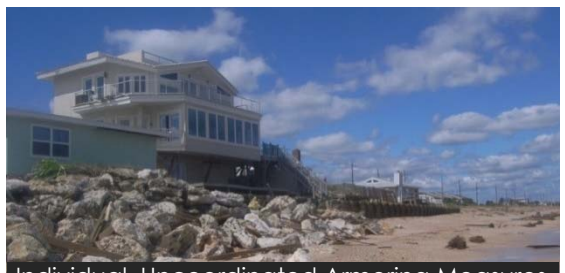
ST. JOHNS COUNTY, FLORIDA COASTAL STORM RISK MANAGEMENT (CSRM) PROJECT

Coastal Storms Impacting Infrastructure



Individual, Uncoordinated Armoring Measures Increasing Overall Community Vulnerability

Vulnerable Stretch of State Road A1A (R115) (Regional Access, Emergency Route, & Scenic Byway)

Dune/Berm Interaction Eliminated Habitat & Natural Processes Lost

March 2017

OVERVIEW: BY ALL ACCOUNTS, A PROJECT IN THE NATIONAL INTEREST

PROJECT SPONSOR: ST. JOHNS COUNTY

The St. Johns County, Florida Coastal Storm Risk Management (CSRM) Recommended Plan is located on a barrier island along a shoreline vulnerable to storm-induced damages from tropical & extra-tropical storms. Without a project, properties including those already storm-distressed & a stretch of a vulnerable emergency evacuation route (State Road A1A) will continue to be exposed to elevated risk of damage. Uncoordinated attempts to armor individual properties exacerbate current conditions by increasing erosion along adjacent properties & decreasing critical habitat for threatened & endangered species.

National Economic Development (NED) Account: The study analysis estimates that with the project, damages will be reduced by 71% over the 50-year period of Federal participation, producing $2.6 million in total average annual benefits.

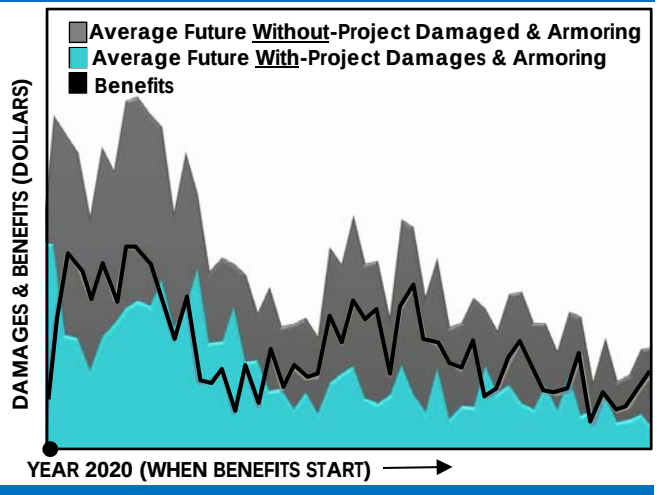
Environmental Quality Account (EQ): The project provides for the maintenance of at least 3.15 acres of habitat for threatened & endangered species, & other wildlife, that would potentially be zero in the future-without project condition.

Other Social Effects (OSE) Account & Regional Economic Development Account (RED): The beaches in St. Johns County serve as an anchor for tourism activity & related employment that contribute substantially to local, state & federal economies. In addition, vulnerable State Road A1A, the primary arterial through the barrier island, is without mainland access for 17 miles. The recommended plan would minimize risk to segments of this long roadway & facilitate maintenance of day-to-day economic activity throughout both the community & the region, & maintain a critical emergency evacuation route. The plan would also promote the continuity of a segment of a national & state cultural & historic scenic byway that threads through a vital stretch of the region's tourist industry, connecting Ponte Vedra Beach to the nation's oldest city of St. Augustine.

ECONOMICS: 71% REDUCTION IN DAMAGES OVER THE 50-YEAR PERIOD OF ANALYSIS

- BCR: 1.30 (2.875% discount rate)
- Total Project First Cost including 28% contingency: $78,417,000 (FY17 price levels)
- Total Federal Cost: $15,196,000
- Total Non-federal Cost: $63,221,000
- Cost Sharing (based on shoreline ownership & use):
  - ► Initial construction: 23.0% Federal: $5,712,000 77.0% Non-federal: $19,122,000
  - ► Periodic nourishments: 17.7% Federal: $9,484,000 82.3% Non-federal: $44,099,000

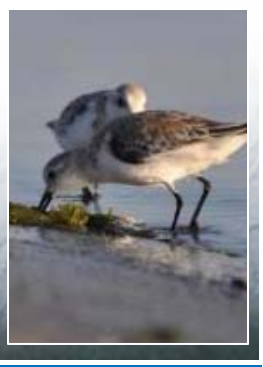
ECONOMIC SUMMARY (FY 17 price level, 50-year period of analysis, 2.875% discount rate)	
Total Average Annual Cost	**$2,031,000**
Average Annual Storm Damage Reduction Benefits	$1,683,000
Average Annual Land Loss	$278,000
Average Annual Recreation Benefits	$692,000
Average Annual Total Benefits	**$2,653,000**
Average Annual Net Benefits	**$622,000**
Benefit Cost Ratio (BCR) (2.875 % discount rate)	**1.30**



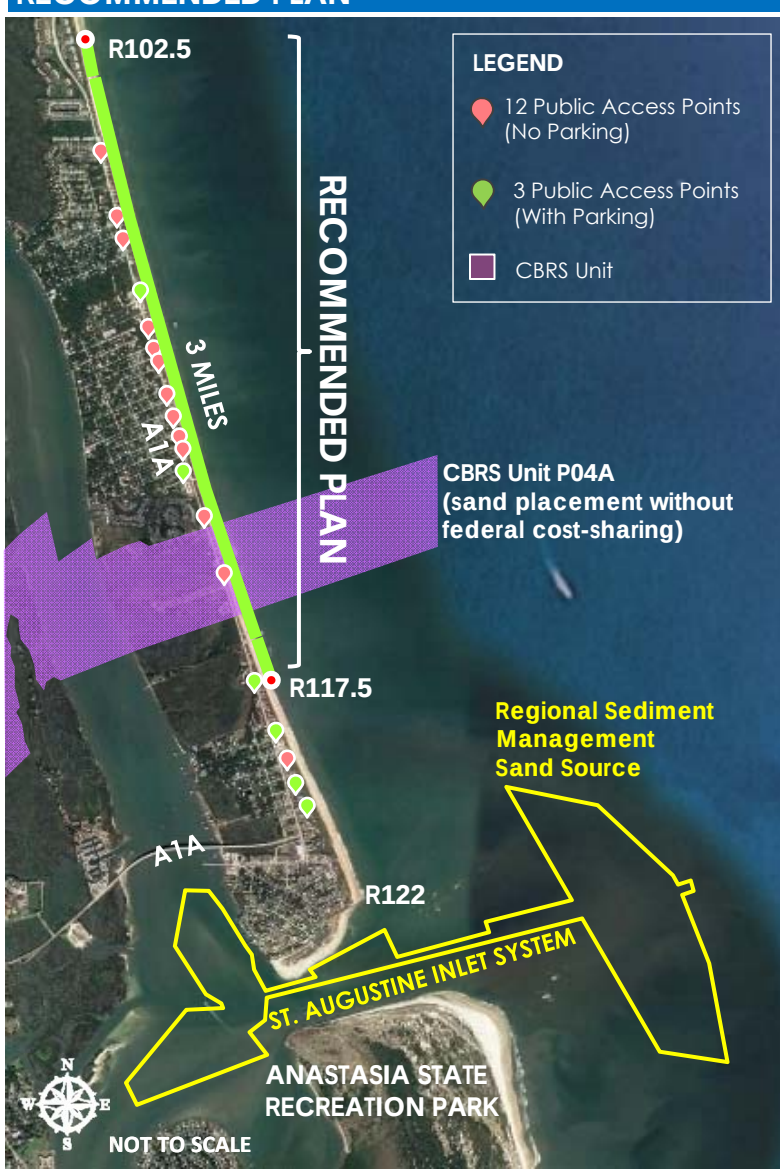
ENVIRONMENTAL

BENEFITS TO FEDERALLY-LISTED SPECIES

- Threatened Species: Loggerhead Turtle, Red Knot, Piping Plover
- Endangered Species: Leatherback Turtle, Green Turtle
- Minimum of 3.15 acres of continuous nesting habitat (sea turtles & shorebirds) maintained over 50 years
  - ► Potentially zero habitat in the future without-project condition
- Sand source compatible with native beach sand
- Berm & dune slopes designed to closely mimic the natural beach
- Dune will be vegetated with native plants to stabilize the dune & promote wildlife usage



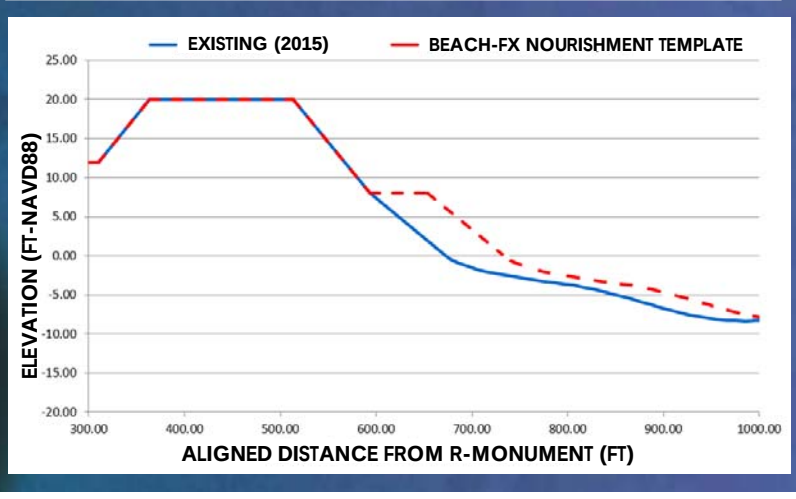
RECOMMENDED PLAN



RECOMMENDED PLAN: EFFICIENT & RESILIENT

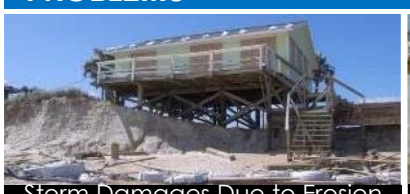
- 3-mile long project, including:
  - ► 60-foot beach & maintenance of 2015 dune along 2.6 miles (from +8 feet NAVD88)
  - ► Maximum tapers of 1,000 feet at northern & southern ends
- Initial construction: 1,310,000 cubic yards
- 3 periodic nourishment events
  - ► 12-year intervals
  - ► Average 866,000 cubic yards per nourishment
- Sand Source/Regional Sediment Management:
  - ► Fill template with sand from St. Augustine Inlet System (shoals and channel)

Note: The project remains justified under all 3 sea level change scenarios (ER-1100-2-8162 / ETL-1100-2-1)

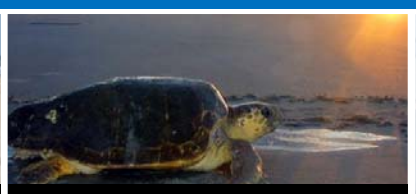


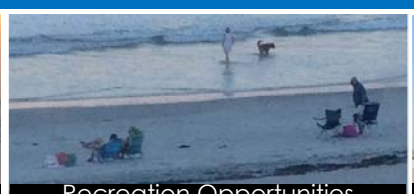
ST. JOHNS COUNTY, FLORIDA CSRM PROJECT PLAN FORMULATION OVERVIEW

PROBLEMS


Storm Damages Due to Erosion, Inundation & Waves

Hurricane Evacuation Route Threatened (State Road A1A)


Loss of Habitat


Recreation Opportunities Threatened


Beach Dune Interaction Limited or Eliminated

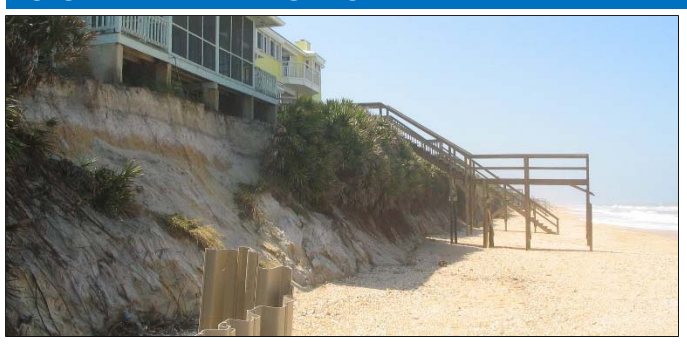
OPPORTUNITIES

- Improve community & environmental resilience:
  - ► Reduce damages to infrastructure, including hurricane evacuation route (State Road A1A)
  - ► Protect/enhance habitat/environmental resources
  - ► Maintain recreation
  - ► Protect/enhance beach/dune interaction
- Leverage regional sediment management opportunities
  - ► Implement recommendations in the State of Florida's St. Augustine Inlet Management Plan

OBJECTIVES

- Reduce storm damage to infrastructure, including the only emergency evacuation route for the northern study area
- Maintain environmental quality provided by the beach/dune system for listed species (sea turtles & avian species)
- Maintain existing recreation (beach & nearshore)

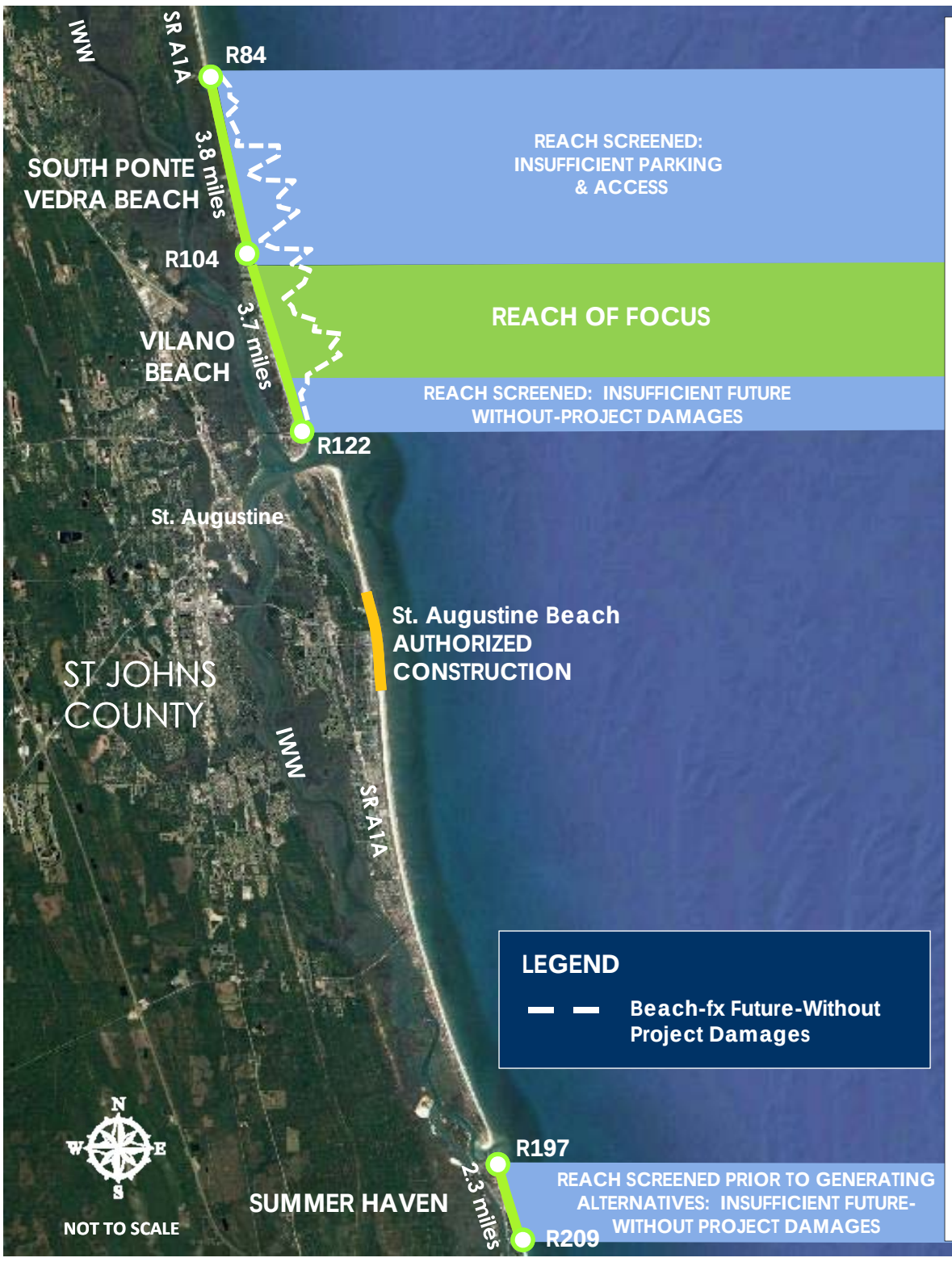
STUDY AREA REACHES


SOUTH PONTE VEDRA BEACH
Single-family Residential Structures


VILANO BEACH
Single/Multi-family Residential & Commercial Structures


SUMMER HAVEN
Single-family Residential Structures

EVALUATING REACHES, MEASURES & ALTERNATIVES - SUMMARY



MEASURES

1) 17 structural & non-structural measures were screened by project objectives, constraints, & the 4 Principles & Guidelines accounts (National Economic Development, Regional Economic Development, Environmental Quality, & Other Social Effects).

ALTERNATIVES

2) The remaining measures were combined into 7 alternatives based on combinability & dependencies, & the Federal Principles & Guidelines evaluation criteria (completeness, effectiveness, efficiency, & acceptability). A no action alternative was retained for comparison purposes.

3) Alternatives were screened by preliminary costs & Beach-fx modeling to determine potential benefits (damages prevented by each alternative).

ALTERNATIVES SCREENED (PRELIMINARY COSTS & BEACH-FX MODELING)

- **No Action**
- ~~**Acquisition of Land & Structures**~~
- ~~**Dunes & Vegetation**~~
- **Beach Nourishment**
- **Beach Nourishment Plus:**
  - ► **Dunes & Vegetation**
  - ~~► **Dunes & Vegetation & Sand-Covered Soft Structure**~~
  - ~~► **Dunes & Vegetation & Multi-purpose Artificial Reef**~~
  - ~~► **Emergent Breakwaters**~~

4) Beach nourishment (berm extensions) & beach nourishment plus dunes & vegetation (berm extensions plus dune extensions) were expanded into various scales & combinations of each.

5) The Beach-fx model identified a final array of two alternatives:
   - Alternative 6: 60-foot berm extension & maintenance of the existing dune profile
   - Alternative 4: 60-foot berm extension with a 10-foot dune extension

6) An additional 100 Beach-fx model iterations with sea-level rise confirmed Alternative 6 as the National Economic Development (NED) Plan – the alternative that maximizes average annual net benefits (damages reduced minus costs to construct the project); meets all study objectives; & is consistent with Corps policy.


Additional Examples of Damages in Recommended Plan Area (from north to south)