American Planning Association
Long Island Section
East End Conference

October 15, 2019

Coastal Resiliency Program

Beaches, Dunes & Barrier Islands

Prepared By

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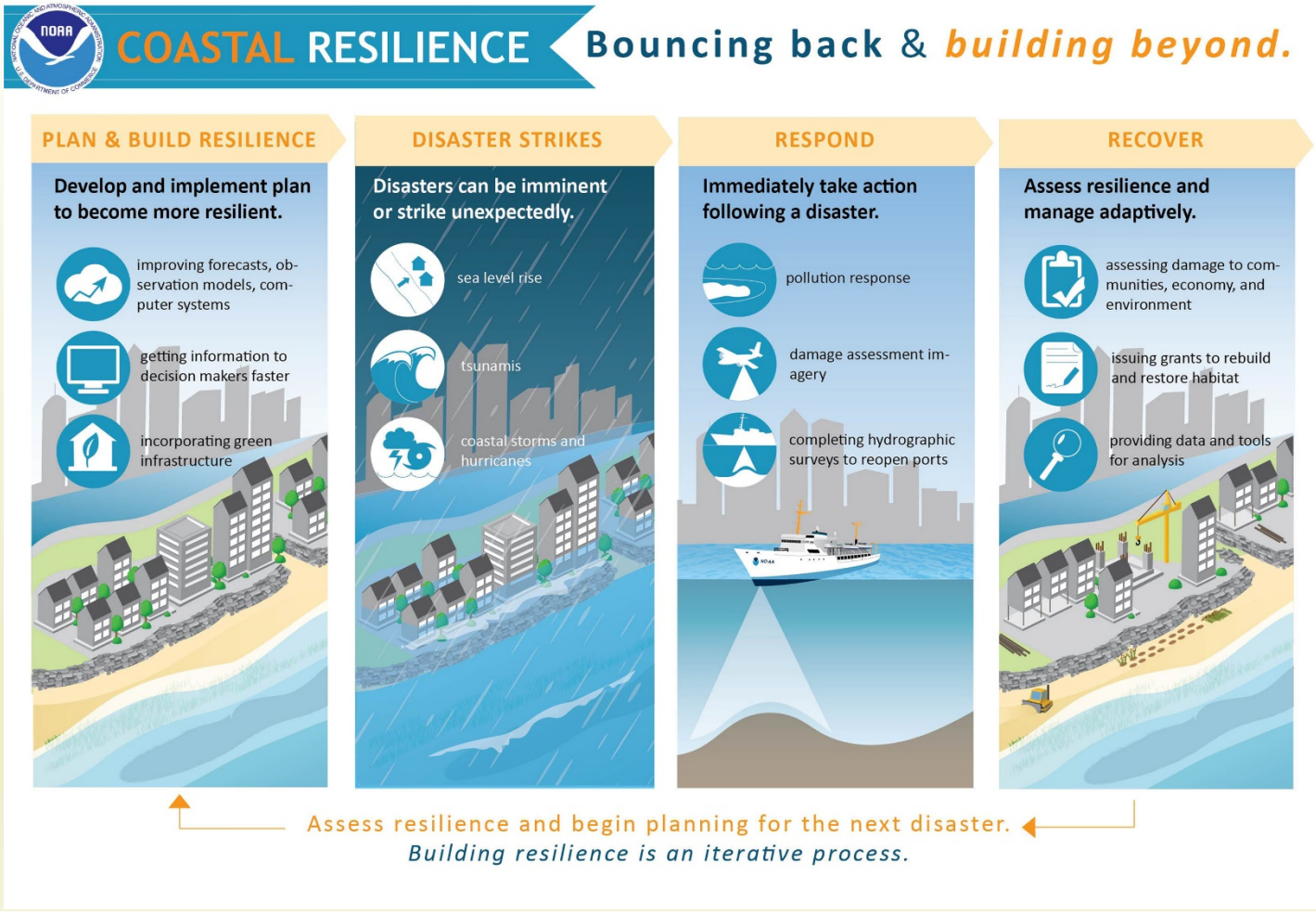

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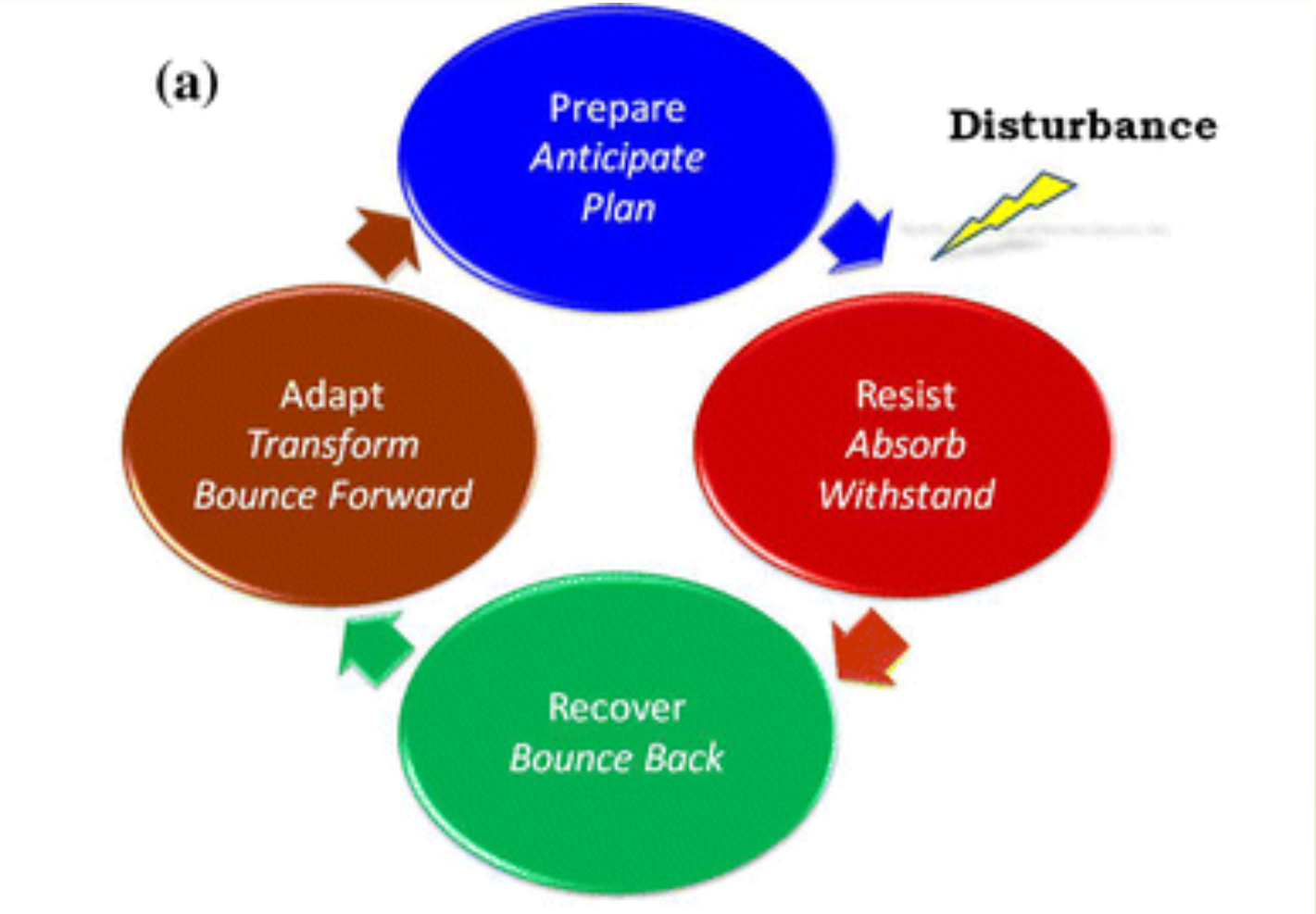

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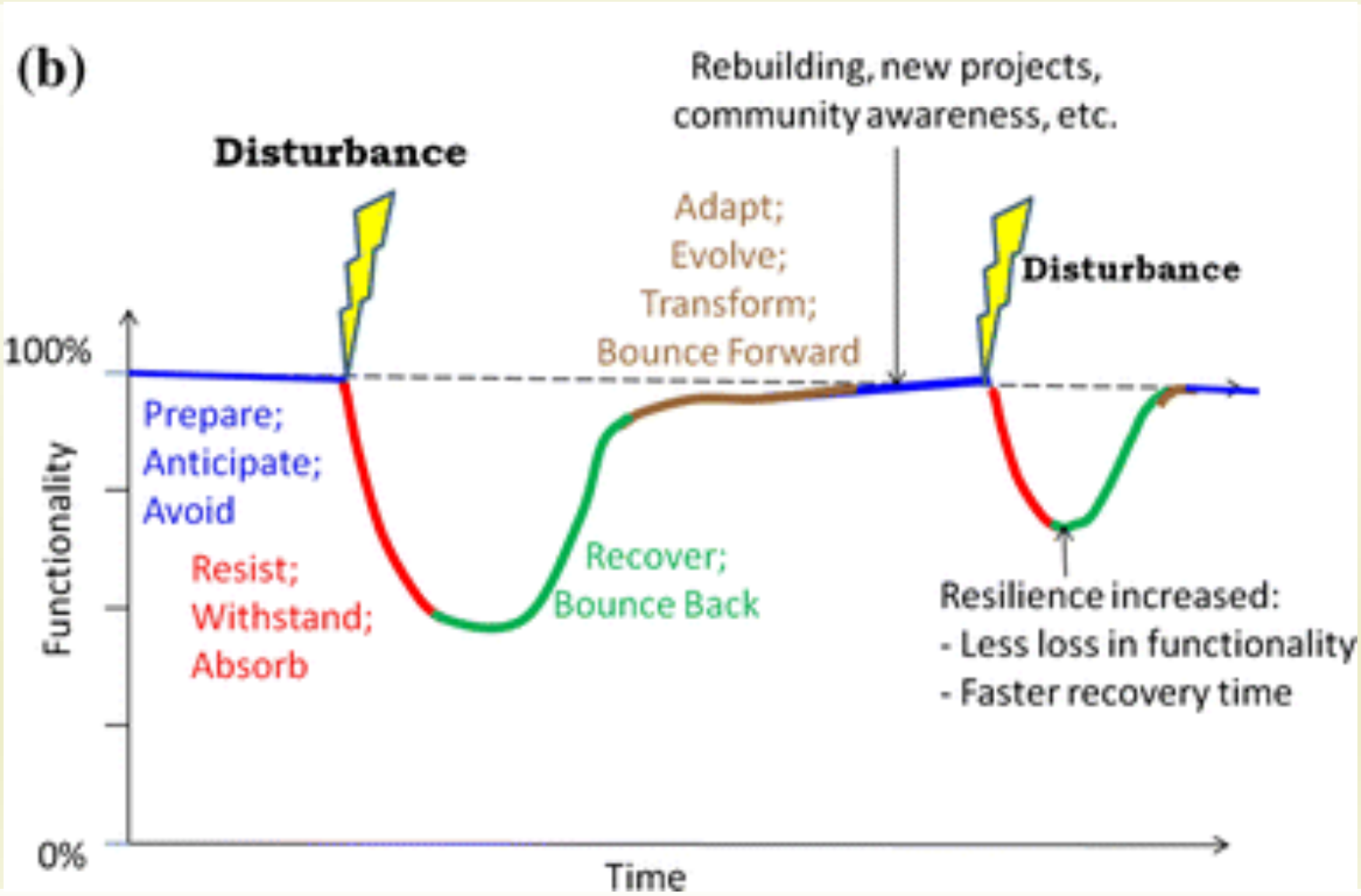

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Coastal Risk Reduction & Resilience Measures

Measure	Definition	Effect	Examples
Natural	Created through the action of physical, biological, geologic, and chemical processes operating in nature	Shoreline erosion control, wave and surge attenuation, especially in low-energy environments; additional resilience benefits; dynamic behavior and response affect performance with respect to objectives	Barrier islands, dunes, reefs, wetlands, and riparian corridors 
Nature-Based	Products of planning, engineering design, and construction incorporating natural processes that contribute to coastal risk reduction and resilience	Shoreline erosion control, wave and surge attenuation, especially in low-energy environments; dynamic behavior and response affect performance with respect to objectives	
Non-Structural	Products of public policy, management and regulatory practices; may include pricing schemes, planning, engineering design, and construction	Modify or avoid the impacts of the hazard (vs. modifying the hazard); relatively predictable level of performance with respect to objectives	Structure acquisitions or relocations, flood proofing, implementing flood warning systems, flood preparedness planning, land use regulations, development restrictions within the greatest flood hazard areas, elevated development, managed retreat, evacuation, buyout and leaseback 
Structural	Products of planning, engineering design, and construction	Shoreline erosion control, wave and surge attenuation, reduced flooding; relatively predictable level of performance with respect to objectives	Levees, storm surge barrier gates, seawalls, groins, revetments, and near-shore breakwaters 

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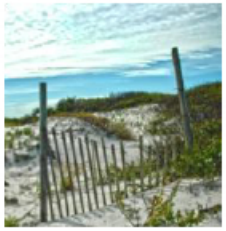
Table 1: Natural and nature-based features at a glance. For more detailed information, see Appendix A. The vegetated features include salt marshes, wetlands, and submerged aquatic vegetation (SAV).

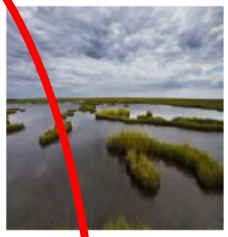
GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:
STORM INTENSITY, TRACK, AND FORWARD SPEED; SURROUNDING LOCAL BATHYMETRY AND TOPOGRAPHY



Dunes and Beaches

Benefits/Processes
Breaking of offshore waves
Attenuation of wave energy
Slow inland water transfer

Performance Factors
Berm height and width
Beach slope
Sediment grain size and supply
Dune height, crest, and width
Presence of vegetation



Vegetated Features

Benefits/Processes
Breaking of offshore waves
Attenuation of wave energy
Slow inland water transfer
Increased infiltration

Performance Factors
Marsh, wetland, or SAV elevation and continuity
Vegetation type and density

Oyster and Coral Reefs

Benefits/Processes
Breaking of offshore waves
Attenuation of wave energy
Slow inland water transfer

Performance Factors
Reef width, elevation, and roughness

Barrier Islands

Benefits/Processes
Wave attenuation and/or dissipation
Sediment stabilization

Performance Factors
Island elevation, length, and width
Land cover
Breach susceptibility
Proximity to mainland shore

Maritime Forests/Shrub Communities

Benefits/Processes
Wave attenuation and/or dissipation
Shoreline erosion stabilization
Soil retention

Performance Factors
Vegetation height and density
Forest dimension
Sediment composition
Platform elevation

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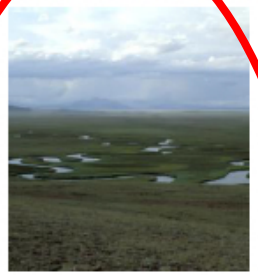
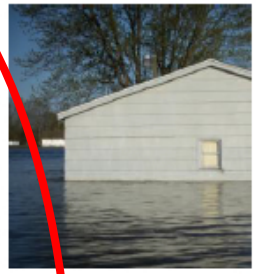
Table 2: Nonstructural features at a glance. For more detailed information, see Appendix A.

GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:
COLLABORATION AND SHARED RESPONSIBILITY FRAMEWORK, WAVE HEIGHT, WATER LEVEL, STORM DURATION





Floodplain Policy and Management	Floodproofing and Impact Reduction	Flood Warning and Preparedness	Relocation
Benefits/Processes	**Benefits/Processes**	**Benefits/Processes**	**Benefits/Processes**
Improved and controlled floodplain development	Reduced opportunity for damages	Reduced opportunity for damages	Reduced opportunity for damages
Reduced opportunity for damages	Increased community resiliency	Increased community resiliency	No increase in flood potential elsewhere
Improved natural coast environment	No increase in flood potential elsewhere	Improved public awareness and responsibility	Improved natural coast environment
Performance Factors	**Performance Factors**	**Performance Factors**	**Performance Factors**
Wave height	Wave height	Wave height	Wave height
Water level	Water level	Water level	Water level
Storm duration	Storm duration	Storm duration	Storm duration
Agency collaboration			

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Structural Measures at a Glance

GENERAL COASTAL RISK REDUCTION PERFORMANCE FACTORS:
STORM SURGE AND WAVE HEIGHT/PERIOD, WATER LEVEL

Levees

Benefits/Processes

Surge and Wave attenuation and/or dissipation

Reduce Flooding

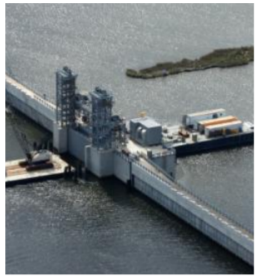
Risk Reduction for vulnerable areas

Performance Factors

Levee height, crest width, and slope

Wave height and period

Water level



Storm Surge Barriers

Benefits/Processes

Surge and Wave attenuation

Reduced Salinity Intrusion

Performance Factors

Barrier height

Wave height

Wave period

Water level

Seawalls and Revetments

Benefits/Processes

Reduce flooding

Reduce wave overtopping

Shoreline stabilization behind structure

Performance Factors

Wave height

Wave period

Water level

Scour protection

Groins

Benefits/Processes

Shoreline stabilization

Performance Factors

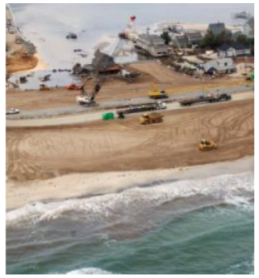
Groin length, height, orientation, permeability and spacing

Depth at seaward end

Wave height

Water level

Longshore transportation rates and distribution



Detached Breakwaters

Benefits/Processes

Shoreline stabilization behind structure

Wave attenuation

Performance Factors

Breakwater height and width.

Breakwater permeability, proximity to shoreline, orientation and spacing

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Floodplain Policy and Management

Benefits/Processes

Improved and controlled floodplain development

Reduced opportunity for damages

Improved natural coast environment

Performance Factors

Wave height

Water level

Storm duration

Agency collaboration

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Dunes and Beaches

Benefits/Processes

Breaking of offshore waves

Attenuation of wave energy

Slow inland water transfer

Performance Factors

Berm height and width

Beach slope

Sediment grain size and supply

Dune height, crest, and width

Presence of vegetation

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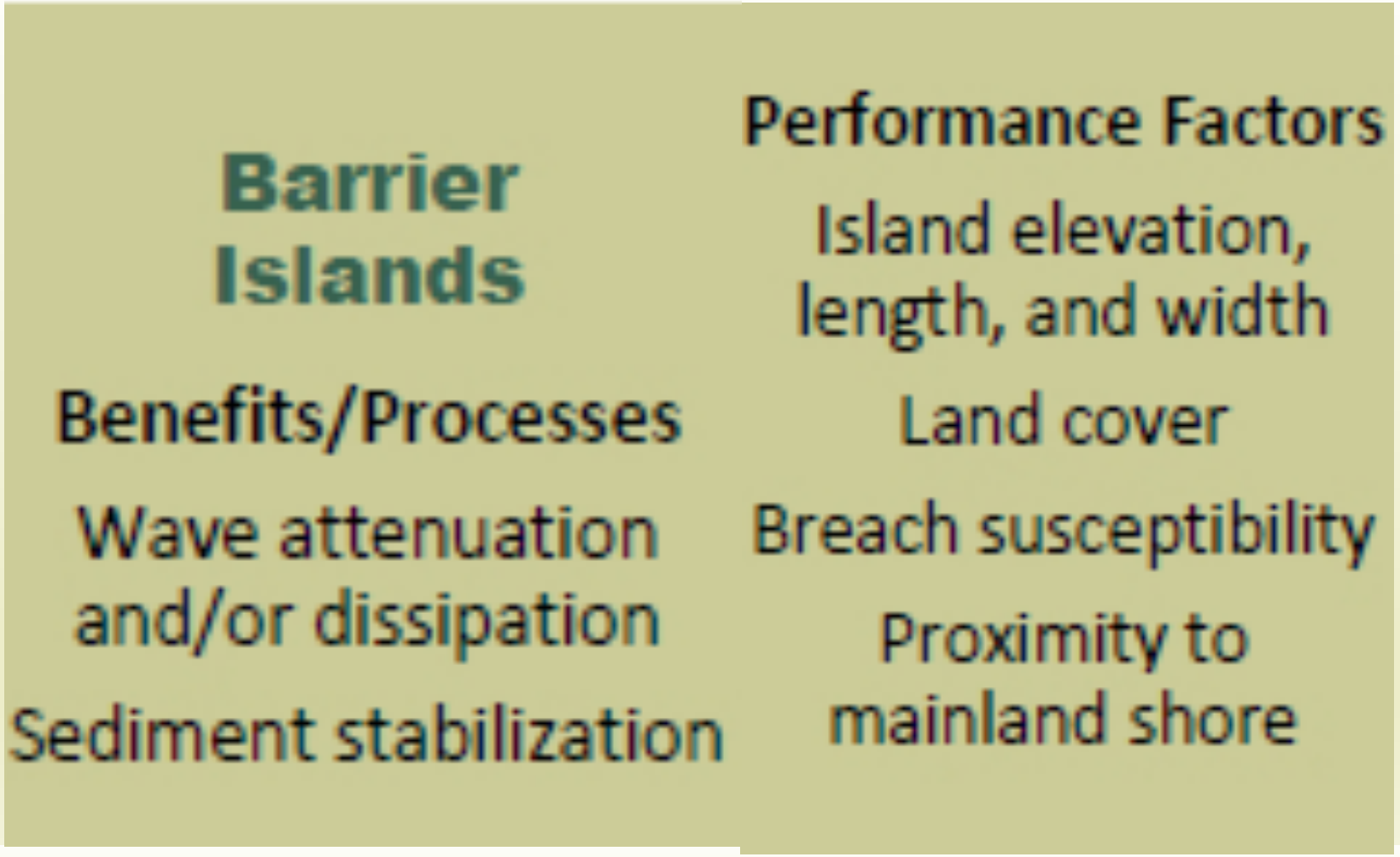

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Three Nature Based Projects

- Sagaponack-Bridgehampton Beach Restoration
- West of Shinnecock Inlet Project (WOSI-FIMP)
- Tiana Beach Emergency Levee Project

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Sagaponack-Bridgehampton Beach Restoration

PREPARE

- *Two Beach Erosion Control Districts (BECD) formed under NYS Town Law*
- *Covers 5.7 miles and approximately 140 homes*
- *$25.5 Million beach restoration project completed in 2013*
- *Bonded over ten (10) year period*
- *Best Restored Beach in America 2019*
- *Approximately 100 % of the the sand is still in the beach system*
- *Dunes growing > 2cubic yards/linear foot of beach/year due to natural wind-blown sand accumulation*
- *No damage from Nor'Easter Melissa*

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Sagaponack-Bridgehampton Beach Restoration

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Sagaponack-Bridgehampton Beach Restoration

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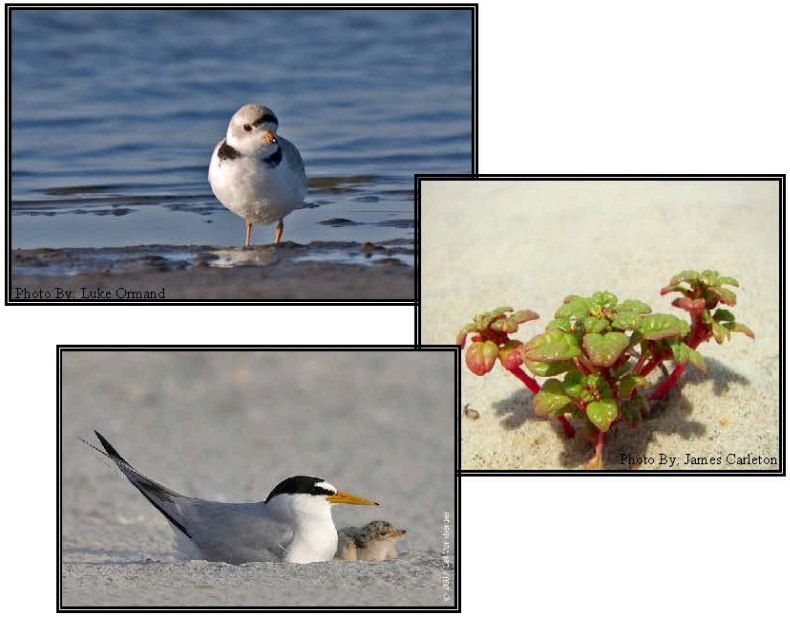
Sagaponack-Bridgehampton Beach Restoration

Threatened and Endangered Species

Management and Protection Program



Pre Project
2012 – 14 Piping Plover Pairs

Post Project
2017 – 29 Piping Plover Pairs

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Sagaponack-Bridgehampton Beach Restoration

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West of Shinnecock Inlet Project (WOSI –FIMP)

RESPOND

- *Federal, State and County project*
- *Interim six (6) year project while overall FIMP is being reformulated*
- *Project termed out in 2011*
- *Emergency restoration after Sandy*
- *No new work scheduled until FIMP is approved by USACE HQ*

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West of Shinnecock Inlet Project (WOSI –FIMP)

1938

The Shinnecock Inlet one month after it was opened by the hurricane. "That afternoon the Shinnecock Inlet was born."
Fairchild Aerial Survey Photo

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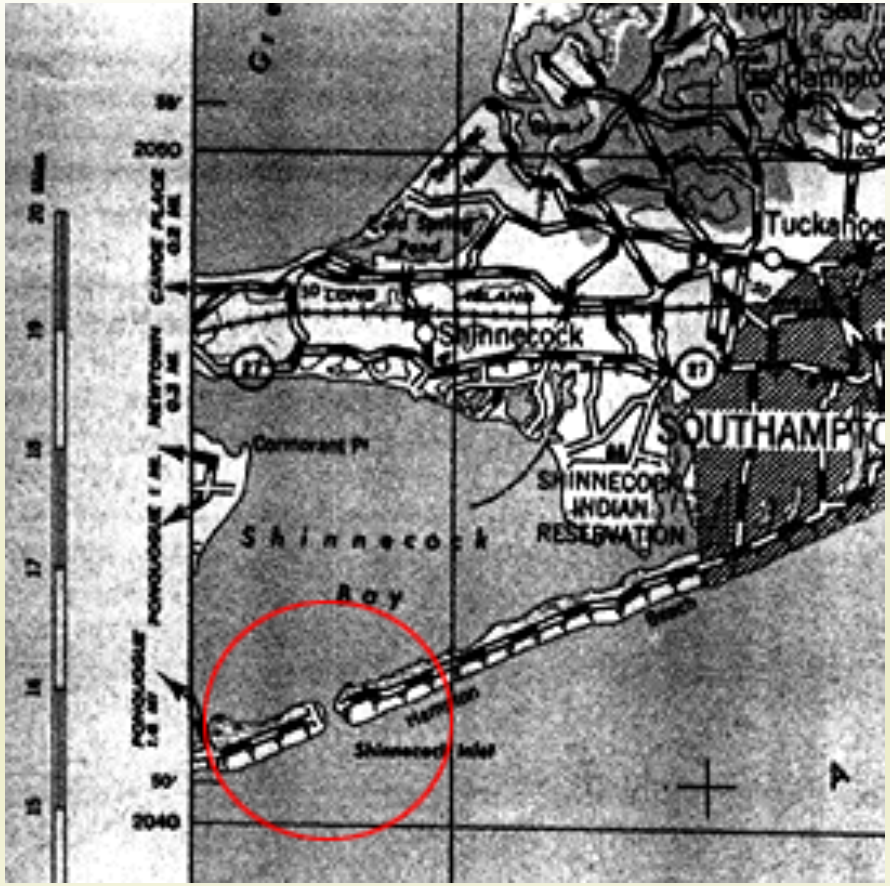
West of Shinnecock Inlet Project (WOSI –FIMP)

1942



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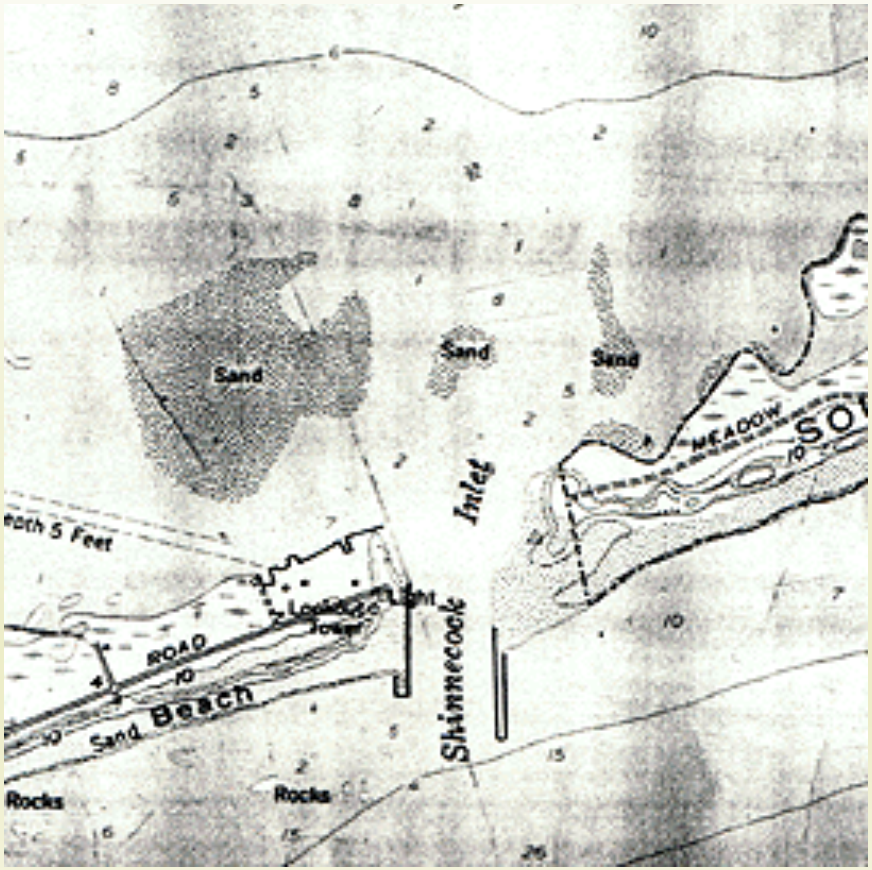
West of Shinnecock Inlet Project (WOSI –FIMP)

1955



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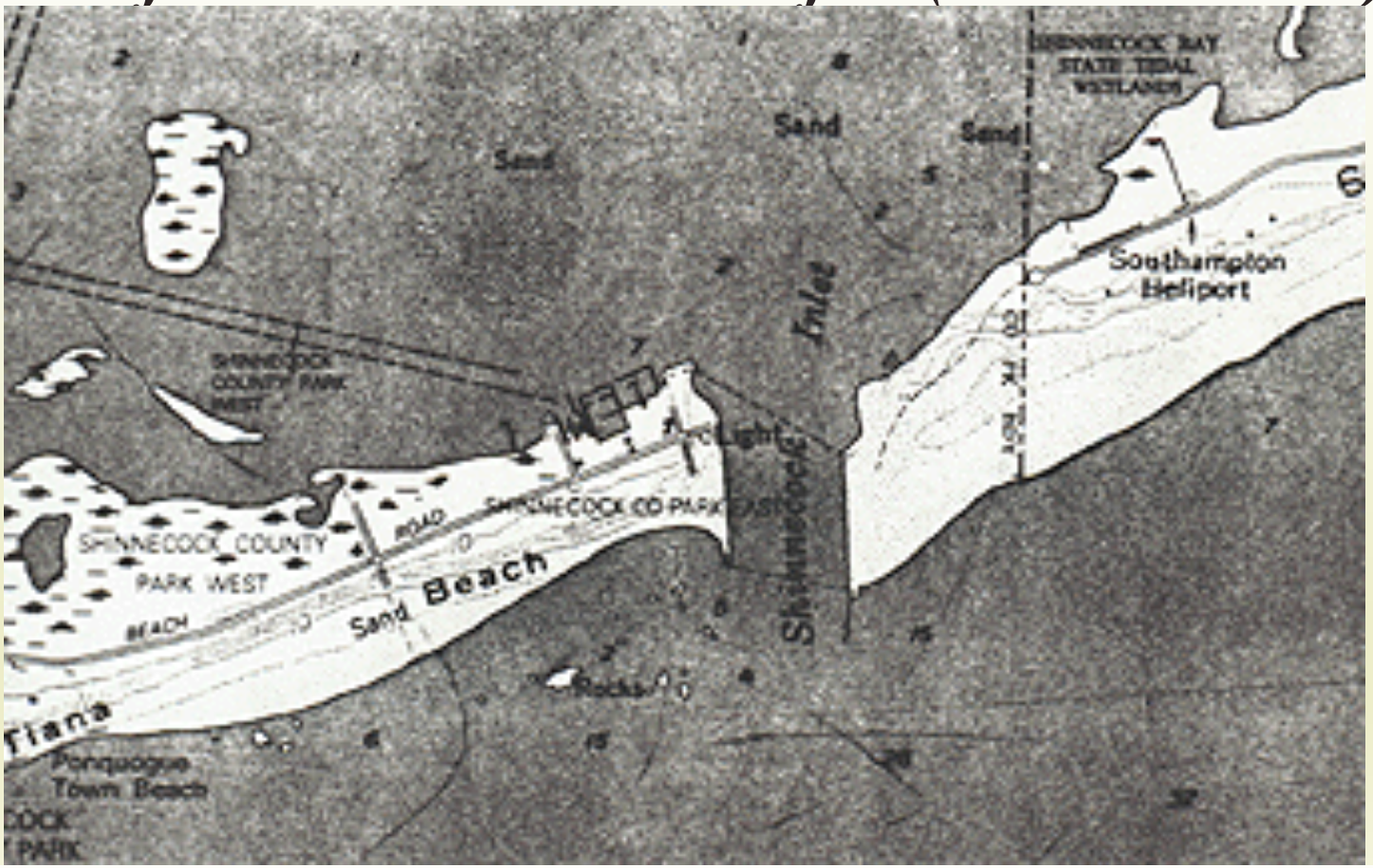
West of Shinnecock Inlet Project (WOSI –FIMP)

1991



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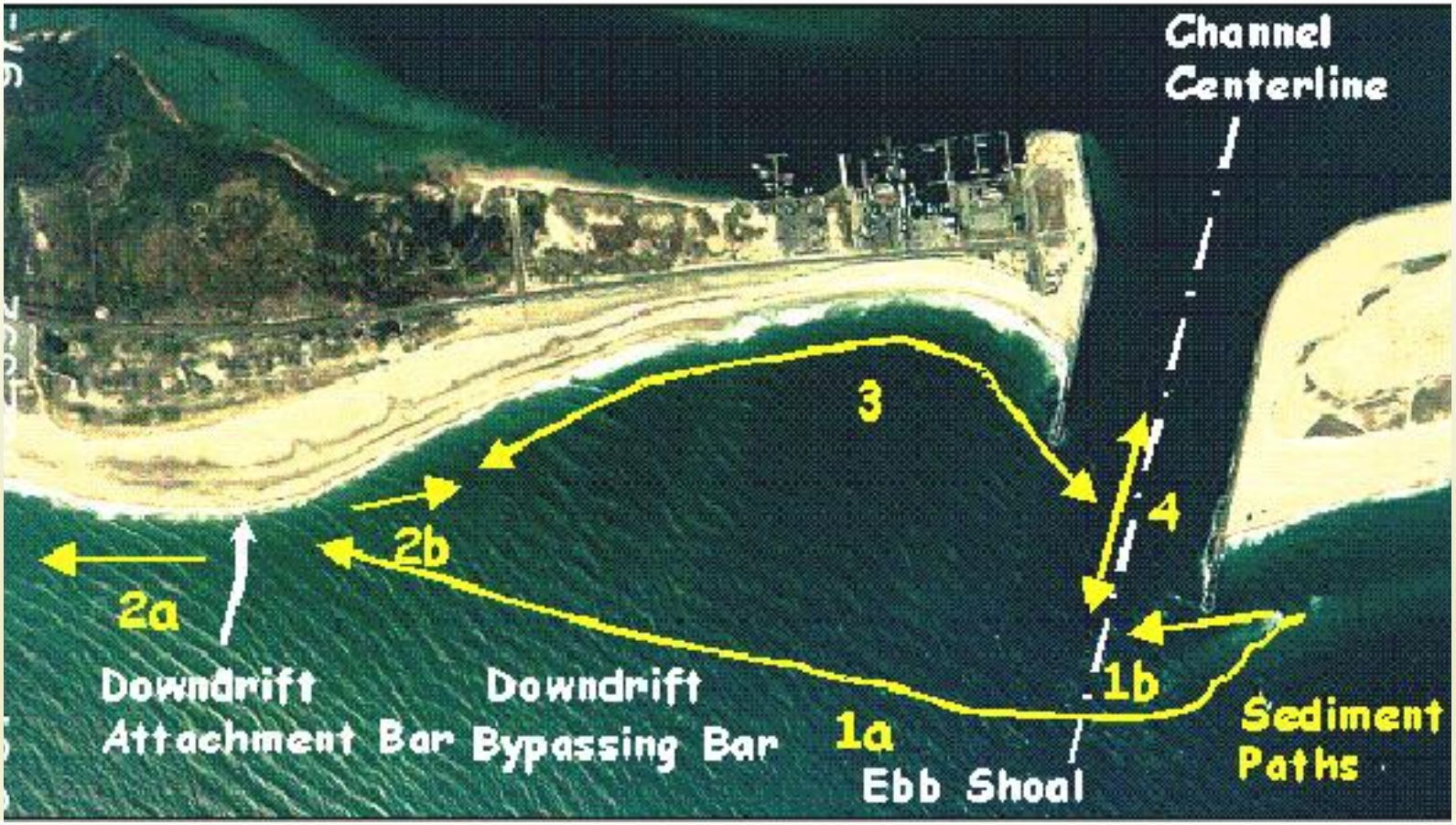

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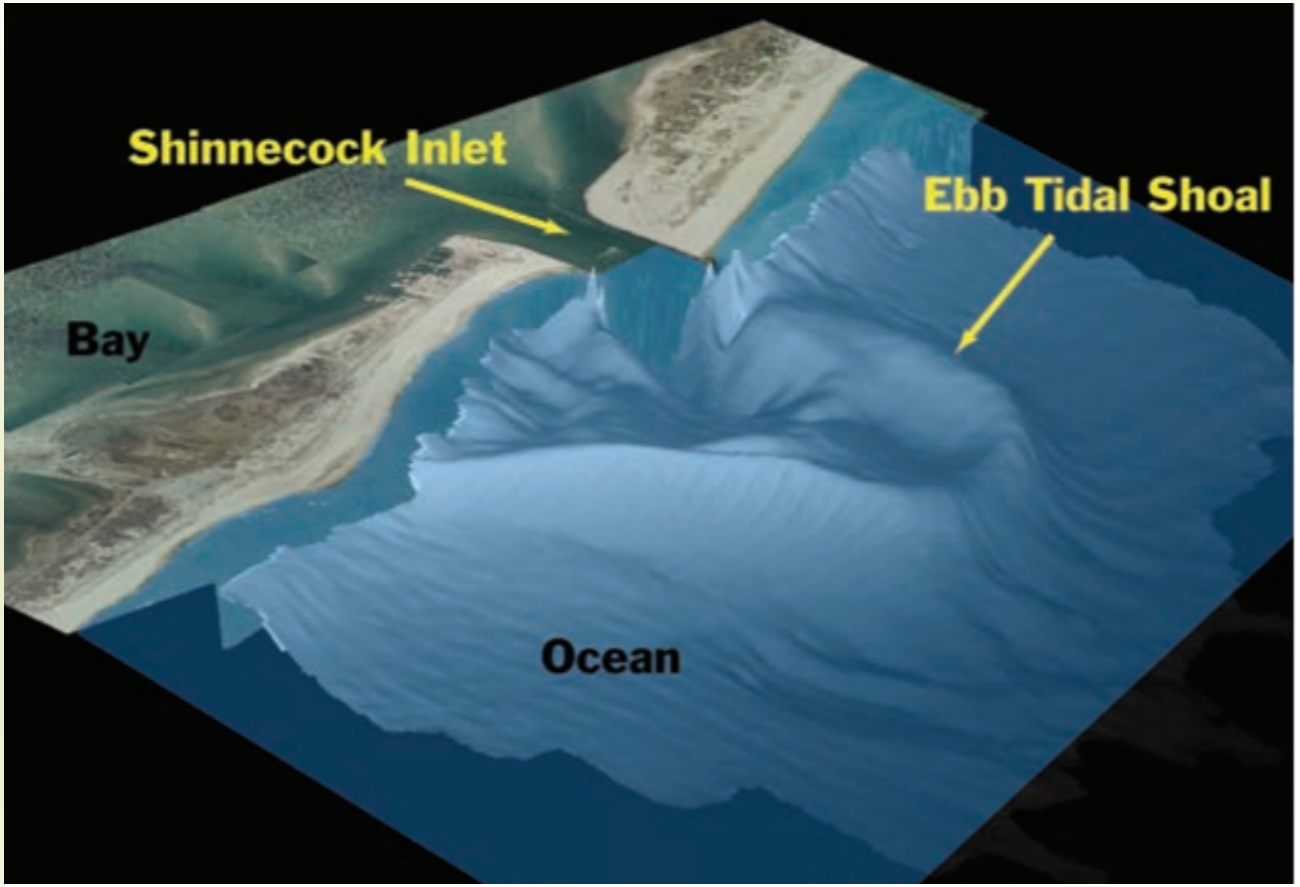

Figure 20. Shinnecock Inlet has trapped approximately 8 million cubic yards of sand from the longshore system in the ebb tidal shoal located seaward of the inlet. This representation of the shoal was constructed from high resolution surveys of the seafloor. (Survey data by R. Flood, GIS integration by B. Batten)

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Tiana Emergency Levee Project

ADAPT

- New York State, Suffolk County and Southampton Town/Town Trustees
- Overwash in February 2014 threatened infrastructure and resources
- NYS provided up to $1,000,000 in emergency funds
- Suffolk County provided real estate and equipment
- Southampton provided project design and supervision
- 75,000 cubic yards placed into a berm at +14 to +15 feet NAVD88

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Be Resilient!!!

Prepare, Resist, Recover, Adapt

Thank You!

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