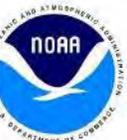




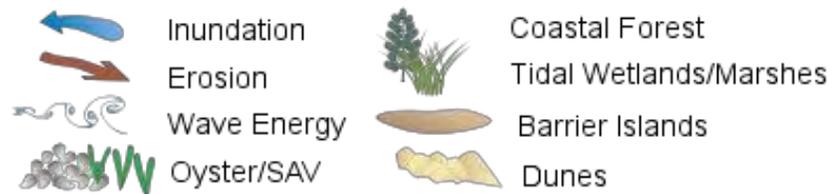
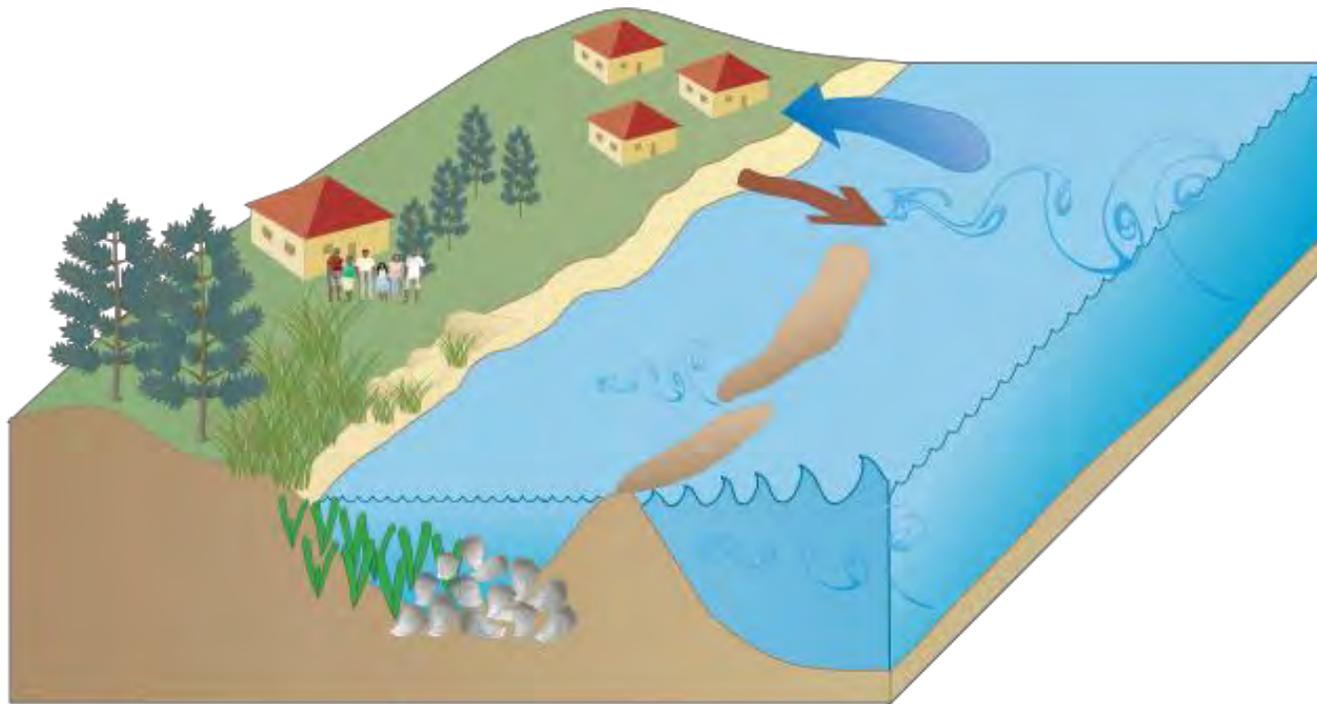
Statewide Coastal Resiliency Assessment: Mapping Natural Solutions for Resilient Maryland Communities

Nicole Carlozo, Maryland Department of Natural Resources

Coast Smart Council
May 16, 2016



Coastal Resiliency Goal



Evaluate the risk reduction benefits of **existing natural features** and establish priorities for conservation and restoration to **enhance resiliency of communities** impacted by coastal hazards.

Coastal Resiliency Partnerships



“Natural Features”

				
Dunes and Beaches	Vegetated Features (e.g., Marshes)	Oyster and Coral Reefs	Barrier Islands	Maritime Forests/Shrub Communities
Benefits/Processes Breaking of offshore waves Attenuation of wave energy Slow inland water transfer	Benefits/Processes Breaking of offshore waves Attenuation of wave energy Slow inland water transfer Increased infiltration	Benefits/Processes Breaking of offshore waves Attenuation of wave energy Slow inland water transfer	Benefits/Processes Wave attenuation and/or dissipation Sediment stabilization	Benefits/Processes Wave attenuation and/or dissipation Shoreline erosion stabilization Soil retention

Coastal Resiliency Evaluation

Terms & Definitions



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.



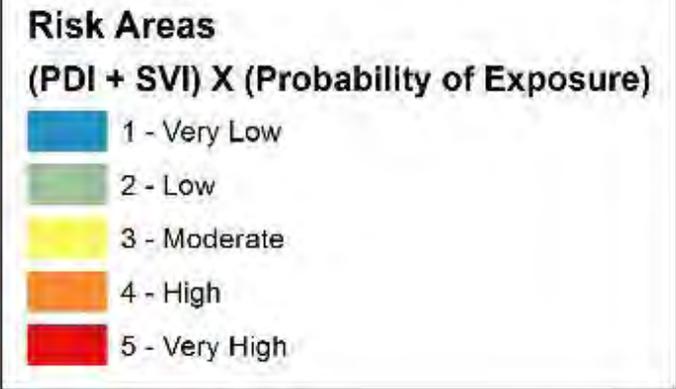
US Army Corps of Engineers
BUILDING STRONG.

natural
capital
PROJECT

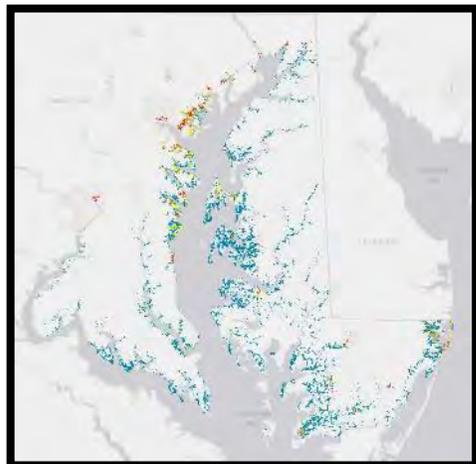


Community Flood Risk Areas

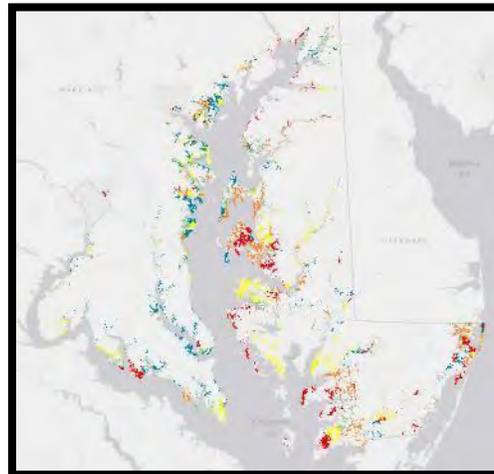
- Residential areas less equipped to prepare for, respond to, or recover from coastal hazard events.
 - Population Density (Residential Focus)
 - Social Vulnerability (Age, Income, Language Proficiency)
 - Probability of Exposure (Floodplain)



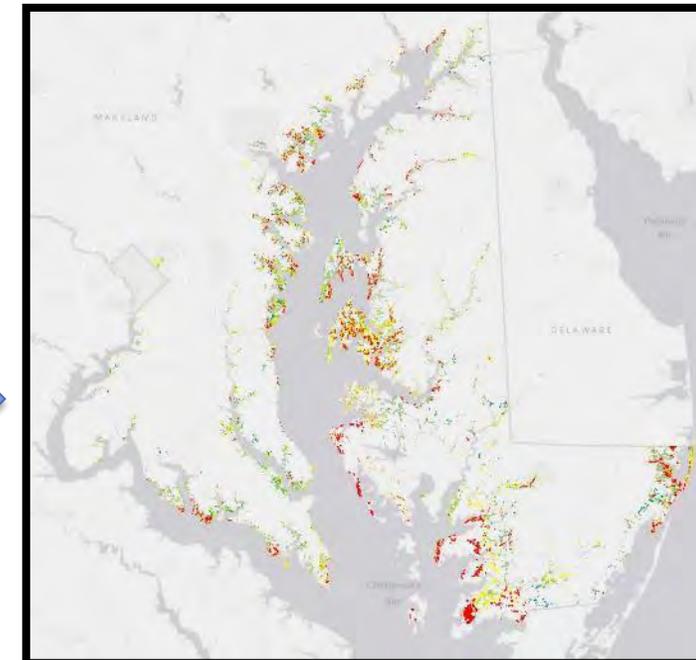
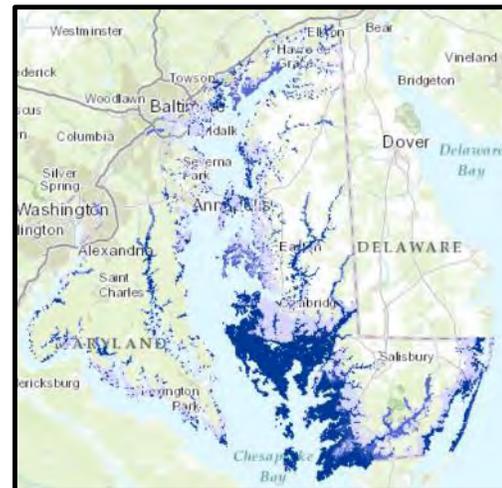
Population Density



Social Vulnerability



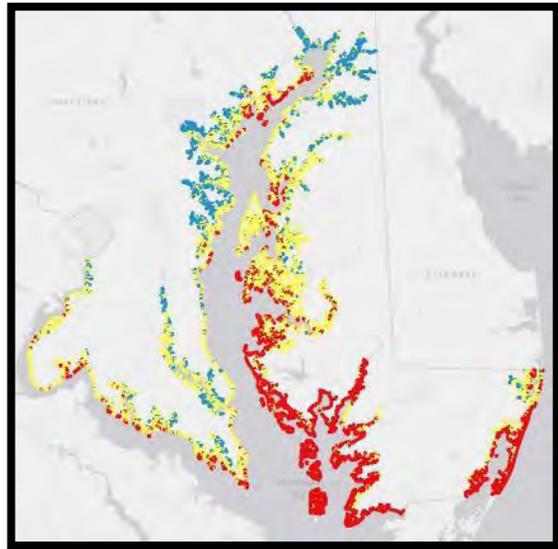
Exposure Probability



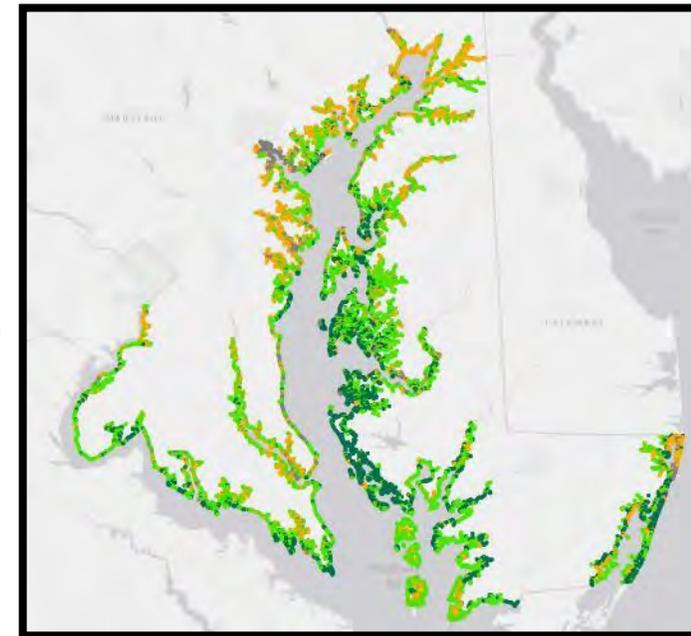
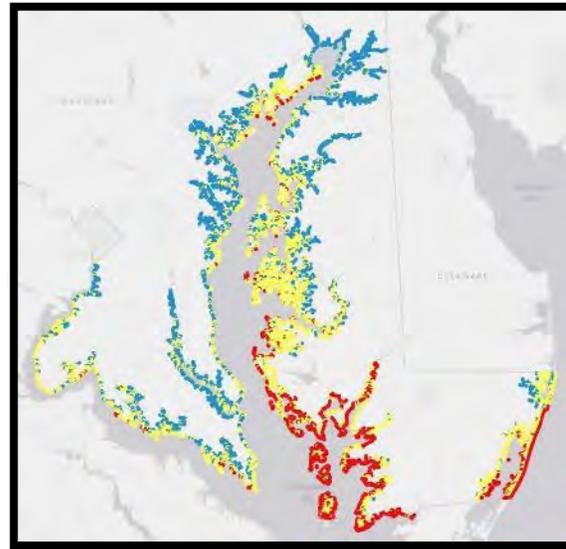
Coastal Exposure and Habitat Role

- Where do Habitats Reduce Exposure to Coastal Hazards?
 - Identify High, Moderate, Low Hazard Shorelines.
 - Evaluate Habitat Role in Reducing Exposure (erosion & inundation impacts).

Hazard based on physical characteristics



Hazard when habitat role is considered



Habitat Role
For Hazard Reduction

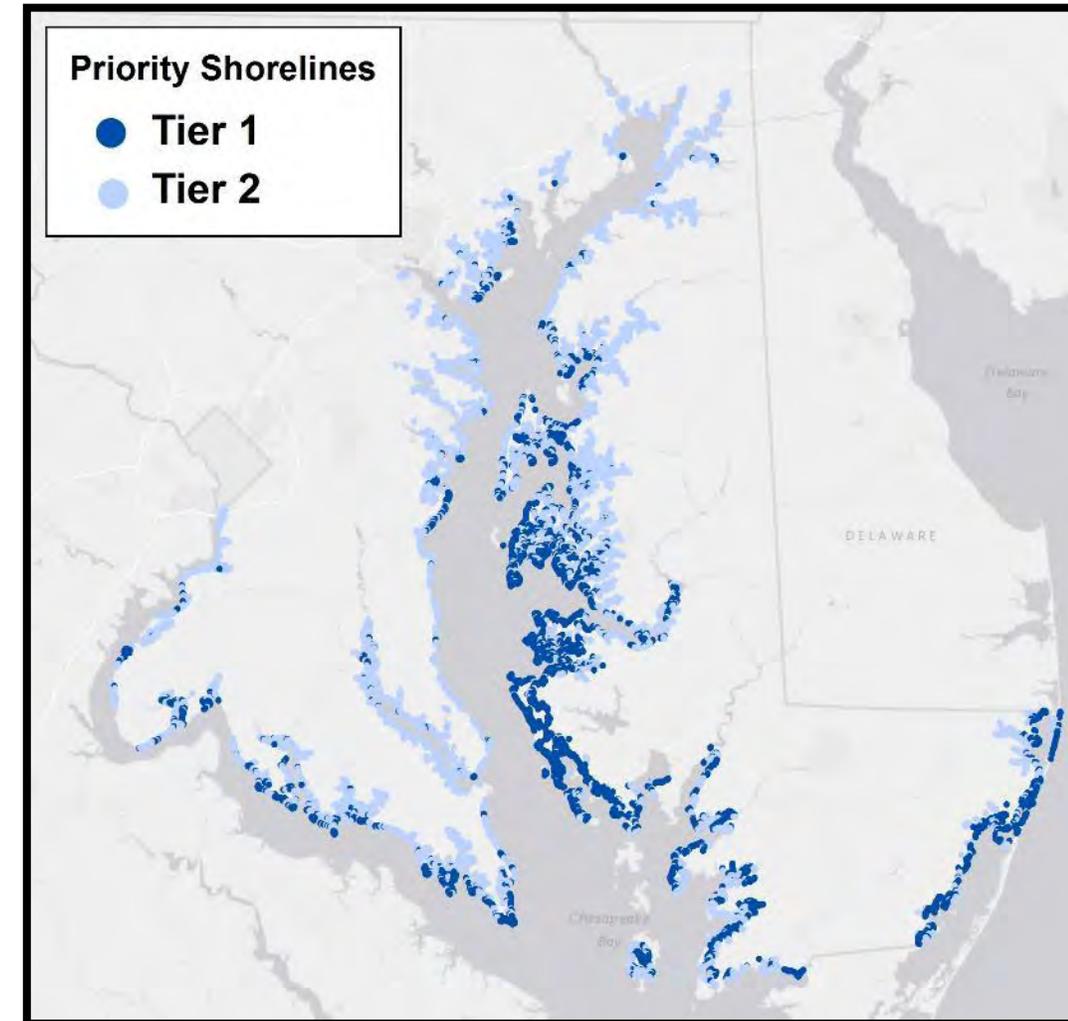
- High
- Moderate
- Low
- None

- Low
- Moderate
- High

High and Moderate Priorities



- **Tier 1 Shorelines**
 - High Habitat Role
 - Transition to High Hazard if Habitats are Lost
 - Within 2km of Risk Area
 - 22% of shoreline
- **Tier 2 Shorelines**
 - Moderate Habitat Role
 - Transition to Moderate Hazard if Habitats are Lost
 - Within 2 km of Risk Area
 - 40% of shoreline



Marsh Protection Potential Index



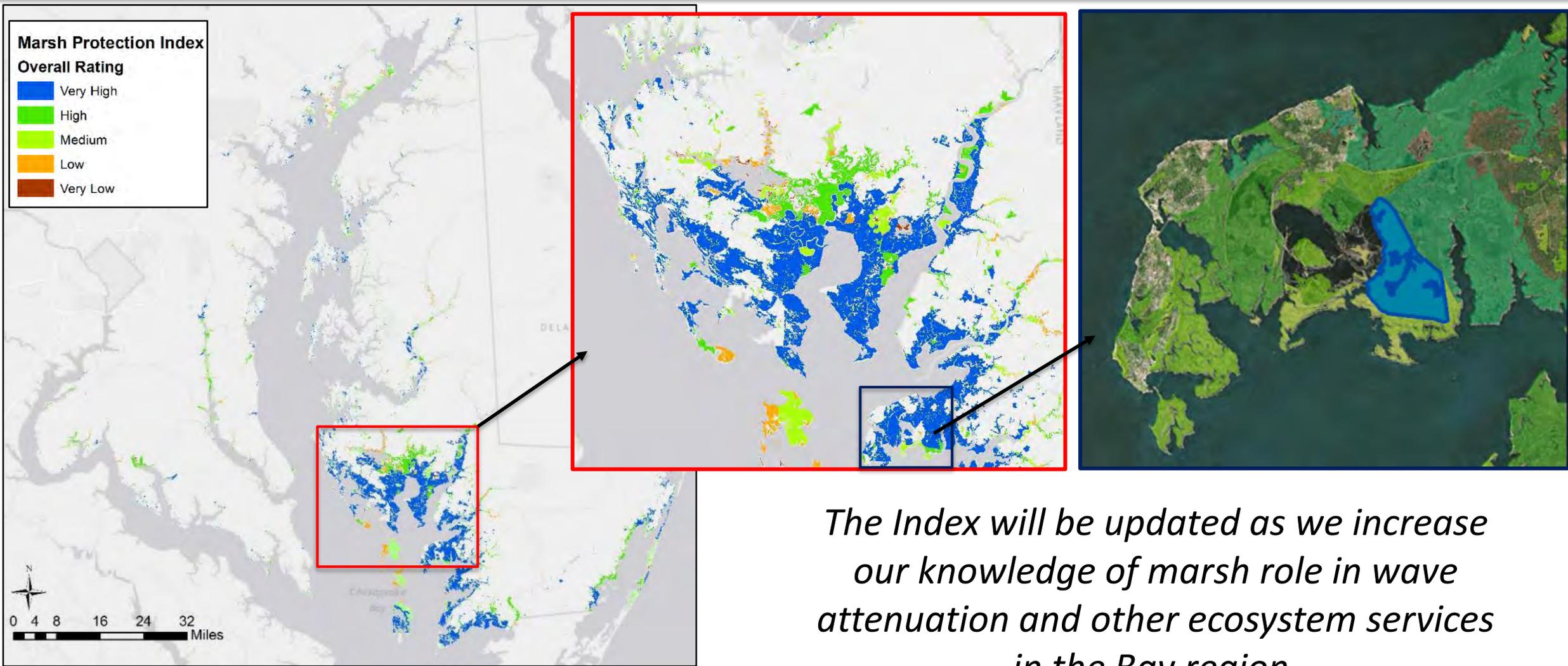
Rank existing marshes by their ability to protect people from coastal hazards, using the following characteristics:

- 1. Protective capacity** (Area/Size)
- 2. Proximity to hazards**
(Shoreline Hazard Ranks; 100/500yr Floodplains)
- 3. Proximity to people** (Population Density/Social Vulnerability Index)
- 4. Persistence** (% of Marsh persisting in 2100; Wetland Adaptation Areas)
- 5. Proximity to other protective habitats** (Coastal Forests; Tidal Wetlands; Dunes; SAV; Oysters)



Photo Credit: NOAA via www.climate.gov

Marsh Protection Potential Index

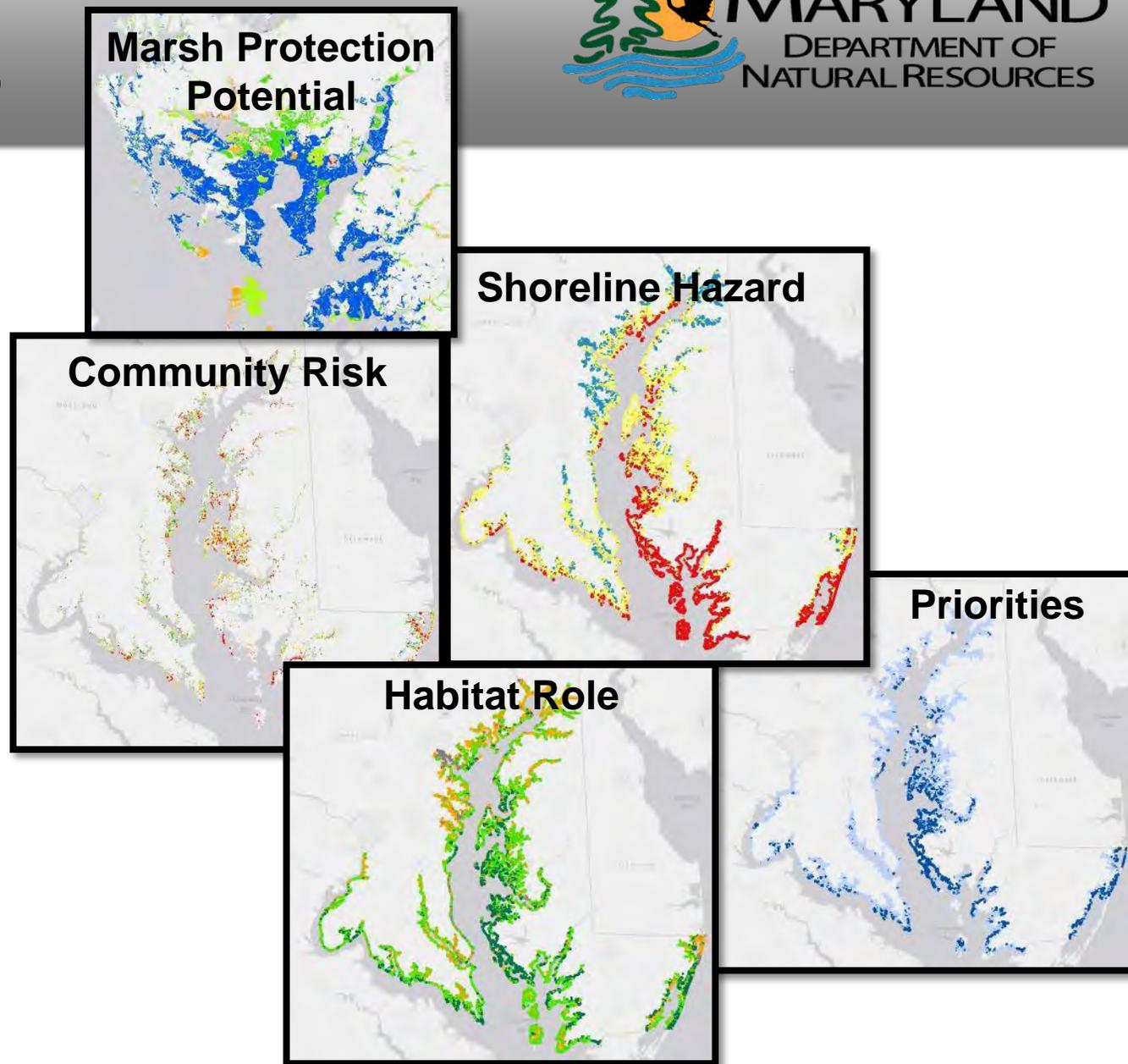


The Index will be updated as we increase our knowledge of marsh role in wave attenuation and other ecosystem services in the Bay region.

DNR Data Applications



- **Land Acquisition**
 - Green Print Ecological Scorecard
 - Easement Review
- **Water Quality**
 - Trust Fund / Green Infrastructure
- **Wildlife & Heritage**
 - Natural Areas Inventory



Broader Applications



- **Restoration:** Where is habitat providing minor protection benefits?
- **GI/Hybrid Creation:** Where is habitat absent along moderate/high hazard shorelines?
- **Conservation:** Where are Priority Shorelines adjacent to the Highest Community Flood Risk Areas?
- **Water Quality/Protection Co-Benefit:** Identify Priority Shorelines and Marshes within Priority Watersheds for water quality improvement.
- **Wildlife Co-Benefit:** Identify Priority Shorelines and Marshes along priorities natural areas.

Questions?

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Special thanks to Steering Committee participants & Reviewers!