Maryland Coastal Resiliency Assessment: Natural Solutions for More Resilient Communities

Nicole Carlozo, Maryland Department of Natural Resources
Coastal Resiliency Goal

Identify locations where existing natural features provide risk-reduction benefits to coastal communities impacted by erosion and flooding. Protect and restore habitats that will enhance resiliency.
# Natural Features

<table>
<thead>
<tr>
<th>Natural Feature</th>
<th>Benefits/Processes</th>
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<tr>
<td>Dunes and Beaches</td>
<td>Breaking of offshore waves</td>
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<td>Attenuation of wave energy</td>
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<td>Slow inland water transfer</td>
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<td>Increased infiltration</td>
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<td>Vegetated Features (e.g., Marshes)</td>
<td>Breaking of offshore waves</td>
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<td>Oyster and Coral Reefs</td>
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<td>Barrier Islands</td>
<td>Wave attenuation and/or dissipation</td>
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<td>Sediment stabilization</td>
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<td>Maritime Forests/Shrub Communities</td>
<td>Wave attenuation and/or dissipation</td>
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<td>Shoreline erosion stabilization</td>
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<td>Soil retention</td>
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US Army Corps 2015, *Use of NNBF for Coastal Resilience*
Resiliency – The ability of a community to prepare for, respond to, and recover from a coastal hazard event.

• Where are the people?
  – Are there demographic/social metrics or community characteristics that limit community resiliency?

• Where are the hazards?
  • Identify physical parameters that contribute to erosion and inundation risk.

• Where are the habitats?
  • Identify natural features that provide risk-reduction benefits.
Study Area

Furthest extent of flood hazard event:

Hurricane Events Category 1-4

Sea, Level, and Overland Surges from Hurricanes Model

Landscape Scale – Coast
Community Flood Risk Areas

- Residential areas less equipped to prepare for, respond to, or recover from coastal hazard events.
  - Population Density (Residential Focus)
  - Social Vulnerability (Age, Income, Language Proficiency)
  - Probability of Exposure (Floodplain)

Risk Areas
(PDI + SVI) X (Probability of Exposure)

- 1 - Very Low
- 2 - Low
- 3 - Moderate
- 4 - High
- 5 - Very High

Population Density  Social Vulnerability  Exposure Probability
Social Vulnerability Index:

- US Census Bureau Block Groups
- 2013 American Community Survey, 5-year estimate
  - % Population <17 or ≥ 65 yrs old
  - % Population with Income Below Poverty
  - % Population of non-proficient English Speakers
- 5 Quantile Re-Classification
A Closer Look at Annapolis: Community Flood Risk

• Focus on residential land use limits applicability to commercial/industrial areas.
• Demographics are not weighted, leading to greatest influence by floodplain layer.
• Risk based on flood inundation, not SLR
Coastal Exposure and Habitat Role

- Where do Habitats Reduce Exposure to Coastal Hazards?
  - Identify High, Moderate, Low Hazard Shorelines based on physical characteristics.
  - Evaluate Habitat Role in Reducing Exposure based on habitat presence/protectiveness.
Priority Shoreline Areas

• Tier 1 Shorelines
  – High Habitat Role
  – Within 2km of Risk Area
  – 22% of shoreline
  – Conserve/Maintain/Enhance Habitats

• Tier 2 Shorelines
  – Moderate Habitat Role
  – Within 2 km of Risk Area
  – 40% of shoreline
  – Restore – action depends on site conditions (hazard level, development level)
The Index ranks marshes based on their ability to protect people from coastal hazards.

The Index will be updated as we increase our knowledge of marsh role in coastal protection.
Where should I work?

- Along Tier I shorelines for larger system enhancement or conservation
- Along Tier II shorelines for restoration
- Where coastal habitat is absent/minimal but hazards are high (hybrid green/gray projects)
- Adjacent to dense and/or socially vulnerable communities
- Adjacent to critical infrastructure

Data Access: Coastal Atlas
http://gisapps.dnr.state.md.us/coastalatlas/WAB/index.html
Data Queries

http://gisapps.dnr.state.md.us/coastalatlas/WAB/index.html
Questions?

Nicole Carlozo, Chesapeake & Coastal Service, MD DNR
nicole.carlozo@maryland.gov

For more information:
http://dnr.maryland.gov/ccs/Pages/CoastalResiliencyAssessment.aspx
Coastal Atlas:
http://gisapps.dnr.state.md.us/coastalatlas/WAB/index.html