Annual Assessment of Florida's Water Resources and Conservation Lands

2025 Edition
Chapter 2

Beaches

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Executive Summary

Beaches are an integral part of Florida's identity. Maintaining them is essential for environmental, economic, and cultural purposes. Beach renourishment, as discussed in this report, is one of the most cost-effective strategies for managing this goal. According to the Department of Environmental Protection's (DEP) Local Government Funding Requests report, requests from FY 2020-21 through FY 2024-25 totaled $855.0 million for beach projects, $23.2 million for beach project monitoring, $133.2 million for inlet projects, and $4.7 million for inlet project monitoring. Additionally, DEP's Long Range Budget Plans estimate costs for FY 2025-26 through FY 2026-27 will total $256.4 million for beach projects, $15.6 million for beach project monitoring, $61.7 million for inlet projects, and $1.9 million for inlet project monitoring. Local governments anticipate providing the majority of funding for beach projects and beach monitoring, whereas state government is expected to provide the majority of funding for inlet projects and monitoring.

2. Beaches

Florida's coastline has ebbed and flowed in size, structure, and shape for thousands of years. The currents and tides present in Earth's oceans contribute to natural cycles of sediment accretion (accumulation) and erosion (depletion). Currently, thirty-five[1] of Florida's sixty-seven counties contain the state's 825 miles of sandy coastline.[2] These beaches are crucial for the state's economy and preservation for myriad reasons, including tourism, conservation, and protection from storm surge. See the Office of Economic and Demographic Research's report entitled *Economic Evaluation of Florida's Investment on Beaches* for additional information regarding the economic importance of Florida's beaches.[3]

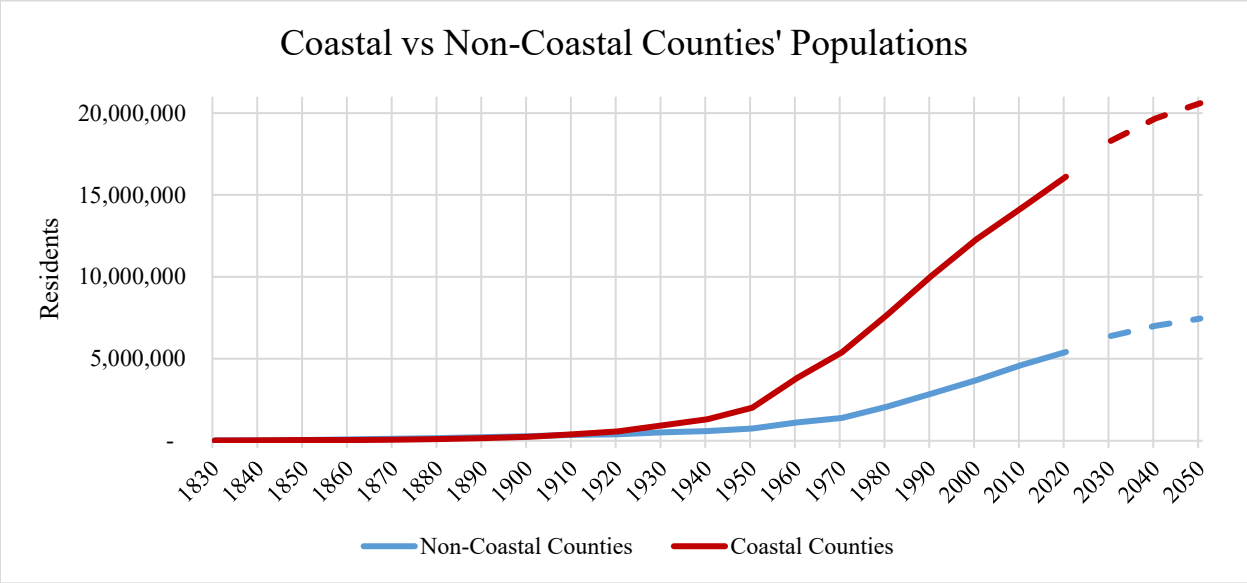
2.1 Coastal Counties

Since the 1910s, Florida's thirty-five coastal counties have contained more of the state's population than non-coastal counties. Since the 1950s, the coastal counties have consistently contained over seventy percent of the population, with Miami Dade (formerly Dade) County alone currently accounting for over twelve percent. The coastal counties have had an average ten-year growth rate of twenty-five percent over the last five decades. Despite recurring natural disasters, these counties are expected to grow another twenty-eight percent, or 4.5 million residents, by 2050. Miami Dade County alone is expected to grow by over 400,000 residents in that timeframe.[4,5] Population projections are shown in Figure 2.1.

[See figure on following page]

[1] *Coastal counties of Florida*. Florida Department of Environmental Protection. https://floridadep.gov/sites/default/files/CPI-coastal-Florida-map.pdf
[2] *Beaches*. Florida Department of Environmental Protection. https://floridadep.gov/rcp/beaches
[3] Office of Economic and Demographic Research. (2015, January). Economic Evaluation of Florida's Investment on Beaches. http://edr.state.fl.us/Content/returnoninvestment/BeachReport.pdf
[4] Office of Economic and Demographic Research. (2023, February). Total County Population: April 1, 1970 - 2050*. http://edr.state.fl.us/content/population-demographics/data/2022_Pop_Estimates.pdf
[5] Office of Economic and Demographic Research. (n.d.). *Florida County Population Census Counts: 1830 to 2020*. Population and Demographic Data - Florida Products. http://edr.state.fl.us/Content/local-government/data/data-a-to-z/FLcountycensus.xlsx

Figure 2.1 Florida's Coastal vs. Non-Coastal Counties' Populations



Sources: Office of Economic and Demographic Research's county population estimates for 1970-2050. Prior years were gathered from Census report compilations. [4,5]

Beginning in 1986, pursuant to Sections 161.101 and 161.161, Florida Statutes (F.S.), the Florida Department of Environmental Protection (DEP) was charged with the responsibility to identify those beaches of the state which are critically eroding and to develop and maintain a comprehensive long-term management plan for their restoration. Pursuant to rule 62B-36.002(5), Florida Administrative Code (F.A.C.), "critically eroded shoreline" is defined as, "*a segment of the shoreline where natural processes or human activity have caused or contributed to erosion and recession of the beach or dune system to such a degree that upland development, recreational interests, wildlife habitat, or important cultural resources are threatened or lost. Critically eroded shorelines may also include peripheral segments or gaps between identified critically eroded areas which, although they may be stable or slightly erosional now, their inclusion is necessary for continuity of management of the coastal system or for the design integrity of adjacent beach management projects.*" Table 2.1 summarizes the most recent Critically Eroded Shorelines report, published August 2024. Many of these beaches have been restored from their original designation of "critically eroded," but they remain on the list to retain their state funding eligibility for maintenance and monitoring. The 2024 list includes 432.8 miles of critically eroded beach, 9.1 miles of critically eroded inlet shoreline, 96.5 miles of non-critically eroded beach and 3.2 miles of non-critically eroded inlet shoreline statewide. Two erosion segments (St. George Island in Franklin County and Gomez Key in Levy County) were added to the report in 2024, and one segment (Hudson Beach in Pasco County) was removed from the list. Brevard County has the most miles of critically eroded beaches (41.2 miles), followed by Palm Beach County (33.6 miles).[6]

[6] Florida Department of Environmental Protection. (2024, August). *Critically Eroded Beaches in Florida*. Office of Resilience and Coastal Protection. https://floridadep.gov/sites/default/files/FDEP_Critically%20Eroded%20Beaches_08-2024_0.pdf

Table 2.1 Counties with Erosion

	Beach			Inlet	
County	Critically Eroded (miles)	Non-Critically Eroded (miles)	Total Beach (miles)	Critically Eroded (miles)	Non-Critically Eroded (miles)
Bay	19.5	10.1	27.0	0.6	0.0
Brevard	41.2	12.1	71.6	0.0	0.0
Broward	21.9	0.0	24.0	0.0	0.0
Charlotte	6.5	0.0	28.0	0.1	0.0
Citrus	0.2	0.0	0.3	0.0	0.0
Collier	15.5	5.1	48.0	0.8	0.0
Dade	17.0	1.4	20.8	0.0	0.3
Dixie	0.6	0.0	0.1	0.0	0.0
Duval	10.4	0.0	22.0	0.7	2.0
Escambia	11.2	11.2	39.0	0.0	0.0
Flagler	8.1	0.0	19.0	0.0	0.0
Franklin	13.6	16.2	55.0	0.0	0.5
Gulf	8.3	8.6	43.0	0.0	0.0
Hernando	0.0	0.5	0.8	0.0	0.0
Hillsborough	1.6	0.0	2.1	0.0	0.0
Indian River	15.7	0.0	22.4	0.0	0.0
Jefferson	0.0	0.0	0.0	0.0	0.0
Lee	22.8	5.3	47.0	0.6	0.4
Levy	1.3	1.2	3.0	0.0	0.0
Manatee	13.0	0.0	12.3	0.0	0.0
Martin	18.4	0.0	22.0	0.0	0.0
Monroe	15.0	0.0	26.0	-	-
Nassau	7.7	0.0	13.0	2.5	0.0
Okaloosa	6.5	0.0	24.0	0.8	0.0
Palm Beach	33.6	0.9	47.0	0.8	0.0
Pasco	0.0	1.1	4.4	0.0	0.0
Pinellas	21.4	4.4	35.0	0.5	0.0
Saint Johns	17.1	7.6	41.1	0.0	0.0
Saint Lucie	7.6	7.9	21.5	0.0	0.0
Santa Rosa	4.1	0.0	5.0	0.0	0.0
Sarasota	25.5	0.0	35.0	1.1	0.0
Taylor	0.2	0.0	0.5	0.0	0.0
Volusia	27.2	2.0	36.0	0.6	0.0
Wakulla	1.3	0.4	3.0	0.0	0.0
Walton	18.8	0.0	26.0	0.0	0.0
Total	**432.8**	**96.0**	**824.8**	**9.1**	**3.2**

Source: DEP's Critical Eroded Beaches in Florida Report, August 2024[6]
Note: due to measuring and designation differences, not all measurements are consistent. Please allow for some margin of error. Also note that Monroe County had no inlets to report.

2.2 Beach Processes

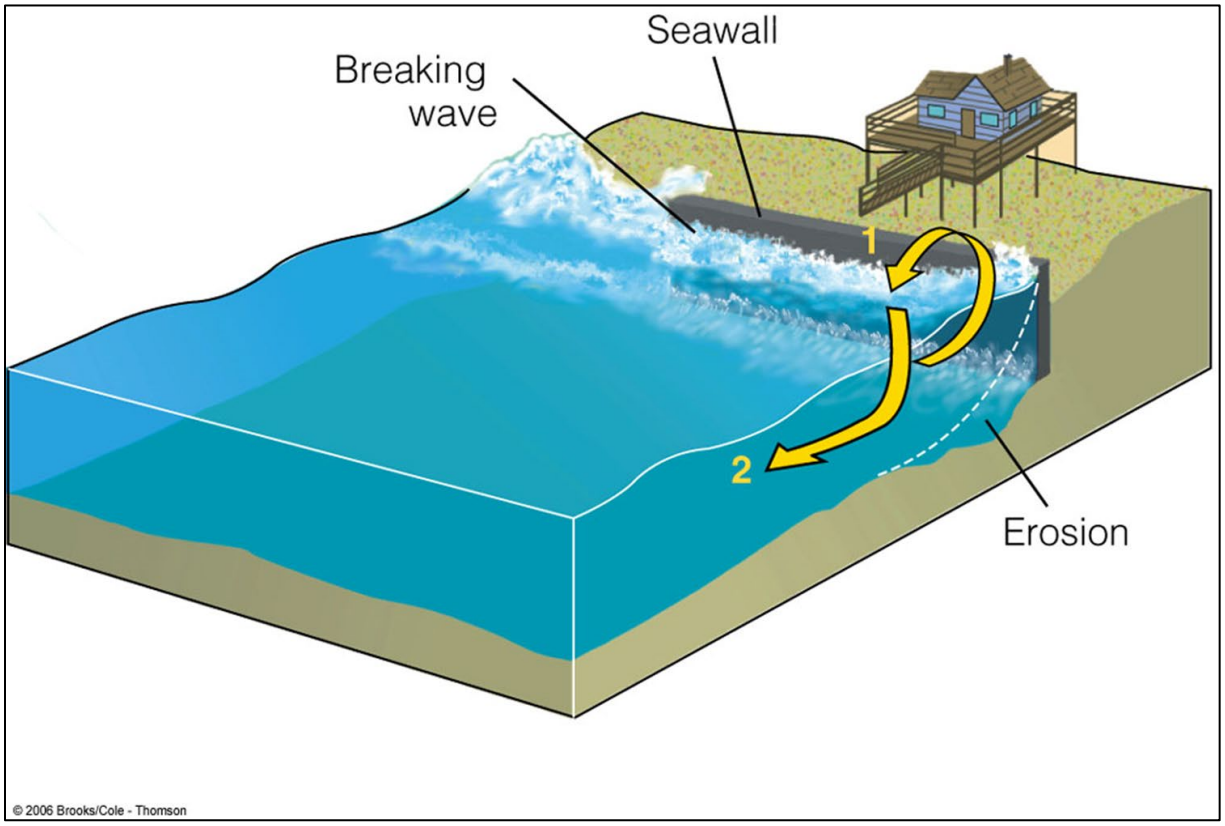
While Florida's coasts often generate thoughts of tourism and recreation, one of their most important features is the protection they provide to upland areas. Under natural conditions, as waves move from the deep open ocean to the shallow nearshore areas, waves break and dissipate their energy along the ocean bottom. Therefore, waves that arrive on a gently sloping beach maintain less energy than a wave that runs into a steep embankment. The farther the wave travels while interacting with the ocean floor, the more energy is dissipated. Coral reefs offshore buffer shorelines from waves, dissipating as much as ninety-seven percent of a wave's energy.[7] The less energy the wave has left when it reaches the shore, the less far inland the wave can travel and the less erosion it causes. Conversely, the more energy a wave has at its final destination, the farther it can travel up the beach and the more erosion it can cause.

There is a natural process of accretion and erosion of sediment on shores: every wave brings some sediment and takes some away. Beaches can even recover after large storms, which move huge volumes of sediment, given enough time. However, the physical structures (residences, businesses, roads, and other infrastructure, etc.) that humans have established near shores impact this natural cycle. For example, seawalls (Figure 2.2) were once a fixture of such construction projects because they prevent waves from encountering the built features and can provide immediate stability on ever-shifting sand foundations. After years of employing this method of protection, it has been determined that vertical seawalls can actually *decrease* stability for built structures because of sand scarping: this occurs when the energy from waves has nowhere to dissipate, and thus circles back over or under itself back to the ocean, taking increased amounts of sediment with it. The deficit of sediment at the base of the seawall eventually leads to its collapse, suddenly creating dangerous conditions for any structures upland.

[See figure on following page]

[7] Pacific Coastal and Marine Science Center. (2022, July 27). Role of Reefs in Coastal Protection. https://www.usgs.gov/centers/pcmsc/science/role-reefs-coastal-protection

Figure 2.2 Seawalls Can Induce Erosion



Source: *Coastal Erosion Lessons*[8]

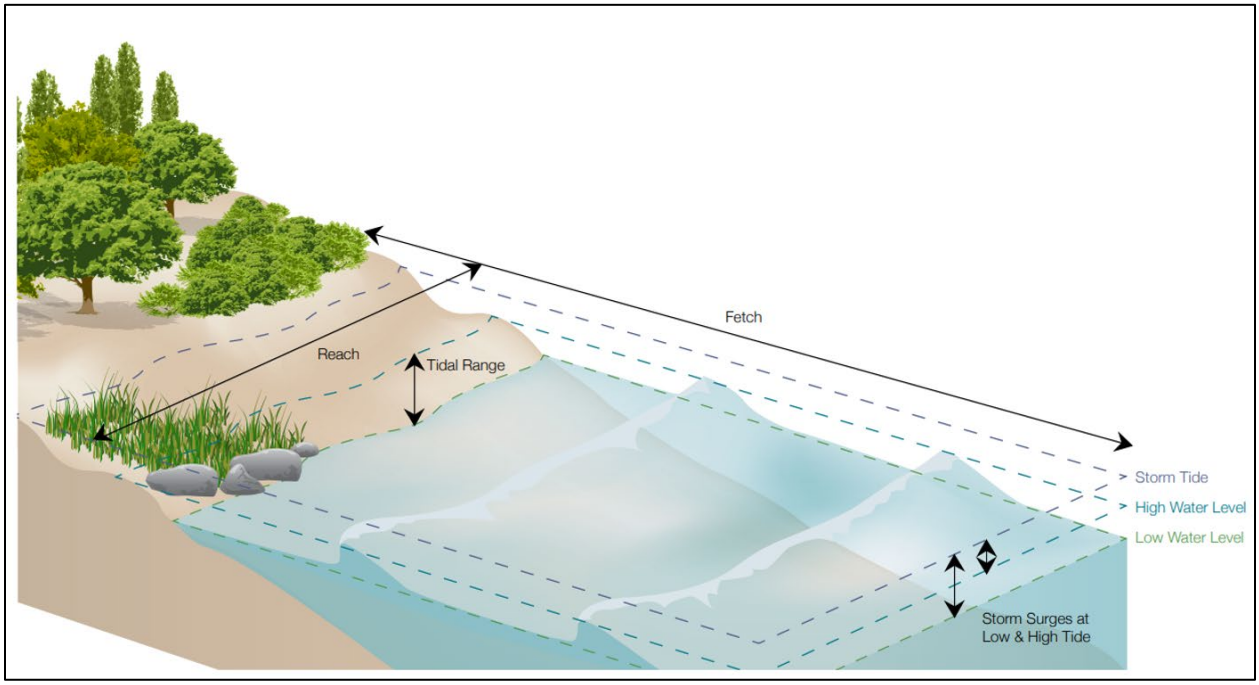
2.3 Beach Projects

Beginning in the 1930s, the United States Army Corps of Engineers (USACE) began providing beach restoration projects along America's coasts. With the complex nature of permitting and overlapping jurisdictions, a federal entity was best suited to manage these projects. Beginning in 1965, Chapter 161.091, F.S., established the legislature's understanding that "erosion of the beaches of this state is detrimental to tourism, the state's major industry, further exposes the state's highly developed coastline to severe storm damage, and threatens beach-related jobs…."[9] Since that year, this area of the law has been expanded to recognize "that beach erosion is a statewide problem that does not confine its effects to local governmental jurisdictions and that beach erosion can be adequately addressed most efficiently by a state-initiated program of beach restoration and beach nourishment."[10] Subsequent additions and revisions have established requirements for projects to receive state funding, as well as guidance for entering cooperative agreements with local governments.

[8] Brooks/Cole-Thomson. (n.d.). *Coastal Erosion Lessons*. The Geophile Pages. https://geophile.net/Lessons/coasts/ND_coasts_04.html
[9] §161.091 Fla. Statutes
[10] §161.101 Fla. Statutes

The most common process for a beach project begins with a local government deciding that its beach needs assistance. The local government contacts the USACE, which does an assessment to determine the best course of action. The DEP's Beach Management Funding Assistance Program provides and manages grants for planning and implementing beach and management projects. This agency confirms that the beach in question is considered "critically eroded" and therefore eligible for funding. The USACE then contracts with a third party to complete the restoration project. After completion, the project is monitored, and subsequent renourishment or maintenance may be needed in three to ten years. According to USACE, "A beach nourishment project is considered successful if damages from waves, inundation, and erosion have been prevented or reduced significantly, and development and ecosystems behind the dunes are still intact." [11] Figure 2.3.1 illustrates the some of the vocabulary surrounding beach projects.

Figure 2.3.1 Beach Project Terms



Source: Township Neighbors Network[12]

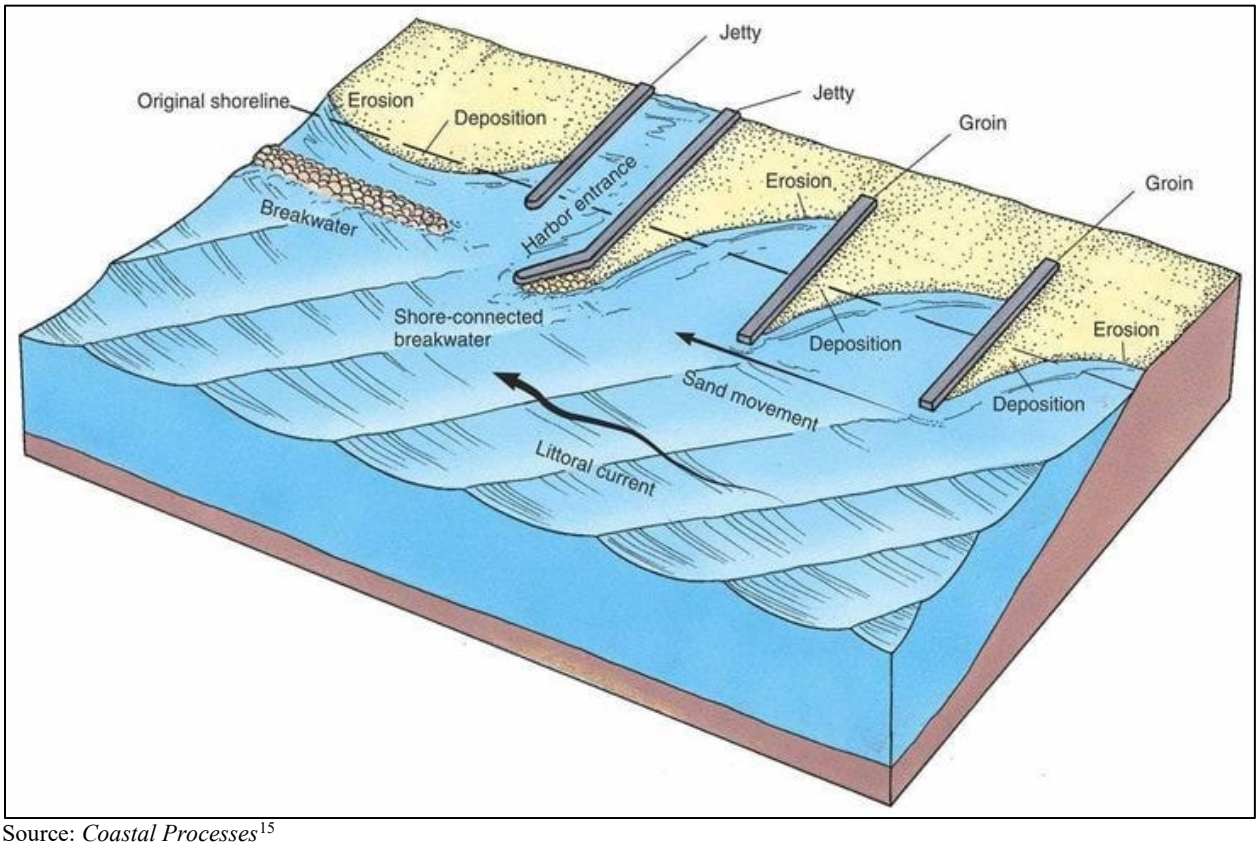
The USACE groups the options for beach projects into three categories—hard coastal structures, non-structural solutions, and soft measures[11]—and the National Park Service provides a fourth: natural and nature-based features.[13] These four categories are detailed as follows:

1. **Hard structures** are constructed to influence wave and sediment transport. *Breakwaters* and *seawalls* are built parallel to the shore, whereas *groins* and *jetties* are built perpendicular to the shore. In 2015, the National Oceanic and Atmospheric Administration

[11] US Army Corps of Engineers. (2007). *Beach Nourishment: How Beach Nourishment Projects Work*. Shore Protection Assessment. https://www.iwr.usace.army.mil/Portals/70/docs/projects/HowBeachNourishmentWorksPrimer.pdf
[12] Township Neighbors Network. (2000). *Sea like conditions apply to East Bay except no tides*. TNN News In Short. https://townshipneighborsnetwork.com/tnn-news/sea-like-conditions-apply-to-east-bay-except-no-tides/
[13] U.S. Department of the Interior. *Coastal Engineering-Soft Structures*. National Parks Service. https://www.nps.gov/subjects/geology/coastal-engineering-soft-structures.htm

(NOAA) estimated the initial construction costs for groins to be $2,001-$5,000 per linear foot, and operations and maintenance costs to be $101-$500 per linear foot. NOAA estimated breakwater and seawall initial construction costs to be $5,001-$10,000 per linear foot, and operations and maintenance costs to be over $500 per linear foot.[14] Due to their disruption in the natural cycle of accretion (deposition) and erosion, these structures can have unintended consequences that projects must anticipate. Figure 2.3.2 illustrates some of the changes to the original shoreline that can occur.

Figure 2.3.2 Potential Consequences of Hard Structures



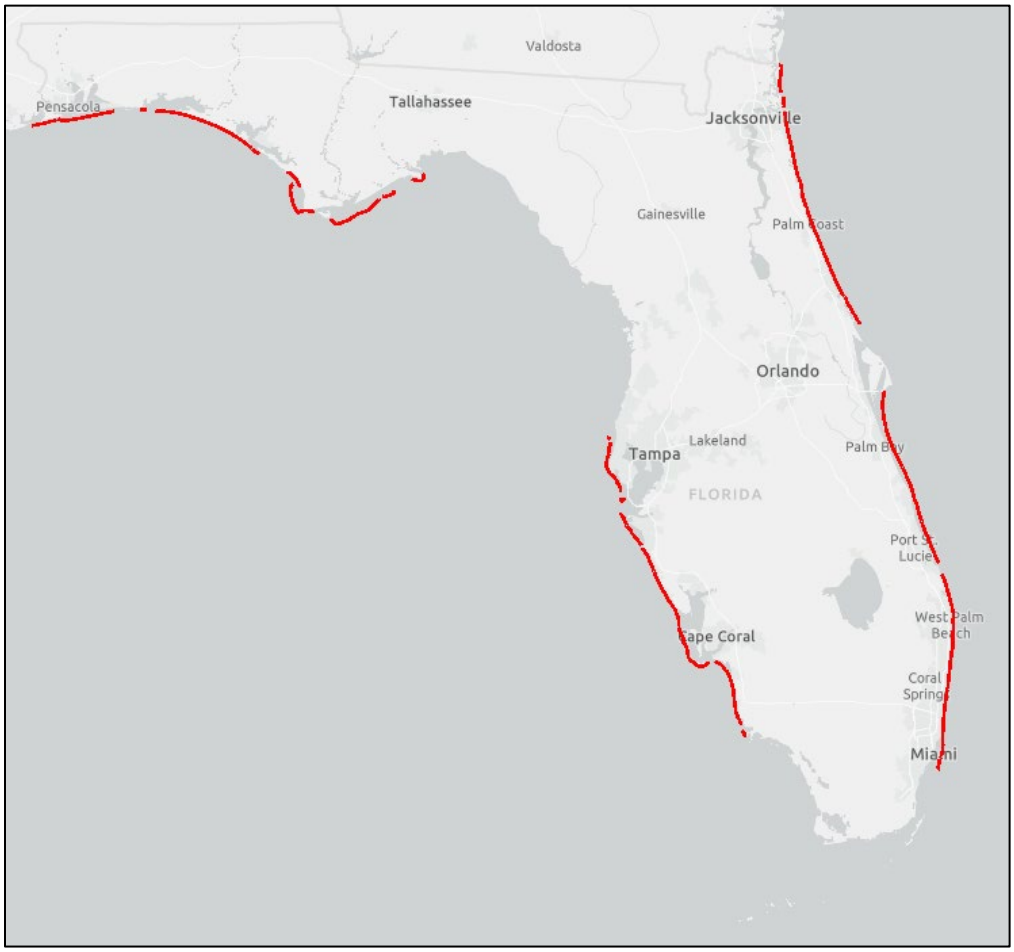
Source: *Coastal Processes*[15]

2. **Non-structural solutions** include projects such as elevating structures (i.e. houses on stilts), preemptively increasing building setbacks from shorelines, and retreating from the shore.
    a. Currently, the state has a Coastal Construction Control Line (CCCL) program (sections 161.052, 161.053, and 161.085, F.S.) in twenty-five of the coastal counties.[16] This line indicates the landward or upward extent of damaging effects

[14] National Oceanic and Atmospheric Administration. (2015, February). *Natural and structural measures for Shoreline Stabilization*. Office for Coastal Management. https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf (Accessed Feb 2025.)
[15] *Coastal Processes*. Erosion Management for Assateague Island. https://anserosion.weebly.com/coastal-processes.html
[16] Florida Department of Environmental Protection. Coastal Construction Control Line Program. https://floridadep.gov/CCCL. (Accessed Sep 2024.)

of a 100-year storm event. This is a storm that is so severe it is likely to occur only once per 100 years. Updated scientific language refers to these events as "one percent events," indicating that, each year, there is a one percent chance of an event of that magnitude. This reduces assumptions of a cyclical nature for these events. Where used, the program does not prohibit construction seaward of the CCCL. Instead, projects, unless exempted via specific situations, must be permitted and monitored by the program. The program is a component of the Beach and Shore Preservation Act and "protects Florida's beaches and dunes from imprudent construction jeopardizing the beach/dune system, accelerating erosion, threatening upland structures and property and interfering with public beach access while allowing reasonable use of private property."[17] The CCCL is shown in Figure 2.3.3.

Figure 2.3.3 Coastal Construction Control Line



Source: DEP's Coastal Construction Control Line maps[18]

[17] Florida Department of Environmental Protection. (2020, April). Frequently Asked Questions About the Coastal Construction Control Line. https://floridadep.gov/sites/default/files/CCCL-FrequentlyAskedQuestions-2020.pdf

[18] Florida Department of Environmental Protection. *LOCATE the Coastal Construction Control Line (CCCL)*. Map direct V7. https://ca.dep.state.fl.us/mapdirect/?webmap=a8c9e92fbad5446d987a8dd4ee5dc5cc (Accessed October 2024.)

b. *Managed retreat* is another non-structural solution. This involves the "purposeful movement of people, buildings, and infrastructure away from areas vulnerable to flooding, sea level rise or other climate change hazards."[19] A 2007 study estimated that the cost of managed retreat along the United States' East Coast would be some $3 trillion.[11]

3. **Soft measures** include beach nourishment, dredging, beach scraping, and sand fencing.
    a. Decades of research, trial and error, and new technology development have led governments to conclude that the "least long-term damaging" method of beach preservation is *beach nourishment*.[20] Beach restoration is discussed in detail later in this chapter.
    b. *Dredging* is the removal of materials from waterways and is often used in tandem with other beach projects. For example, dredged materials are frequently used as a source for nourishment. In addition, dredging is sometimes used to correct the induced accretion associated with hard structures.
    c. *Beach scraping* is the artificial reshaping of beaches and dunes to mimic natural recovery processes. This process is not well-studied, and concerns about sea turtle nests make this a less desirable beach project.
    d. *Sand fences* are short, slatted fences that reduce local wind speed and trap sand. These simple structures can modify sediment patterns using wind dynamics. In 2015, NOAA estimated the initial construction cost of sand fences, or "edging," to be $1,001-$2,000 per linear foot, and operations and maintenance costs to be up to $100 per linear foot.[14] However, their usefulness is often short-lived: as sand accumulates around the short structures, they become buried. They may also blow or be washed away, creating unwanted debris on the beach.
4. **Nature-based solutions** mimic natural features of shorelines to help protect coasts and dissipate wave energy. Living shorelines featuring mangroves and other estuarine plants help reduce erosion by holding sediment in place. Hybrid solutions incorporate hard structures and nature-based solutions to create the best chance of success. In 2015, NOAA estimated the initial construction cost for *sills* (mixture of stones, living reef, and vegetation) to be $1,001-$2,000 per linear foot, and operations and maintenance costs to be up to $100 per linear foot.[14]

To determine which type of beach project is best suited for a location, there are many factors to consider. The size of the beach, available funding, ease of access, local regulations, stakeholder feedback, season, and urgency are all factors in choosing a beach project. NOAA suggests "green" or "softer techniques" such as vegetation, edging, sills, and beach nourishment for areas with small waves, small fetch, gentle slope, and/or sheltered coasts. Conversely, NOAA suggests "gray" or "harder techniques" such as breakwaters, groins, revetments, bulkheads, and seawalls for areas with large waves, large fetch, steep slope, and/or open coasts.[14]

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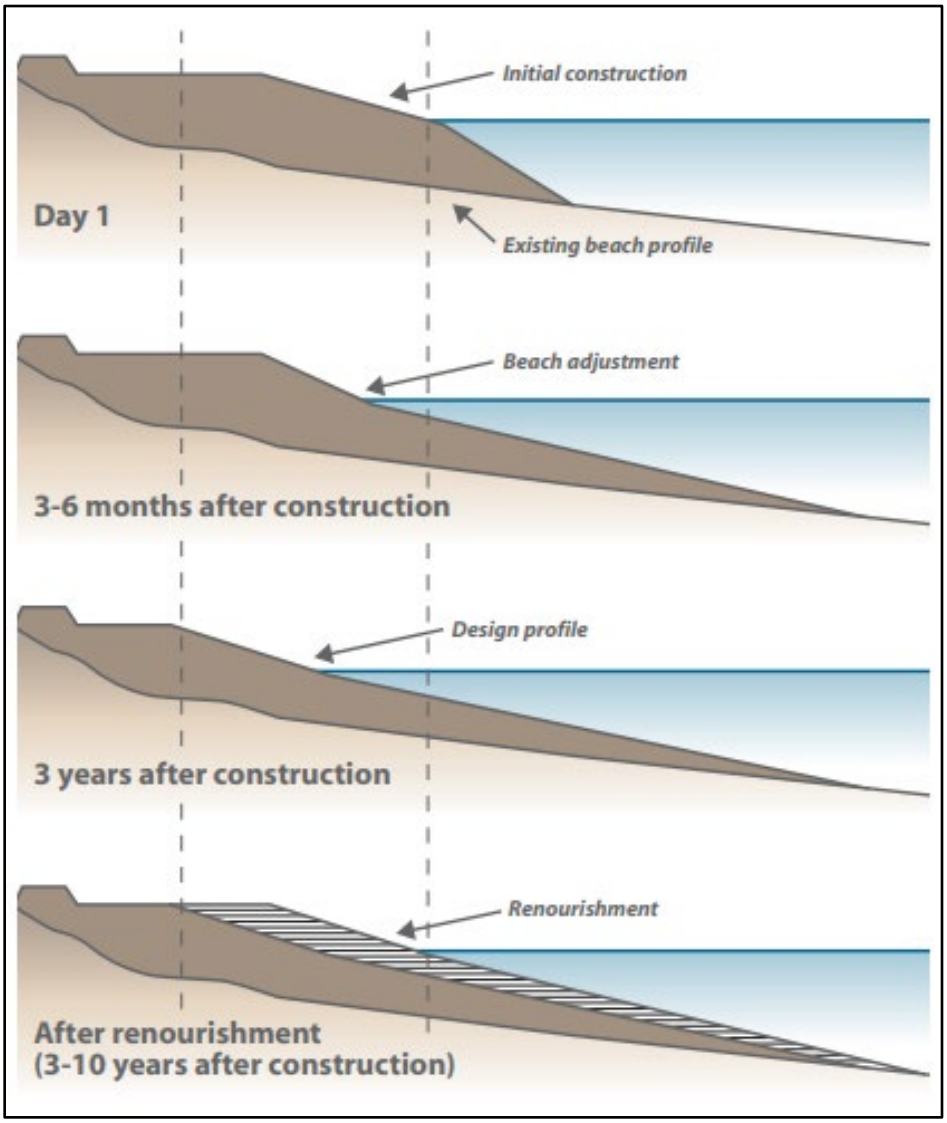
[19] Udel, D. (2021, June 17). *New Analysis Discusses Role of Managed Retreat as a Climate Change Response*. University of Miami News and Events. https://news.miami.edu/rosenstiel/stories/2021/06/new-analysis-discusses-role-of-managed-retreat-as-a-climate-change-response.html

[20] Weinhofer, C. (2023, September 13). *Longboat's beaches withstood Idalia's surge, but flooding still prevailed. how?* Your Observer. https://www.yourobserver.com/news/2023/sep/13/longboat-beaches-idalia-surge-flooding-prevailed/ (Accessed Sep 2024.)

2.4 Beach Nourishment

"Beach restoration" is defined in section 161.021, F.S., as "the placement of sand on an eroded beach for the purposes of restoring it as a recreational beach and providing storm protection for upland properties." Moreover, "beach nourishment" is defined as "the maintenance of a restored beach by the replacement of sand." The two terms are often used interchangeably as they both indicate the placement of sand. Sand is often placed directly on the exposed beach and spread around by large machines (See Figure 2.4). Other times, sand is placed in the active sediment zone slightly offshore so that it may naturally return to the beach with the tides.

Figure 2.4 Sand Deposit Cycles



Source: USACE *Beach Nourishment* brochure[11]

Sand source for a beach nourishment is an important consideration. The sediment must be similar in composition and grain size to the original beach. Using sand that is too different could impact the balance of the established ecosystem. The source area must further be plentiful enough to withstand donating the volume needed for a particular project. Lastly, the source area must be close enough to be cost effective to transport.

Sand is often collected using large dredge barges, which vacuum sediment from the ocean floor, stow it in the ship's hull, and pump the contents onto the beach being restored. This can cause major disruptions for benthic (ocean floor) ecologies and local currents at the donor site, creating a secondary erosion issue. Sand can also be trucked in via land for depositing. Regardless of delivery method, engineers must be careful to avoid sea turtle nests and other coastal wildlife that may be present. In this regard, sea turtle nesting limits beach projects to certain months of the year at known nesting sites.

DEP has a Regional Offshore Sand Source Inventory (ROSSI) where the public can view sand sources. Currently ROSSI lists 154 proven donor sites and ninety-three expended sites. At the 147 proven sites with estimates, the initial volume totaled 5.9 billion cubic yards (yd^3). While they are no longer available for use, the initial volume totaled 238 million yd^3 for the fifty-seven expended sites that had estimates.[21] There were no changes between this and last year's reported numbers. See Table 2.4.1 for details.

Table 2.4.1 Proven and Expended Sites

	Proven Sites			Expended Sites			
	Count			Count			
County	Without Estimated Initial Volume	With Estimated Initial Volume	Estimated Initial Volume (yd^3)	Without Estimated Initial Volume	With Estimated Initial Volume	Estimated Initial Volume (yd^3)	Total Sites
Bay				21			21
Brevard		2	38,900,000	1			3
Charlotte		5	1,545,000				5
Collier		6	352,000		2	247,000	8
Duval				3			3
Indian River	2	2	17,417,644				4
Lee		19	52,059,785		12	13,291,000	31
Manatee		29	38,837,000		14	18,699,900	43
Martin		2	533,164,792	2			4
Miami-Dade				5			5
Nassau		3	2,882,210		2	10,070,000	5
Palm Beach		15	3,748,781,672	3	2	56,673,000	20
Pinellas		14	890,000		10	33,742,200	24
Sarasota		35	22,041,774		14	5,962,000	49
St. Johns	2	2	25,236,060				4
St. Lucie	3	10	1,459,820,522	1	1	99,705,895	15
Volusia		3	7,912,156				3
Total	**7**	**147**	**5,949,840,615**	**36**	**57**	**238,390,995**	**247**
Total	**154**			**93**			

Source: DEP's ROSSI[21]

[21] Florida Department of Environmental Protection. *Regional Offshore Sand Source Inventory*. ROSSI Map Viewer. https://rossi.aecomonline.net/Map/ (Accessed Sep 2024.)

2.5 Beach Project Funding

State funding for beach projects and beach restoration comes from three funds: General Revenue, the Land Acquisition Trust Fund, and the Ecosystem Management and Restoration Trust Fund. Since Fiscal Year 2014-15, the expenditures for these programs total more than $330.68 million. Of the total appropriations, approximately 90 percent of the funds went to statewide beach projects, 10 percent went to hurricane beach recovery, and less than 1 percent went to other projects. Table 2.5.1 shows the annual cash expenditures over the past ten years by funding source. Overall, FY 2023-24 had the highest appropriated level of the period, largely due to the provision of supplemental funding from General Revenue.

Table 2.5.1 State Funding for Beach Projects and Beach Restoration (in $millions)

	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22	FY 22-23	FY 23-24
Ecosystem Management & Restoration Trust Fund	$10.24	$22.50	$4.79	$11.74	$0.99	$1.32	$0.60	$0.44	$0.01	$1.26
General Revenue Fund	$14.68	$14.42	$21.81	$6.89	$5.27	$13.56	$3.55	$9.34	$9.29	$26.41
Land Acquisition Trust Fund	-	$0.50	$10.64	$10.11	$22.78	$13.46	$28.45	$26.39	$12.30	$16.93
Total	**$24.92**	**$37.42**	**$37.24**	**$38.74**	**$29.04**	**$28.34**	**$32.59**	**$36.18**	**$21.61**	**$44.60**

Source: State expenditure data

DEP's Office of Resilience and Coastal Protection provides funding documents for beach projects, including local government funding requests. Tables 2.5.2 and 2.5.3 show the funding requests for beaches and inlets, respectively, for FY 2019-20 through FY 2026-27 for each government entity, and Figure 2.5.1 shows the average share of funding by government entity. Data for FY 2019-20 through FY 2024-25 was retrieved from DEP's Office of Resilience and Coastal Protection's Local Government Funding Request reports[22], while data for FY 2025-26 and FY 2026-27 was retrieved from their Long Range Budget report.[23]

[22] Florida Department of Environmental Protection. (December 2023). *Local Government Funding Requests*. Beaches Funding Documents. https://floridadep.gov/rcp/beaches-funding-program/content/beaches-funding-documents

[23] Florida Department of Environmental Protection. (December 2023). *Long Range Budget Plan 2024-2029.* Beaches Funding Documents. https://floridadep.gov/sites/default/files/FY%2024-25%20Long%20Range%20Budget%20Plan%202024-2029_0.pdf

Table 2.5.2 Local Government Funding Requests for Beach Projects

		Beaches			Beaches--Monitoring		
FY	**Source**	**Federal**	**State**	**Local**	**Federal**	**State**	**Local**
19-20	LGFR	$74,969,134	$68,574,762	$112,621,688	$277,985	$1,432,855	$2,310,260
20-21	LGFR	$70,471,318	$71,255,878	$108,889,247	$0	$685,853	$962,747
21-22	LGFR	$48,533,584	$62,583,552	$53,739,729	$356,490	$1,265,664	$2,198,657
22-23	LGFR	$73,649,527	$50,725,663	$46,048,132	$18,850	$1,720,812	$2,449,938
23-24	LGFR	$5,755,518	$43,930,158	$44,446,156	$416,974	$2,433,110	$3,023,279
24-25	LGFR	$69,170,069	$49,195,841	$56,601,557	$670,920	$3,046,093	$3,998,173
25-26	LBPR	$2,164,835	$35,161,806	$46,603,259	$252,354	$3,598,856	$4,699,404
26-27	LBPR	$56,278,588	$51,642,238	$64,502,610	$175,000	$3,134,494	$3,764,462
	Total	**$ 400,992,573**	**$ 433,069,898**	**$ 533,452,377**	**$ 2,168,573**	**$ 17,317,737**	**$ 23,406,920**
	Total	**$ 1,367,514,848**			**$ 42,893,230**		

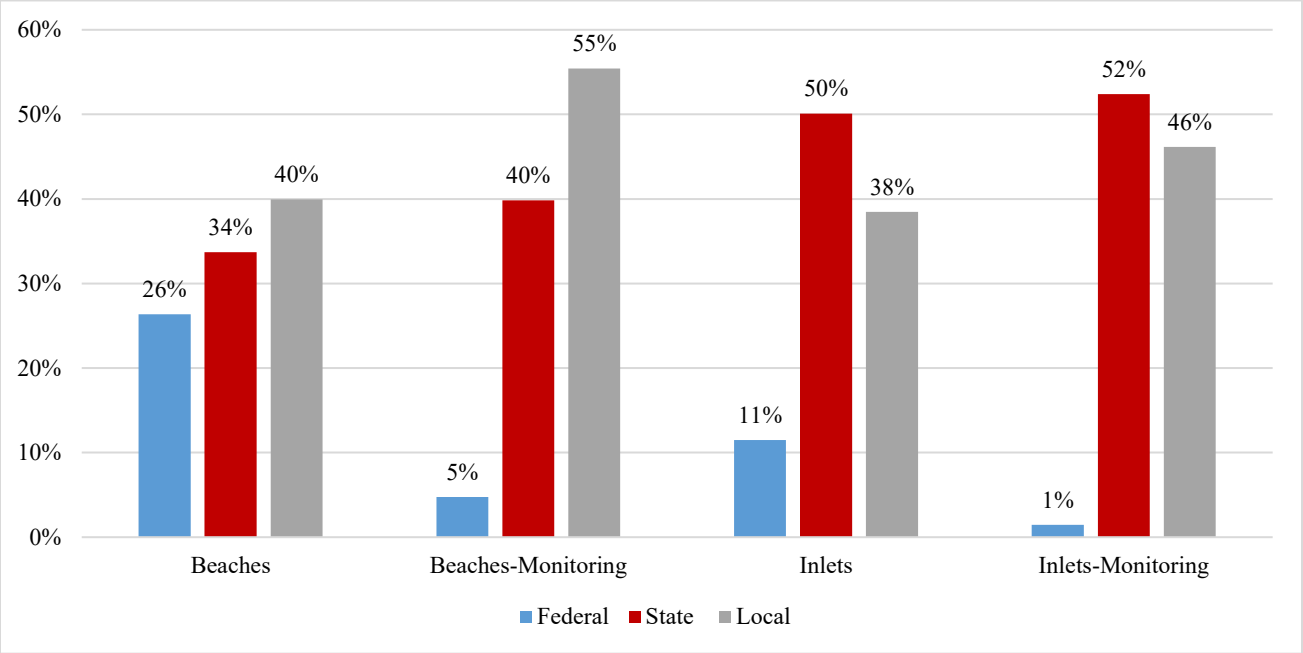
Source: DEP Local Government Funding Requests (LGFR)[22] and Long Range Budget Plan (LRBP)[23]

Table 2.5.3 Local Government Funding Requests for Inlet Projects

		Inlets			Inlets--Monitoring		
FY	**Source**	**Federal**	**State**	**Local**	**Federal**	**State**	**Local**
19-20	LGFR	$0	$6,876,194	$2,225,398	$0	$509,625	$169,875
20-21	LGFR	$7,500,000	$10,882,347	$10,022,696	$0	$519,100	$519,100
21-22	LGFR	$0	$7,758,403	$6,458,403	$0	$324,500	$324,500
22-23	LGFR	$0	$7,898,268	$4,965,768	$0	$807,308	$807,308
23-24	LGFR	$900,000	$6,069,842	$6,069,842	$0	$259,500	$259,500
24-25	LGFR	$37,800,000	$15,689,059	$11,179,059	$0	$444,000	$444,000
25-26	LBPR	$0	$23,960,105	$23,960,105	$50,000	$290,000	$290,000
26-27	LBPR	$0	$6,883,969	$6,883,969	$50,000	$622,500	$622,500
	Total	**$ 46,200,000**	**$ 86,018,187**	**$ 71,765,240**	**$ 100,000**	**$ 3,776,533**	**$ 3,436,783**
	Total	**$ 203,983,427**			**$ 7,313,316**		

Source: DEP Local Government Funding Requests[22] and Long Range Budget Plan[23]

Figure 2.5.1 Average Funding Share: FY 19-20 through 26-27



Source: DEP Local Government Funding Requests[22] and Long Range Budget Plan[23]

According to the American Shore and Beach Preservation Association (ASBPA) database, since 1935, eighty-two Florida communities have received over 371 million yd^3 of sand across 788 projects. Of the 381 projects with reported cost information, $2.0 billion has been spent on these projects. Since 2014 there have been 230 projects in Florida entered into the database, seventy-eight of which have cost information.[24] Many factors affect the cost of these projects, and thus the costs vary greatly. Of the seventy-two projects with cost information, the cost per linear foot ranges from $22/ft to $8,757/ft, and the cost per cubic yard of sand ranges from $2/$yd^3$ to $119/ yd^3. Summary information is shown in Table 2.5.4, Figure 2.5.2, and Figure 2.5.3. See Appendix B for details regarding these projects.

[See table on following page]

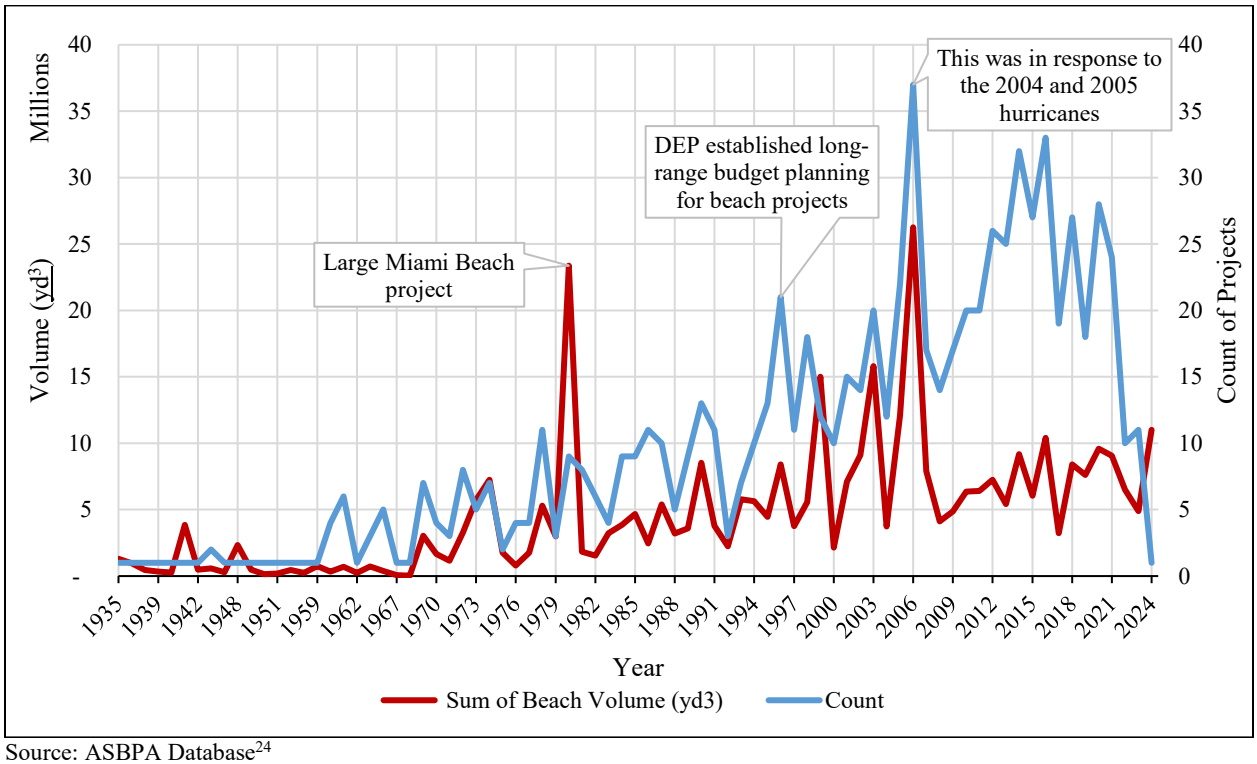
[24] American Shore & Beach Preservation Association. ASBPA. https://asbpa.org/national-beach-nourishment-database/

Table 2.5.4 ASBPA Database Florida Entries Since 2014

Year	Projects with Reported Costs	Total Reported Cost	Projects with Reported Lengths	Reported Length (ft)	Total Projects	Total Volume (yd^3)
2014	14	$108,621,505	30	351,119	32	9,178,572
2015	6	$43,574,099	25	164,384	27	6,054,436
2016	6	$94,430,898	32	346,523	33	10,419,013
2017	3	$5,235,080	19	205,168	19	3,222,164
2018	14	$177,750,940	24	423,544	27	8,402,091
2019	7	$57,441,595	17	252,190	18	7,618,994
2020	12	$144,012,949	16	214,480	28	9,596,340
2021	7	$65,041,699	16	239,682	24	9,060,182
2022	2	$4,369,601	7	206,486	10	6,502,927
2023	6	$84,434,000	11	168,432	11	4,902,210
2024	1	$20,000,000	1	15,840	1	11,000,000
Total	**78**	**$804,912,366**	**198**	**235,259**	**230**	**85,956,929**

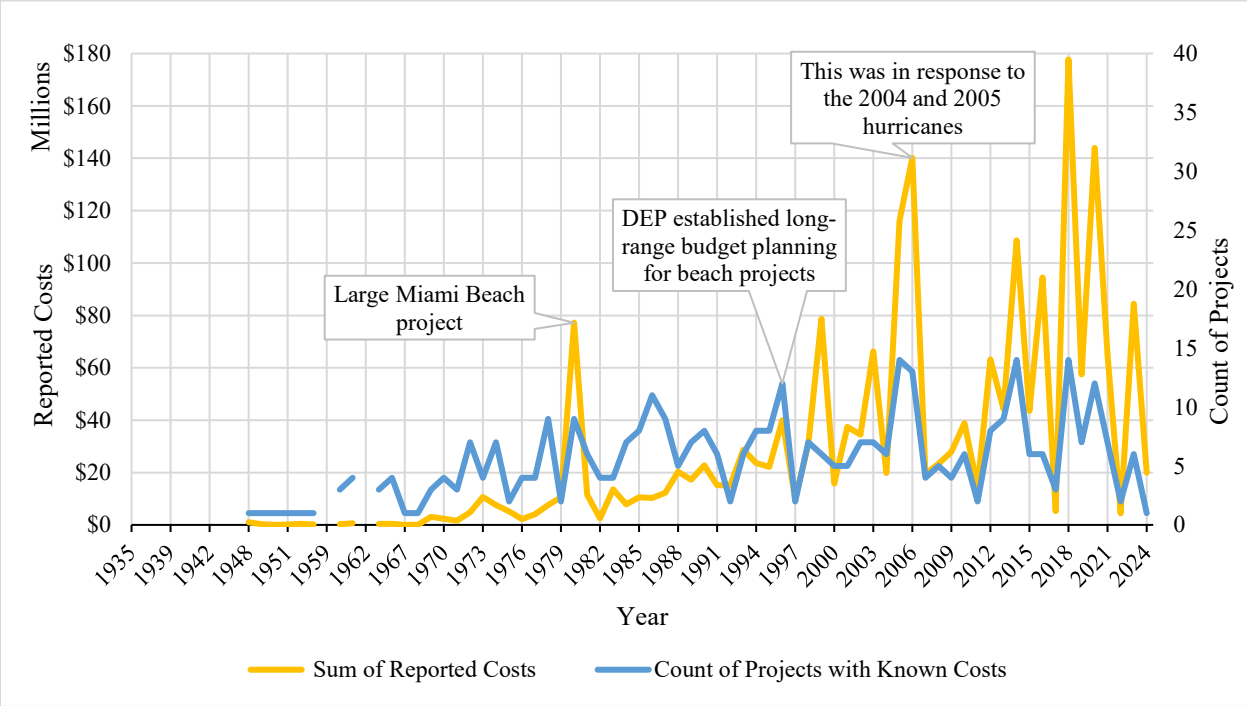
Source: ASBPA Database[24]

Figure 2.5.2 ASBPA Database Florida Projects by Year



Source: ASBPA Database[24]

Figure 2.5.3 ASBPA Database Florida Projects with Reported Costs by Year



Source: ASBPA Database[24]

2.6 Next Steps and Recommendations

Because beaches are so vital to Florida's identity, it is important that further research be conducted to mitigate future—and likely increasing—stresses on this resource. Beach projects are one category of solutions, but others can be employed in coordination with these efforts. Coral reefs help to buffer shorelines against wave energy, especially during storm surge events.[25] Recent studies estimate that U.S. coral reefs avert $1.8 billion dollars in damage to property and economic activity each year.[26] Research is currently underway to optimize reef restoration to protect the nation's coasts.[27] Wetlands and barrier islands are the next defense by acting as natural sponges. The vegetation slows the speed of floodwaters, helping to dissipate excess water during surge events, especially in low-lying areas that can be inundated with seawater.[28] Combining diverse efforts allows Florida to benefit multiple objectives, with beach preservation at the core. Future editions of this chapter will include more detailed funding information for all known projects, as well as more data and cost-benefit analyses regarding alternative strategies.

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[25] *How do coral reefs protect lives and property?*. NOAA's National Ocean Service. (2014, March 1). https://oceanservice.noaa.gov/facts/coral_protect.html#:~:text=Corals%20form%20barriers%20to%20protect,%2C%20property%20damage%2C%20and%20erosion. (Accessed Sep 2024.)

[26] Pacific Coastal and Marine Science Center. *The value of us coral reefs for risk reduction*. United States Geologic Survey. https://www.usgs.gov/media/images/value-us-coral-reefs-risk-reduction (Accessed Sep 2024.)

[27] Fitzgeorge-Balfour, T. (2021, May 11). *Coral reef restorations can be optimized to reduce flood risk* . Science News. https://blog.frontiersin.org/2021/05/11/frontiers-marine-science-new-practices-restoring-coral-reefs-help-prevent-floods/ (Accessed Sep 2024.)

[28] US Environmental Protection Agency. (2023, March 22). *Why are wetlands important?* Wetlands Protection and Restoration. https://www.epa.gov/wetlands/why-are-wetlands-important (Accessed Sep 2024.)

Appendix A: Acronyms

Table A.1 Acronyms

Acronym/Label	Meaning
ASBPA	American Shore and Beach Preservation Association
cy	Cubic Yards (volume)
DEP	Florida Department of Environmental Protection
EDR	Office of Economic and Demographic Research
EEL	Environmentally Endangered Lands
EPA	U.S. Environmental Protection Agency
ft	Feet (linear)
FY	State Fiscal Year (July 1 through June 30)
GIS	Geographic Information System
LGFR	Local Government Funding Requests
LRBP	Long Range Budget Plan
NOAA	National Oceanic and Atmospheric Administration
ROSSI	Regional Offshore Sand Source Inventory
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

Appendix B: ASBPA Database—Florida Projects since 2014

Table B.1 ASBPA Florida Projects since 2014

Community Name	Projects with Reported Costs	Total Reported Cost	Projects with Reported Lengths	Total Reported Length (ft)	Total Projects	Volume (cubic yards)
Amelia Island			2	36,432	3	4,170,421
Anna Maria Island	3	$38,436,989	3	61,406	5	2,519,913
Bal Harbour/Surfside	4	$14,959,079	4	15,584	7	1,131,670
Bathtub Beach			5	16,368	5	591,878
Big Hickory Island	1	$454,080	1	1,600	1	68,320
Boca Raton	2	$17,338,750	9	28,328	11	2,232,981
Bonita Beach	1	$1,600,000	1	4,224	1	134,484
Boynton Beach	1	$200,245	6	11,400	8	823,776
Brevard Co - S. Beaches	6	$35,740,000	6	389,136	6	750,855
Cape Canaveral/Cocoa Beach	3	$41,036,000	3	74,200	3	2,769,535
Captiva Island	1	$19,086,000	2	52,800	2	1,628,969
Deerfield Beach	1	$834,000	2	2,128	2	58,680
Delray Beach	2	$23,987,400	2	9,346	2	745,600
Destin	1	$10,508,310	1	1,200	1	143,102
Duval County	2	$29,254,170	3	146,784	3	1,975,439
Egmont Key	1	$11,590,365	2	5,400	2	1,223,496
Fernandina Beach	1	$32,859,630	2	10,032	3	1,464,200
Flagler Beach	1	$25,000,000	2	94,836	4	730,506
Fort Myers Beach	1	$3,142,320			1	124,000
Ft. Pierce	3	$18,640,027	5	42,134	6	2,004,552
Gasparilla Island	1	$5,843,350	2	8,448	2	281,638
Grand Lagoon					1	177,000
Hillsboro Beach	1	$4,000,000	4	11,508	4	293,793
Honeymoon Island	1	$1,533,945	1	2,500	1	162,890
Indian River County	2	$16,352,920	8	167,736	8	1,883,713
Indiatlantic/Melbourne Beach	3	$30,720,000	3	55,864	3	1,724,726
John U Lloyd/Hollywood/Hallandale	1	$7,864,770	3	78,144	3	274,909
Juno Beach			1	12,672	1	990,773
Jupiter Island/Carlin Beach	2	$8,377,129	12	97,763	13	4,716,511
Keewaydin Island			1	4,224	1	7,300
Kennedy Space Center			1	21,120	2	485,000
Key Biscayne			2	11,616	2	58,064
Knight Island			2	8,976	2	1,387,100
Lido Key	1	$3,940,000	2	14,256	3	997,800
Longboat Key			17	40,158	20	2,329,350
Lovers Key	1	$3,100,000	1	6,336	1	333,494

Manasota Key			2	26,928	2	990,380
Marco Island	1	$2,098,980	4	13,939	6	423,220
Martin County	1	$8,730,161	2	24,816	2	628,667
Miami Beach	3	$68,289,481	6	27,894	7	1,568,184
Mid-Town Beach/Palm Beach	1	$32,090,800	4	29,040	4	1,764,543
Naples/Park Shore/Vanderbilt	2	$6,869,600	6	62,494	6	560,039
Navarre Beach			1	21,648	1	1,600,000
Ocean Ridge	2	$19,721,273	2	10,452	2	958,690
Palm Beach	2	$21,369,247	5	39,741	11	4,399,746
Panama City	1	$12,000,000	4	186,384	4	4,330,773
Patrick Air Force Base	1	$9,600,000	3	38,000	3	494,532
Pensacola			1	42,768	1	1,750,000
Pompano Beach/Lauderdale by the Sea	1	$35,600,000	4	98,208	4	1,238,595
Rest Beach			1	541	1	3,800
Sand Key	1	$42,676,049	2	121,605	2	2,599,716
Sanibel Island			1	4,224	1	89,700
Satellite/Indian Harbour Beach	3	$34,450,000	3	86,468	3	745,695
Singer Island			5	25,872	5	181,597
Smathers Beach			1	3,168	1	23,740
South Siesta Key	1	$1,900,000	1	10,000	1	713,000
St. Augustine			2	12,672	2	2,747,185
St. Johns County	3	$41,167,000	3	56,216	3	11,898,085
St. Joseph Pensinsula	1	$10,200,000	1	16,254	1	2,600,000
St. Pete Beach	2	$9,403,166	2	7,392	2	451,452
Sunny Isles/Haulover	1	$8,605,564	8	39,529	8	501,067
Treasure Island	2	$17,924,676	2	20,040	2	578,168
Venice Beach	1	$15,816,890	1	16,896	1	719,917
Amelia Island			2	36,432	3	4,170,421
Total	**78**	**$804,912,366**	**198**	**2,587,848**	**229**	**85,956,929**