

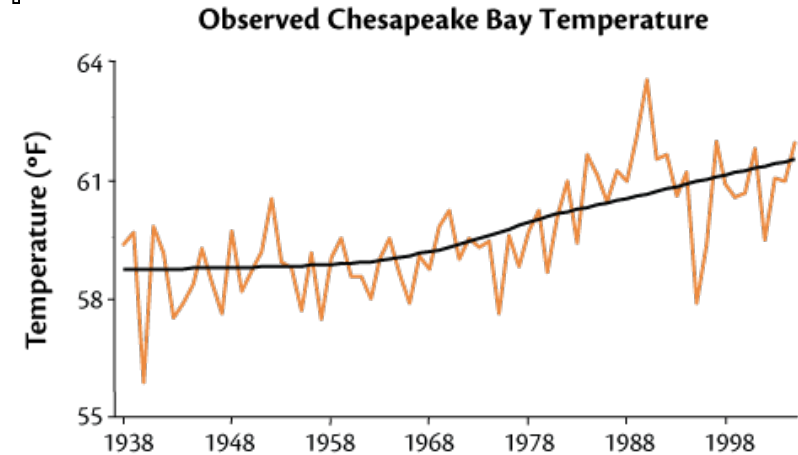
## Planning for Coastal Change: Communities & Land Conservation

Catherine McCall  
New Partners for Smart Growth Conference  
January 31, 2015

# Global Climate Change: Real Consequences for Maryland's Coasts



Sea level has risen approximately 1 ft (.3m) in the last century.



Chesapeake Bay has warmed by more than 2°F.



Extreme Events, such as Hurricane Sandy in 2012, foreshadow MD's vulnerability to climate change impacts.

- ✓ Sea Level Rise: 2- 6 feet (.6 – 1.8 meters)
  - ✓ Temperature: +2 to > 8 degree C
  - ✓ Annual Precipitation: -10% to +20%
    - ✓ Spring Runoff: Higher
    - ✓ Summer Runoff: Lower
    - ✓ More Extreme Events

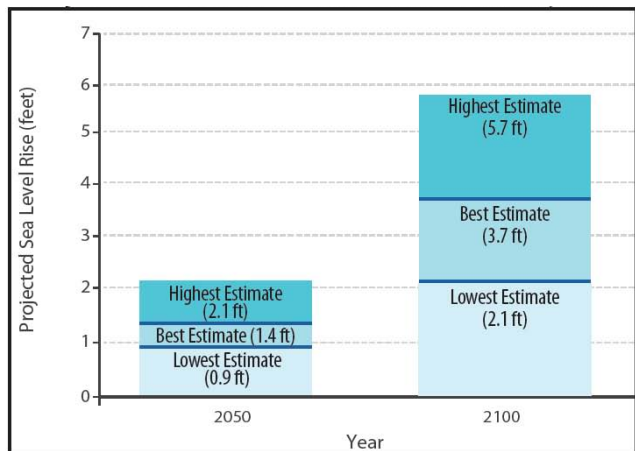
*Global Climate Change =  
Real Consequences for our Coasts*



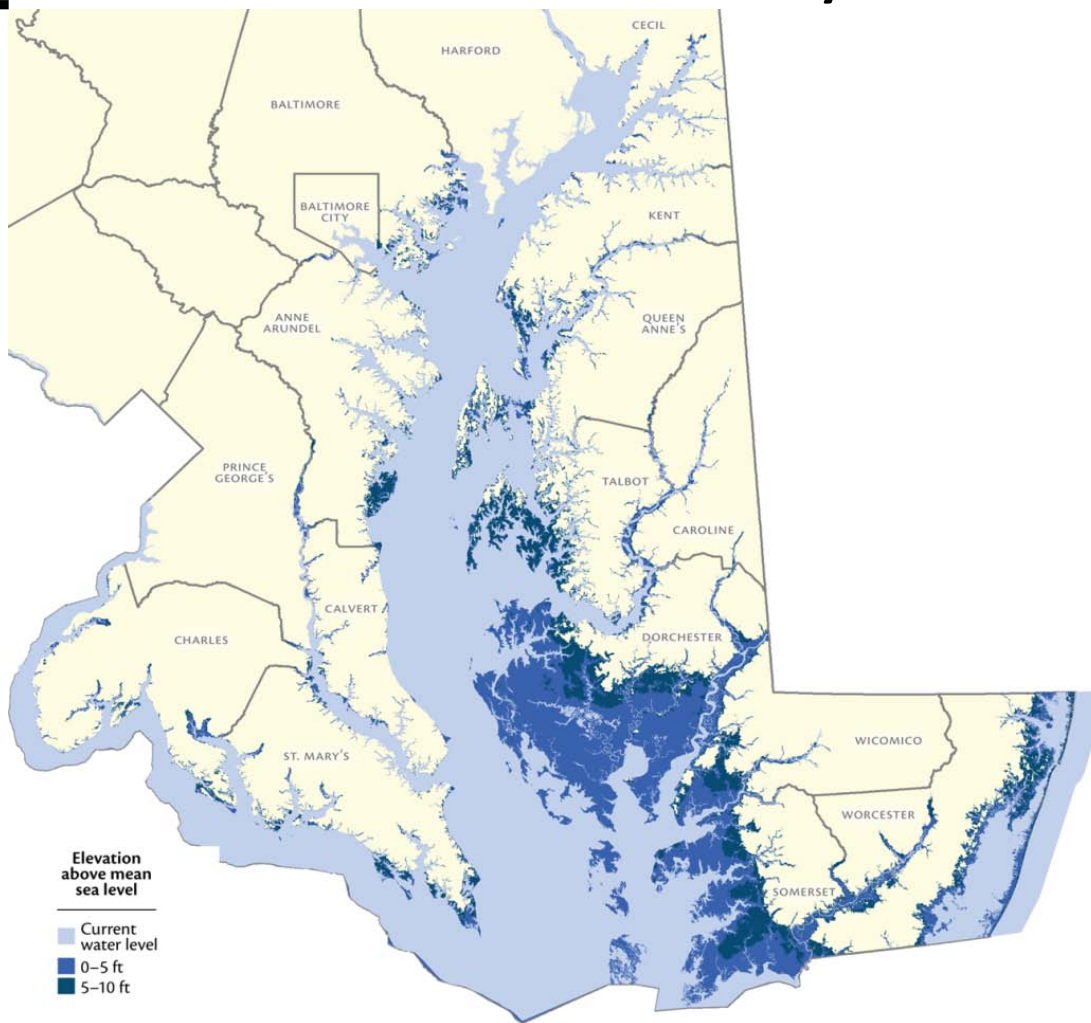
# Future Sea Level Rise

## Sea Level Rise Vulnerability Areas

### Sea Level Rise Projections

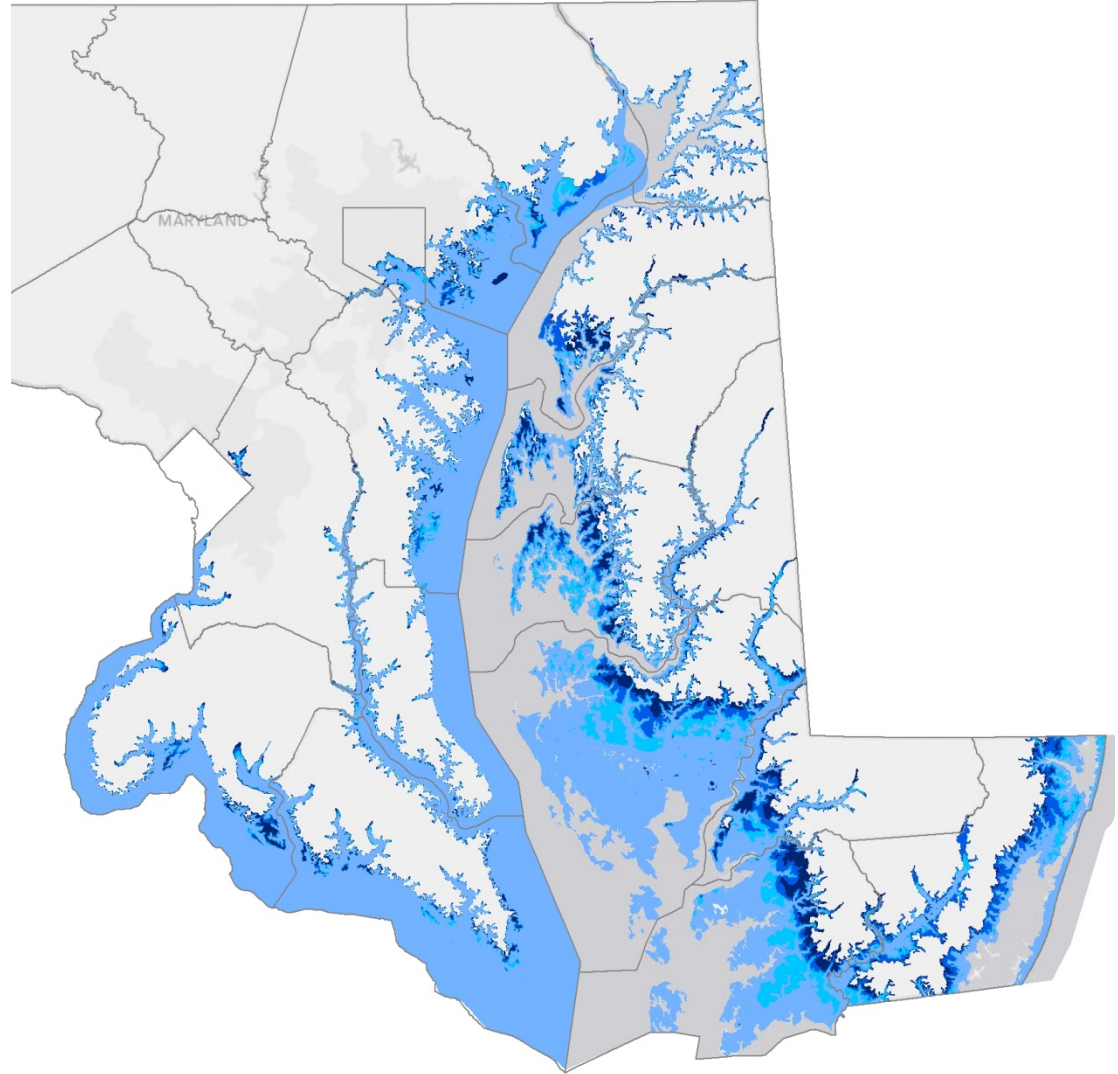


Source: Boesch et al., 2013

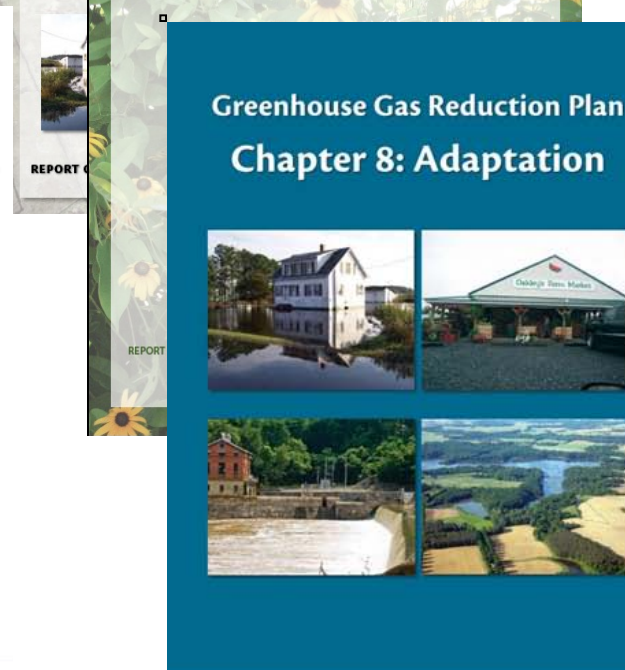
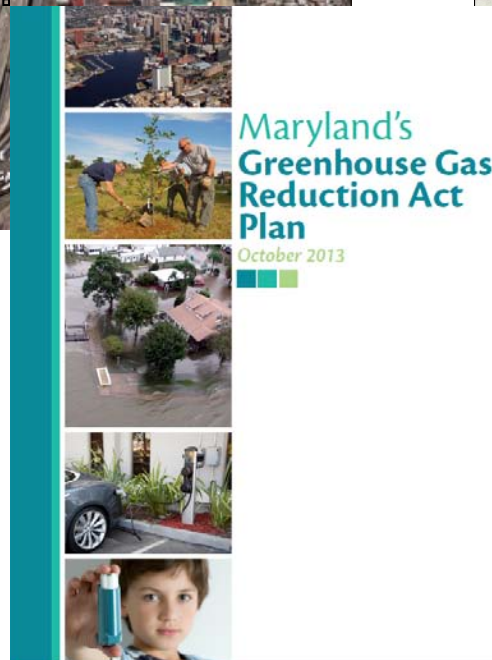
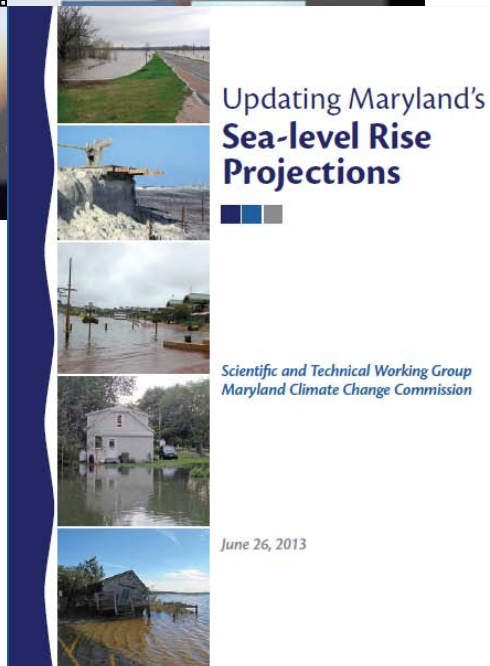
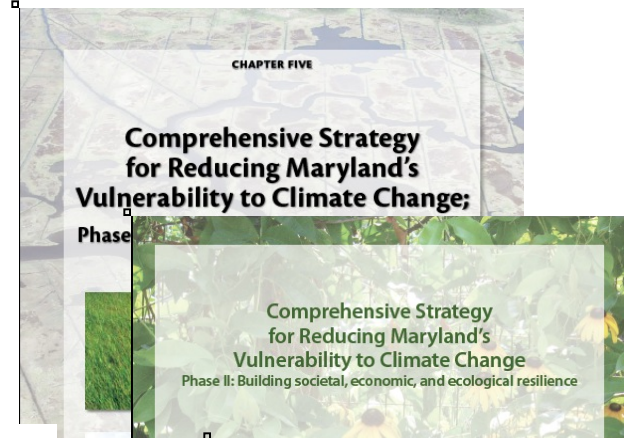
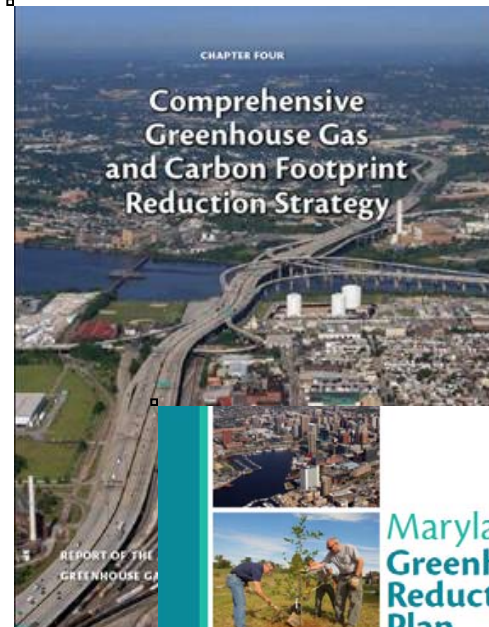
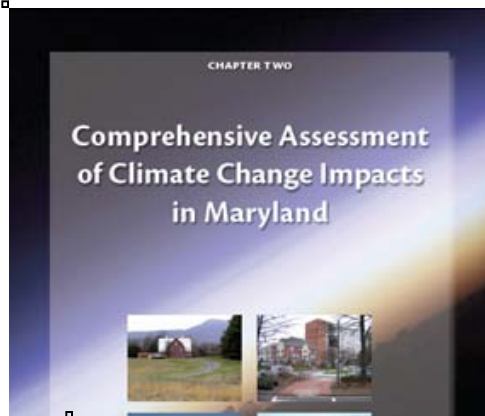


# Storm Surge Risk

- Category 1 (5-7 feet)
- Category 2 (7-11 feet)
- Category 3 (11-19 feet)
- Category 4 (19-24 feet)



# Maryland's Climate Action Plans





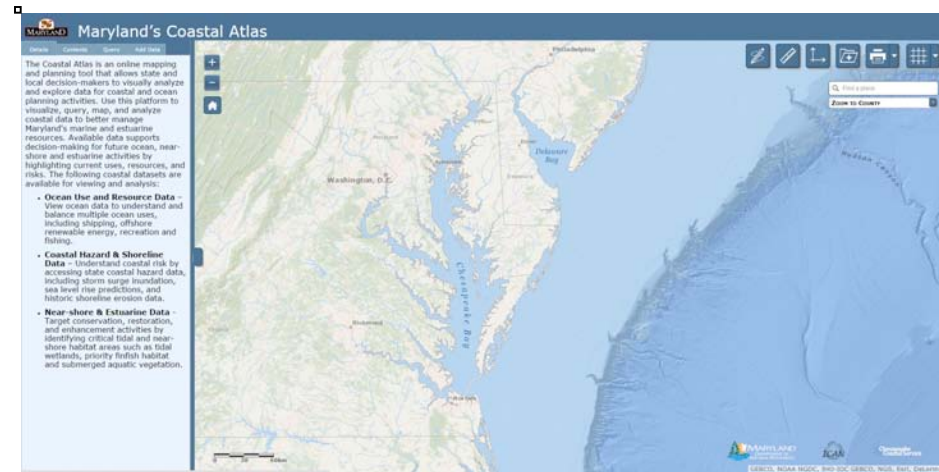
***DNR shall proactively seek the protection of lands that enhance the resilience of bay, aquatic and terrestrial ecosystems.***

- 1) Identify landscape or site-level characteristics that support ecosystem resilience, limitations on future use of the site and opportunities to increase resiliency and/or mitigate adverse impacts.
- 2) Assess land acquisitions for potential impacts of climate change and sea level rise.

<http://dnr.maryland.gov/ccs/coastalatlasc/index.asp>

## Climate Change Data Layers:

- **Sea Level Rise Vulnerability**
- **Storm Surge Areas**
- **Wetland Adaptation Areas**
- **Shoreline Inventory**
- **Historical Shorelines & Shoreline Rates of Change**
- **Erosion Vulnerability Assessment**
- **100 & 500 Year Flood Areas**





# Wetland Migration Corridors

Wetlands provide coastal ecosystem services that include maintaining healthy water quality and coastal community protection such as flood control and storm-surge protection.

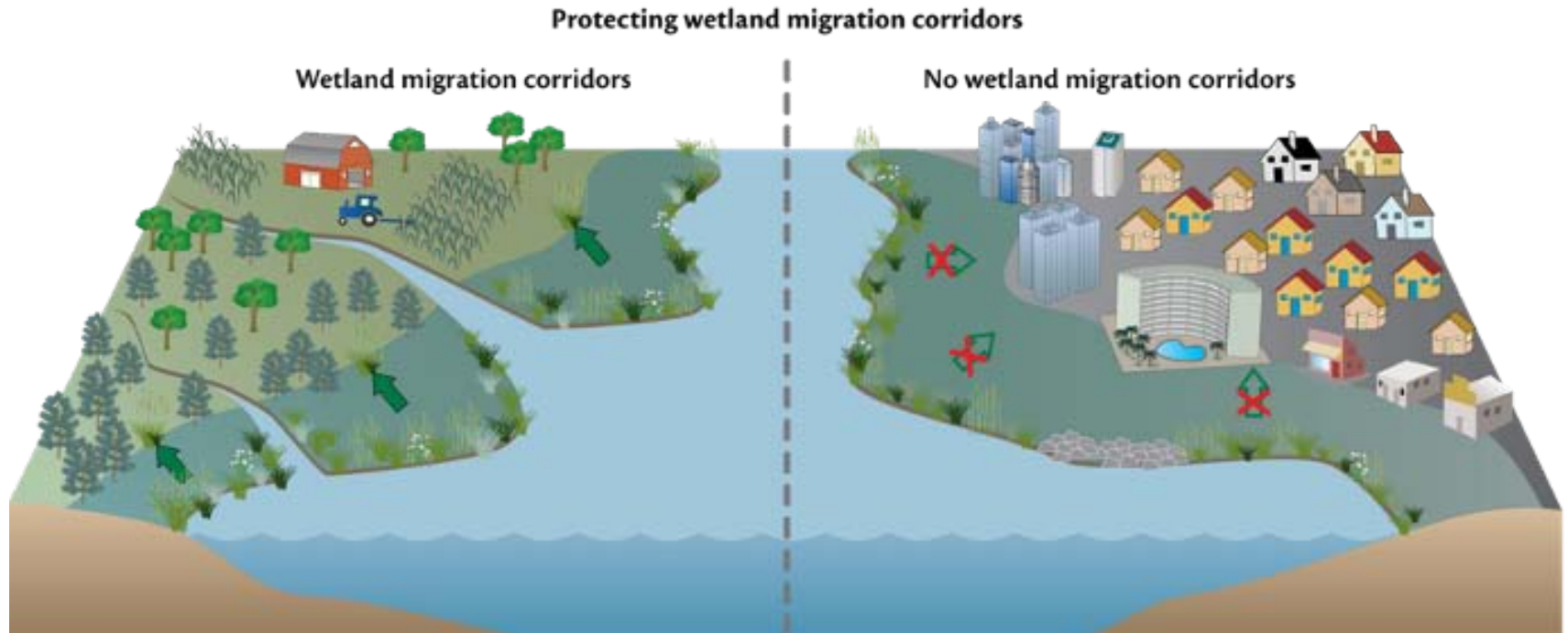










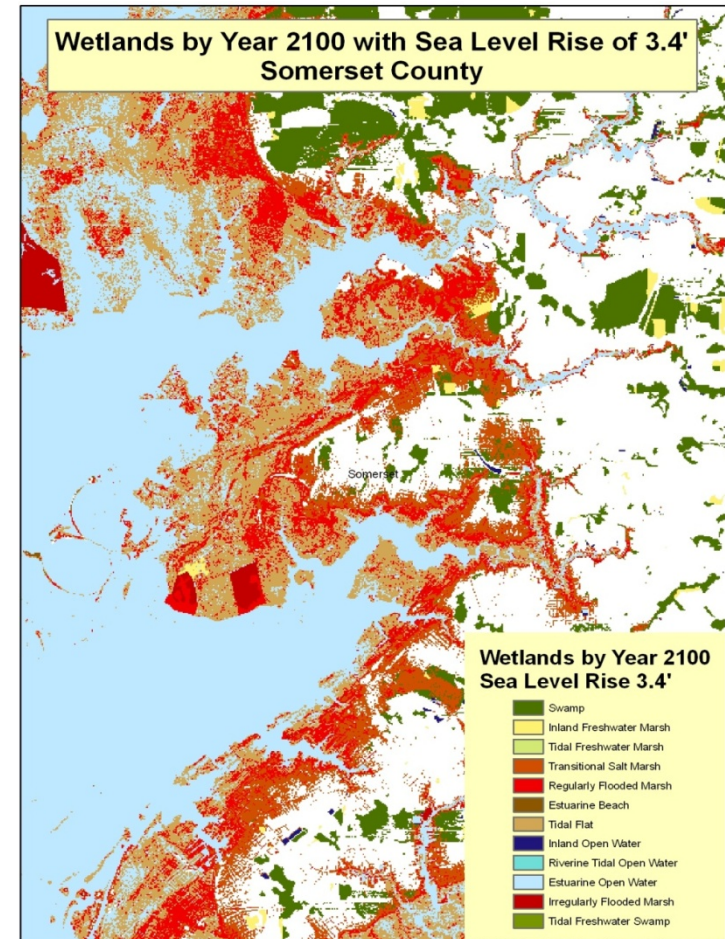
Figure 14. As sea level rises, wetlands may migrate  into open spaces such as forests  and fields . However, wetlands cannot migrate  into areas with man-made barriers such as hardened shorelines  and heavy development such as urban , commercial , and residential areas .

## 1st - Sea-Level Affecting Marshes Model (SLAMM) was run for 2050 and 2100 sea-level rise scenarios.

- SLAMM uses elevation, accumulation of sediments, wetland accretion and erosion rates, and sea level rise to predicatively model long-term wetland and shoreline change.

## • 2nd - Additional analysis was conducted to identify priority conservation areas.

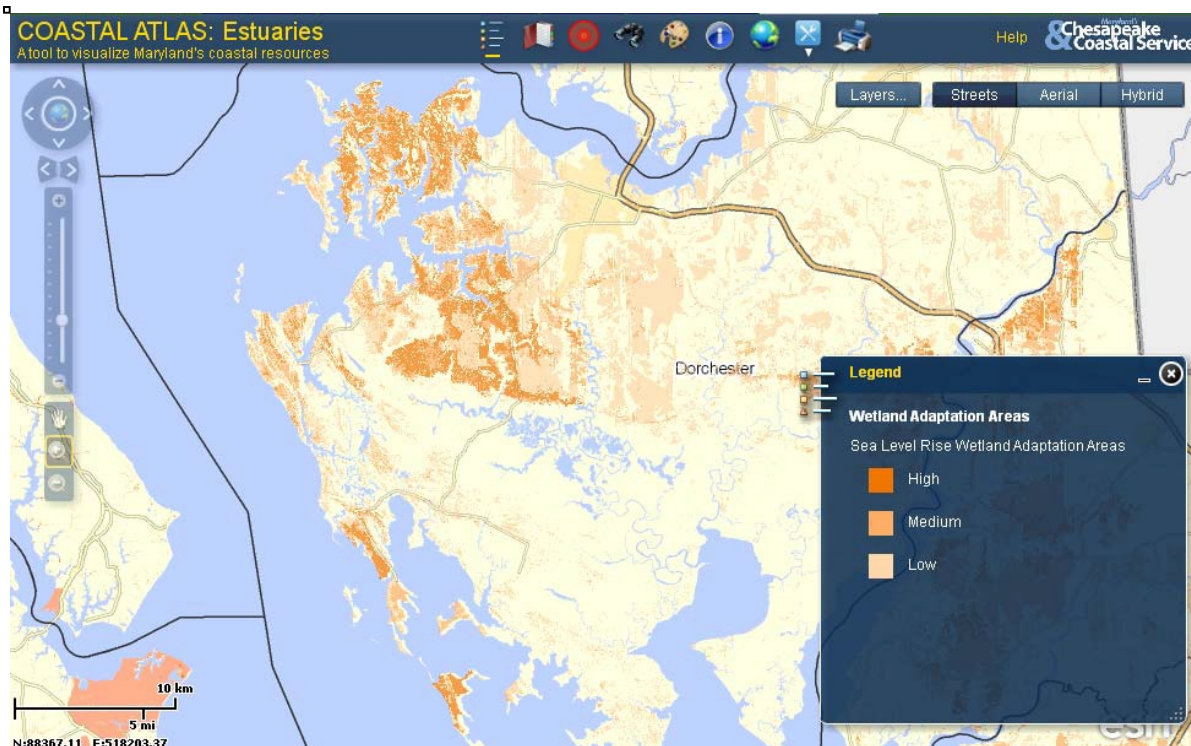
- Targeted key habitat features from 2100 results including large continuous wetland areas, wetland diversity, new wetland areas, breeding marsh-dependent birds, and all future wetland areas by year 2100.
- Priority for areas aligning with existing non-wetland hydric soils and Maryland's Green and Blue Infrastructure Assessments.



# Wetland Adaptation Areas

## 3rd – Results are a range of low, medium and high priority areas called Maryland's Wetland Adaptation Areas

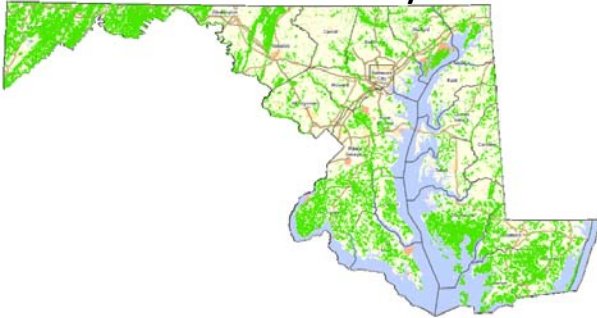
- Top two tiers (medium and high priority areas) were selected as the best-of-the-best and added to Maryland's TEAs.
- 5+ acres on a property is now a trigger for Coastal Resilience Easements.



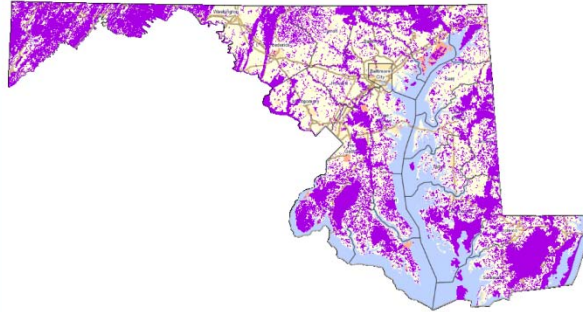


# Program Open Space Targeted Ecological Areas

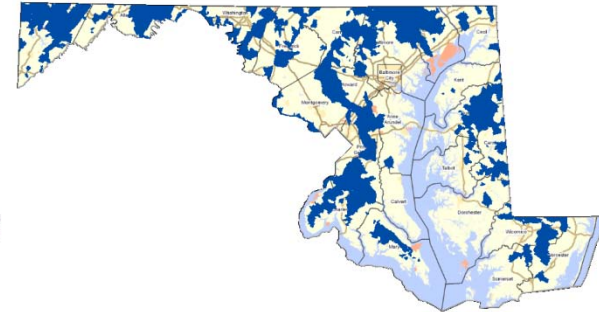
Green Infrastructure  
and Forests Important  
for Water Quality



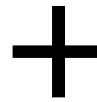
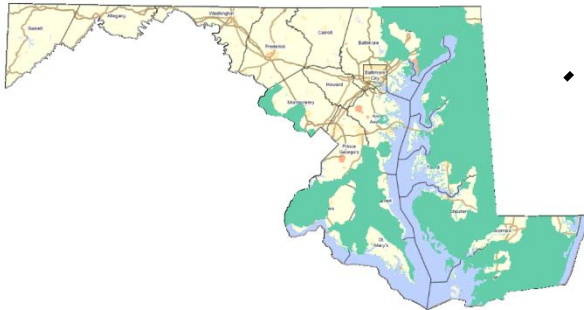
Wildlife and Rare  
Species Habitat



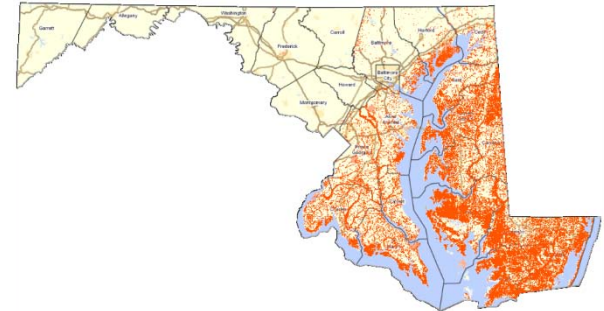
Nontidal Streams and  
Fisheries



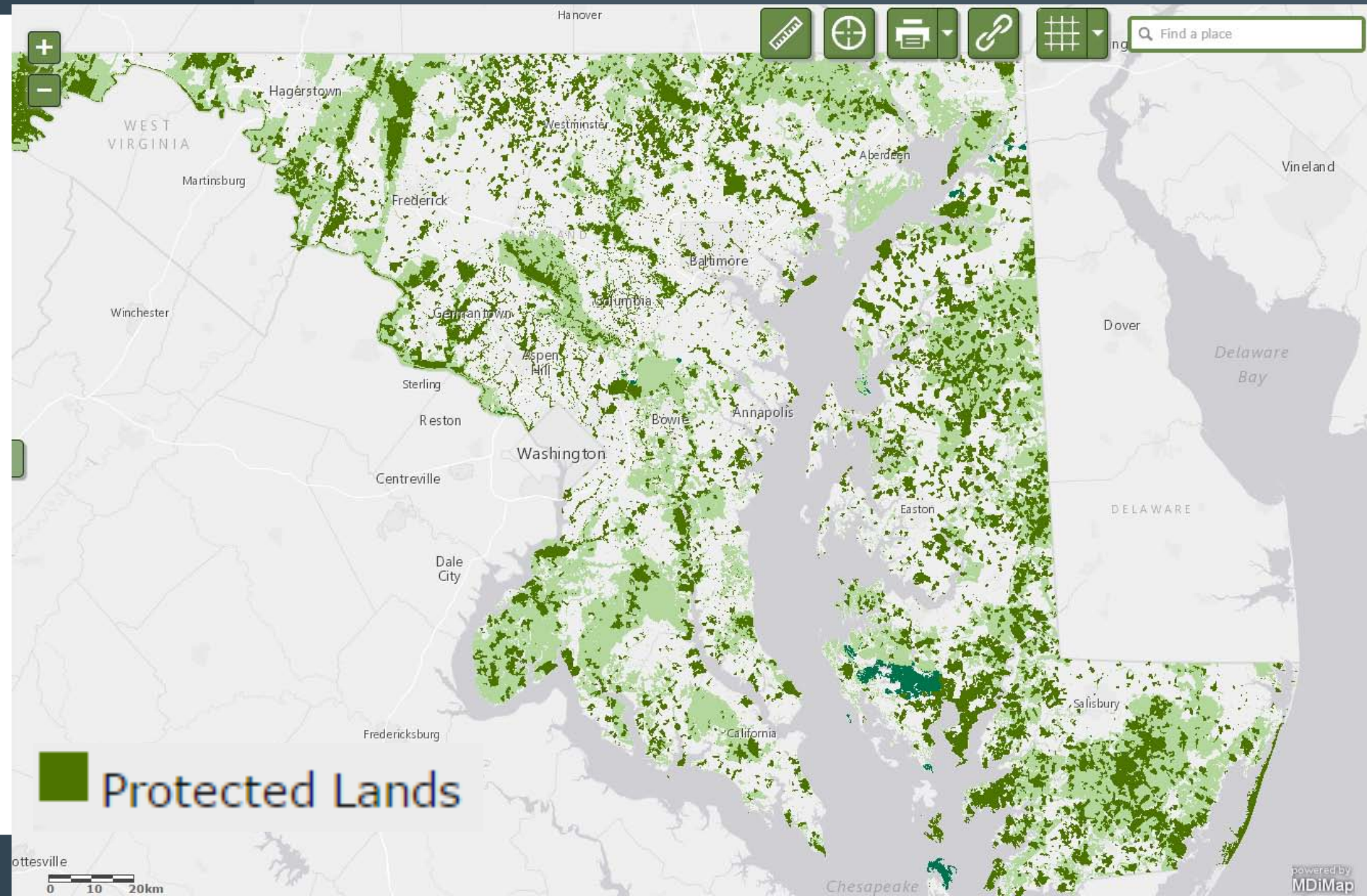
Tidal Fisheries, Bay and  
Coastal Ecosystems



Wetland Adaptation Areas



# GreenPrint: TEAs





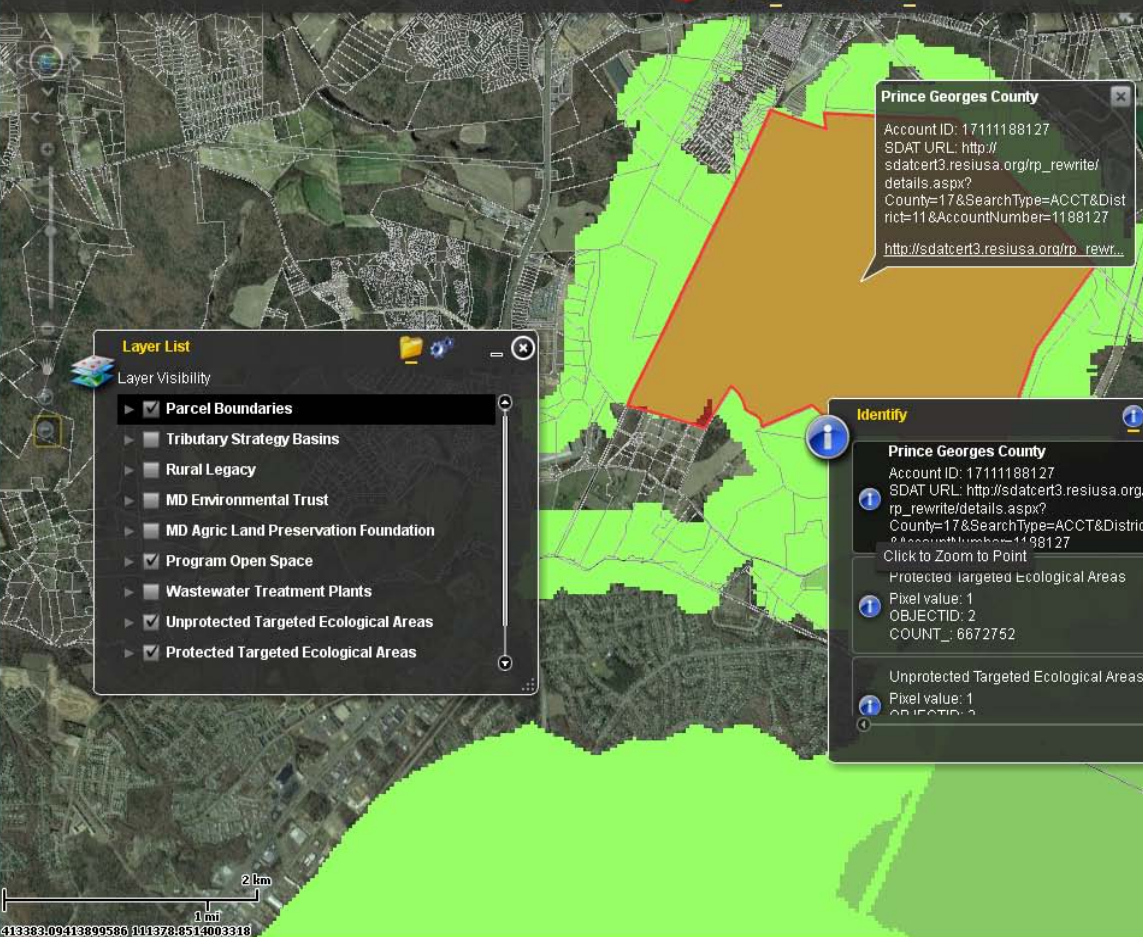
# GreenPrint Website & Scorecards



**MARYLAND GREENPRINT**

SG&G GREENPRINT AGPRINT GROWTHPRINT TREES OYSTERS STREAMHEALTH BAYSTAT

GreenPrint Interactive Map



<b>Property:</b> Turnell LLC	County: Charles Map / Parcel: Multi	<b>Final Score</b> <b>116</b>
<b>In Targeted Ecological Area?</b> Yes		
<b>Step #1: Ecological Value Ranking (100 points possible)</b>		
A. Landscape Score		
I. Overall Landscape Score (10 points possible for each of the following categories - total 40 points):		
a. Green Infrastructure	9.3	
b. Rare Species	2	
c. Aquatic Life - Tidal or Non-Tidal	4	
d. Forests Important for Water Quality Protection	6	
Subtotal (Overall Landscape Value Score):		21.3
II. Targeted Ecological Area (TEA) Bonus (20 points if more than 50 acres is in a TEA or 25% is in a TEA):		
		20
B. Parcel Score (10 points possible for each of the following categories - total 40 points):		
a. Green Infrastructure	8.8	
b. Rare Species	9	
c. Aquatic Life - Tidal or Non-Tidal	3	
d. Forests Important for Water Quality Protection	6.3	
Subtotal (Parcel Value Score):		27.1
<b>Step #1 Total - Ecological Value Score: 68.4</b>		
<b>Step #2: Special Adjustment for Multiple Benefit Ranking (20 points possible)</b>		
A. Recreation Score (0, 5, or 10 points)	10	
B. Historic or Cultural Value (0 or 5 points)	0	
C. In-holding or Adjacency (0 or 5 points)	5	
Step #2 Total - Multiple Benefit Score:		15
<b>Step #3: Habitat Maintenance or Restoration Values Ranking ((0.25 x Step 1) points possible)</b>		
A. If the parcel requires proactive management to maintain habitat, OR provides a restoration opportunity, then multiply Step #1 total by 0.1.		
		6.8
B. If more than 5 acres of a designated Climate Change Adaptation Area falls within the parcel, then multiply Step #1 total by 0.1.		
		6.8
Step #3 Total - Habitat Maintenance or Restoration Value Score:		13.7
Subtotal of Steps #1, #2, and #3: 97.1		
<b>Step #4: Management and Operations Ranking (Yes, No, or Undetermined)</b>		
A. Parcel desired by DNR & parcel management is possible - Proceed with acquisition.		Yes
B. No known or reliable committed process for managing the parcel. <b>STOP</b> don't acquire.		
<b>Step #5: Consistency with Local Land Protection ((0.25 x Step 1+2+3) points possible)</b>		
Amount of protected land acres within one mile of parcel: 263		19.4
<b>Total of Steps 1 to 5 - FINAL SCORE</b>		<b>116.5</b>

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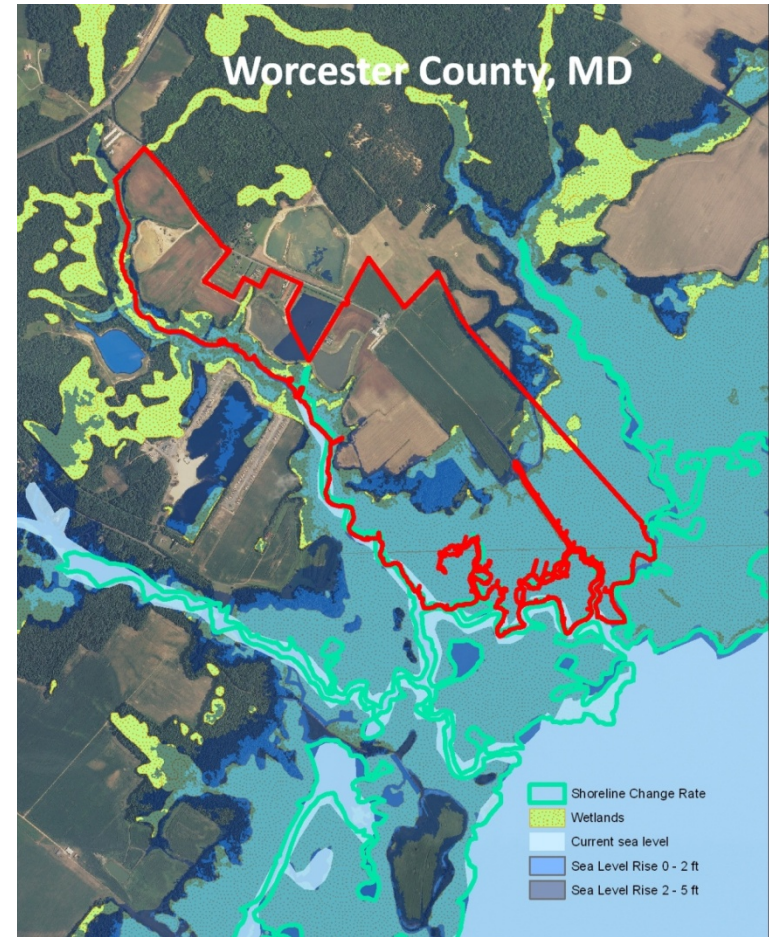




# Coastal Resilience Easement

## Easement Provisions:

- Development setbacks in areas subject to sea-level rise inundation by 2050
- Buffers to protect high priority Wetland Adaptation Areas
- Impervious surface limits to reduce runoff and pollution due to increased storm events
- Grantee review of shoreline stabilization projects
- Mandatory updates of Soil Conservation & Water Quality plans every 10 years to promote Best Management Practices



# Coastal Resilience Action Plan: Sustainable Shorelines and Buffers

## Management Plan Provisions:

- Wetland/hydrologic restoration
- Living shoreline projects
- Invasive species management
- Environmental hazard management
- Removal of barriers to wetland migration
- Documentation of vulnerable historic and cultural resources





## The **CoastSmart** Communities Grant 2015 REQUEST FOR PROPOSALS



- Risk & Vulnerability
- Land Use Planning
- People & Property
  - Hazard Mitigation
  - Emergency/Disaster
- Infrastructure & Critical Facilities
- Natural Resources
- Economy & Society

The *CoastSmart* Communities Grant provides financial and technical assistance to local governments to promote the incorporation of natural resource and/or coastal management issues into local planning and permitting activities. The *CoastSmart* Grant will target coastal communities that want to reduce their vulnerability to the effects of coastal hazards and sea level rise by becoming ready, adaptive and resilient – *CoastSmart*.





# Thank You



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# Online Resources

- Coastal Habitat and Climate Resources:
  - [http://dnr.maryland.gov/ccs/habitats\\_slr.asp](http://dnr.maryland.gov/ccs/habitats_slr.asp)
- Coastal Atlas Mapper:
  - <http://dnr.maryland.gov/ccs/coastalatl/index.asp>