A- D

20 MEASURES/4 REACHES
NON-STRUCTURAL & STRUCTURAL

- **No Action**
- CCCL *
- Moratorium on construction
- No Growth Program
- Relocate Structures
- Relocate SR A1A
- Flood Proofing Structures
- Buyout/Land Acquisition
- Seawalls
- Revetments
- Sand Covered Soft Structure
- **Beach Nourishment**
- Groins
- Submerged Artificial Reef
- Submerged Artificial Multi-Purpose Reef
- Nearshore Placement
- Emergent Breakwaters
- **Dunes and Vegetation**
- Pressure Equalizing Modules
- Under Current Stabilizers

PRELIMINARY SCREENING

- Meet at least one Planning Objective?
- Address 4 accounts?
- **(11 measures)**
- Combinability & dependencies **(39 alternatives)**
- ROM cost estimates **(5 alternatives)**

INTERMEDIATE SCREENING

- Beach-*fx* modeling **final array of alternatives**
- Low, intermediate & high **sea-level rise analysis**

FINAL SCREENING

- Beach-*fx* modeling: **recommended plan**
- Low, intermediate & high **sea-level rise analysis**

Alternative =
a measure/combination of measures by reach and construction technique

RELOCATION OF SR A1A ALTERNATIVE

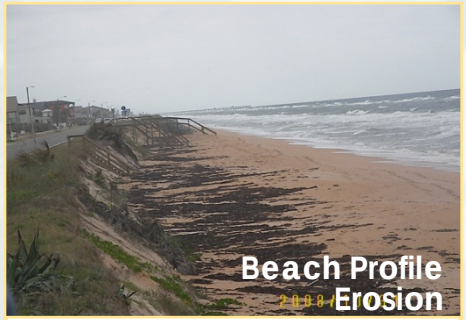
Assumption: SR A1A relocated one block inland to Central Avenue

Screened: ROM costs (conservative values) exceeded FWOP damages

- Central Avenue width not adequate to serve as evacuation route
- Significant real estate acquisition necessary (100+ properties) for adequate right of way
- Not socially acceptable to the sponsor or community

BEACH-FX MODELING

Incorporates the cycles of beach erosion and recovery over time

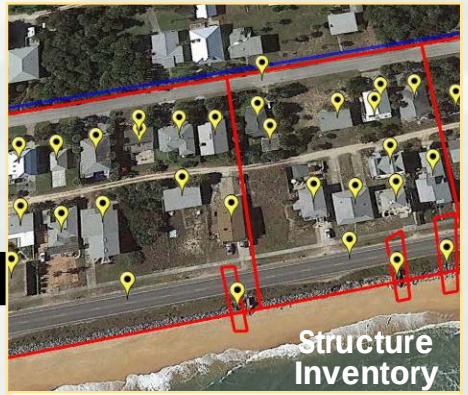


SHORELINE RESPONSE DATA

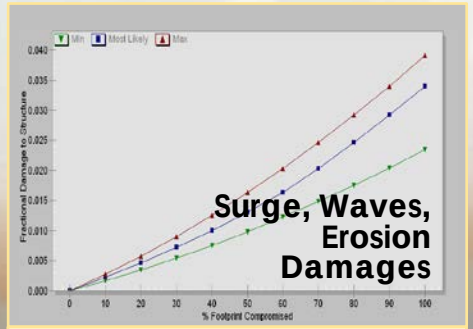
PLAUSIBLE STORM DATA

552 Tropical;
48 Non-tropical (Northeasters)

BEACH-*FX*
MONTE CARLO LIFE CYCLE MODEL



DAMAGE ELEMENT DATA



DAMAGE FUNCTION DATA

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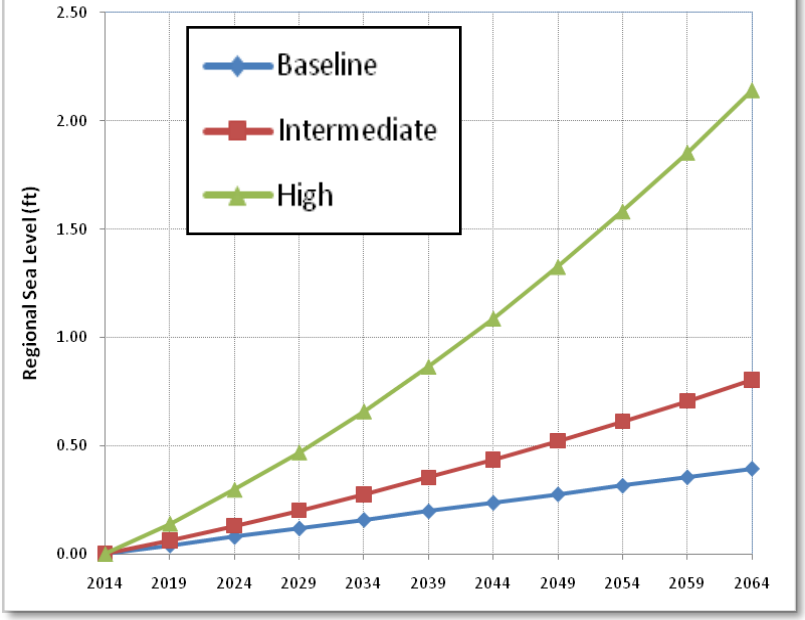
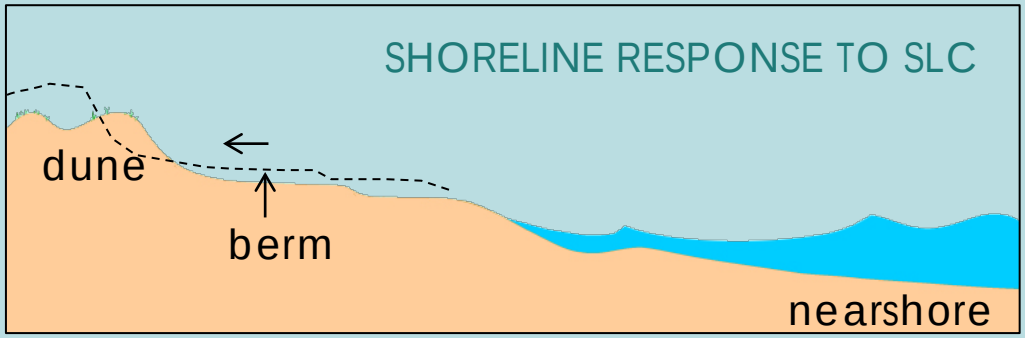
SEA-LEVEL CHANGE (SLC) CONSIDERATION

REGIONAL SEA LEVEL VERSUS YEAR FLAGLER COUNTY



- **Used current guidance**
  (ER 1100-2-8162 & ETL 1100-2-1)
- **Beach-*fx*: SLC effects (all 3 scenarios) are applied within the Damage Function Data**
- **Recommended Plan is economically justified for all 3 sea-level change scenarios**

BEACH NOURISHMENT AND ADAPTIVE MANAGEMENT

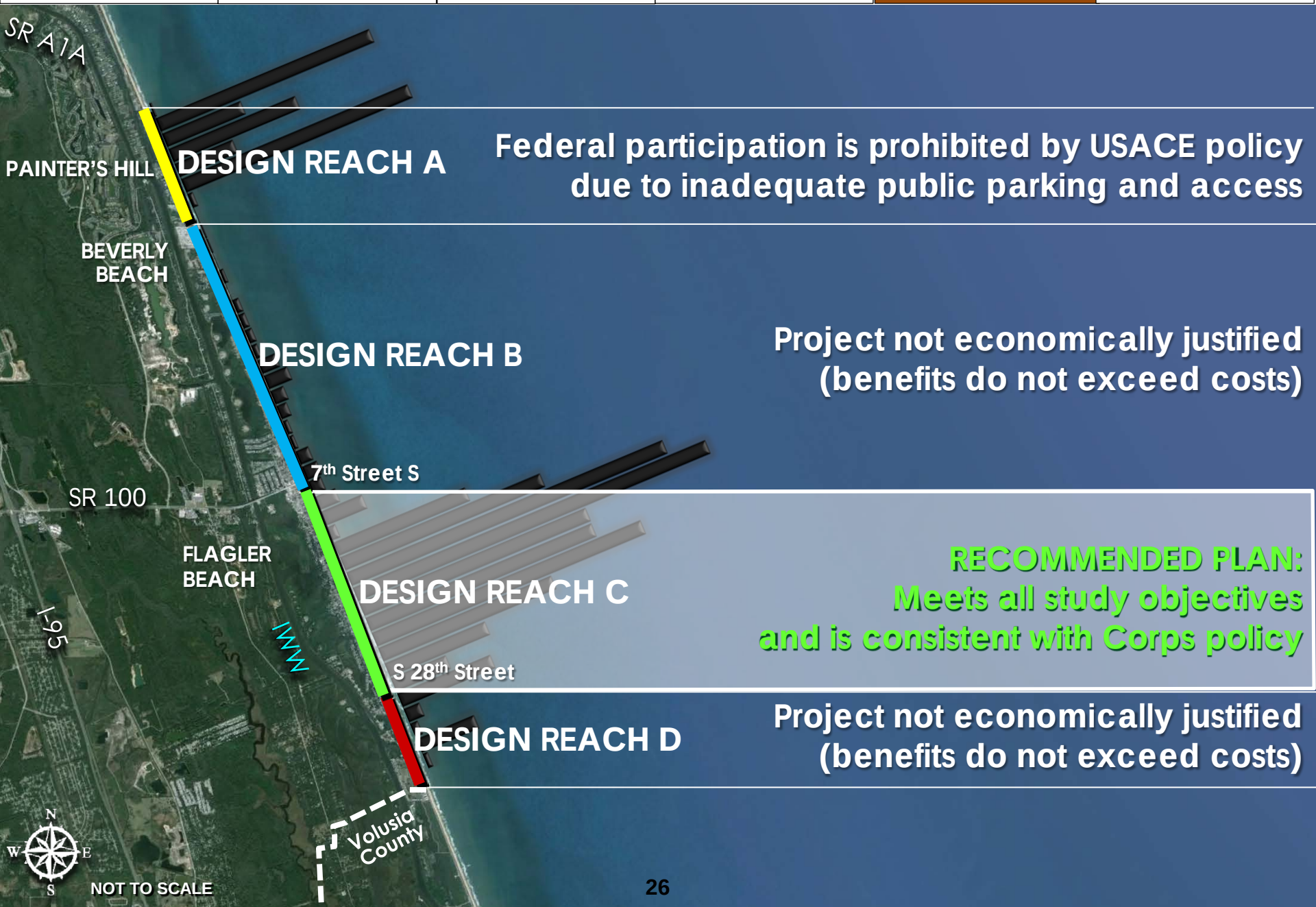


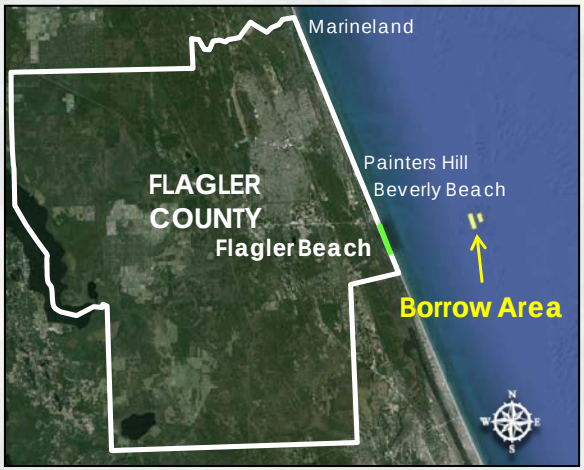
- **As sea level rises, a shoreline profile (shape) will maintain its form, but will shift upward and landward**
- **Beaches are highly adaptable because the design can be modified based on conditions at the time of each nourishment**

SLC SCENARIO	EXPECTED RENOURISHMENT INTERVAL
Baseline (SLC1)	11 years
Intermediate (SLC2)	9 years
High (SLC3)	6 years

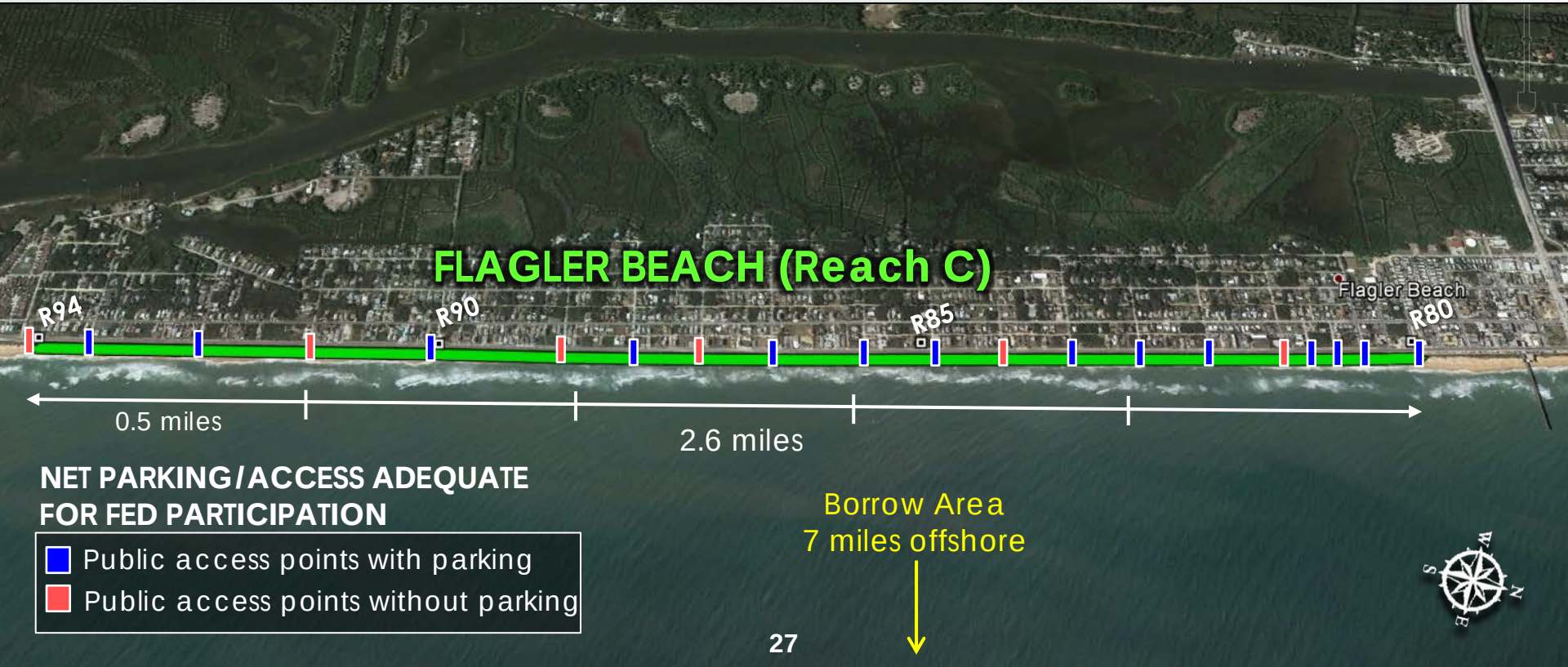
Final Array of 8 Alternatives	Benefits	Cost	Net Benefits
10' dune & profile extension in reach A	$220,000	$170,000	$52,000
10' dune & 20' berm extension in reach A	$690,000	$700,000	-$16,000
10' dune & profile extension in reach B	$200,000	$250,000	-$57,000
10' dune & 20' berm extension in reach B	$210,000	$1,030,000	-$809,000
10' dune & profile extension in reach C (NED Plan)	**$2,190,000**	**$810,000**	**$1,387,000**
10' dune & 20' berm extension in reach C	$2,250,000	$1,180,000	$1,065,000
10' dune & profile extension in reaches A&C	**$2,940,000**	**$1,130,000**	**$1,814,000**
10' dune & 20' berm extension in reaches A&C	$2,960,000	$1,750,000	$1,206,000

* FY11 Price Levels & Discount Rate


SR A1A
PAINTER'S HILL
DESIGN REACH A
Federal participation is prohibited by USACE policy due to inadequate public parking and access
BEVERLY BEACH
DESIGN REACH B
Project not economically justified (benefits do not exceed costs)
7th Street S
SR 100
FLAGLER BEACH
DESIGN REACH C
RECOMMENDED PLAN:
Meets all study objectives and is consistent with Corps policy
I-95
IWW
S 28th Street
DESIGN REACH D
Project not economically justified (benefits do not exceed costs)
Volusia County
N
W
E
S
NOT TO SCALE

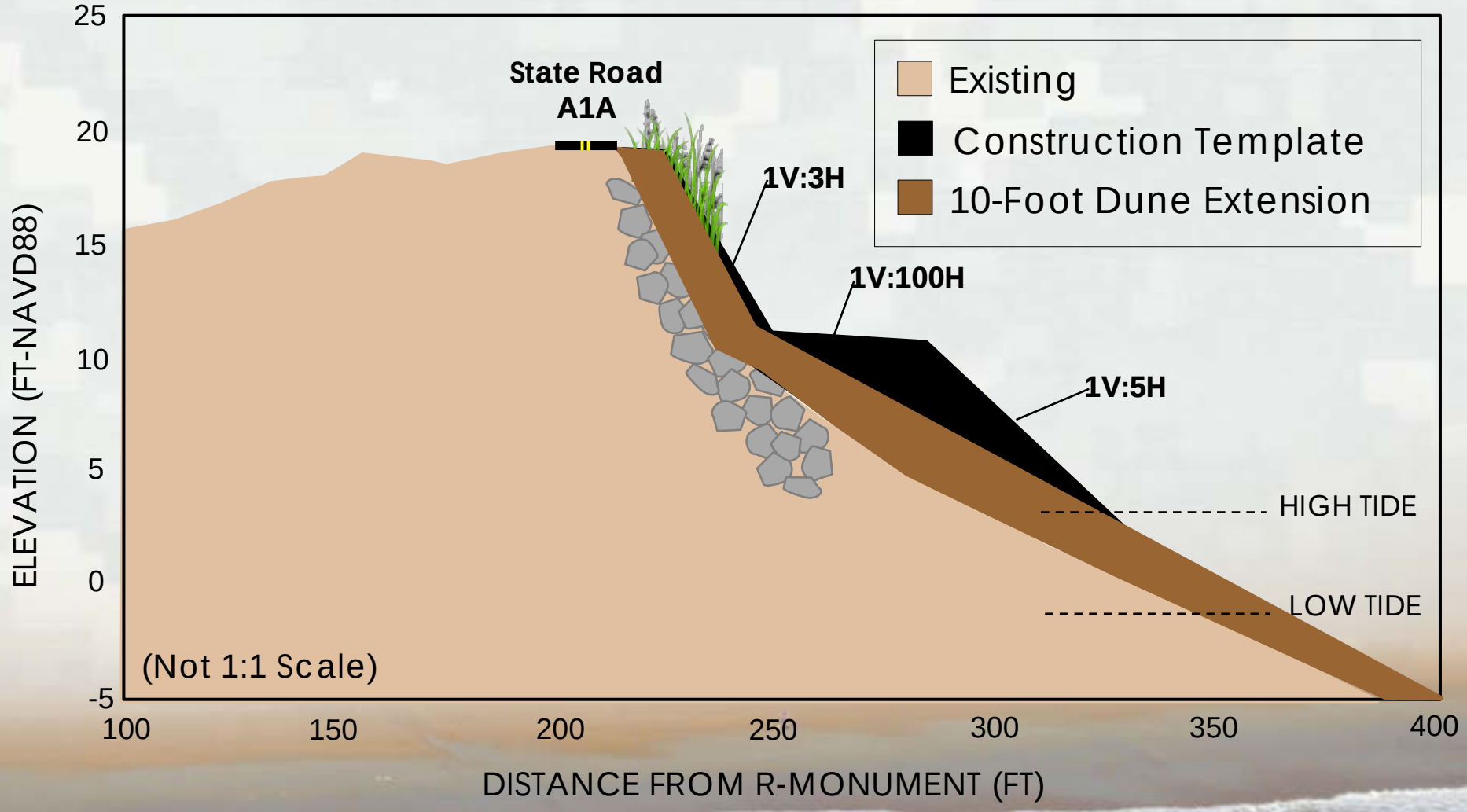


- **10-foot dune and beach profile extension**
- **2.6 miles**
- **Initial construction: 330,000 cubic yards**
- **Each periodic nourishment: 320,000 cubic yards**
- **11-year average nourishment interval**
- **50-year period of Federal participation**
- **Borrow area 7 miles offshore**



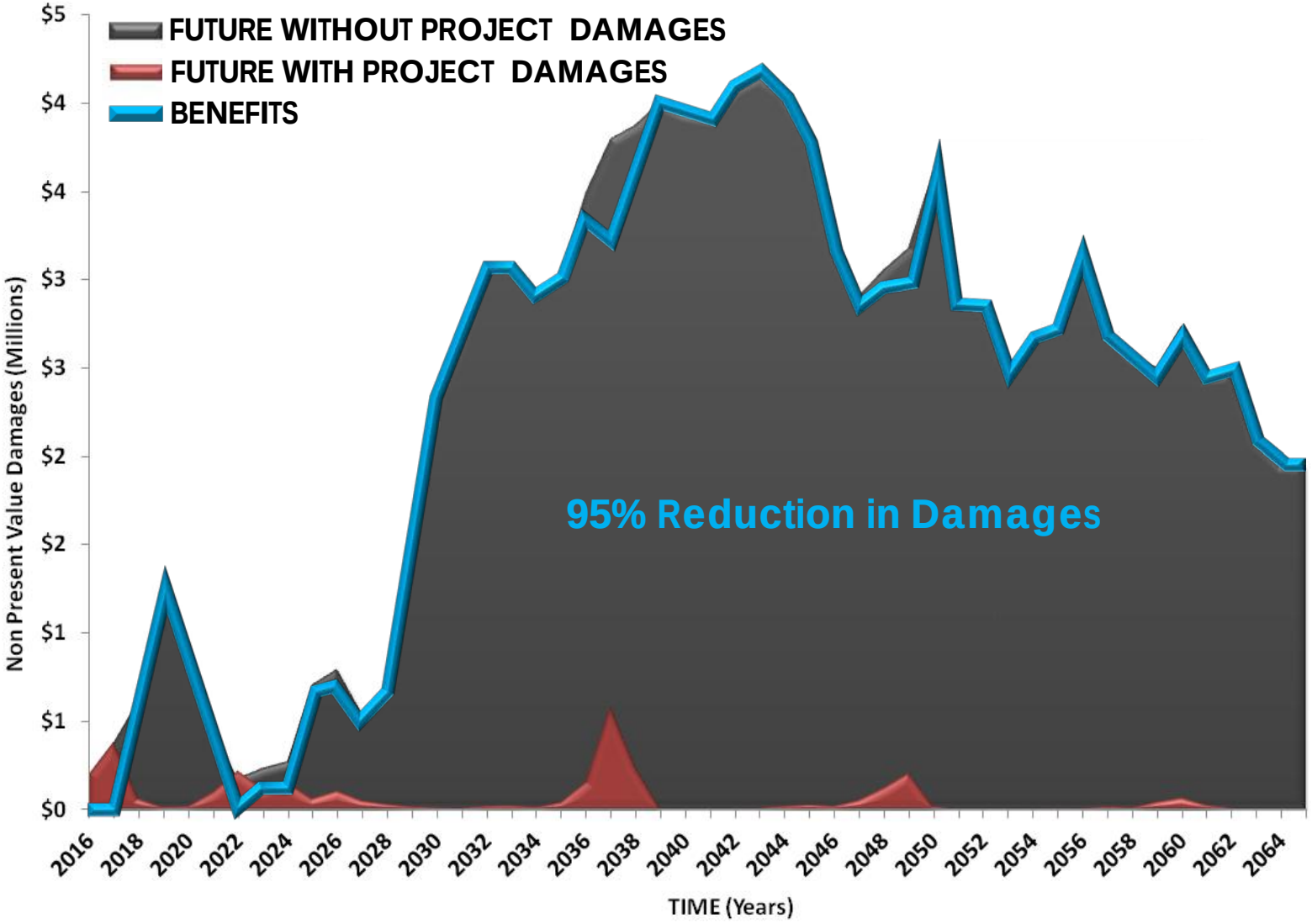
TYPICAL PROFILE FOR RECOMMENDED PLAN

10-foot seaward extension of the dune and beach profile in Reach C



CONCEPTUAL RENDERING

BENEFITS OF THE RECOMMENDED PLAN



SUMMARY OF PROJECT COSTS

FY15 (October 2014) Price Levels

Flagler County, Florida Hurricane and Storm Damage Reduction Project					
Summary of Project Cost Sharing (Constant Dollar Basis, FY15 (1 Oct 14) price levels)					
Initial Construction					
Cost Share Description	**Federal Cost Share %**	**Federal Cost**	**Non-Federal Cost Share %**	**Non-Federal Cost**	**Project First Cost**
Storm Damage Reduction Costs	65%	$9,218,300	35%	$4,963,700	**$14,182,000**
Real Estate Costs (LERRD Credit)	0%	$0	100%	$3,336,000	$3,336,000
Cash Portion		$9,218,300		$1,627,700	$10,846,000
Periodic Nourishment					
Periodic Nourishment	50%	$15,390,000	50%	$15,390,000	**$30,780,000**
Initial Construction + Periodic Nourishment					
Final Project Cost Share and Cost (50 years)	55%	**$24,608,300**	45%	**$20,353,700**	**$44,962,000**

***Non-Federal Administrative Costs and Relocation of Dune Walkovers for LERRD will be included in the Total Project Cost and credited against the Non-Federal sponsor's responsibility.**

ECONOMIC SUMMARY

ECONOMIC SUMMARY (FY 14 price level, 50-year period of analysis, 3.5% discount rate)	
Average Annual Investment Cost	$1,229,000
Annual OMRR&R (100% Non-Federal)	$10,000
Total Average Annual Cost	**$1,239,000**
Average Annual Storm Damage Reduction Benefits	$2,159,000
Average Annual Recreation Benefits	$72,000
Average Annual Traffic Re-route Benefits	$176,000
Average Annual Total Benefits	**$2,407,000**
Average Annual Net Benefits	**$1,168,000**
Benefit Cost Ratio (3.5 % discount rate)	**1.9**

ENVIRONMENTAL ASPECTS

- Dune extension will be vegetated with native plants to stabilize the dune and promote wildlife usage
  - Nesting habitat
    - Threatened Species: Loggerhead Turtles
    - Endangered Species: Leatherback Turtles, Green Turtles, Piping Plover
  - Shelter (protection from predators)
  - Food source (for various wildlife)
  - Biodiversity (increased plant species variety)
- Minimum of **3.15 additional acres** of continuous nesting habitat (sea turtles and shore birds) over 50 years compared to **zero habitat** in the FWOP condition
- Hardbottom resources are outside of borrow and sand placement areas – no impacts to occur
- Reduced damages to Scenic and Historic Coastal Byway

ENVIRONMENTAL COMPLIANCE

- ✓ Environmental Assessment prepared and coordinated (NEPA)
- ✓ Endangered Species Act Coordination (USFWS – SPBO*)
- ✓ Endangered Species Act Coordination (NMFS – SARBO**)
- ✓ National Historic Preservation Act (SHPO)
- ✓ Essential Fish Habitat Coordination (NMFS)
- ✓ Coastal Zone Consistency (FDEP)
- ✓ Bureau of Ocean Energy Management (BOEM) Coordination

* SPBO: State Programmatic Biological Opinion
** SARBO: South Atlantic Regional Biological Opinion

PUBLIC AND AGENCY INVOLVEMENT

Public Involvement

- Scoping Letters – August 26, 2008
- Public Scoping Meeting – October 25, 2011
- Draft Report Public Comment Period – January 17 to March 15, 2014
- Public Workshop on TSP – February 5, 2014

Agency Involvement

- Scoping Letters – August 26, 2008
- Feasibility Scoping Meeting – January 28, 2011
- Draft Report Agency Comment Period – January 17 to March 15, 2014
- Bureau of Ocean Energy Management (BOEM) is a Cooperating Agency

ENVIRONMENTAL OPERATING PRINCIPLES

Foster sustainability

Proactive consideration of environmental consequences

Mutually supporting economic and environmentally sustainable solutions

Accountability for activities which may impact human and natural environments

Collaborative leveraging of scientific, economic, and social knowledge to understand environmental context

Consideration of environment and risk management in context of project and program lifecycle

Open, transparent process respecting views of individuals and groups interested in Corps activities

RECOMMENDED NATIONAL PRIORITIES

Reduce deficit

Create jobs/restore economy

Improve resiliency and safety

Preserve and protect the environment

Maintain global competitiveness

Increase energy independence

Improve quality of life

WRRDA 2014 - SECTION 1011 PROJECT /STUDY FUNDING PRIORITIES

(A) Address an imminent threat to life and property
(D) Protect emergency hurricane evacuation routes or shelters
(E) Prevent adverse impacts to publicly owned or funded infrastructure and assets
(F) Minimize disaster relief costs to the Federal Government

USACE COMPLIANCE REVIEWS

- ☑ Coastal PCX Review (Throughout study process)
- ☑ Value Engineering Certification: April 2014
- ☑ Independent External Peer Review (IEPR): Exclusion May 2013
- ☑ Final Agency Technical Review (ATR): June 2014
- ☑ Cost Certification: June 2014
- ☑ Legal Certification: June 2014
- ☑ SAD Policy Compliance Review: July 2014

PROJECT RISK MANAGEMENT

Study Phase

- The Walla Walla MCX facilitated a CSRA and determined that a 23% contingency should be included. **Three main factors are competition and market conditions, dredging quantities for the final design, and increasing fuel prices.**
- Beach-fx modeling uses life-cycle simulations to account for risk and uncertainty
- Project performance evaluated for three sea level rise scenarios per ER 1100-2-8162
- DQC, ATR, and HQ Review completed with improvements incorporated

Construction Phase

- Risk register and risk management plan are living documents
- PED activities will include data collection, VE, and Industry Days
- Implement Lessons Learned from previous beach nourishment contracts
- Best acquisition strategies developed to minimize costs and increase quality (eg., structure, scope and number of contracts)
- Plans & Specifications for all contracts will undergo DQC, ATR, and BCOE reviews

SCHEDULE & STUDY COST

*Subject to Authorization and Appropriations

Study Length:
- Original FCSA Signed: 2 Sep 2004
- Amended FCSA Signed: 30 July 2012 (Accelerated Funds provided $578,500)
- 10 years to date

Study Costs:
- As of 8/15/14 $3,012,601.62

Gaps in Federal Funding:
- 2006/2007
- Only $2,853.86 provided in 2013 (reason for Accelerated Funds)

CONCLUSIONS

The Recommended Plan meets the objective to reduce damages caused by coastal erosion, is environmentally acceptable, and has been formulated according to USACE Policy:

- **Benefit Cost Ratio: 1.9**
- **Maximizes net benefits for storm damage reduction ($1,168,000 average annual net benefits)**
- **Reduces damage to critical hurricane evacuation/recovery route and scenic byway**
- **Public Safety**
- **Increases habitat by 3.15 acres**
- **Maintains recreational and tourism opportunities**
- **Full support from local sponsor**