



Environmental Justice and Coastal Resiliency

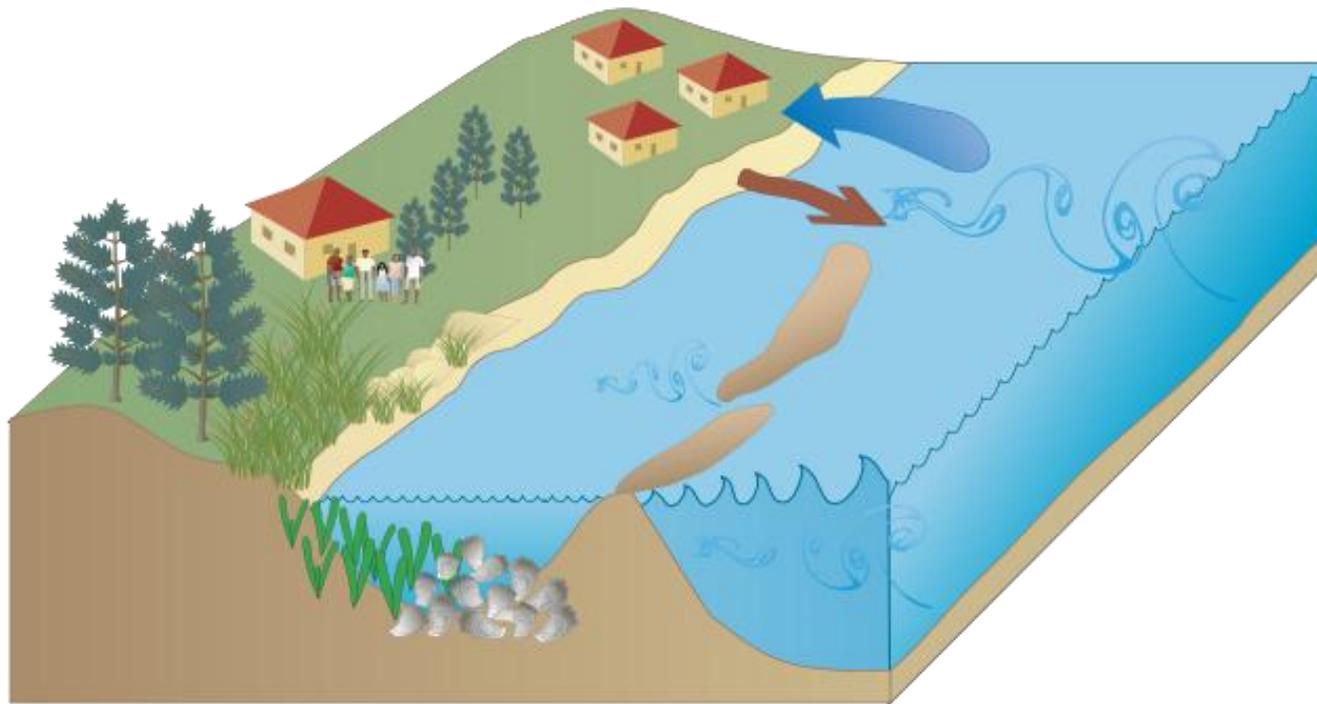
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Chesapeake & Coastal Service

MCCC Mitigation Working Group
March 16, 2017



Coastal Resiliency Assessment

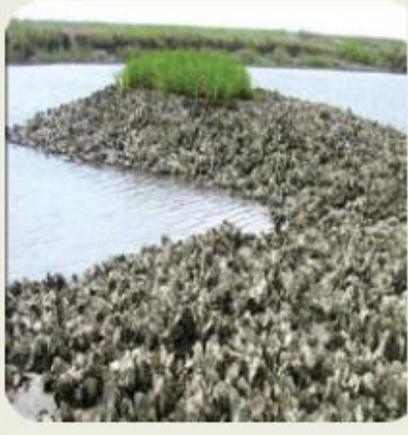


Where are natural features reducing risk for coastal communities?

Where are the state's vulnerable coastal communities?

Protect/restore coastal habitats that will enhance resiliency.

“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 Partnerships



US Army Corps of Engineers
BUILDING STRONG®



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.

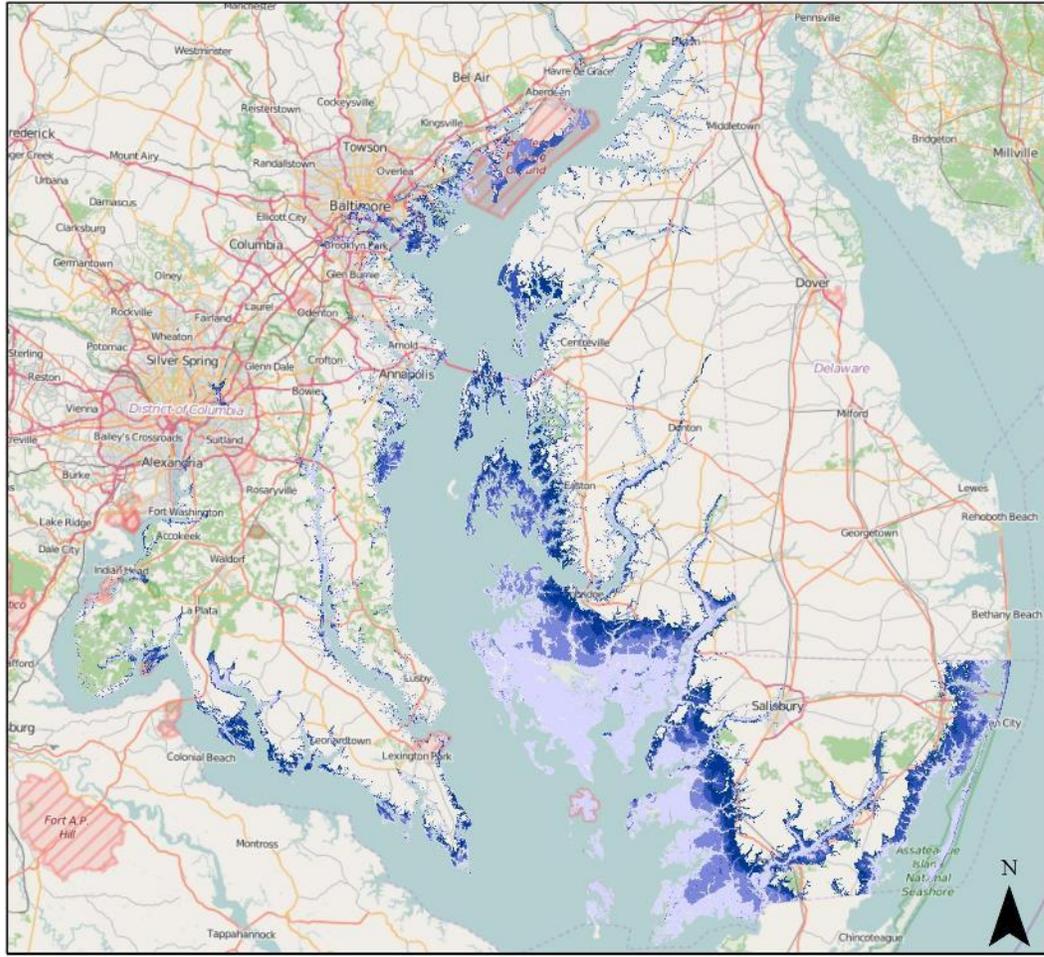


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natural
capital
PROJECT



Study Area



Furthest
extent of flood hazard event:

Hurricane Events Category 1-4

Sea, Level, and Overland Surges
from Hurricanes Model

Landscape Scale – Coast



Vulnerability Metrics (Census Block Groups)



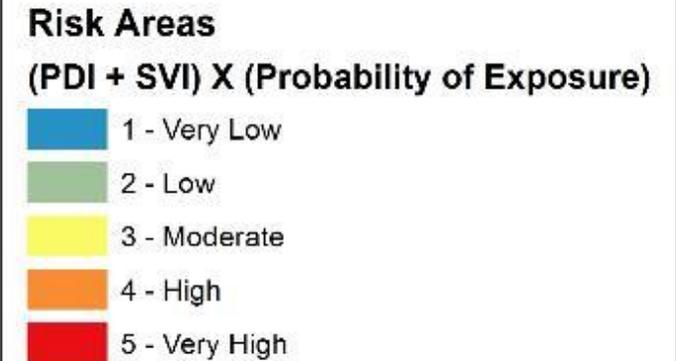
- **Population Density**
- **Age (≤ 17 , ≥ 65)**
- **% Population Income Below Poverty**
- **% Population Non-proficient English Speakers**
- Social Isolation (Religion, Housing Tenure, Living Alone, Vehicle)
- Race
- % Female Population
- Education
- Storm-related Damage: Casualties/Property Loss
- Mobility: Vehicle, Disabled
- Occupation / Single Sector Economic Reliance

Resources

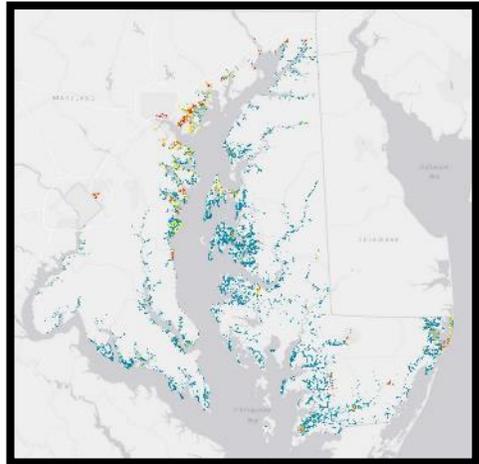
- EPA EJ Screening Tool
- NACCS
- MDP Vulnerable Populations
- MD Park Equity Tool
- Oxford Community Vulnerability Study
- National Adaptation Forum
- Census Bureau / Block Groups

Community Flood Risk Areas

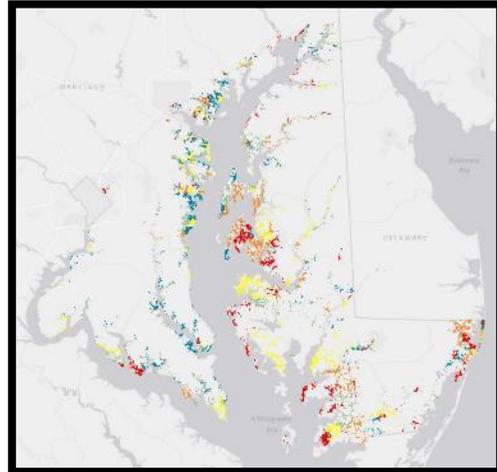
- Residential areas less equipped to prepare for, respond to, or recover from coastal hazard events.
 - Population Density (Residential Focus)
 - Social Vulnerability (Age, Income, Language Proficiency)
 - Probability of Exposure (Floodplain)



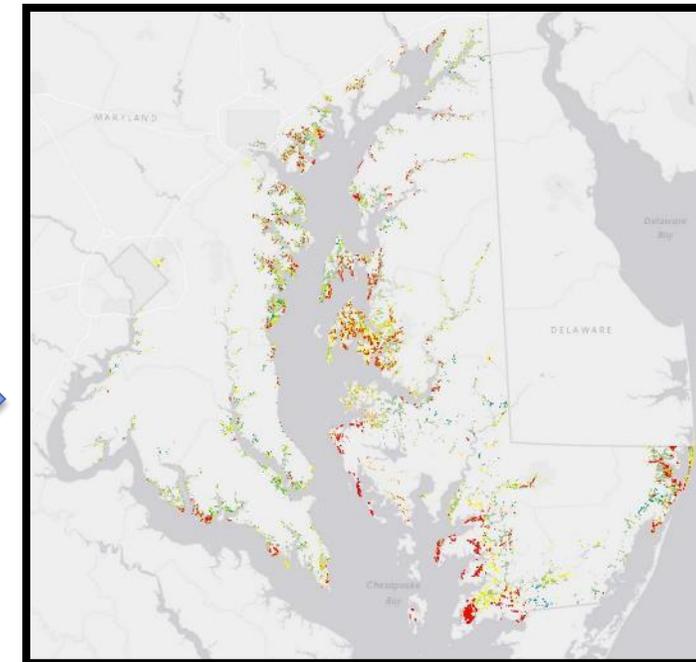
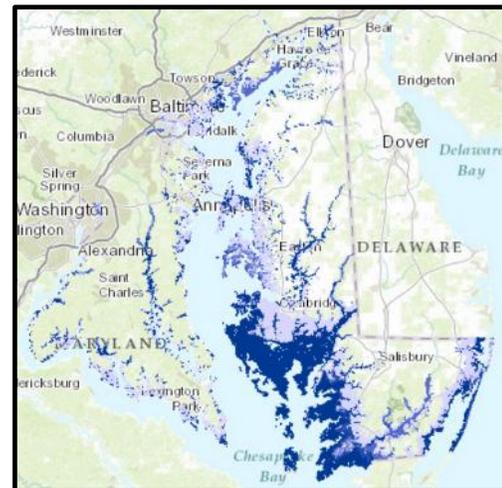
Population Density

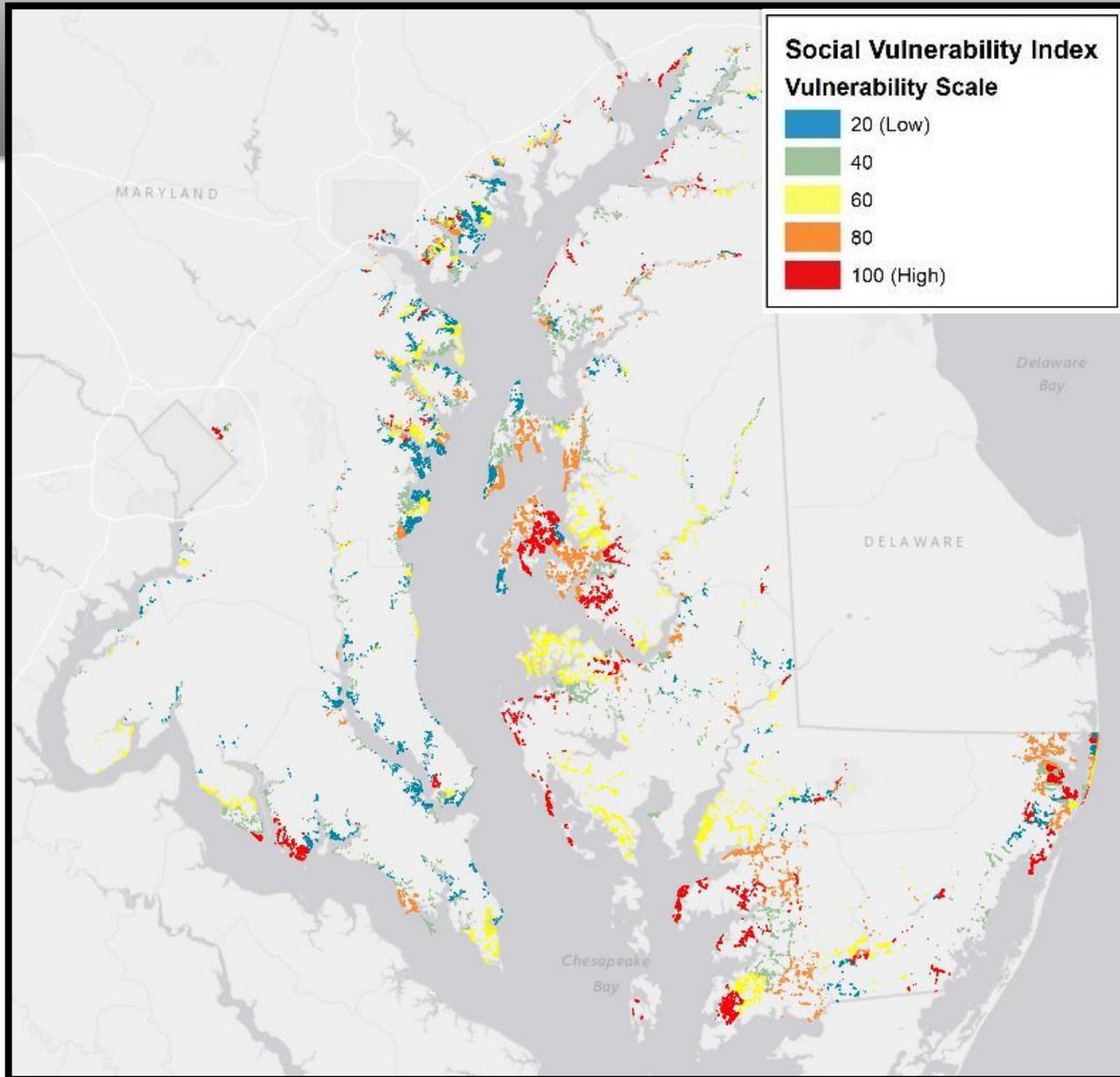


Social Vulnerability



Exposure Probability





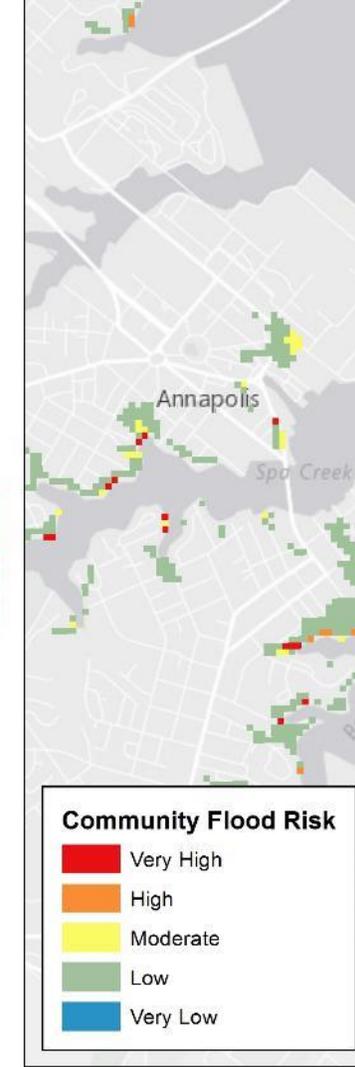
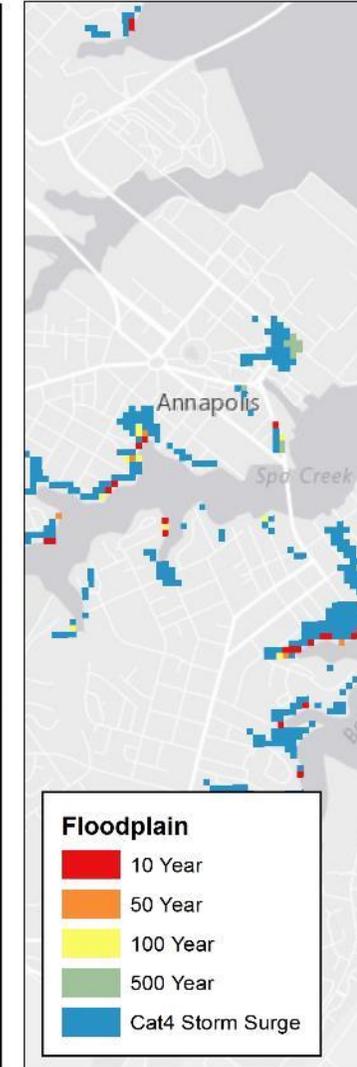
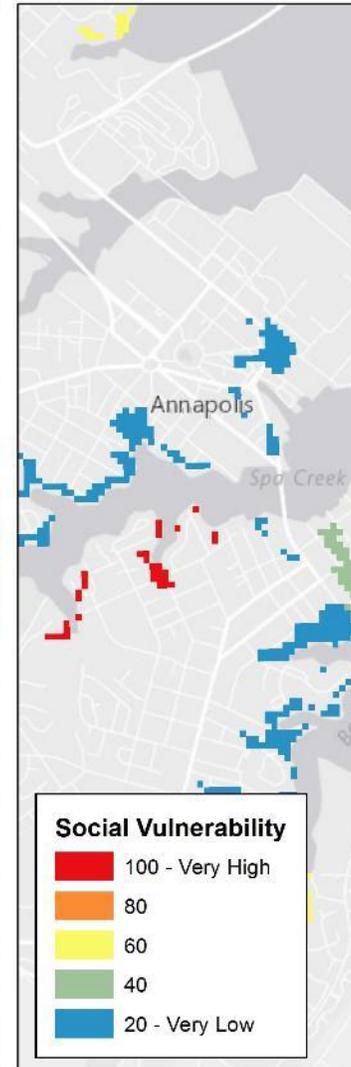
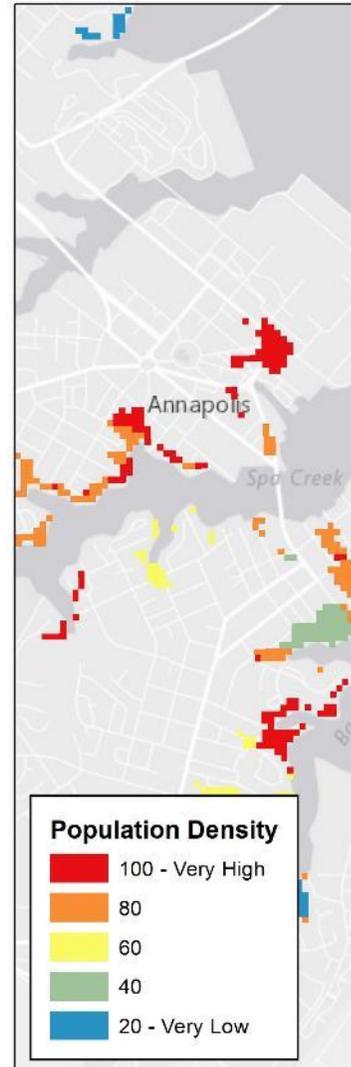
Social Vulnerability Index:

- 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

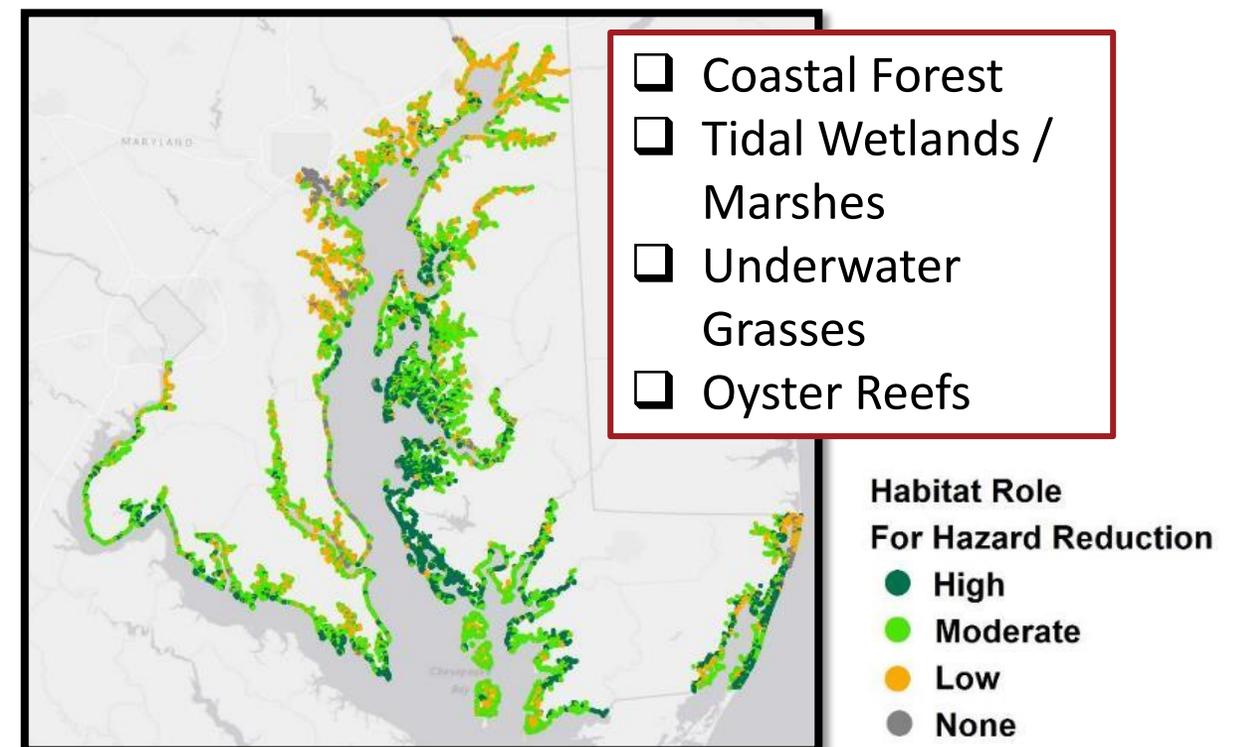
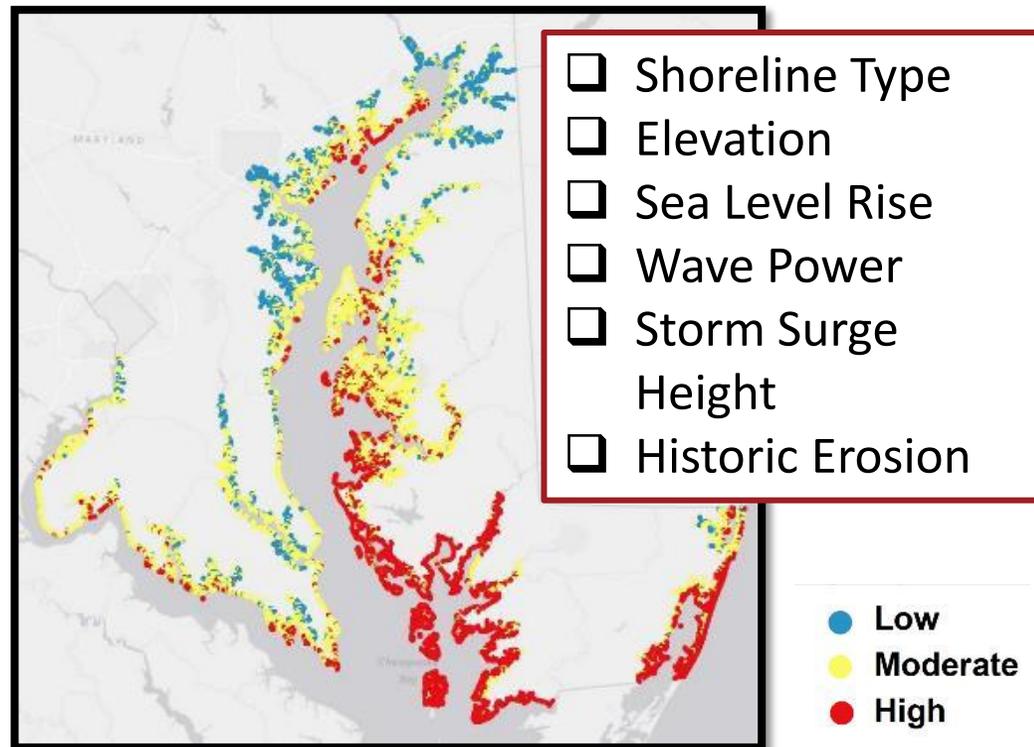


- Focus on residential land use limits applicability to commercial/industrial areas.
- Demographics are not weighted, leading to greatest influence by floodplain layer.
- Risk based on flood inundation, not SLR



Coastal Exposure and Habitat Role

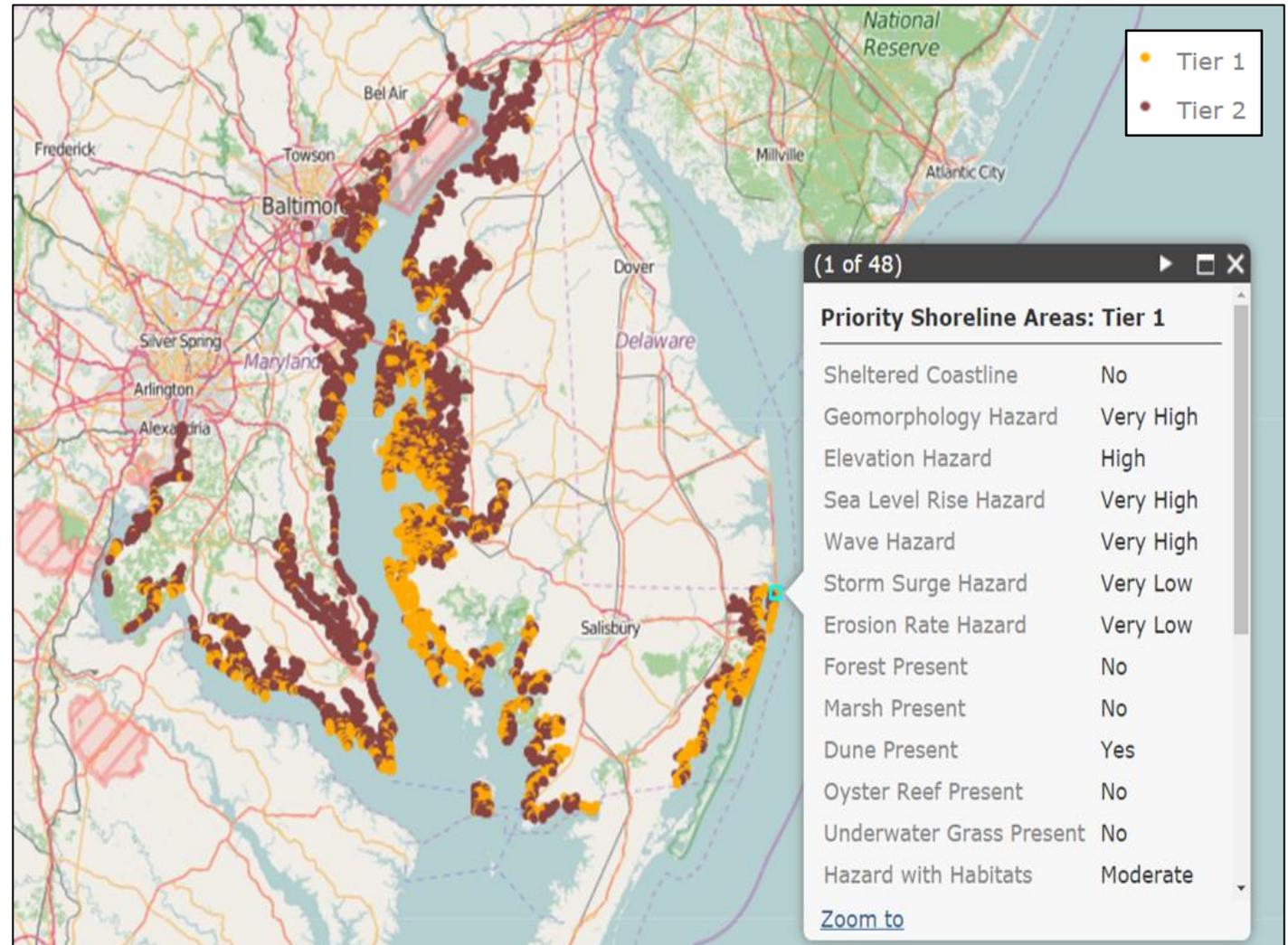
- Where do Habitats Reduce Exposure to Coastal Hazards?
 - Identify High, Moderate, Low Hazard Shorelines based on physical characteristics.
 - Evaluate Habitat Role in Reducing Exposure based on habitat presence/protectiveness.



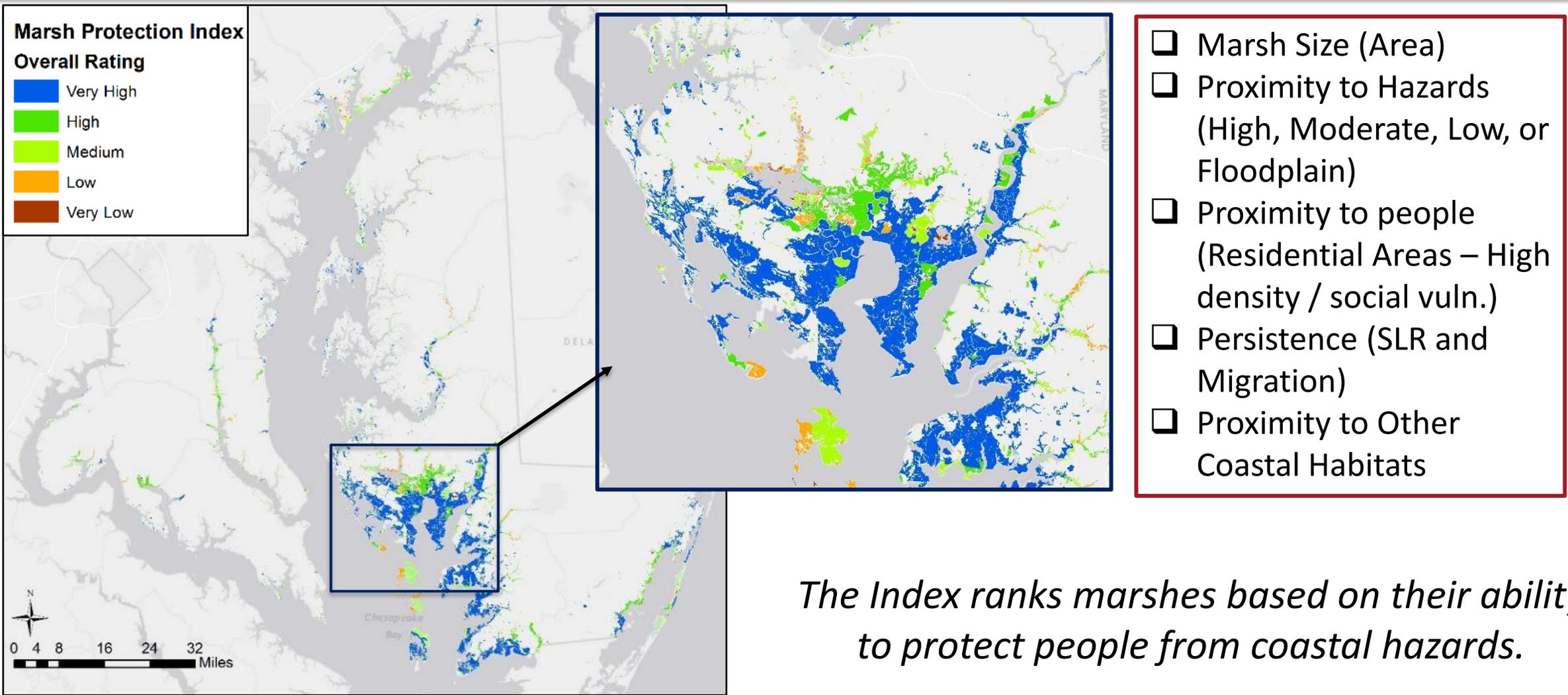
Priority Shoreline Areas



- Tier 1 Shorelines
 - High Habitat Role
 - Within 2km of Risk Area
 - 22% of shoreline
 - Conserve/Maintain/Enhance
- Tier 2 Shorelines
 - Moderate Habitat Role
 - Within 2 km of Risk Area
 - 40% of shoreline
 - Restore



Marsh Protection Potential Index



The Index ranks marshes based on their ability to protect people from coastal hazards.

Want to Learn More?



Coastal Resiliency Assessment Training Manual

June 2016



Using the Coastal Atlas to Make Better Decisions

Chesapeake and Coastal Service

Coastal Resiliency | Recreational Planning | Land Conservation | Working Waterfronts

Maryland's Resiliency Assessment

Coastal Resiliency

With over 7,000 miles of shoreline and about seventy percent of residents living within the coastal zone, Maryland is susceptible to flooding and erosion from tides, storms and sea level rise. Resilient communities are able to prepare for, respond to, and bounce back from these coastal threats. The traditional approach to counteracting coastal threats involves armoring the shoreline with bulkheads and other hardened structures to protect residents and infrastructure. Unfortunately, traditional approaches often increase the rate of erosion along adjacent shorelines, and are very costly to replace once they fail. Natural solutions, on the other hand, can bounce back following coastal storm events and provide many of the same benefits as their structural counterparts.

Natural Habitats, Natural Defenses

Forests, marshes, dunes, oyster reefs and underwater grasses can reduce erosion and flooding impacts for nearby coastal communities, especially when they exist in concert with each other. These habitats buffer communities from the full impacts of tides and storms.



ESRI Story Maps

Citizen Engagement through Participatory Mapping (PGIS)

Maryland plays host to residents and tourists alike who depend on the state's natural resources for boating, fishing, paddling, and many recreational activities. To ensure recreational needs are considered in future decision making, CCS relies on local experts to share their knowledge and stories about where Maryland's recreational resources are located. The Chesapeake and Coastal Service (CCS) invites local experts to share their knowledge about where, when, and how people enjoy certain areas. Participatory mapping on a projected map image that represents general and dominant footprints of where activities take place.

To date, four workshops have been held as part of an ongoing effort to collect recreational use data across Maryland:

- Atlantic Ocean
- Western Maryland
- Choptank River



For more information, visit:

<http://dnr.maryland.gov/ccs/coastalatlus/Pages/CoastalResiliencyAssessment.aspx>

Or email nicole.carlozo@maryland.gov

