

ASBPA: Broadening our Coast and our Perspective

WESTERN DREDGING ASSOCIATION – EASTERN CHAPTER
OCTOBER 29, 2015

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asbpa

American Shore & Beach Preservation Association

Advocating for healthy coastlines

American Shore & Beach Preservation Association

- ASBPA is dedicated to preserving, protecting and enhancing our coasts by merging science and public policy;
- Formed in 1926;
- Publishes *Shore & Beach*;
- Board, membership composed of:
 - Coastal engineers, geologists, planners, ecologists, etc.
 - Across industry, government, academia.
- Conferences



Sand on Beaches...





**DUNES ARE
FRAGILE
KEEP OFF!**

DUNES

- ARE NATURE'S WAY OF PROTECTING THE SHORE
- ARE VERY IMPORTANT TO THE FUTURE OF ASSATEAGUE ISLAND

PLEASE HELP US WORK WITH NATURE

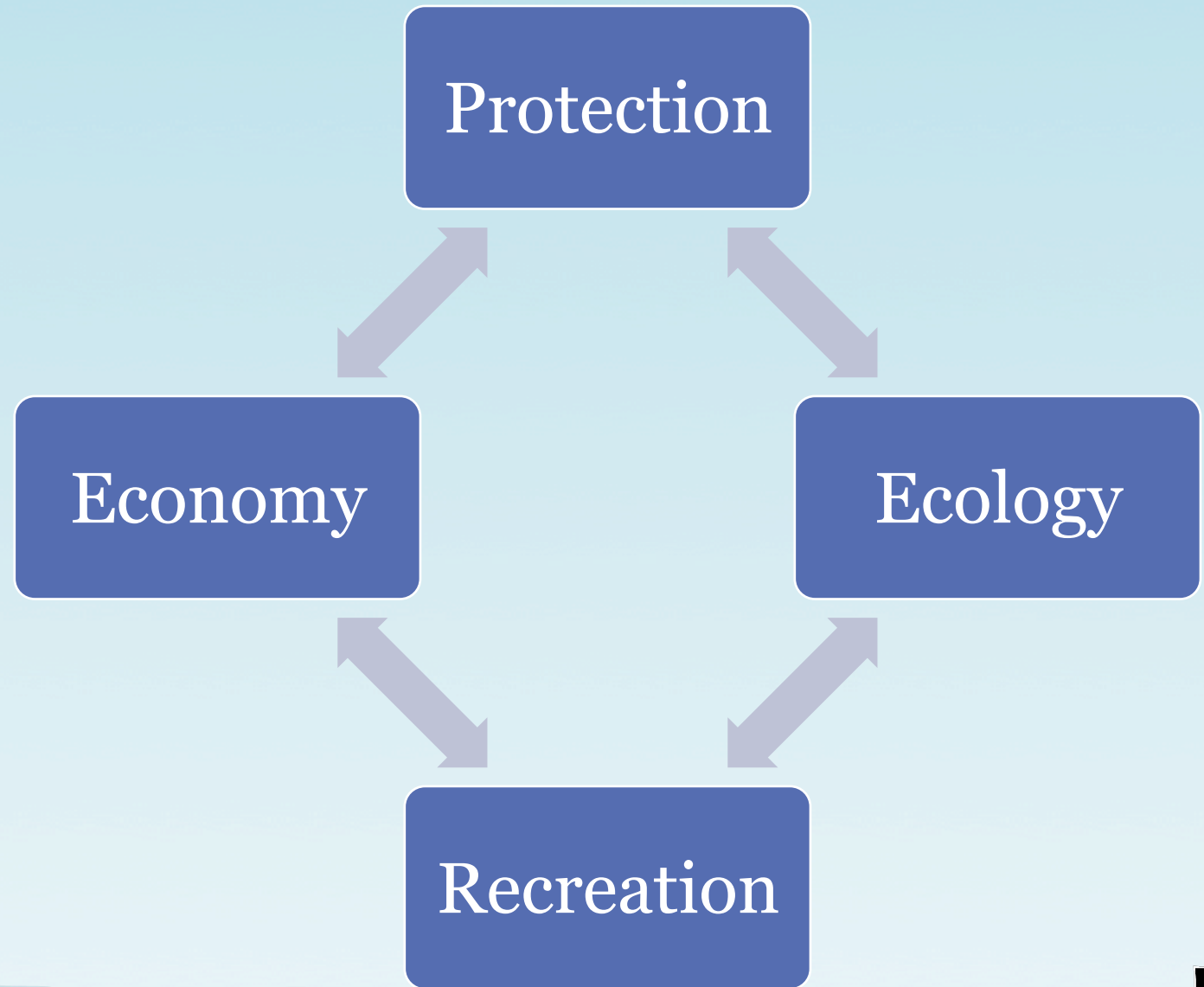
- ONLY WALK ACROSS THE DUNE ON THE HARD SURFACED CROSSOVERS
- REFRAIN FROM PLAYING, PICNICKING, OR OTHERWISE DISTURBING THE DUNE

WITH YOUR HELP, ASSATEAGUE WILL BE HERE FOR FUTURE GENERATIONS TO ENJOY. WE THANK YOU FOR YOUR COOPERATION!

ASSATEAGUE STATE PARK STAFF

Vision:

*Advocating
for healthy
coastlines*



Erosion doesn't just happen to
beaches...

...and our coastline is more than
where surf meets sand.

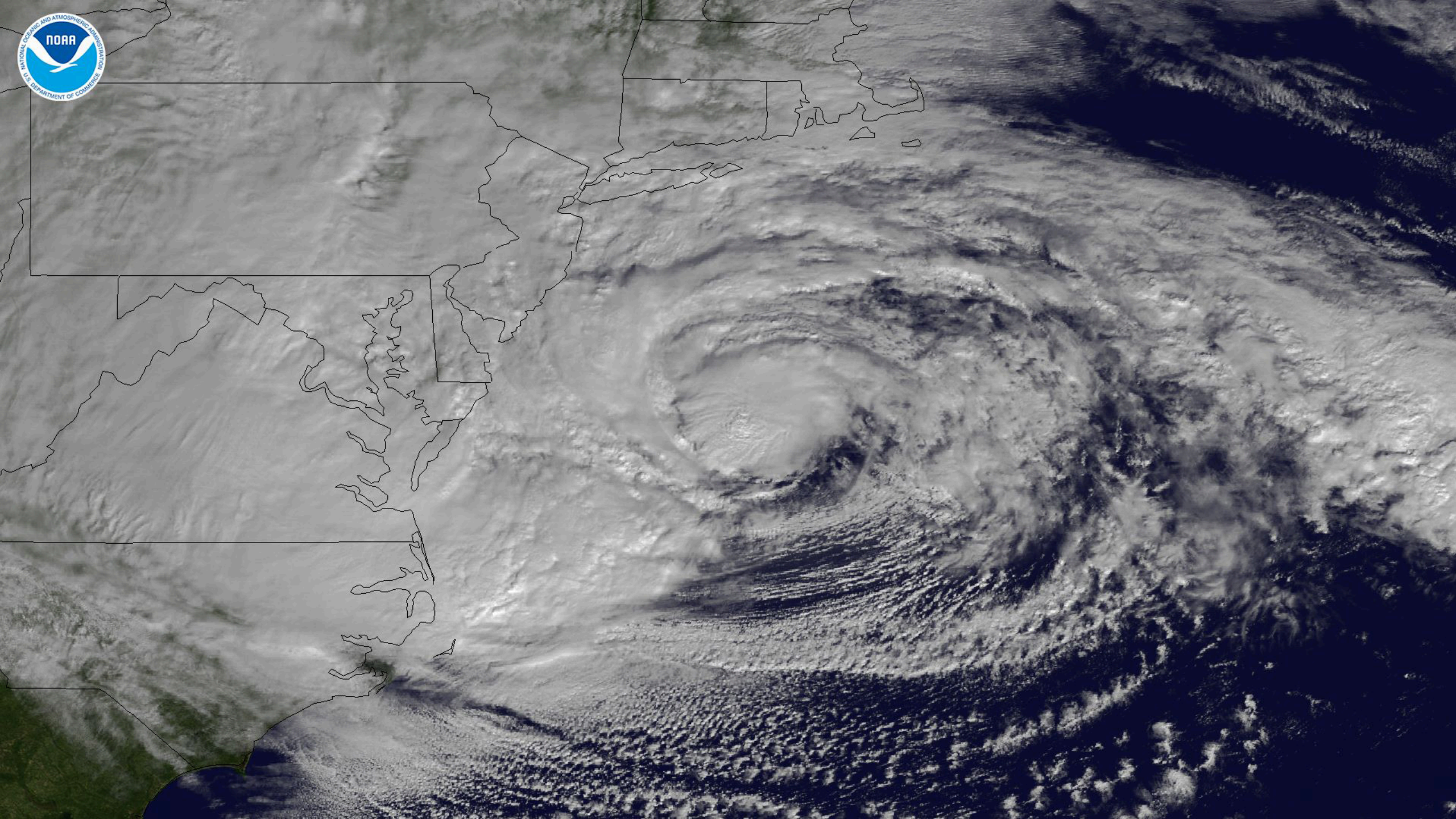














North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk

MAIN REPORT

Final Report
January 2015

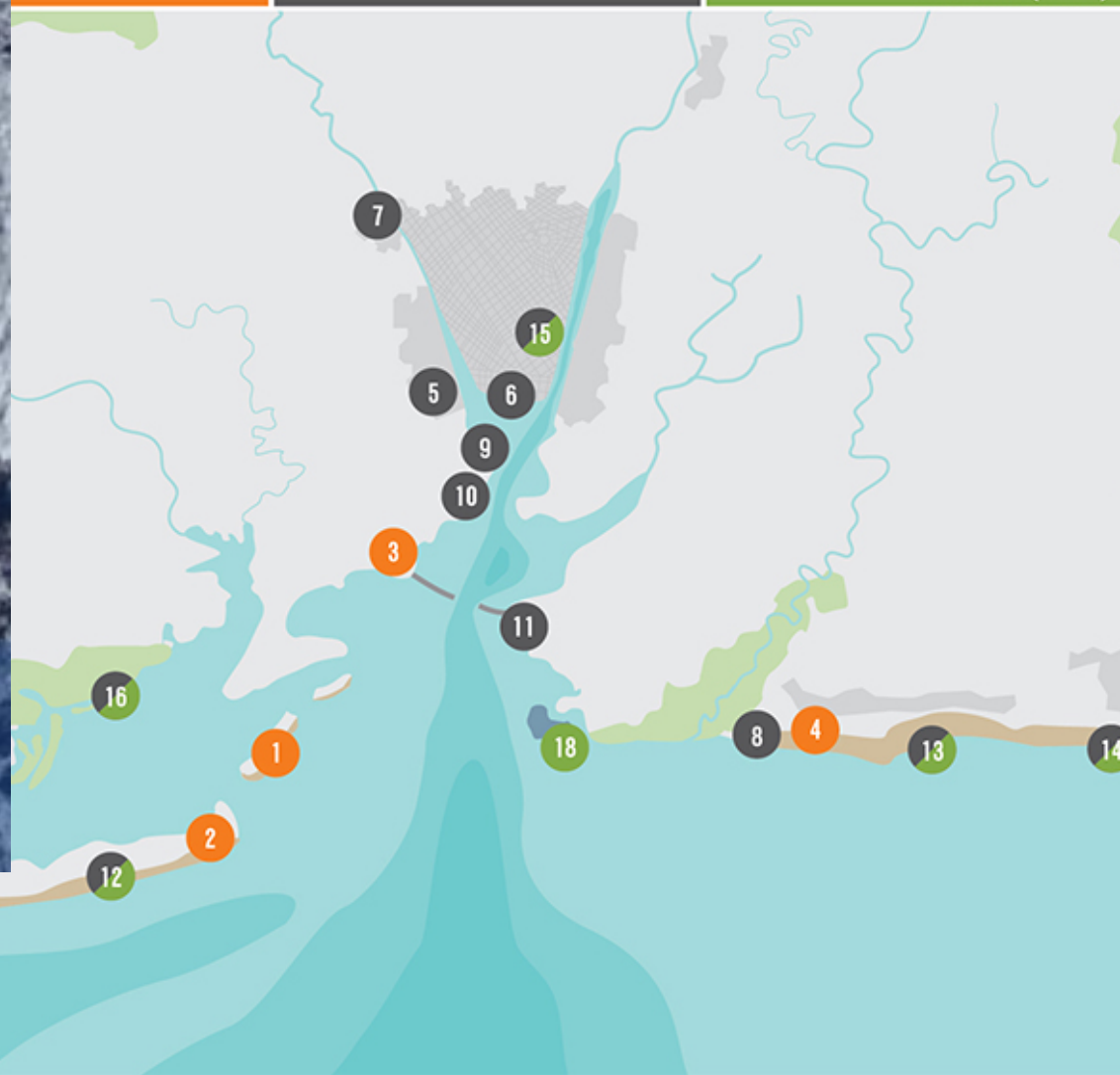


US Army Corps
of Engineers

NON-STRUCTURAL

STRUCTURAL

NATURAL & NATURE-BASED FEATURES (NNBF)



- 1 ACQUISITION & RELOCATION
- 2 BUILDING RETROFIT
- 3 ENHANCED FLOOD WARNING & EVACUATION PLANNING
- 4 LAND USE MANAGEMENT/ZONING & FLOOD INSURANCE
- 5 DEPLOYABLE FLOODWALLS
- 6 FLOODWALLS
- 7 LEVEES
- 8 SEAWALLS
- 9 REVETMENTS
- 10 BULKHEADS
- 11 STORM SURGE BARRIERS
- 12 BEACH RESTORATION
- 13 BEACH RESTORATION & BREAKWATERS
- 14 BEACH RESTORATION & GROINS
- 15 DRAINAGE IMPROVEMENTS
- 16 LIVING SHORELINES
- 17 OVERWASH FANS
- 18 REEFS
- 19 SUBMERGED AQUATIC VEGETATION
- 20 WETLANDS

Living Shorelines:

GREEN - SOFTER TECHNIQUES Small Waves | Small Fetch | Shallow Slope | Open Coast

HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

GRAY - HARDER TECHNIQUES Large Waves | Large Fetch | Steep Slope | Open Coast

LIVING SHORELINE



ROOTS HOLD IN PLACE to reduce erosion. Provide a buffer to upland areas and breaks in the shoreline.

Suitable For
Low wave energy environments.

Material Options

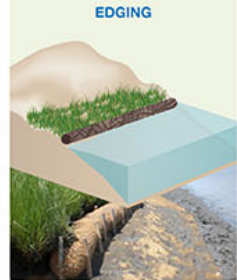
- Native plants*

Benefits

- Dissipates wave energy
- Slows inland water transfer
- Increases natural storm water infiltration
- Provides habitat and ecosystem services
- Minimal impact to natural community and ecosystem processes
- Maintains aquatic/terrestrial interface and connectivity
- Flood water storage

Disadvantages

- No storm surge reduction ability
- No high water protection
- Appropriate in limited situations
- Uncertainty of successful vegetation growth and competition with invasive



Structure to hold the toe of existing or vegetated slope in place. Protects against shoreline erosion.

Suitable For
Most areas except high wave energy

Material Options

- (low wave only, temporary)
- "Snow" fencing
- Erosion control blankets
- Geotextile tubes
- Living reef (oyster/mussel)
- Rock gabion baskets

Benefits

- Dissipates wave energy
- Slows inland water transfer
- Provides habitat and ecosystem services
- Increases natural storm water infiltration
- Toe protection helps prevent wetland edge loss

Disadvantages

- No high water protection
- Uncertainty of successful vegetation growth and competition with invasive



Parallel to existing or vegetated shoreline, reduces wave energy and prevents erosion. A gapped approach would allow habitat connectivity, greater tidal exchange, and better waterfront access.

Suitable For
Most areas except high wave energy

Material Options

- Stone
- Sand breakwaters
- Living reef (oyster/mussel)
- Rock gabion baskets

Benefits

- Provides habitat and ecosystem services
- Dissipates wave energy
- Slows inland water transfer
- Provides habitat and ecosystem services
- Increases natural storm water infiltration
- Toe protection helps prevent wetland edge loss

Disadvantages

- Require more land area
- No high water protection
- Uncertainty of successful vegetation growth and competition with invasive



Large volume of sand added from outside source to an eroding beach. Widens the beach and moves the shoreline seaward.

Suitable For
Low-lying oceanfront areas with existing sources of sand and sediment.

Material Options

- Sand

Benefits

- Expands usable beach area
- Lower environmental impact than hard structures
- Flexible strategy
- Redesigns with relative ease
- Provides habitat and ecosystem services

Disadvantages

- Requires continual sand resources for renourishment
- No high water protection
- Appropriate in limited situations
- Possible impacts to regional sediment transport



Helps anchor sand and provide a buffer to protect inland areas from waves, flooding and erosion.

Suitable For
Low-lying oceanfront areas with existing sources of sand and sediment.

Material Options

- Sand with vegetation
- Can also strengthen dunes with:
- Geotextile tubes
- Rocky core

Benefits

- Expands usable beach area
- Lower environmental impact
- Flexible strategy
- Redesigns with relative ease
- Vegetation strengthens dunes and increases their resilience to storm events
- Provides habitat and ecosystem services

Disadvantages

- Requires continual sand resources for renourishment
- No high water protection
- Appropriate in limited situations
- Possible impacts to regional sediment transport



Offshore structures intended to break waves, reducing the force of wave action and encourages sediment accretion. Can be floating or fixed to the ocean floor, attached to shore or not, and continuous or segmented. A gapped approach would allow habitat connectivity, greater tidal exchange, and better waterfront access.

Suitable For
Most areas except high wave energy environments often in conjunction with marinas.

Material Options

- Grout-filled fabric bags
- Armorstone
- Pre-cast concrete blocks
- Living reef (oyster/mussel)
- If low wave environment

Benefits

- Reduces wave force and height
- Stabilizes wetland
- Can function like reef
- Economical in shallow areas
- Limited storm surge flood level reduction

Disadvantages

- Expensive in deep water
- Can reduce water circulation (minimized if floating breakwater is applied)
- Can create navigational hazard
- Require more land area
- Uncertainty of successful vegetation growth and competition with invasive
- No high water protection
- Can reduce water circulation
- Can create navigation hazard



Perpendicular, projecting from shoreline. Intercept water flow and sand moving parallel to the shoreline to prevent beach erosion and break waves. Retain sand placed on beach.

Suitable For
Coordination with beach nourishment.

Material Options

- Concrete/stone rubble*
- Timber
- Metal sheet piles

Benefits

- Protection from wave forces
- Little maintenance
- Indefinite lifespan
- Can be combined with beach nourishment projects to extend their life

Disadvantages

- Erosion of adjacent sites
- Can be detrimental to shoreline ecosystem (e.g. replaces native substrate with rock and reduces natural habitat availability)
- No high water protection

COASTAL STRUCTURE



Lays over the slope of a shoreline. Protects slope from erosion and waves.

Suitable For
Sites with pre-existing hardened shoreline structures.

Material Options

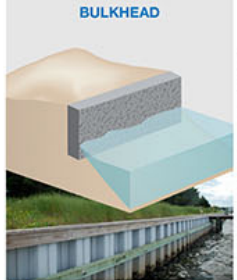
- Stone rubble*
- Concrete blocks
- Cast concrete slabs
- Sand/concrete filled bags
- Rock-filled gabion basket

Benefits

- Mitigates wave action
- Little maintenance
- Indefinite lifespan
- Minimizes adjacent site impact

Disadvantages

- No major flood protection
- Require more land area
- Loss of intertidal habitat
- Erosion of adjacent unreinforced sites
- Require more land area
- No high water protection
- Prevents upland from being a sediment source to the system



Parallel to the shoreline, vertical retaining wall. Intended to hold soil in place and allow for a stable shoreline.

Suitable For
High energy settings and sites with pre-existing hardened shoreline structures. Accommodates working water fronts (eg: docking for ships and ferries).

Material Options

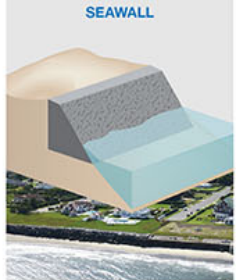
- Steel sheet piles
- Timber
- Concrete
- Composite carbon fibers
- Gabions

Benefits

- Moderates wave action
- Manages tide level fluctuation
- Long lifespan
- Simple repair

Disadvantages

- No major flood protection
- Erosion of seaward seabed
- Erosion of adjacent unreinforced sites
- Loss of intertidal habitat
- May be damaged from overtopping oceanfront storm waves
- Prevents upland from being a sediment source to the system
- Induces wave reflection



Parallel to shoreline, vertical or sloped wall. Soil on one side of wall is the same elevation as water on the other. Absorbs and limits impacts of large waves and directs flow away from land.

Suitable For
Areas highly vulnerable to storm surge and wave forces.

Material Options

- Stone
- Rock
- Concrete
- Steel/vinyl sheets
- Steel sheet piles

Benefits

- Prevents storm surge flooding
- Resists strong wave forces
- Shoreline stabilization behind structure
- Low maintenance costs
- Less space intensive horizontally than other techniques (e.g. vegetation only)

Disadvantages

- Erosion of seaward seabed
- Disrupt sediment transport leading to beach erosion
- Higher up-front costs
- Visually obstructive
- Loss of intertidal zone
- Prevents upland from being a sediment source to the system
- May be damaged from overtopping oceanfront storm waves

* Native plants and materials must be appropriate for current salinity and site conditions.

GRAY CAN BE GREENER: e.g., 'Living Breakwater' using oysters to colonize rocks or 'Greenwall/Blowall' using vegetation, alternative forms and materials

Initial Construction: ● up to \$1000 per linear foot, ●● = \$1001 - \$2000 per linear foot, ●●● = \$2001 - \$5000 per linear foot, ●●●● = \$5001 - \$10,000 per linear foot

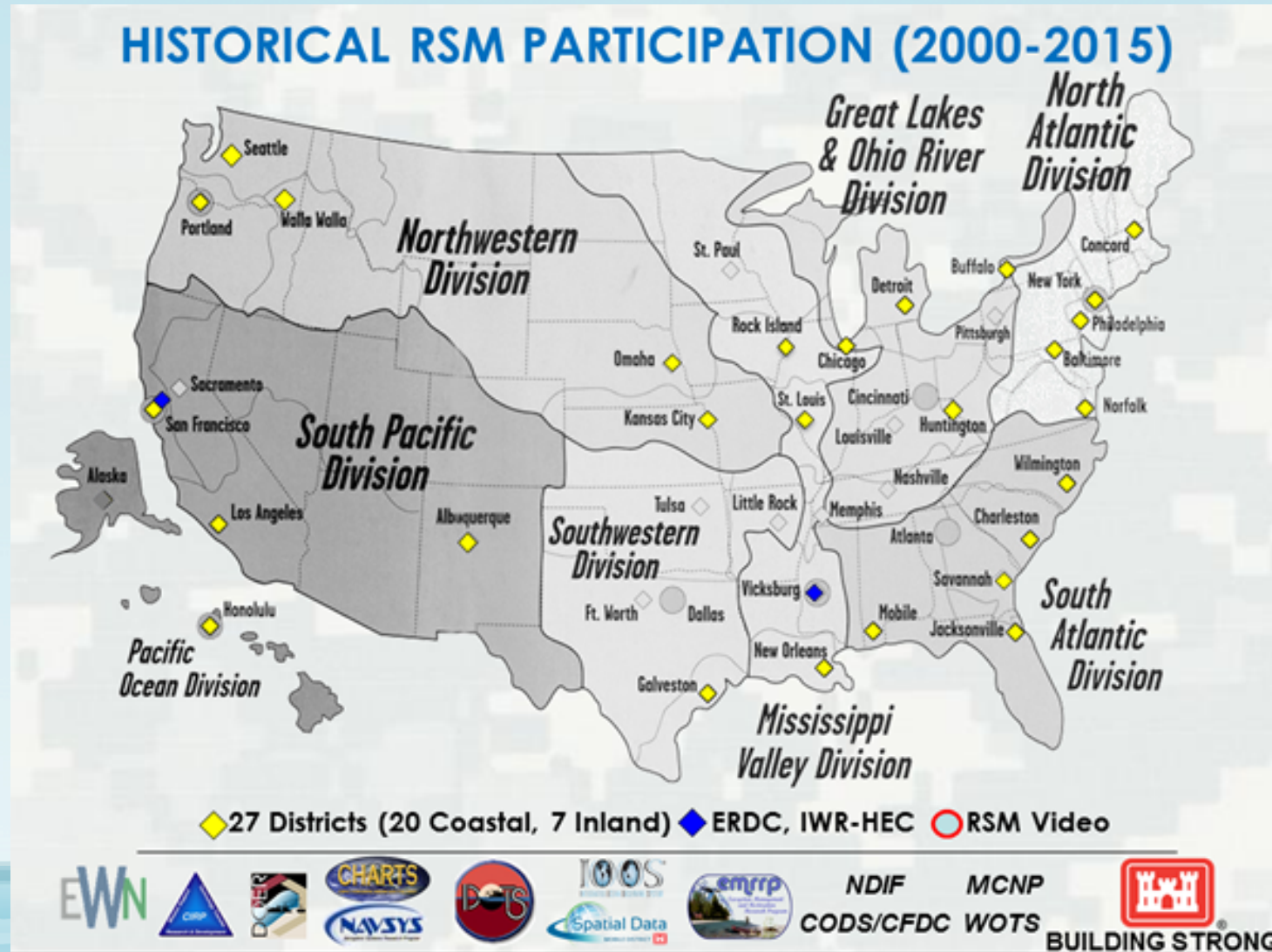
Initial Construction: ●●●● Operations & Maintenance: ●●●●

Coastal Resilience:



Photo: USGS

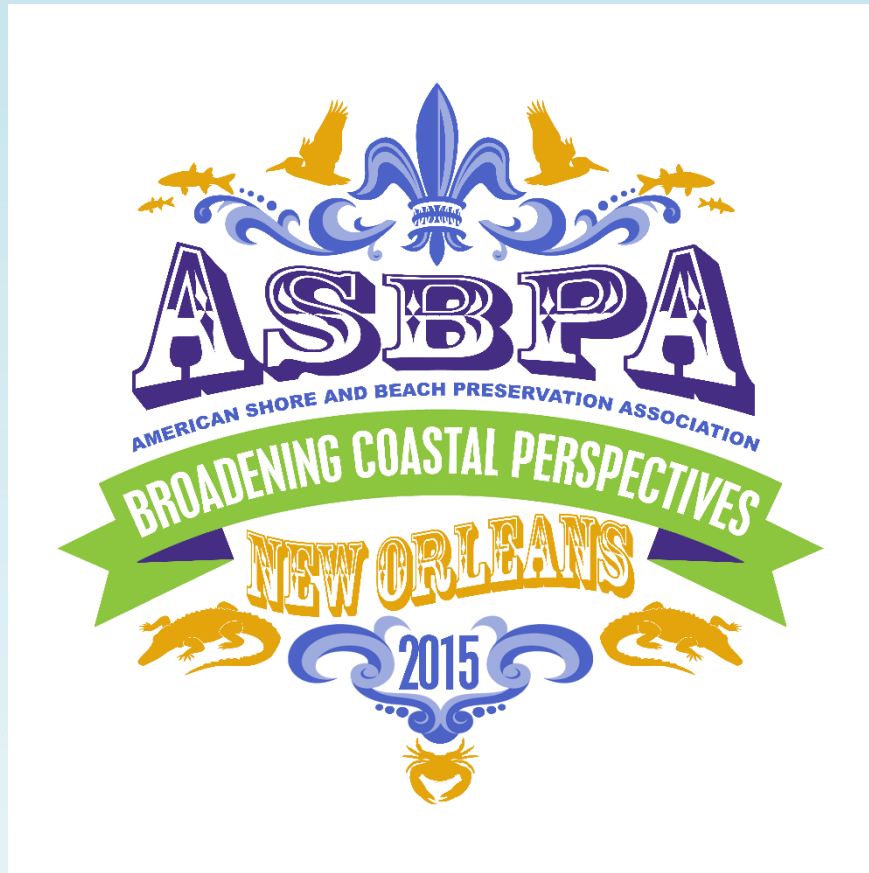
Regional Sediment Management:



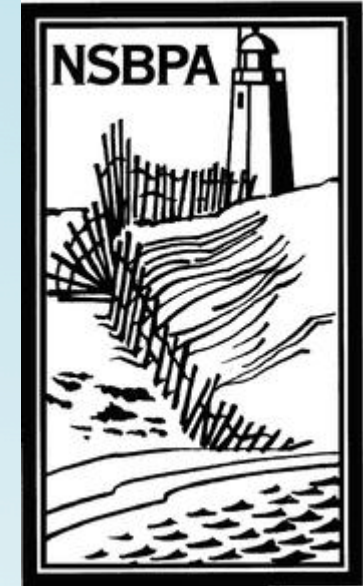
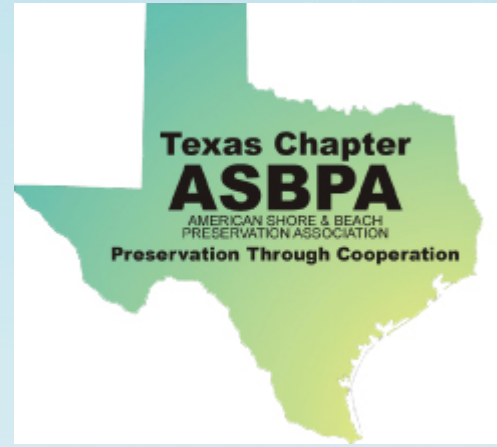
How do we do this?

Science & Policy

Coastal Conference and DC Summit



Chapters



- Great Lakes Shore & Beach Preservation Association
- Central East Coast Shore & Beach Preservation Association

Shore & Beach



Geologists

Engineers

Dredgers

USACE

Students

Ecologists



Elected
Officials

NOAA

Surveyors

It takes partnerships.



Questions?