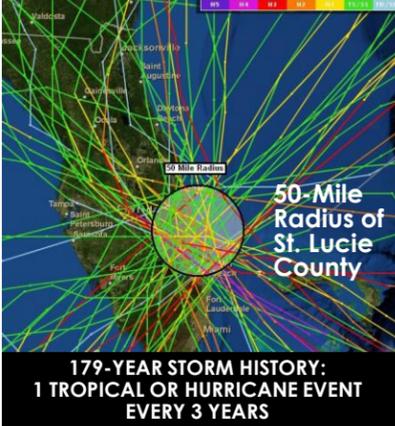


ST. LUCIE COUNTY, FLORIDA COASTAL STORM RISK MANAGEMENT (CSRM) PROJECT



Decreases Risk to Built Environment from Storm & Wave Erosion | Deters Damage to Recreational Facilities & Access | Facilitates Continuous Sea Turtle Nesting Habitat | Mitigates Risk to SR A1A from Flooding

OVERVIEW: BY ALL ACCOUNTS, A PROJECT IN THE NATIONAL INTEREST PROJECT SPONSOR: ST. LUCIE COUNTY EROSION DISTRICT



The St. Lucie County, Florida Coastal Storm Risk Management (CSRM) Recommended Plan is located on a natural barrier island along a shoreline vulnerable to storm-induced damages from tropical & extra-tropical storms. This efficient project (estimated nourishment every 18 years) reduces risk of damages to residential & commercial properties; recreational facilities including a regional public park; & emergency evacuation route (State Road A1A).

National Economic Development (NED) Account: The reach included in the recommended plan is designated a Florida Department of the Environment critically-eroded shoreline. This reach is home to a population of 5,200 & is comprised of 52 commercial structures (condominiums and traditional commercial) & 35 dune walks for a total structure and content value of \$669,291,000. The project is estimated to reduce damages by 98% over 50-years, & produce \$3 million in total average annual benefits.

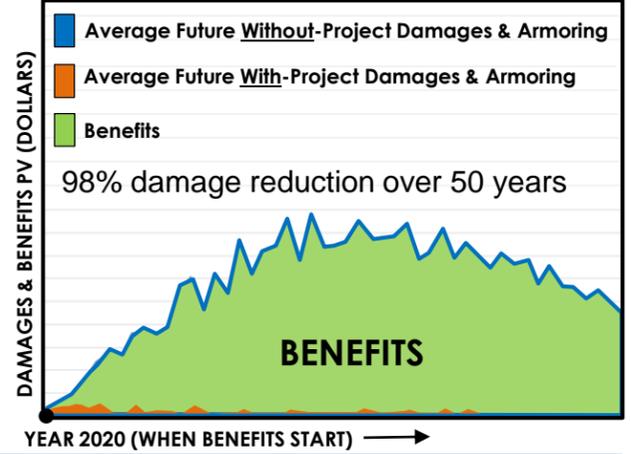
Environmental Quality Account (EQ): The project area is important to nesting sea turtles, where over 1,500 sea turtle nests were counted in the 2015 nesting season. This project, using sand as a natural barrier to withstand storm damages rather than hard structures, will maintain at least 3.3 miles of habitat for threatened & endangered species, & other wildlife.

Other Social Effects (OSE) Account & Regional Economic Development Account (RED): Between 2000 & 2010, St. Lucie County was one of the fastest growing counties in the nation. The beaches, including those within the recommended plan, support the quality of life that draws both year-round and seasonal populations to the county, and drives a healthy tourism sector that contributes substantially to local, state, and federal economies. The St. Lucie County beaches provide a myriad of recreational opportunities, including one of the few places in Florida where horseback riding is permitted on the beach. In addition, the recommended plan would minimize risk to State Road A1A, the community's primary arterial, facilitating the maintenance of day-to-day economic activity throughout both the community & the region, & maintaining a critical emergency evacuation route.

ECONOMICS: 98% REDUCTION IN DAMAGES OVER THE 50-YEAR PERIOD OF ANALYSIS

- BCR: 2.25 (2.75% discount rate)
- BCR: 1.17 (7% discount rate)
- Total Project First Cost including 28% contingency: \$53,296,000 (FY18 price levels)
- Total Federal Cost: \$16,737,000
- Total Non-federal Cost: \$36,559,000
- Cost Sharing (based on shoreline ownership & use):
 - ▶ Initial construction: 35.0% Federal: \$7,097,000; 65.0% Non-federal: \$13,179,000; *LERRD CREDIT = \$725,000
 - ▶ Periodic nourishments: 27% Federal: \$8,915,000; 73% Non-federal: \$24,105,000

ECONOMIC SUMMARY (FY 18 price level, 50-year period of analysis, 2.75% discount rate)	
Total Average Annual Cost	\$1,335,000
Average Annual Storm Damage Reduction Benefits	\$2,186,000
Average Annual Land Loss	\$234,000
Average Annual Recreation Benefits	\$588,000
Average Annual Total Benefits	\$3,007,000
Average Annual Net Benefits	\$1,672,000
Benefit Cost Ratio (BCR) (2.75 % discount rate)	2.25



ENVIRONMENTAL



BENEFITS TO FEDERALLY-LISTED SPECIES

- Threatened Species: Loggerhead Turtle, Red Knot, Piping Plover
- Endangered Species: Leatherback Turtle, Green Turtle
- Minimum of 3.3 miles of continuous nesting habitat (sea turtles & shorebirds) maintained over 50 years
- 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



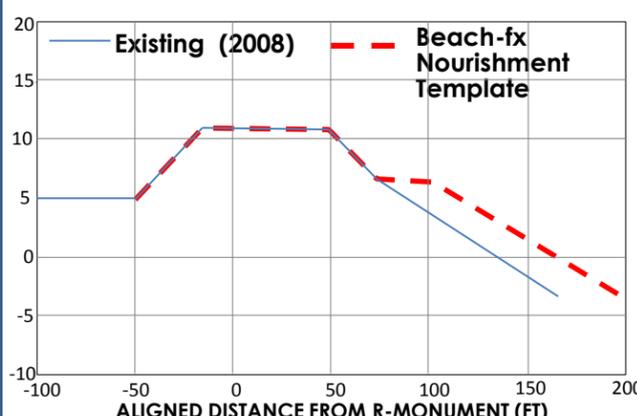
RECOMMENDED PLAN



RECOMMENDED PLAN: EFFICIENT & RESILIENT

- 3.3-mile long project, including:
 - ▶ 20-foot beach & maintenance of the existing dune (from +7 feet NAVD88)
 - ▶ Additional tapers of up to 1,000 feet at northern & southern ends
- Initial construction: 422,000 cubic yards
- 2 periodic nourishment events
 - ▶ 18-year intervals
 - ▶ Average 390,000 cubic yards per nourishment
 - ▶ Opportunities to pursue mobilization efficiencies with adjacent federal beaches
- Sand Source:
 - ▶ Fill template with sand from St. Lucie shoals

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



ST. LUCIE 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

OPPORTUNITIES

- Improve community & environmental resilience:
 - ▶ Reduce damages to infrastructure, including hurricane evacuation route (State Road A1A)
 - ▶ Protect/enhance habitat/environmental resources
 - ▶ Maintain recreation

OBJECTIVES

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

STUDY AREA REACHES



North Hutchinson Island (NHI)
No Development; within CBRA unit



Power Plant (PP)
FPL Power Plant is only structure, within CBRA unit



Narrows of Hutchinson Island (NH)
Low Development, within CBRA unit



South Hutchinson Island (SHI)
High Development, small area in CBRA unit

EVALUATING REACHES, MEASURES & ALTERNATIVES - SUMMARY

MEASURES AND REACHES

- 1) 16 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).
- 2) North Hutchinson Island (NHI), Power Plant (PP), and Narrows of Hutchinson Island (NH) reaches were screened out due to lack of damageable infrastructure. The South Hutchinson Island (SHI) reach was carried forward.

ALTERNATIVES IN SOUTH HUTCHINSON ISLAND REACH

- 3) The remaining measures for SHI reach were combined into 7 alternatives (including the no action alternative) based on combinability & dependencies, & the Federal Principles & Guidelines evaluation criteria (completeness, effectiveness, efficiency, & acceptability).
- 4) Alternatives were screened by comparing preliminary costs & Beach-fx future without-project damages (as a proxy for potential benefits). Costs greater than FWOP damages were screened out, as shown in the figure to the right.

ALTERNATIVES SCREENED (PRELIMINARY COSTS & BEACH-FX MODELING)

- No Action
- ~~Submerged Artificial Reef~~
- Dunes & Vegetation
- Beach Nourishment
- Beach Nourishment Plus:
 - ▶ Dunes & Vegetation
 - ▶ ~~Dunes & Vegetation & Groins~~
 - ▶ ~~Dunes & Vegetation & Submerged Artificial Reef~~

- 5) Beach nourishment (berm extensions) & beach nourishment plus dunes & vegetation (berm extensions plus dune extensions) were carried forward and expanded into various scales & combinations of each.
- 6) The Beach-fx model identified a final array of 5 alternatives:
 - 10-foot berm extension & maintenance of the existing dune profile
 - 20-foot berm extension & maintenance of the existing dune profile
 - 30-foot berm extension & maintenance of the existing dune profile
 - 40-foot berm extension & maintenance of the existing dune profile
 - 10-foot dune extension
- 7) The 20-foot berm extension is the National Economic Development (NED) Plan – **the alternative that reasonably maximizes average annual net benefits (damages reduced minus costs to construct the project)**. It meets all study objectives & is consistent with Corps policy.



SOUTH HUTCHINSON ISLAND REACH INITIAL SCREENING (BEACH-FX AND PRELIMINARY COSTS)

LEGEND

- █ Beach-fx Future-Without Project Damages
- █ Alternatives with costs less than damages were carried forward:
 - Beach Nourishment
 - Dunes & Vegetation
 - Beach Nourishment + Dunes & Vegetation



NOT TO SCALE