
**CAPTIVA ISLAND 2025 BEACH RENOURISHMENT PROJECT BENEFIT
ANALYSIS**

**PREPARED
FOR:**

CAPTIVA EROSION PREVENTION DISTRICT

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Introduction

The Enabling Legislation of the Captiva Erosion Prevention District (hereafter the District) **authorizes** the District to levy” special assessments upon benefited property” to fund erosion prevention projects.¹

Upon adoption of a reasonably final plan of improvement beach and shore preservation within the District, the Board shall conduct, through the use of personnel competent and qualified in this field, an economic analysis of the proposed program, determining the nature and extent of benefits expected to accrue from the program and allocating those benefits to their proper recipients by categories or zones of comparable benefits, or follow some other method as may be deemed suitable for the purposes of this act. ²

This report contains the economic analysis performed for the 2021 Beach Renourishment Project that has been adopted by the District Board and updated for the 2025 Beach Renourishment Project, necessitated by the impact from Hurricane Ian. The report has determined the nature and extent of Project benefits and allocated those benefits to their proper recipients by categories or zones of comparable benefits. Two types of benefits are identified: storm protection benefits and recreation benefits.

Storm protection benefits are the reduction in losses experienced by benefitting properties as a result of the construction of the project. These benefits protect the values of benefitting properties. Such properties are primarily along the Gulf-front although, in some cases properties away from the Gulf-front, have ownership rights to properties

¹ Section 10(1) of Chapter 2000-399, Laws of Florida (the Enabling Act).

² Section 7 of the Enabling Act

along the Gulf-front. The storm protection benefits have been determined by the District's Engineer, APTIM Coastal Planning & Engineering, Inc.

Recreational benefits are the increased values of almost all properties on the island because of the availability of the increased recreational beaches resulting from the Project. These benefits have been determined by the District's Economic Consultant, Stronge, who has a Ph.D. degree in economics and long experience in analyzing public projects. Stronge has been the District Economic Consultant for more than 30 years and has prepared the economic analysis of the 1988-89 Beach Restoration and the Maintenance Nourishment Projects that have been undertaken periodically since that time.

The enabling legislation continues:

The District Board shall divide the District's lands into major categories and zones to appropriately determine the benefit to lands from the construction, maintenance and operation of Erosion Prevention Projects and beach restoration. The Legislature finds and determines that all Gulf-front Lands in the District are directly and specially benefitted by the projects by the construction, operation, and maintenance of Erosion Prevention Projects in the category and zone in which such Gulf-front lands are situated. The District may also determine that categories or zones that do not constitute Gulf-front Lands may be benefitted by the construction, maintenance, and operation of Erosion Prevention Projects.³

The District Engineer has identified six beach zones which contain Gulf-front properties that receive comparable benefits from the proposed 2025 Beach

³ Section 10(2) of the Enabling Act.

Renourishment project. These zones are (from north to south) Upper and Lower South Seas, the Village and Tween Waters beaches, and The Upper and Lower Gold Coast beaches. The District Economic Consultant has grouped properties on the island into four benefit categories based on their different land uses as determined by the Lee County Property Appraiser. The recreational benefit categories include single-family residential, condominium, multi-family residential with less than 10 units and commercial properties. Some non-residential properties are also assigned to these categories.

Benefit Analysis

The benefits from the 2025 nourishment of Captiva’s beaches are given in Table 1. The benefits considered are the same as those that were used to determine assessments for the previous Captiva beach renourishment projects undertaken since 1989. The 2025 renourishment of Captiva’s beaches will yield benefits of \$6,590,987 each year over the 19-year life of the project. The project was designed to be consistent with an 8-to-10-year renourishment interval, but it is expected that a portion of the sand placed for the 2025 project will remain within the project area at the end of the first renourishment interval. Thus, the post-construction period was defined to represent approximately two 8-to- 10 year renourishment intervals, which is consistent with the previous benefits analysis, thereby encapsulating the full benefit of the project.

Table 1 Annual Public and Private Benefits of the 2025 Beach Renourishment Project by Type		
Benefit	Amount	Percent
Storm Protection		
Roads Storm Protection	\$ 21,501	0.3
Other Public Storm Protection Benefits	\$ 466,284	7.1
Sub-total Public Storm Protection Benefits	\$ 487,785	7.4
Private Storm Protection Benefits	\$ 2,417,881	36.7
Sub-Total Public & Private Storm Protection Benefits	\$ 2,905,666	44.1
Recreation		
Public Recreation Benefits (Day Visitors)	\$ 860,789	13.1
Private Recreation Benefits	\$ 2,824,533	42.9
Sub-Total Public & Private Recreation Benefits	\$ 3,685,321	55.9
Total Public & Private Benefits	\$ 6,590,987	100.0

Note: Items may not add to totals because of rounding errors.

Table 1 shows that the recreation benefits are larger than the storm protection benefits, \$ 3,685,321 in recreation compared to \$ 2,905,666 in storm protection benefits. This is the usual case with a renourishment, since the project adds sand to an existing beach that already provides significant protection to upland properties. The benefits from the 1989 beach restoration were evenly divided between storm protection and recreation because much of the shoreline at that time had little or no beach.

The benefits in Table 1 also distinguish between publicly owned and privately-owned properties. About 80 percent of the total benefits from the project are received by private properties (79.6 percent) and more than 20 percent are received by Lee County (20.4 percent). The share of the project costs accounted for by the storm protection benefits to roads and other public properties are covered by the grant that is expected to be obtained, as in past years, from Lee County.

The CEPD's coastal engineering consultant (APTIM Coastal Planning & Engineering, Inc.) has determined from the design and size of the Beach Renourishment Project that storm protection benefits will not extend beyond the first line of properties (structures) along the beachfront. In some cases where there is a "common element" in the first line of properties, the benefits extend further inland to the properties that share the ownership of the common element.

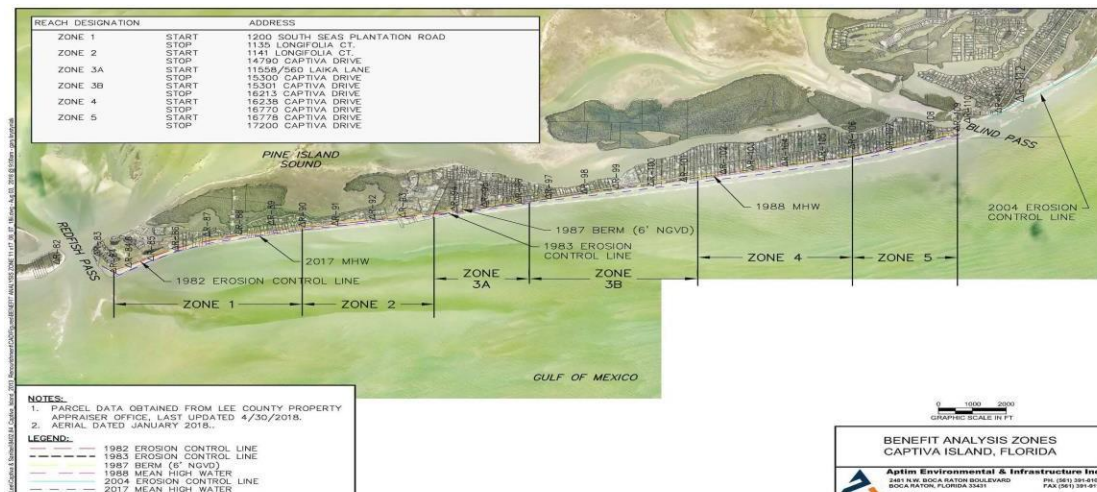
Table 2 shows that private properties on Captiva will receive \$2,417,881 in storm benefits on an annual basis from the 2025 Beach Renourishment Project. The percentages in Table 2 show how the portion of the project cost due to private storm protection will be shared by the property owners in the six beach zones. The largest share of storm protection benefits is in the Upper South Seas zone (37.4 percent). This Zone

Table 2
Annual Storm Protection Benefits of Private Properties on Captiva
2025 Beach Renourishment by Benefit Category

Benefit Category	Amount	Percent of Total Private Storm
Upper South Seas Beach Zone Properties	\$ 904,501	37.4
Lower South Seas Beach Zone Properties	\$ 290,306	12.0
Village Beach Zone Properties	\$ 344,186	14.2
Tween Waters Beach Zone Properties	\$ 338,826	14.0
Upper Gold Coast Beach Zone Properties	\$ 315,811	13.1
Lower Gold Coast Beach Zone Properties	\$ 224,251	9.3
Total Private Storm Protection Benefits	\$ 2,417,881	100.0

Note: items may not add to totals because of rounding.

has been extended to align with adjacent areas of high erosion for this Project. The zone will also receive a relatively large share of the new beach fill to be placed as part of 2025 project because the design beach width is being widened in this part of the island. The design beach width in this zone will be similar to the design beach width in the rest of the island. Finally, the zone contains relatively expensive properties with high land values.



The beach zones were selected by the coastal engineer on the basis of erosion conditions in the different reaches of beach. The zones are the same as those used in the

Apportionment Plan for the 2021 Beach Renourishment Project. In 2021, the boundary between the Upper South Seas and the Lower South Seas zones was moved approximately 2,800 feet further south of Redfish Pass. Hagerup Beach and the first property to its south are included in the Lower South Seas Zone.

The cost share for the benefits received by day visitors who use Captiva’s beaches for recreational purposes are treated as public rather than private, because these beach users do not use lodging facilities and make limited use of restaurants and shops during their brief stays on the island. Many of these recreational beach users are residents of elsewhere in Lee County; others are staying in lodging elsewhere in the county and they have a positive impact on the county economy. As a result, the portion of the project cost corresponding to day visitors is treated as a public benefit and is covered by the County grant.

Benefit Category	Amount	Percent of Total Private Recreation
Residential Properties	\$ 2,177,674	77.1
Commercial Properties	\$ 646,859	22.9
Total Private Recreational Benefits	\$ 2,824,533	100.0

The portion of the project cost due to private recreational benefits will be shared by four different types of properties according to the percentages shown in Table 3. The grouping of properties is the same as was used for the 2021 Project. In 2021, Multi-Family less than 10 units have been grouped into a separate category, rather than being grouped with condominiums as in 2014.

The properties were grouped based on the frequency of beach use by their residents, guests, or customers. Surveys of beach users since 1986 substantiated the differences in intensity of beach use by these property types. Residential properties will receive the largest share of the total.

Table 4 Annual Benefits Received by Captiva Private Properties by Benefit Category 2025 Renourishment Project		
Benefit Category	Amount	Percent Share of Total Private
Upper South Seas Beach Zone Properties	\$ 904,501	17.3
Lower South Seas Beach Zone Properties	\$ 290,306	5.5
Village Beach Zone Properties	\$ 344,186	6.6
Tween Waters Beach Zone Properties	\$ 338,826	6.5
Upper Gold Coast Beach Zone Properties	\$ 315,811	6.0
Lower Gold Coast Beach Zone Properties	\$ 224,251	4.3
Residential Properties	\$ 2,177,674	41.5
Commercial Properties	\$ 646,859	12.3
Total Private Benefits	\$ 5,242,414	100.0

A summary of the benefit analysis as it applies to private properties is given in Table 4. The top 3 benefit categories shares are Single Family properties (41.5 percent), properties in the Upper South Seas Beach Zone (17.3 percent) and Commercial properties (12.3 percent).

Cost Shares by Beach Zone and Recreational Benefit Category

Once the project cost is determined, the benefit shares become the cost shares assigned to the properties in the different benefit categories. For the purposes of the Tentative Apportionment, the total cost was set at \$25,000,000 at the direction of the CEPD Board as a worst-case scenario. This was decided upon in order to assist the property owners in determining whether they support the proposed project.

The benefit shares in Table 4 were used to apportion the \$25,000,000 cost among the different benefit (storm protection and recreation) categories. The results are presented in Table 5. Properties in the Upper South Seas Beach zone, as well as Single Family and Condominium properties will pay the largest share of Project costs.

Table 5 Cost Shares for Captiva Private Properties by Benefit Category 2025 Renourishment Project		
Benefit Category	Benefit Share (%)	Cost Share (\$)
Upper South Seas Beach Zone	17.3	\$4,313,380
Lower South Seas Beach Zone	5.5	\$1,384,410
Village Beach Zone	6.6	\$1,641,353
Tween Waters Road Beach Zone	6.5	\$1,615,792
Upper Gold Coast Beach Zone	6.0	\$1,506,038
Lower Gold Coast Beach Zone	4.3	\$1,069,407
Residential Properties	41.5	\$10,384,882
Commercial Properties	12.3	\$3,084,738
Total	100.0	\$25,000,000

A Plan for the Tentative Apportionment of the Project Cost

The enabling Legislation of the District provides guidance on apportioning the Project Cost to properties within each Benefit category.⁴ When the proposed project is complete, the District will cause to be prepared a preliminary assessment roll. The preliminary roll will contain an apportionment between the benefitted lots and parcels, uniform in each category or zone, by one of the following methods:

1. Upon an ad valorem basis as to lands in a specific zone or category.
2. Upon a front foot basis of lineal feet of land in a specific zone or category.
3. Upon an area or square-foot basis as to all lands in a specific zone or category.
4. Upon any other fair and equitable basis according to the specific benefits received by the lands in a specific zone or category.

Ever since the beach restoration in 1988-89, successive Boards of the Captiva Erosion Prevention District have elected to apportion costs within benefit categories upon an ad valorem basis. This assigns the shares of costs to individual properties in a benefit category that is equal to their shares of the total just (i.e. market) value of all the properties in that category, as obtained from the latest Lee County NAL file that has been submitted to the Florida State Department of Revenue.

Previous District Boards have asked their consultants to prepare a Tentative Apportionment of Costs⁵ and associated Tentative Assessment Roll to provide information to individual property owners on the assessments that might be levied against their properties once the project is completed. The apportionment is tentative, because final information of Project Costs and anticipated Grants from other levels of government, including Lee County, the State of

⁴ Section 10(9) of the Enabling Act.

⁵ Section 10(5) of the Enabling Act requires this Tentative Apportionment.

Florida and the Federal Government are not available before construction on the Project.

Property values on the island will also likely change because of construction activity and market conditions by the time the project is complete. Finally, there will be changes in the amount of District Reserves that might be committed to the Project.

Tabulations of the “just” (market) values were made for the Captiva private properties in each of the benefit categories. These are presented in Table 6. The cost shares are divided by the just values and the results are present as millages in the Table. The highest Basic Millage Rates are for properties in the Upper South Seas Beach Zone, Commercial Properties, and Properties in the Village Beach Zone. Properties in the beach zones will be assessed for storm benefits depending on their zone, and for recreational benefits depending on their recreation benefit category. Their total tentative assessment will be the sum of both assessments. Properties which are not in a beach zone will receive only recreational assessments.

TABLE 6

Basic Millage Rates for the 2025 Beach Renourishment Project			
Benefit Category	Cost Shares	Just Values	Millage Rates
Upper South Seas Beach Zone	\$4,313,380	\$141,444,558	30.4952
Lower South Seas Beach Zone	\$1,384,409	\$181,075,007	7.6455
Village Beach Zone	\$1,641,352	\$58,811,964	27.9085
Tween Waters Beach Zone	\$1,615,791	\$182,476,032	8.8548
Upper Gold Coast Beach Zone	\$1,506,038	\$190,191,160	7.9185
Lower Gold Coast Beach Zone	\$1,069,407	\$91,193,000	11.7269

NA = not applicable. Millages are thousandths, or tenths of percentages.

Appendix A: Methodology

The Beach Renourishment Project will generate a stream of annual benefits for property owners on Captiva Island which, ultimately, will show up as an enhancement of property values beyond the levels they would have attained in the absence of the Project.

To the extent that properties are better protected from erosion and storm damage by the Beach Renourishment Project, their values will increase. Additionally, properties away from the beach that share in the ownership of common element properties on the beach will have their values enhanced by the Beach Renourishment Project. These enhancements in values are the storm protection benefits of the project.

Captiva properties also experience enhancements in values due to increased recreational benefits. The beach provides an opportunity for beach activities enjoyed by recreational beach users. Captiva beach users enjoy swimming and sunning, walking and shelling and fishing, among other activities. Island properties increase in value because of their proximity to beach recreational opportunities and because they may generate a stream of income for their owners as a result of renting lodging and other facilities to beach users.

In sum, the Beach Renourishment Project will benefit Captiva Island properties by providing two types of benefits. First, the Project will protect properties from erosion and storm damage, the "storm protection benefit." Second, the Project will provide access to an enhanced recreational beach, the "recreational benefit." These benefits are estimated in the same manner as the previous assessments on Captiva Island. They are computed using the broad features of the methodology used by the US Army Corps of Engineers to determine the benefits from erosion control projects that receive federal funding.

Additionally, the basic methodology was validated in Lee County Court as part of a bond validation undertaken for the 1988-89 project.

Storm Protection Benefits

Project benefits associated with storm protection were generated for properties that front on the Gulf of Mexico. The storm protection benefit to a property represents the difference between the value of expected property losses if the project is constructed compared to the value of losses if the project is not constructed. These benefits may flow to properties away from the beach, if the beach parcel is a common element owned by properties that are not on the beach itself.

For the purpose of determining project benefits, the enabling legislation of the Captiva Erosion Prevention District requires that Captiva properties be grouped into areas and zones. Areas are relatively large groups of properties where CEPD projects have been undertaken in the twelve months prior to project construction. Zones are smaller divisions of areas which are characterized by the same degree of beach erosion and gradient of the beach profiles.

The entire Gulf-front of Captiva is grouped into a single area because at the anticipated time of the Beach Renourishment Project no CEPD project will have been undertaken in the preceding twelve months.

The storm protection benefits were computed for different beach zones, which are defined in Table B.1. The zones were delineated based on erosion conditions on the different beach areas.

Zone	Profiles	Lee Co. Parcel Numbers	Street Addresses
1	R-84 to R-89	2245210000005002B to 27452101000000010	1057-1900 South Seas Plantation Road to 1135 Longifolia Ct.
2	R-90 to R-93	274521010000A00CE to 26452104000010010	1141 Longifolia Ct. to 14790 Captiva Drive
3A	R-94 to R-96	26452102000010060 to 35452101000000140	11558/560 Laika Lane to 15300 Captiva Drive
3B	R-97 to R-101	35452101000000150 to 034621010000B0030	15301-16213 Captiva Drive
4	R-102 to R-105	034621020000B0010 to 03462100000200010	16238-16770 Captiva Drive
5	R-106 to R-109	03462100000210010 to 11462100000010010	16778-17200 Captiva Drive

Erosion rates along each zone were based on the September 2009 to October 2017 erosion and accretion rates in cubic yards per year per foot (Table B.2). Upper South Seas (Zone 1) and the Village (Zone 3A) experience the highest erosion rates, followed by Lower South Seas (Zone 2) and southern section of the Gold Coast (Zone 5). Although the shorelines in Zones 3B and 4 are relatively stable, properties in these reaches are vulnerable to storm damage.

Zone	Profile Lines	Erosion (+) & Accretion (-) (c.y./foot/year)	Shoreline Retreat (-) & Advance (+) (feet/year)	Average Residential Land Value per Square Foot
1. Upper South Seas	R-84 to R-89	-5.0	-8.3	\$60.88
2. Lower South Seas	R-90 to R-93	-2.5	-7.3	\$40.72
3A Village	R-94 to R-96	-5.7	-12.9	\$47.43
3B Tween Waters Road	R-97 to R-101	-1.5	-12.3	\$47.47
4 Upper Gold Coast	R-102 to R-105	-0.1	-4.5	\$41.47
5 Lower Gold Coast	R-106 to R-109	-2.9	-7.9	\$44.89

Note: Rates based on annualized changes between September 2009 and October 2017, excluding the construction period (September 2013 and January 2014) for the 2013-14 beach renourishment project.

The storm protection received by a property is the expected loss due to erosion and storm damage in the absence of the Beach Renourishment Project, or the cost of an alternative erosion control project for storm protection, whichever is less. A comparison of the erosion control options which include the expected loss under the "do-nothing" alternative is made for each property. The expected loss consists of the discounted stream of future losses multiplied by the probabilities of various storm events. In addition to beach conditions in each zone, expected losses reflect land and building values, beach widths and distances between buildings and the mean high-water line. Future losses are discounted by an interest rate of 2.75 percent over the estimated project life of the Beach Renourishment Project. Revetted properties experience annual maintenance and structural damage to the revetments during the storms in the computation of project benefits. The Risk and Uncertainty Storm Damage Model version 2.0 (RU SDM, U.S. Army Corps of Engineers, Jacksonville District, 1999) was used to calculate benefits in each zone.

The benefits analysis for Captiva Island was based on property value data obtained from the Lee County Property Geographic Information System. An interest rate of 2.75% was used in this study. This rate was based on the "Memorandum for Planning Community of Practice" issued by the U.S. Army Corps of Engineers on October 20, 2017. See (<http://www.usace.army.mil/CECW/PlanningCOP/Documents/egms/egm10-01.pdf>).

Average land values were calculated based on the total value (in dollars) and total land area (in square feet) of the residential parcels fronting the Gulf of Mexico.

Further details on the Storm Benefits Methodology can be found in APTIM Coastal Planning & Engineering, Inc., Captiva Island Beach Renourishment Project Storm Damage Reduction Benefits Analysis, June 2018.

Recreational Benefits

Recreational benefits consist of the recreational value of the beach that is created once the beach maintenance project is implemented. Unlike the storm protection benefits, the recreational benefits flow to properties on the island regardless of whether they are on the Gulf or not.

The recreational value of the beach was obtained from detailed surveys of more than 600 beach users on Captiva, conducted during a ten-day period in the winter of 2018 and during a five-day period in the summer of 2018. Surveys were collected all along the beach and the results are to be found in the report Recreational Use of Captiva's Beaches and Economic Impact 2018. The primary determinant of recreational value is beach usage. Properties which send, or can send, relatively large numbers of beach users on to the beach receive relatively greater recreational benefits than do properties which send relatively few beach users onto the beach.

Users of Captiva's beaches were classified on the basis of the type of properties that they lived in or were staying in. Such properties were classified into single-family, condominium, multi-family < 10 units and commercial (hotel) categories. Day visitors to the beaches were not assigned to a lodging type on Captiva and were accounted for separately. On the basis of the lodging type of beach users, beach usage and recreational value was assigned to Captiva properties.

Recreational value was obtained from a willingness to pay survey of beach users. The same median willingness to pay value, projected to 2025 was assigned to almost all beach users, to determine the annual recreational value over the estimated project life.

Properties can also be categorized on the basis of their land use. The land uses of properties were determined on the basis of the land use code specified on the tax roll record obtained from the Lee County Property Appraiser. No distinction was made between vacant and improved properties. Commercial properties include resorts, restaurants, shops and offices. Non-lodging commercial properties were grouped with hotels and resorts because their businesses are mainly dependent, either directly or indirectly, on beach users, particularly users who spend at least one night on the island.

Institutional properties include the properties owned by the Rauschenberg Foundation as well as the Captiva Civic Association and Chapel by the Sea. Government properties included those owned by the Federal and State Governments, Lee County and the Captiva Island Fire Association. There were also a small number of miscellaneous properties including those owned by utilities, drainage, marshland and submerged parcels. Storm protection benefits were calculated for institutional, government and miscellaneous properties that were located on the beachfront. Recreation benefits were computed for most institutional properties and for the three utility parcels in the miscellaneous category. No recreation assessments were levied against government parcels.