VULNERABILITY PARAMETERS

PRIMARY

SHORELINE ENCROACHMENT 1
the horizontal distance (or “buffer”) between the MHW shoreline position and infrastructure

INFRASTRUCTURE EXPOSURE 2
the percentage of parcels where infrastructure is within or below 1 ft of the USACE SACS 1% AEP SWEL

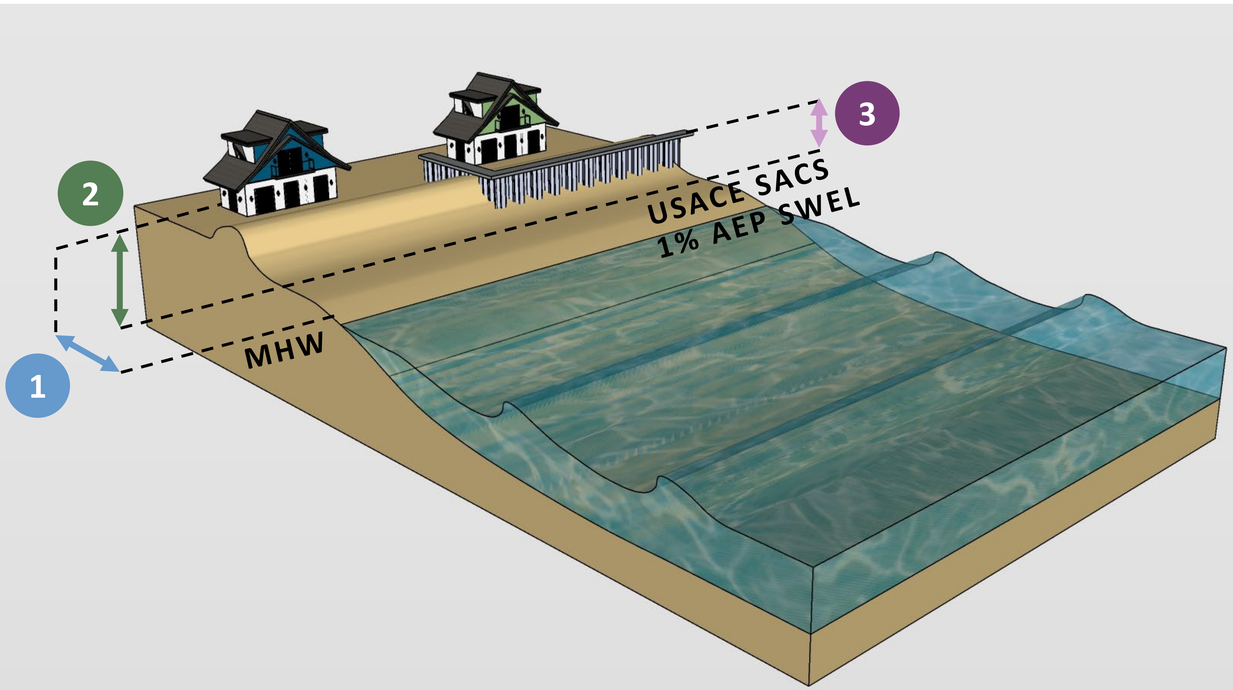
HISTORICAL EROSION RATE
the average shoreline change rate since 2016 calculated via linear regression

SECONDARY

ARMORING EXPOSURE 3
the percentage of parcels where seawalls are within or below 1 ft of the USACE SACS 1% AEP SWEL

SBEACH STORM RESPONSE
the horizontal buffer between infrastructure and the landward-most 1 ft of vertical erosion associated with a 4% AEP storm event, regularly referred to as the 25-year event

**USACE’s Storm-induced BEAch CHange (SBEACH) model calculates transect-based cross-shore sediment transport*



OTHER DECISION-MAKING FACTORS

ADDITIONAL COMMUNITY INFORMATION
- Average infrastructure elevation
- Armoring coverage
- Land uses
- Public beach accesses
- Drivable beach
- Total land and improved property value
- Critical assets
- Disadvantaged communities

**See “Additional Community Information” Poster for more information*

DATA SOURCES
- Volusia County parcel data
- FDEP R-monument locations
- Coastal shoreline armoring data
- Recent aerial imagery
- 2022 post-Hurricane Nicole aerials (NOAA)
- 2023 aerials (NAIP)
- 2024 post-Hurricane Milton aerials (USACE/FEMA)
- 2024 post-Hurricane Milton LiDAR (NOAA)
- USACE South Atlantic Coastal Study (SACS) 1% annual exceedance probability (AEP) stillwater elevations (SWEL)

GEOSPATIAL ANALYSIS

1. Mark the approximate seaward edge of upland infrastructure within each parcel

Infrastructure categories:
- Home
- Road
- Condominium
- Hotel
- Commercial- including restaurants, shops, or office spaces
- Park with amenities

2. Calculate the **elevation** at each infrastructure point and the **distance** between infrastructure points and the MHW shoreline position contour

3. Use the location and elevation data to classify and inform vulnerability parameters

RISK ASSESSMENT RESULTS

RISK RESULTS- BY COMMUNITY

Community	Shoreline Encroachment- feet	Infrastructure Exposure- number of parcels (%)	Armoring Exposure- number of parcels (%)	Historical Shoreline Change Rate- feet/year	SBEACH Storm Response- feet
North Peninsula (R-0 to R-16)	134	0 (0%)	-	-4.4	44
Ormond-by-the-Sea (R-16 to R-47)	156	0 (0%)	0 (0%)	-5.5	61
Ormond Beach (R-47 to T-67)	178	2 (1%)	15 (10%)	-7.6	58
Daytona Beach and Daytona Beach Shores (T-67 to R-122)	139	11 (3%)	103 (30%)	-13.2	16
Wilbur-by-the-Sea (R-122 to R-128)	123	0 (0%)	44 (49%)	-12.6	17
Ponce Inlet (R-128 to R-148)	206	3 (2%)	14 (10%)	-12.4	87
New Smyrna Beach North (R-149 to R-160)	572	8 (9%)	3 (3%)	0.7	543
New Smyrna Beach South (R-160 to R-185)	181	3 (1%)	47 (19%)	-10.6	73
Silver Sands and Bethune Beach (R-185 to T-208)	124	65 (22%)	6 (2%)	-3.3	19
Average	178	-	-	-8.5	65
Standard Deviation	115	-	-	5.2	127

Community	Shoreline Encroachment	Infrastructure Exposure	Armoring Exposure	Historical Shoreline Change Rate	SBEACH Storm Response	Risk Score	Rank
North Peninsula (R-0 to R-16)	Medium (2)	Low (1)	Low (1)	Low (1)	Medium (2)	26	7
Ormond-by-the-Sea (R-16 to R-47)	Medium (2)	Low (1)	Low (1)	Low (1)	Medium (2)	26	7
Ormond Beach (R-47 to T-67)	Low (1)	Medium (2)	Medium (2)	Medium (2)	Medium (2)	33	6
Daytona Beach and Daytona Beach Shores (T-67 to R-122)	Medium (2)	Medium (2)	High (3)	High (3)	High (3)	47	**1**
Wilbur-by-the-Sea (R-122 to R-128)	High (3)	Low (1)	High (3)	High (3)	High (3)	47	**1**
Ponce Inlet (R-128 to R-148)	Low (1)	Medium (2)	Medium (2)	High (3)	Low (1)	36	5
New Smyrna Beach North (R-149 to R-160)	Low (1)	Medium (2)	Medium (2)	Low (1)	Low (1)	26	7
New Smyrna Beach South (R-160 to R-185)	Low (1)	Medium (2)	High (3)	High (3)	Low (1)	38	4
Silver Sands and Bethune Beach (R-185 to T-208)	High (3)	High (3)	Medium (2)	Low (1)	High (3)	45	**3**
Weight	5	5	2	5	2	-	-
	PRIMARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY		

RISK RESULTS- RANKING

1. Daytona Beach and Daytona Beach Shores
1. Wilbur-by-the-Sea
3. Silver Sands and Bethune Beach
4. New Smyrna Beach South
5. Ponce Inlet
6. Ormond Beach
7. North Peninsula
7. Ormond-by-the-Sea
7. New Smyrna Beach North

TABLE LEGEND

POINTS: High (3) / Medium (2) / Low (1) × weight = total score

points = risk

ADDITIONAL COMMUNITY INFORMATION

OTHER DECISION-MAKING FACTORS

AVERAGE INFRASTRUCTURE ELEVATION
the average elevation of shorefront infrastructure; note, this excludes large empty lots where infrastructure is set back

SEAWALL COVERAGE
the percentage of parcels with seawalls

LAND USES
the percentage of beachfront shoreline classified as residential, commercial, and public land.

- Residential- single-family and multi-family residential lands
- Commercial- general, neighborhood, heavy and tourist oriented commercial lands
- Public- public, conservation, federal-owned, state-owned, county-owned, and municipal-owned lands

PUBLIC BEACH ACCESSES
the number of public beach accesses, as defined by Florida Administrative Code (FAC) 62B-36.002, per mile of shoreline

BEACH DRIVING
the total mileage and percentage of areas designated for beach driving

TOTAL LAND AND IMPROVED PROPERTY VALUE
the sum of the land and improved property value for the seaward most first line of coastal parcels

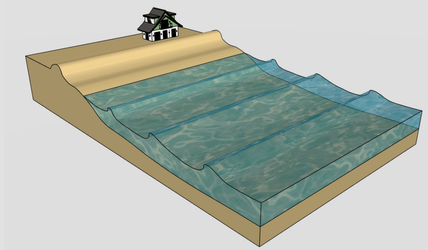
CRITICAL ASSETS
the number of beachfront critical assets, as defined by Florida Statute 380.093

DISADVANTAGED COMMUNITIES
the number of census tracts designated as disadvantaged or areas of persistent poverty

DATA SOURCES
- Volusia County parcel, land zoning, and public access databases
- 2024 post-Hurricane Milton LiDAR (NOAA)
- Coastal shoreline armoring data
- Florida Statewide Vulnerability Assessment critical asset database
- 2020 Census and the Climate and Economic Justice Screening Tool (CJEST)

Community	Parcel Count	Average Infrastructure Elevation (ft-NAVD88)	Seawall Coverage	Land Uses (Residential/ Commercial/ Public)	Public Beach Accesses	Beach Driving	Total Land and Improved Property Value	Critical Assets	Disadvantaged Communities
North Peninsula (R-0 to R-16)	14	17.2	0 (0%)	0%/0%/100%	1 (0.4 per mile)	-	$400 per linear ft ($6,529,000)	1	-
Ormond-by-the-Sea (R-16 to R-47)	192	16.6	40 (21%)	68%/9%/23%	29 (5.3 per mile)	-	$24,200 per linear ft ($700,987,000)	1	1 Disadvantaged and Persistent Poverty Census Tract
Ormond Beach (R-47 to T-67)	152	18.9	88 (58%)	64%/29%/7%	16 (4.4 per mile)	47% (1.7 miles)	$33,200 per linear ft ($630,737,000)	1	1 Persistent Poverty Census Tract
Daytona Beach and Daytona Beach Shores (T-67 to R-122)	339	18.0	258 (76%)	48%/45%/7%	70 (7.1 per mile)	79% (7.8 miles)	$65,200 per linear ft ($3,388,524,000)	1	1 Disadvantaged Census Tract; 1 Disadvantaged and Persistent Poverty Census Tract
Wilbur-by-the-Sea (R-122 to R-128)	89	23.0	61 (69%)	95%/0%/5%	6 (5.5 per mile)	-	$14,000 per linear ft ($80,805,000)	-	-
Ponce Inlet (R-128 to R-148)	146	17.7	80 (55%)	82%/1%/18%	14 (3.9 per mile)	16% (0.6 miles)	$37,800 per linear ft ($723,318,000)	-	-
New Smyrna Beach North (R-149 to R-160)	86	17.3	14 (16%)	62%/0%/38%	16 (8.4 per mile)	100% (1.9 miles)	$60,700 per linear ft ($609,802,000)	-	-
New Smyrna Beach South (R-160 to R-185)	247	16.6	141 (57%)	75%/10%/15%	46 (10.2 per mile)	66% (3.0 miles)	$64,400 per linear ft ($1,537,348,000)	1	-
Silver Sands and Bethune Beach (R-185 to T-208)	294	13.0	53 (18%)	93%/0%/7%	14 (3.4 per mile)	-	$49,300 per linear ft ($1,067,419,000)	-	1 Persistent Poverty Census Tract

MANAGEMENT ALTERNATIVES



NO ACTION
The community and decision-makers decide to let nature take its course

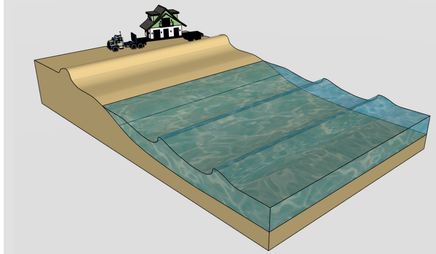
PRIMARY FUNCTION
Allow natural dynamics to proceed without intervention

CONTRIBUTION TO OBJECTIVE
- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS
- Minimal environmental disruption due to no construction
- No direct cost

DRAWBACKS
- Disruption to local economy
- Greater risk for increased social effects such as increased hardships and potentially loss of human life
- High risk potential for increased coastal erosion and inundation which may result in the loss of infrastructure
- May lead to accessibility or lifestyle disruptions
- Potential loss of habitat

COST ● | DESIGN ●
PERMITTING ● | MAINTENANCE ●



STRUCTURAL RELOCATION
Relocating structures inland and restoring the beach system to its natural state

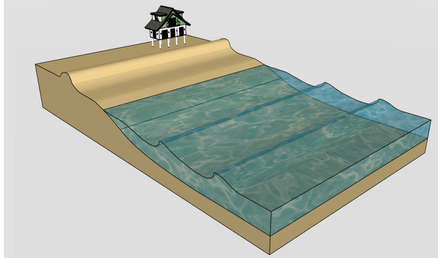
PRIMARY FUNCTION
Remove infrastructure from risk

CONTRIBUTION TO OBJECTIVE
- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS
- Historic preservation (when applicable)
- Minimal adjacent site impacts
- Recreation opportunity
- Reduced damages and risk of life from elevated water levels
- Reduced flood insurance rates
- Require minimal maintenance
- Primary purpose is to protect upland infrastructure
- Provides habitat and ecosystem

DRAWBACKS
- Damage may require full replacement
- Disruption to local economy
- May lead to accessibility or lifestyle disruptions

COST ● | DESIGN ●●
PERMITTING ● | MAINTENANCE ●●



FLOODPROOFING & STRUCTURAL ELEVATION
Solution(s) to protect from flooding

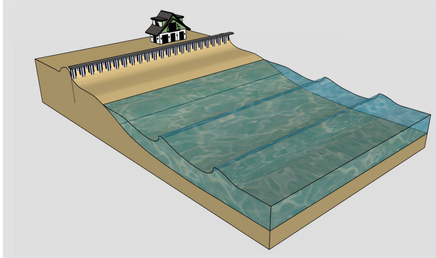
PRIMARY FUNCTION
Implement structural/nonstructural techniques to protect against flooding; includes the use of flood barriers, raising grade, elevating structures, etc.

CONTRIBUTION TO OBJECTIVE
- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS
- Can be adapted to changing conditions
- Historic preservation (when applicable)
- Materials are easily accessible
- Minimal adjacent site impacts
- Primary purpose is to protect upland infrastructure
- Reduced damages and risk of life from elevated water levels
- Reduced flood insurance rates
- Tailored to infrastructure asset

DRAWBACKS
- May lead to accessibility or lifestyle disruptions

COST ● | DESIGN ●
PERMITTING ● | MAINTENANCE ●



SEAWALLS
A wall installed at the landward edge of the beach parallel to shore to protect upland infrastructure

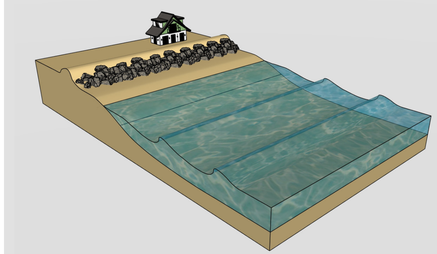
PRIMARY FUNCTION
Protect upland infrastructure

CONTRIBUTION TO OBJECTIVE
- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS
- Primary purpose is to protect upland infrastructure
- Reduced damages and risk of life from elevated water levels
- Require minimal maintenance

DRAWBACKS
- Adjacent erosion due to wave reflection or refraction is common and may negatively impact adjacent shorelines
- Damage may require full replacement
- Failure can be catastrophic
- If system is sand starved, beach may not accrete
- May lead to accessibility or lifestyle disruptions
- Potential loss of habitat
- Prevents upland from adding sediment to the system
- Visually obstructive

COST ●●● | DESIGN ●●
PERMITTING ●● | MAINTENANCE ●●



REVETMENTS
A series of rock structures, placed parallel to the dune, to dissipate wave energy

PRIMARY FUNCTION
Decrease wave energy during increased water levels

CONTRIBUTION TO OBJECTIVE
- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS
- Can be adapted to changing conditions
- Decreased wave energy impacting the shoreline or upland infrastructure
- Primary purpose is to protect upland infrastructure
- Reduced damages and risk of life from elevated water levels
- Require minimal maintenance

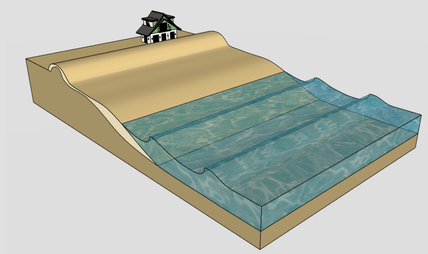
DRAWBACKS
- If system is sand starved, the beach may not accrete
- Limited storm damage protection
- May lead to accessibility or lifestyle disruptions
- Potential loss of habitat
- Prevents upland from adding sediment to the system
- Requires large footprint
- Visually obstructive

COST ●● | DESIGN ●●
PERMITTING ●● | MAINTENANCE ●●

LEGEND: COST/DESIGN/PERMITTING/MAINTENANCE: ○ Low magnitude/effort ○○ Moderate magnitude/effort ○○○ High magnitude/extensive effort

CONTRIBUTION TO OBJECTIVE: Does not meet | Partially meets | Fully meets

MANAGEMENT ALTERNATIVES



BEACH NOURISHMENT

Placement of sand along the beach dune, berm, and nearshore areas to extend the beach seaward

PRIMARY FUNCTION

Add sediment to the system to reduce risk and increase recreation

CONTRIBUTION TO OBJECTIVE

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

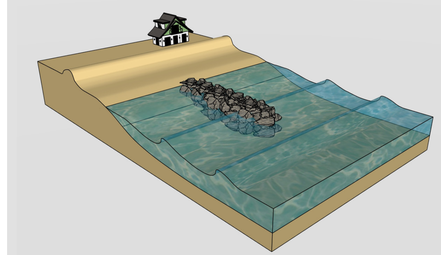
BENEFITS

- Adds sand into the system; may benefit adjacent shorelines with sand movement from longshore processes
- Can be adapted to changing conditions
- Can lead to sand accumulation in vicinity of management measure
- Decreased wave energy impacting the pre-project shoreline or upland infrastructure
- Increase a dune's resilience to erosive events
- Minimal adjacent site impacts
- Natural feature with ability to adapt to a changing environment
- Primary purpose is to protect upland infrastructure
- Provides habitat and ecosystem services
- Recreation opportunity
- Reduced damages and risk of life from elevated water levels

DRAWBACKS

- Increased maintenance may be required
- Requires large footprint
- Visually obstructive

COST ●● DESIGN ●●
PERMITTING ●● MAINTENANCE ●●●



GROINS

Rock structures perpendicular to shore intended to slow longshore sand transport

PRIMARY FUNCTION

Reduce erosion along the shoreline

CONTRIBUTION TO OBJECTIVE

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

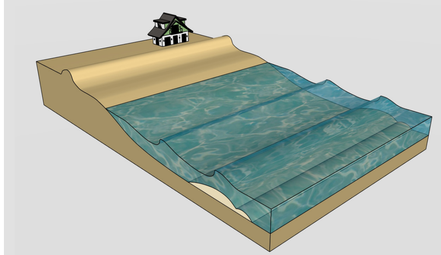
BENEFITS

- Can be adapted to changing conditions
- Can lead to sand accumulation in vicinity of management measure
- Provides habitat and ecosystem services
- Require minimal maintenance

DRAWBACKS

- Adjacent erosion due to wave reflection or wave refraction is common and may negatively impact adjacent shorelines
- If system is sand starved, beach may not accrete
- Limited storm damage protection
- May lead to accessibility or lifestyle disruptions
- Navigational hazard to boaters and swimmers
- Requires large footprint

COST ●●● DESIGN ●●●
PERMITTING ●●● MAINTENANCE ●●



NEARSHORE SAND PLACEMENT

Sand placed in the nearshore for wave action to move it onshore and restore the beach

PRIMARY FUNCTION

Add sediment to the system to reduce risk

CONTRIBUTION TO OBJECTIVE

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

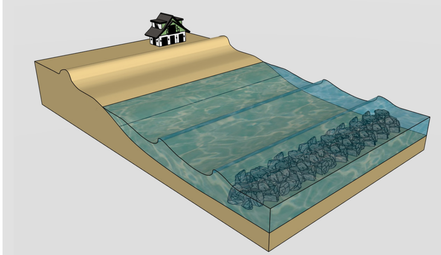
BENEFITS

- Adds sand into the system; may benefit adjacent shorelines with sand movement from longshore processes
- Can be adapted to changing conditions
- Can lead to sand accumulation in near management measure
- Decreased wave energy impacting the shoreline or upland infrastructure
- Minimal adjacent site impacts
- Natural feature with ability to adapt to a changing environment
- Requires less construction equipment

DRAWBACKS

- Adjacent erosion due to wave reflection or wave refraction is common and may negatively impact adjacent shorelines
- Efficacy is dependent on placement depth and wave conditions
- Limited storm damage protection

COST ● DESIGN ●
PERMITTING ●● MAINTENANCE ●●●



BREAKWATERS

A series of nearshore rock structures designed to break waves and encourage sediment accretion

PRIMARY FUNCTION

Decrease wave energy impacting the shoreline

CONTRIBUTION TO OBJECTIVE

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

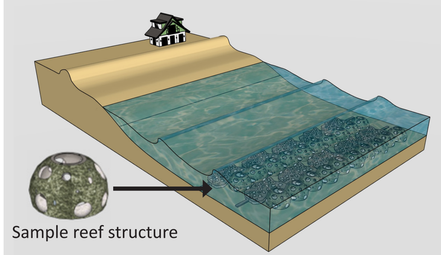
BENEFITS

- Can be adapted to changing conditions
- Can lead to sand accumulation in vicinity of management measure
- Decreased wave energy impacting the shoreline or upland infrastructure
- Provides habitat and ecosystem services
- Require minimal maintenance

DRAWBACKS

- Adjacent erosion due to wave reflection or refraction is common and may negatively impact adjacent shorelines
- Costs increase with water depth
- Efficacy is dependent on placement depth and wave conditions
- If system is sand starved, the beach may not accrete
- Limited storm damage protection
- Navigational hazard to boaters and swimmers
- Requires large footprint
- Visually obstructive

COST ●●● DESIGN ●●●
PERMITTING ●●● MAINTENANCE ●●



NEARSHORE ARTIFICIAL REEFS

Components intended to enhance biodiversity, dissipate waves, and encourage sediment accretion

PRIMARY FUNCTION

Enhance marine habitat

CONTRIBUTION TO OBJECTIVE

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

BENEFITS

- Can be adapted to changing conditions
- Can lead to sand accumulation in vicinity of management measure
- Decreased wave energy impacting the shoreline or upland infrastructure
- Provides habitat and ecosystem services
- Recreation opportunity
- Require minimal maintenance

DRAWBACKS

- Adjacent erosion due to wave reflection or wave refraction is common and may negatively impact adjacent shorelines
- Costs increase with water depth
- Efficacy is dependent on placement depth and wave conditions
- If system is sand starved, the beach may not accrete
- Limited storm damage protection
- Navigational hazard to boaters and swimmers
- Requires large footprint

COST ●●● DESIGN ●●●
PERMITTING ●●● MAINTENANCE ●●

LEGEND: COST/DESIGN/PERMITTING/MAINTENANCE: ○ Low magnitude/effort ○○ Moderate magnitude/effort ○○○ High magnitude/extensive effort

CONTRIBUTION TO OBJECTIVE: Does not meet · Partially meets · Fully meets

CONTRIBUTION TO OBJECTIVE

Defining the study's problems, opportunities, objectives, and constraints establishes a clear foundation for evaluating beach management alternatives. This framework ensures that potential strategies are developed with a consistent understanding of challenges, goals, and limitations, aligning outcomes with Volusia County's long-term coastal management priorities.

PROBLEMS

- Threats to critical infrastructure and roadways from storm-induced erosion, inundation, and wave action
- Deterioration of natural ecosystems, including habitat loss, shoreline erosion, and potential damages to cultural resources
- Economic losses due to coastal storm impacts
- Potential economic losses due to degraded coastal parks and beach access infrastructure

OPPORTUNITIES

- Enhance community awareness and understanding of coastal resilience
- Increase storm damage protection and resilience for critical coastal infrastructure
- Increase the economic vitality of the community
- Maintain or improve the coastal ecosystem

OBJECTIVES

- Reduce risk to life safety
- Reduce coastal storm damages to structures
- Reduce coastal storm damages to critical infrastructure
- Reduce damages to cultural resources
- Reduce risk of natural resource loss
- Maintain or improve coastal tourism

CONSTRAINTS

- Compliance with federal, state, and local policies and regulations

CONSIDERATIONS

- Minimize impacts to threatened and endangered species and their habitats
- Minimize adverse impacts to cultural resources
- Minimize impacts and disruptions to recreational activities including beachgoing, surfing, fishing, wildlife viewing, and beach driving

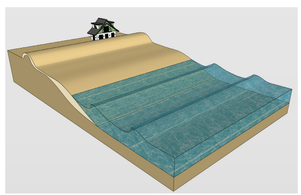
MANAGEMENT ALTERNATIVES AND THEIR CONTRIBUTION TO OBJECTIVE

MULTIPLE-CRITERIA DECISION ANALYSIS- CONTRIBUTION TO OBJECTIVE

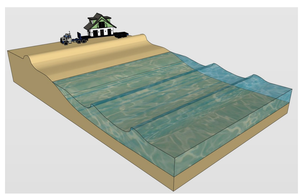
Beach Management Alternatives	Reduce coastal storm damages to structures, critical infrastructure, and cultural resources	Reduce risk of natural resource loss	Reduce risk to life safety	Avoid impact to recreation	Minimize impacts to threatened and endangered species and their habitats	Comply with federal, state, and local policies and regulations	Multiple-Criteria Decision Analysis*	Rank
Weighting	25%	15%	15%	20%	15%	10%	Total	-
No Action	Does not meet (0)	Does not meet (0)	Does not meet (0)	Partially meets (1)	Partially meets (1)	Partially meets (1)	0.45	10
Structural Relocation	**Fully meets (2)**	**Partially meets (1)**	**Fully meets (2)**	**Partially meets (1)**	**Partially meets (1)**	**Fully meets (2)**	**1.50**	**2**
Floodproofing and Structural Elevation	Partially meets (1)	Does not meet (0)	Partially meets (1)	Partially meets (1)	Partially meets (1)	Fully meets (2)	0.95	6
Seawalls	Partially meets (1)	Does not meet (0)	Partially meets (1)	Partially meets (1)	Does not meet (0)	Partially meets (1)	0.70	9
Revetments	Partially meets (1)	Does not meet (0)	Partially meets (1)	Partially meets (1)	Does not meet (0)	Fully meets (2)	0.80	8
Beach Nourishment	**Fully meets (2)**	**Fully meets (2)**	**Fully meets (2)**	**Fully meets (2)**	**Partially meets (1)**	**Fully meets (2)**	**1.85**	**1**
Groins	Partially meets (1)	Does not meet (0)	Partially meets (1)	Partially meets (1)	Partially meets (1)	Fully meets (2)	0.95	6
Nearshore Sand Placement	**Partially meets (1)**	**Fully meets (2)**	**Partially meets (1)**	**Fully meets (2)**	**Partially meets (1)**	**Fully meets (2)**	**1.45**	**3**
Breakwaters	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Fully meets (2)**	**1.10**	**4**
Nearshore Artificial Reefs	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Partially meets (1)**	**Fully meets (2)**	**1.10**	**4**

TOP FIVE MANAGEMENT ALTERNATIVES

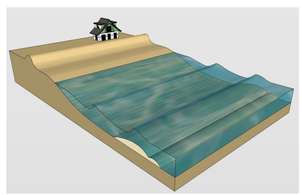
1 BEACH NOURISHMENT



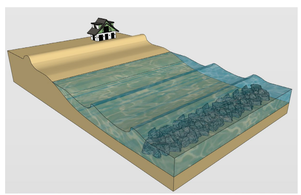
2 STRUCTURAL RELOCATION



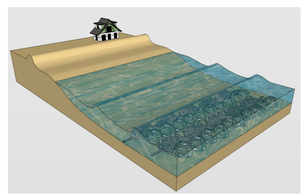
3 NEARSHORE SAND PLACEMENT



4 BREAKWATERS



4 NEARSHORE ARTIFICIAL REEFS

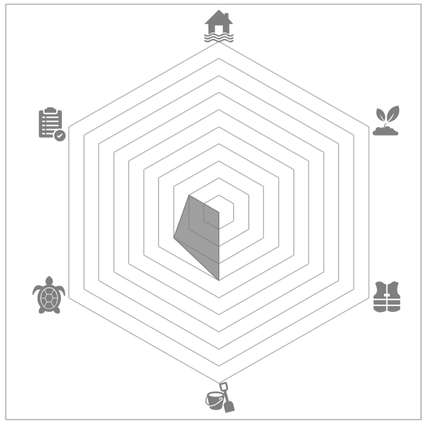


MULTIPLE-CRITERIA DECISION ANALYSIS- ADDITIONAL CONSIDERATIONS

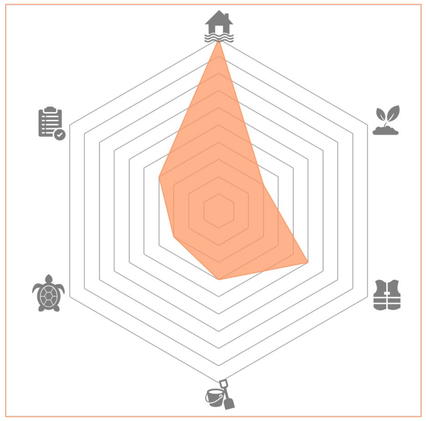
Beach Management Alternatives	Contribution to Objective	Design Effort	Maintenance Effort	Permitting Effort	Cost Magnitude	Multiple-Criteria Decision Analysis*	Rank
Weighting	60%	10%	10%	10%	10%	Total	-
Structural Relocation	1.5	Moderate (1)	Moderate (1)	Low (2)	Low (2)	1.50	1
Beach Nourishment	1.85	Moderate (1)	Extensive (0)	Moderate (1)	Moderate (1)	1.41	2
Nearshore Sand Placement	1.45	Low (2)	Extensive (0)	Moderate (1)	Low (2)	1.37	3
Breakwaters	1.1	Extensive (0)	Moderate (1)	Extensive (0)	High (0)	0.76	4
Nearshore Artificial Reefs	1.1	Extensive (0)	Moderate (1)	Extensive (0)	High (0)	0.76	4

MANAGEMENT ALTERNATIVES AND THEIR CONTRIBUTION TO OBJECTIVE-2

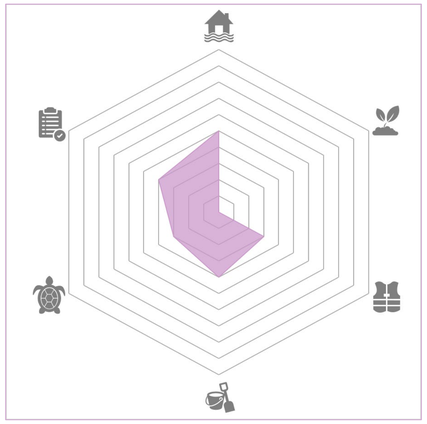
NO ACTION



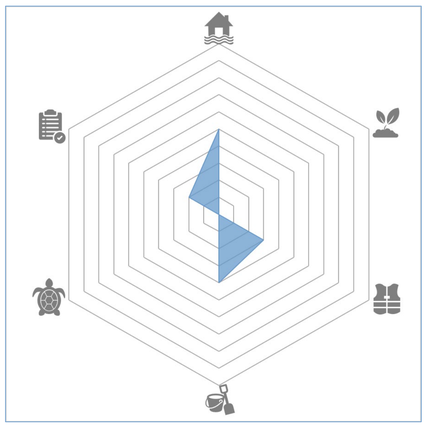
STRUCTURAL RELOCATION



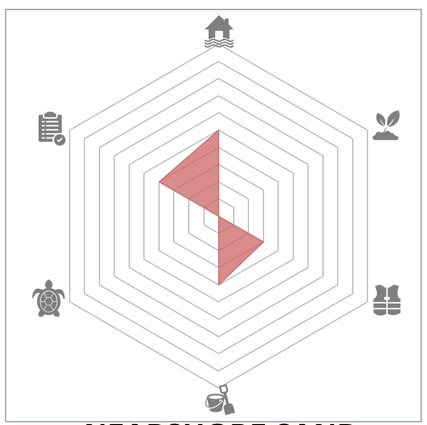
FLOODPROOFING AND STRUCTURAL ELEVATION



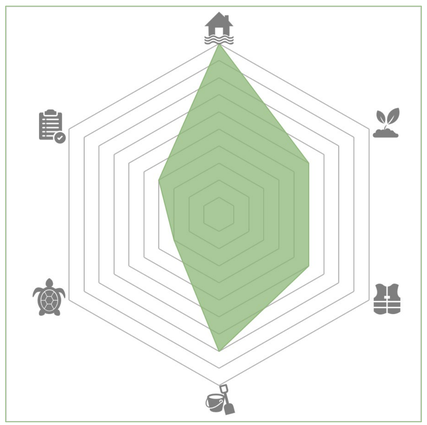
SEAWALLS



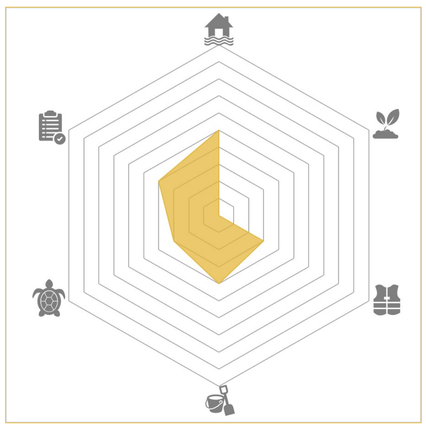
REVETMENTS



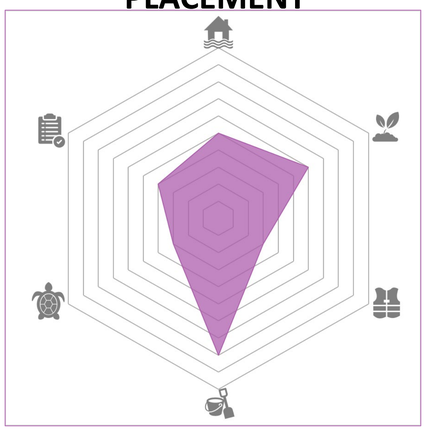
BEACH NOURISHMENT



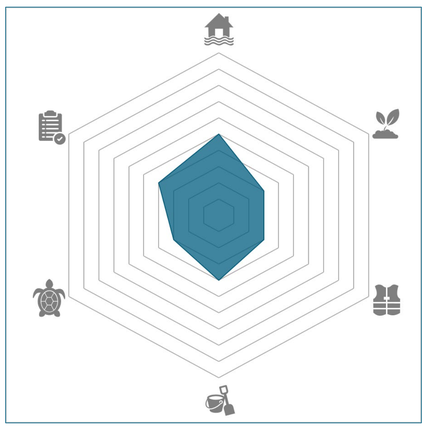
GROINS



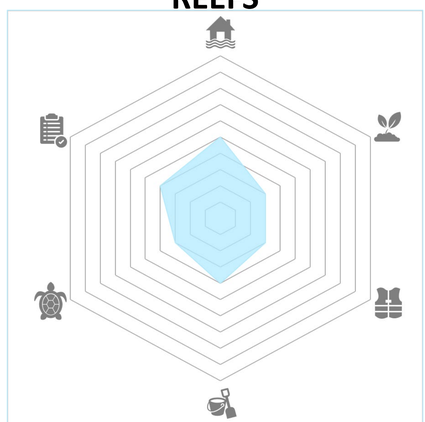
NEARSHORE SAND PLACEMENT



BREAKWATERS



NEARSHORE ARTIFICIAL REEFS

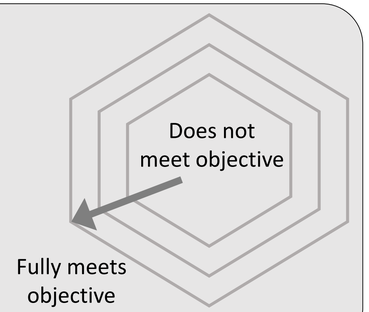


PROBLEMS, OPPORTUNITIES, OBJECTIVES, AND CONSTRAINTS

- Reduce coastal storm damages to structures, critical infrastructure, and cultural resources
- Reduce risk of natural resource loss
- Reduce risk to life safety
- Avoid impact to recreation
- Minimize impacts to threatened and endangered species and their habitats
- Comply with federal, state, and local policies and regulations

UNDERSTANDING THESE PLOTS:

These radar plots illustrate how each management alternative contributes to the study objectives. A larger plotted area indicates a greater ability of the alternative to meet the objectives established through the County's defined problems, opportunities, objectives, and constraints. Notably, the plots incorporate the weight of each objective, so some objectives have a greater maximum extent than others.



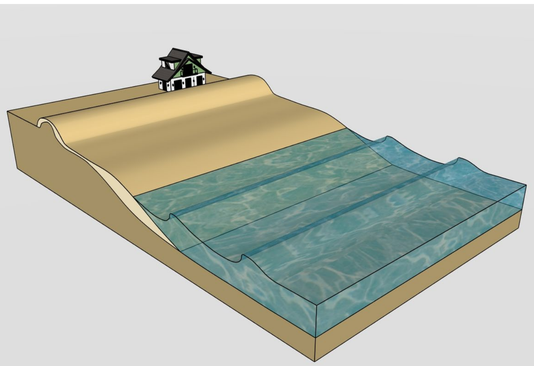
TOP RANKED MANAGEMENT ALTERNATIVES

To refine the management alternatives and identify those best suited for the County, Taylor Engineering further investigated measurable factors for each alternative. For the initial screening, the project team first quantified each alternative's ability to meet the contribution to objectives, which serve as the primary screening criterion to narrow the list of alternatives. Based on this evaluation, the project team identified the five most viable shoreline management alternatives for further investigation and recommendation.

**See "Contribution to Objective" and "Management Alternatives and Their Contribution to Objective" posters for additional information*

The top ranked management alternatives based on each alternative's ability to contribute to the objectives include:

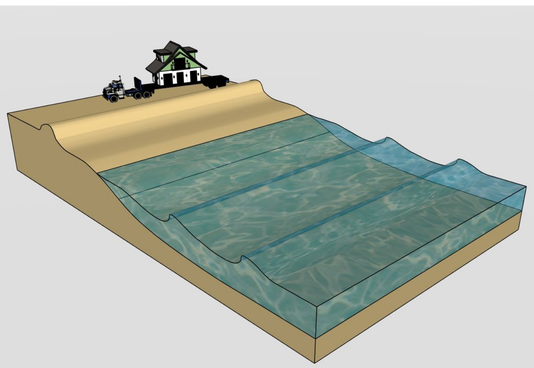
#1 BEACH NOURISHMENT



- Often-used shoreline management strategy
- Restores the coastal system by directly adding sand to it
- Expands beach width and increases recreational space
- Creates an additional buffer between coastal infrastructure and the ocean that helps to protect property during storm events
- Supports beach tourism and the local economy while also improving the beach habitat
- Risks and uncertainties associated with how quickly erosion will occur
- Adaptable for future conditions or evolving projects goals
- Requires periodic renourishment

PRIMARY FUNCTION- ADD SEDIMENT TO THE SYSTEM TO REDUCE RISK AND INCREASE RECREATION

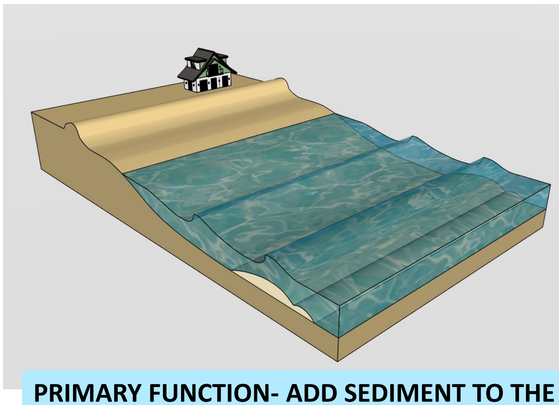
#2 STRUCTURAL RELOCATION



- Drastic but effective adaptation option
  - Greatly reduces the risks of storm damage and sea level rise for coastal infrastructure
- Governing agencies face major challenges when trying to implement relocation
  - Property ownership rights create legal and financial obstacles
  - Vacant land will then need to be maintained by an entity
- Requires acquisition of private property, coordination with residents and businesses, and construction of new infrastructure and services at the new development location
- Does not directly maintain or enhance the beach resource

PRIMARY FUNCTION- REMOVE INFRASTRUCTURE FROM RISK

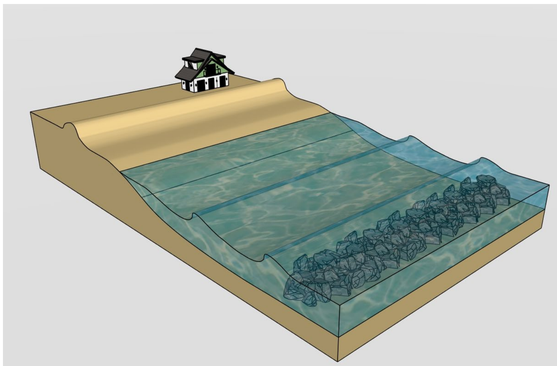
#3 NEARSHORE SAND PLACEMENT



- Restores the coastal system by directly adding sand to it
- Does not immediately increase beach width or provide additional recreational space
- Effectiveness is condition dependent
  - Sand is placed in the nearshore, where waves and currents gradually transport it in the nearshore system and toward the shoreline
- Most efficient when material can be sourced from a nearby navigation project (e.g., an inlet)
- Using an offshore shoal as the sand source for a nearshore placement project is uncommon
- Requires periodic renourishment

PRIMARY FUNCTION- ADD SEDIMENT TO THE SYSTEM TO REDUCE RISK

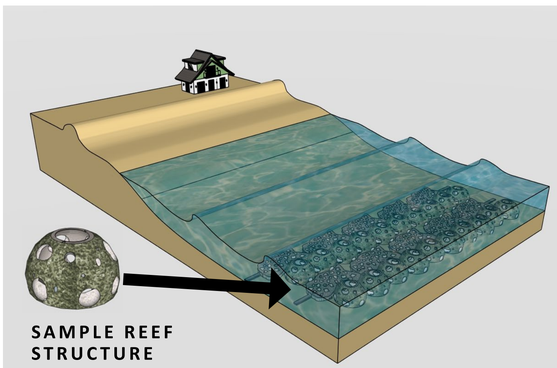
#4 (T) BREAKWATERS



- Due to the Atlantic Ocean being highly energetic, generally not a practical option along the open coastline except in targeted hotspot locations
- Would need to be massive in scale to effectively withstand storm forces and everyday high-energy conditions and extend for miles alongshore
- Require extensive permitting and design efforts to optimize siting, which in turn carries high costs
- Do not directly maintain or enhance the beach resource and may negatively impact in-water recreation activities
- Disrupts natural sediment transport and may starve other sections of shoreline of sand

PRIMARY FUNCTION- DECREASE WAVE ENERGY IMPACTING THE SHORELINE

#4 (T) NEARSHORE ARTIFICIAL REEFS



- Primary function is habitat enhancement, not shoreline protection
- Would need to be massive in scale to effectively withstand storm forces and everyday high-energy conditions and extend for miles alongshore
- Require extensive permitting and design efforts to optimize siting, which in turn carries high costs
- Do not directly maintain or enhance the beach resource and may negatively impact in-water recreation activities
- Disrupts natural sediment transport and may starve other sections of shoreline of sand

PRIMARY FUNCTION- ENHANCE MARINE HABITAT

RECOMMENDED MANAGEMENT ALTERNATIVES

NORTH PENINSULA

RISK: #7

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**

ORMOND-BY-THE-SEA

RISK: #7

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**

ORMOND BEACH

RISK: #6

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**

DAYTONA BEACH AND DAYTONA BEACH SHORES

RISK: #1

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**
  - Expand North Sand Placement Project or Implement Larger Project

WILBUR-BY-THE-SEA

RISK: #1

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**
  - Maintain North Sand Placement Project or Implement Larger Project

PONCE INLET

RISK: #5

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration or Nearshore Sand Placement**
  - Maintain North Sand Placement Project or Implement Larger Project
  - Beneficially Reuse Material from nearby Waterways

NEW SMYRNA BEACH NORTH

RISK: #7

- **Recommended Shoreline Management Alternative: No Action**
  - Monitor and Maintain Dunes

NEW SMYRNA BEACH SOUTH

RISK: #4

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration or Nearshore Sand Placement**
  - Maintain South Sand Placement Project; Beneficially Reuse Material from nearby Waterways or MSA 434

SILVER SANDS AND BETHUNE BEACH

RISK: #3

- **Recommended Shoreline Management Alternative: Beach/Dune Restoration**
  - Expand South Sand Placement Project or Implement Larger-Scale Project

ECONOMIC IMPACT OF BEACH TOURISM

Volusia County FLORIDA

Contributes **$4.3 billion annually** to the County's GDP (17% total) EQUATES TO

31% OF VOLUSIA COUNTY'S ANNUAL SALES TAX REVENUE

$28,000 OF VOLUSIA COUNTY'S ANNUAL SALES TAX REVENUE

From 2021-2023, beach-oriented tourism was **30% higher** than in 2017-2019 (pre-pandemic)

2x THE ATTENDANCE AT ALL FLORIDA STATE PARKS COMBINED

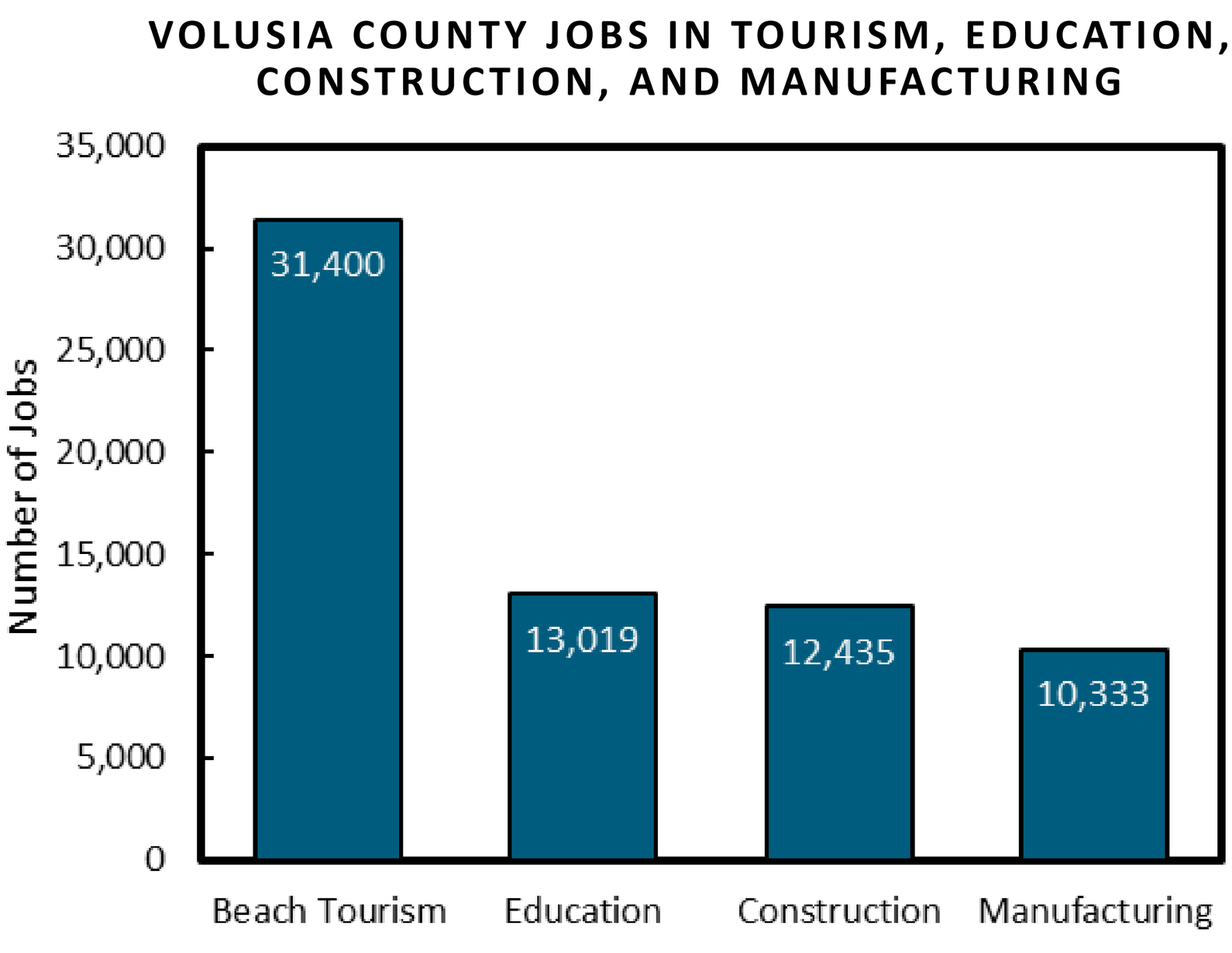
Nearly **61 million day trips** are made to Volusia County beaches each year

19x AS MANY VOLUSIA COUNTY RESIDENTS GO TO COUNTY BEACHES COMPARED TO COUNTY PARKS AND TRAILS

DATA SOURCES

- Daytona Beach Area Convention and Visitors Bureau (CVB)

Spending by **beach-oriented tourists** supports **more jobs** in the county than **any other industry** and almost as many jobs as the combined number of jobs in education, construction, and manufacturing.



NEXT STEPS

Current Management Actions

Community Feedback

Risk

Shoreline Alternatives Analysis

→ **Feasibility Study** → **Management Actions**

STUDY TIMELINE

FALL 2025

Second set of outreach meetings

WINTER/SPRING 2026

Public comment

TBD…

Approve & implement actions

WINTER 2026

Draft Feasibility Report

SPRING/SUMMER 2026

Final recommendations

***NOTE:** Volusia County and Taylor Engineering will hold an additional public meeting related to the economic value of beaches in the County; however, details are still being finalized.

Thank you for joining us to learn more about the ongoing feasibility assessment, please do not forget to:

1 Take the survey to provide meeting feedback

2 Follow Volusia County for more information:

Volusia County coastal website

Sign up for the beach newsletter