

# North Atlantic Coast Comprehensive Study Natural and Nature-Based Approaches to Support Coastal Resilience and Risk Reduction

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# Outline

- Coastal Risk Reduction and Resilience and Natural and Nature-Based Features (NNBF)
- NACCS NNBF Policy Workshop
- Findings and Opportunities on NNBF Policy and Institutional Barriers
- Questions




# Coastal Risk Reduction and Resilience

*The USACE planning approach supports an **integrated approach** to reducing coastal risks and increasing human and ecosystem community resilience through a combination of **natural, nature-based, non-structural and structural measures**. This approach considers the engineering attributes of the component features and the dependencies and interactions among these features over both the short- and long-term. It also considers the **full range of environmental and social benefits** produced by the component features.*

**Coastal Risk Reduction  
and Resilience**

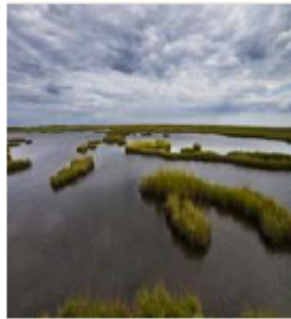
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# Natural and Nature-Based Infrastructure at a Glance

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



## Dunes and Beaches

### Benefits/Processes

- Break offshore waves
- Attenuate wave energy
- Slow inland water transfer

### Performance Factors

- Berm height and width
- Beach Slope
- Sediment grain size and supply
- Dune height, crest, width
- Presence of vegetation

## Vegetated Features:

### Salt Marshes, Wetlands, Submerged Aquatic Vegetation (SAV)

### Benefits/Processes

- Break offshore waves
- Attenuate wave energy
- Slow inland water transfer
- Increase infiltration

### Performance Factors

- Marsh, wetland, or SAV elevation and continuity
- Vegetation type and density

## Oyster and Coral Reefs

### Benefits/Processes

- Break offshore waves
- Attenuate 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

# Key Definitions

## Natural and Nature-Based Features

**Natural features are created and evolve over time through the actions of physical, biological, geologic, and chemical processes operating in nature. Natural coastal features take a variety of forms, including reefs (e.g., coral and oyster), barrier islands, dunes, beaches, wetlands, and maritime forests.**

**Nature-based features are those that may mimic characteristics of natural features but are created by human design, engineering, and construction to provide specific services such as coastal risk reduction.**

**The relationships and interactions among the natural and built features comprising the coastal system are important variables determining coastal vulnerability, reliability, risk, and resilience.**





# “Policy Challenges to Using Nature-Based and Green Coastal Features for Risk Reduction and Resiliency” Workshop

- November 20<sup>th</sup>, 2013 at USACE IWR in Alexandria, VA
- 34 participants
- Breakout groups and plenary sessions generated discussion and input



# Questions from Policy Workshop

- **Question #1:** What do you believe are the most significant policy challenges related to the implementation of NNBF? What changes in existing policy would have the greatest positive influence on the implementation of NNBF?
- **Question #2:** What actions could be taken to improve the coordination needed among federal, state and local agencies in order to implement NNBF? What actions could be taken within your own organization to expand opportunities for the implementation of NNBF?
- **Question #3:** What uncertainties or information gaps impede decision making for NNBF projects? How can progress be made on implementing NNBF in view of these uncertainties? How do existing policies support or impede the application of adaptive management to NNBF projects?
- **Question #4:** How can communication across the organizations interested in NNBF (including governmental and non-governmental organizations) be improved?



# KEY FINDINGS AND OPPORTUNITIES





# Science, Engineering, and Technology

- Knowledge and Data Deficiencies on NNBF
  - Performance
  - Timing
  - Scale
  - Lifecycle costs to operate and maintain
  - Effects of sea level rise and climate change
- Policies and resources are needed to address these deficiencies.



# Science, Engineering, and Technology

- Ecosystem Goods and Services (EGS)
  - The kinds of EGS and the extent of EGS provided by different NNBF solutions are generally poorly understood.
  - Need means to perform full valuations of the complete range of EGS provided by NNBF.
  - Policies to inform cost-benefit valuations of the EGS provided by NNBF are needed for project prioritization and agency budgeting.
  - There is a need for policies regarding the use of non-monetized benefits and direction on how to monetize benefits provided by NNBF.



# Science, Engineering, and Technology

- Adaptive Management
  - Many federal agencies lack funding or clear mandates to conduct adaptive management.
  - Adaptive management can be impeded by NEPA requirements although the use of a tiered or programmatic approach can overcome these issues.
  - Existing policies hamper the application of adaptive management in municipalities.





# Science, Engineering, and Technology

- Opportunities
  - NNBF demonstration projects are needed.
  - Need to develop case studies, best practices, and guidance documents on NNBF.
  - Create risk and resiliency performance metrics for NNBF.
  - Need to more effectively and transparently share information between the government, stakeholders, and general public about NNBF.



# Leadership and Institutional Coordination

- Land use planning and zoning policies often do not encourage, and can limit the use of NNBF.
- All USACE flood and coastal storm damage reduction projects require a cost sharing partner, but aligning budgets and schedules for cost-sharing partnerships is an ongoing challenge.
- Integration and coordination of planning and regulatory processes within and among local, state, and federal agencies is needed to inform planning and regulatory activities before decisions and investments are finalized.
- Projects are often regulated on a “case by case” basis that precludes the development of comprehensive programmatic, regional, landscape, or system focused projects.
- There is a need for policies that support efficient coordination and decision making for NNBF projects that could impact wetlands, threatened and endangered species, or essential fish habitat.



# Leadership and Institutional Coordination

- Emergency Response

- Some authorities restrict what can be built using emergency funds. Potential changes to these policies should be discussed.
- Aid provided after emergencies should be delivered in a strategic way by implementing updated and more resilient solutions, including NNBF, as opposed to rebuilding to pre-disaster conditions.
- A gap in coordination between the emergency response, recovery, and mitigation communities is currently present that could be addressed to encourage the implementation of more resilient solutions following a disaster.



# Leadership and Institutional Coordination

- Opportunities

- Improve regional coordination through existing mechanisms such as Silver Jackets and NOAA Sea Grant.
- Utilize public/private partnerships to implement NNBF.
- Develop guidance and policies to promote coordination and data sharing among resource and planning agencies.
- Incorporate NNBF into existing decision support and communication tools.
- Leverage partnerships and funding to promote NNBF in support of community resilience.
- Develop a guidebook with information on NNBF that could be implemented during the process following a disaster.





# Communication and Outreach

- Develop common definitions for NNBF.
- A greater understanding of the costs and benefits of NNBF is needed to be able to compare these features to more traditional structural methods.
- Communication needs to be improved at multiple levels including between and within Federal, state, and local levels of government.
- Outreach and communication should target private interests and homeowners who determine the types of projects to implement on their land.





# Communication and Outreach

- Opportunities
  - Develop a policy digest with relevant definitions of NNBF, as well as the authorities, roles and responsibilities of Federal, state and local agencies that have jurisdiction or interest in the implementation of NNBF.
  - Form a NNBF community of practice.
  - Develop guidance and tools for private interests and landowners with information on the use, implementation and performance of NNBF.



# Questions?

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