

## Maryland's Adaptation Policy & Practice



Photo: Jane Thomas, UMCES

## Mitigation

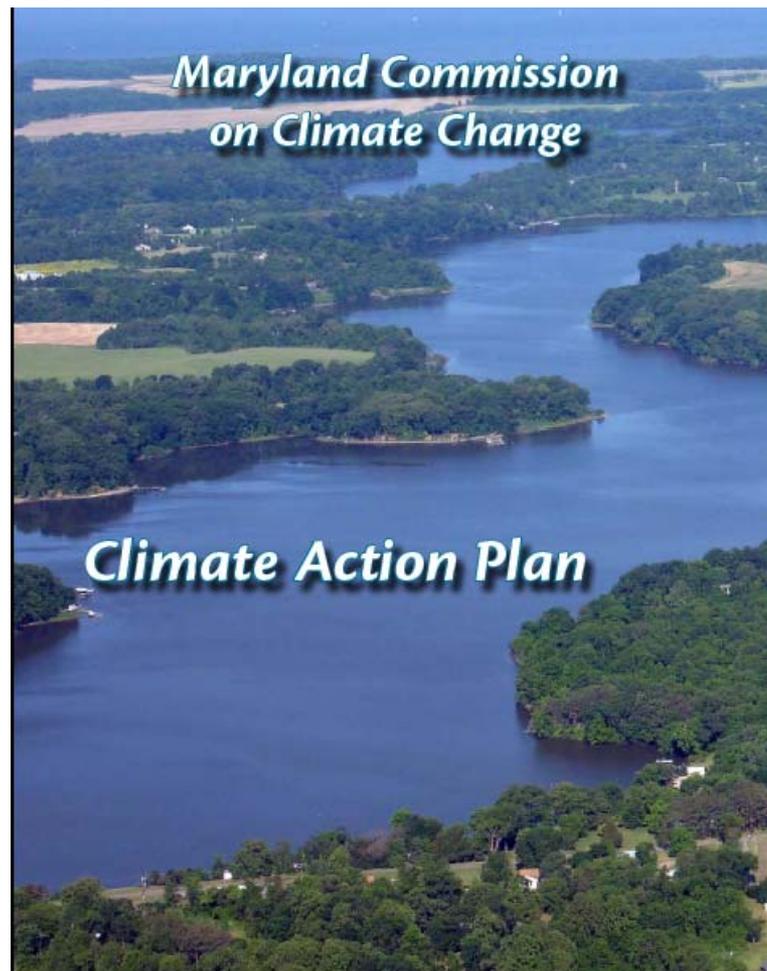
Reducing greenhouse gas emissions in order to slow or stop global climate change.

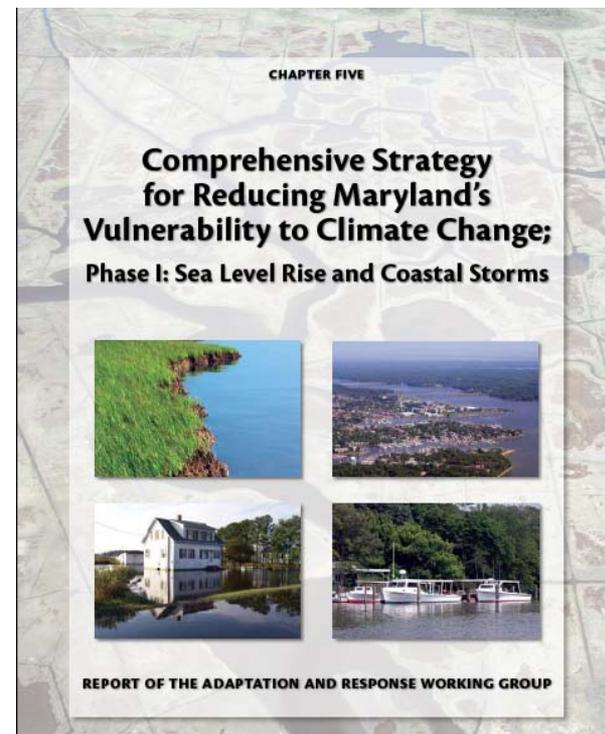
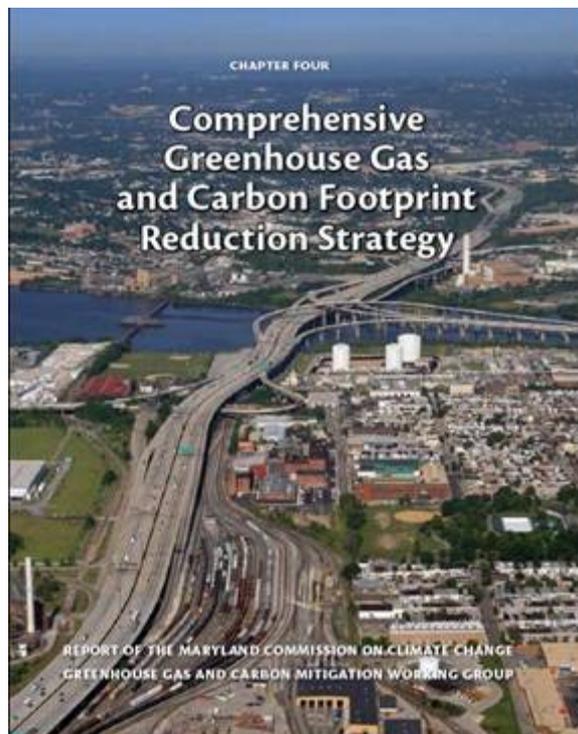
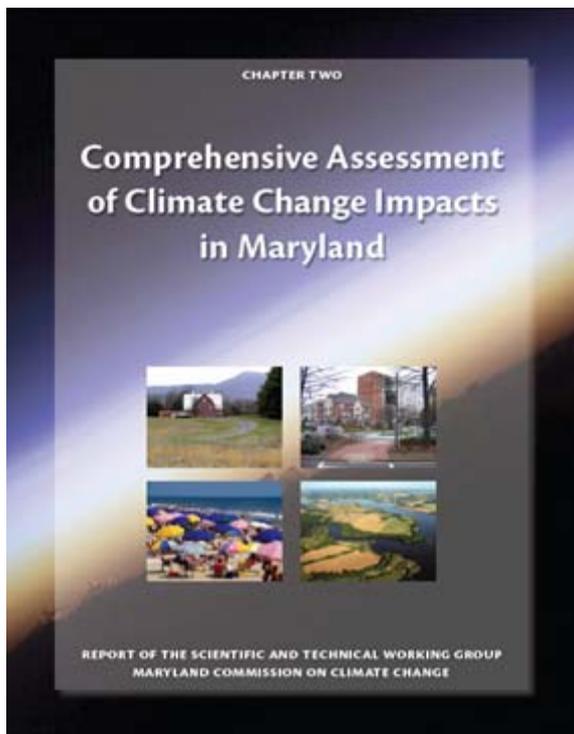
## Adaptation

Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

# Maryland Climate Action

- Maryland Healthy Air Act (2006)
- Maryland Clean Cars Act (2007)
- EmPOWER Maryland (2008)
- NE Regional Greenhouse Gas Initiative (2007)
- Maryland Commission on Climate Change (2007)
- Maryland Climate Action Plan (2008)
- Greenhouse Gas Reduction Act (2009)
- Smart, Green & Growing Legislative Package (2009)
- Sustainable Forestry Act (2009)
- No Net Loss – Forest Conservation Act (2009)





# Sector-Based Adaptation

Affected Sectors	Climate Stressor	Climate Vulnerability	Adaptation Strategies
Water Resources	<ul style="list-style-type: none"> <li>• Changes in precip.</li> <li>• Extreme events</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased water supply</li> <li>• Increased flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Create water markets</li> <li>• Improve flood control</li> </ul>
Bay/Aquatic Ecosystems	<ul style="list-style-type: none"> <li>• Sea level rise</li> <li>• Increased water temp</li> </ul>	<ul style="list-style-type: none"> <li>• Increased salinity</li> <li>• Habitat loss</li> </ul>	<ul style="list-style-type: none"> <li>• Install “living shorelines”</li> <li>• Protect critical habitat</li> </ul>
Human Health	<ul style="list-style-type: none"> <li>• Increased air temp.</li> <li>• Extreme events</li> </ul>	<ul style="list-style-type: none"> <li>• Vector-borne illness</li> <li>• Heat-related health effects</li> </ul>	<ul style="list-style-type: none"> <li>• Designate “cooling centers”</li> <li>• Vector-borne surveillance</li> </ul>
Agriculture	<ul style="list-style-type: none"> <li>• Changes in precip.</li> <li>• Sea level rise</li> </ul>	<ul style="list-style-type: none"> <li>• Drought</li> <li>• Salt-water intrusion</li> </ul>	<ul style="list-style-type: none"> <li>• Plant salt tolerant crops</li> <li>• Drought management</li> </ul>
Forest/Terrestrial Ecosystems	<ul style="list-style-type: none"> <li>• Changes in precip.</li> <li>• Increased air temp.</li> </ul>	<ul style="list-style-type: none"> <li>• Disease, Fire</li> <li>• Species shifts</li> </ul>	<ul style="list-style-type: none"> <li>• Fire mgmt. and control</li> <li>• Invasive species mgmt</li> </ul>
Growth & Infrastructure	<ul style="list-style-type: none"> <li>• Changes in precip.</li> <li>• Sea level rise</li> </ul>	<ul style="list-style-type: none"> <li>• Increased population growth</li> <li>• Increased flooding</li> </ul>	<ul style="list-style-type: none"> <li>• “Smart” site and building design</li> <li>• Retrofit storm water mgmt.</li> </ul>
Coastal Zone	<ul style="list-style-type: none"> <li>• Sea level rise</li> <li>• Extreme events</li> </ul>	<ul style="list-style-type: none"> <li>• Submergence of low-lying lands</li> <li>• Increased coastal flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Protect coastal infrastructure</li> <li>• Increase natural vegetative buffers</li> </ul>

Scientific Assessment  
(complete)

Adaptation: Phase I  
(complete)

Adaptation: Phase II  
(underway)

# Adaptation Planning Process

Review state of the science

Assess climate vulnerability

Identify critical information gaps

Consider and prioritize key issues of concern

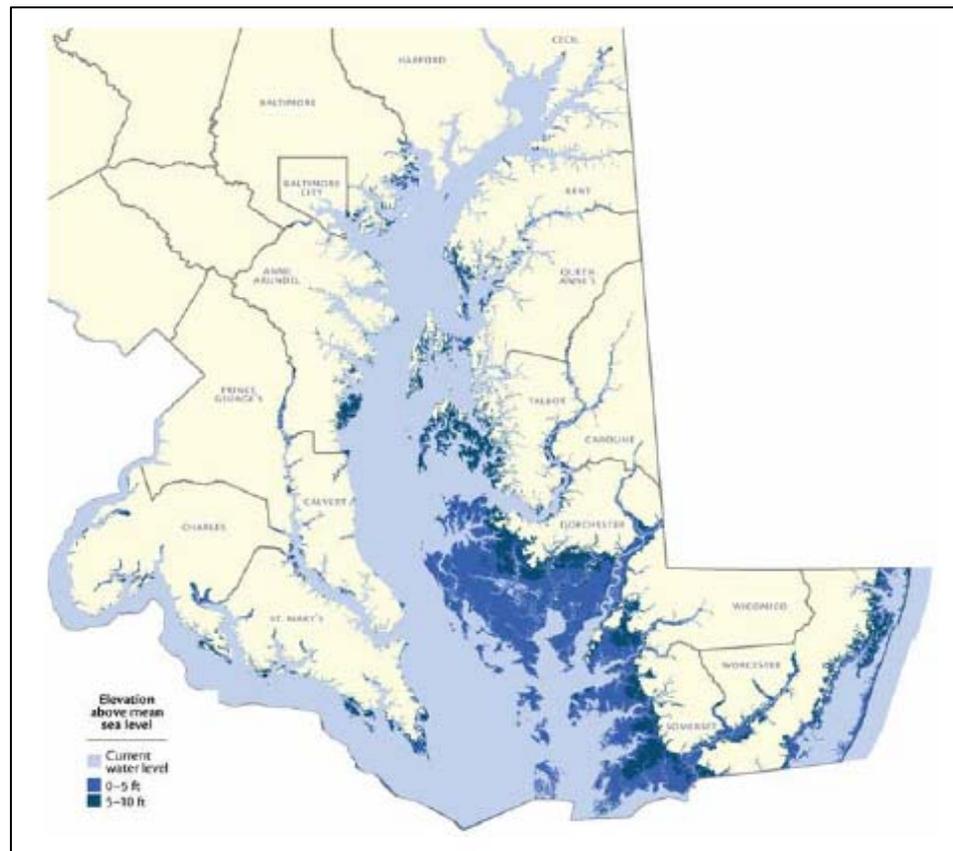
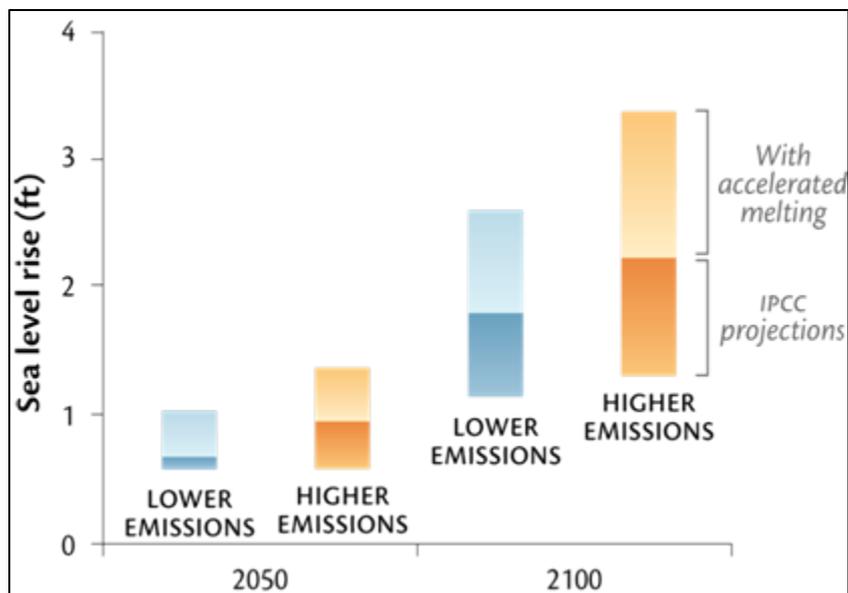
Explore potential adaptation strategies

Evaluate adaptation infrastructure (institutional framework)

Identify opportunities & mechanisms to affect change

Recommend action strategies (short, medium long-term)

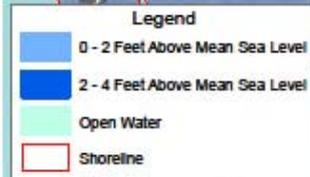
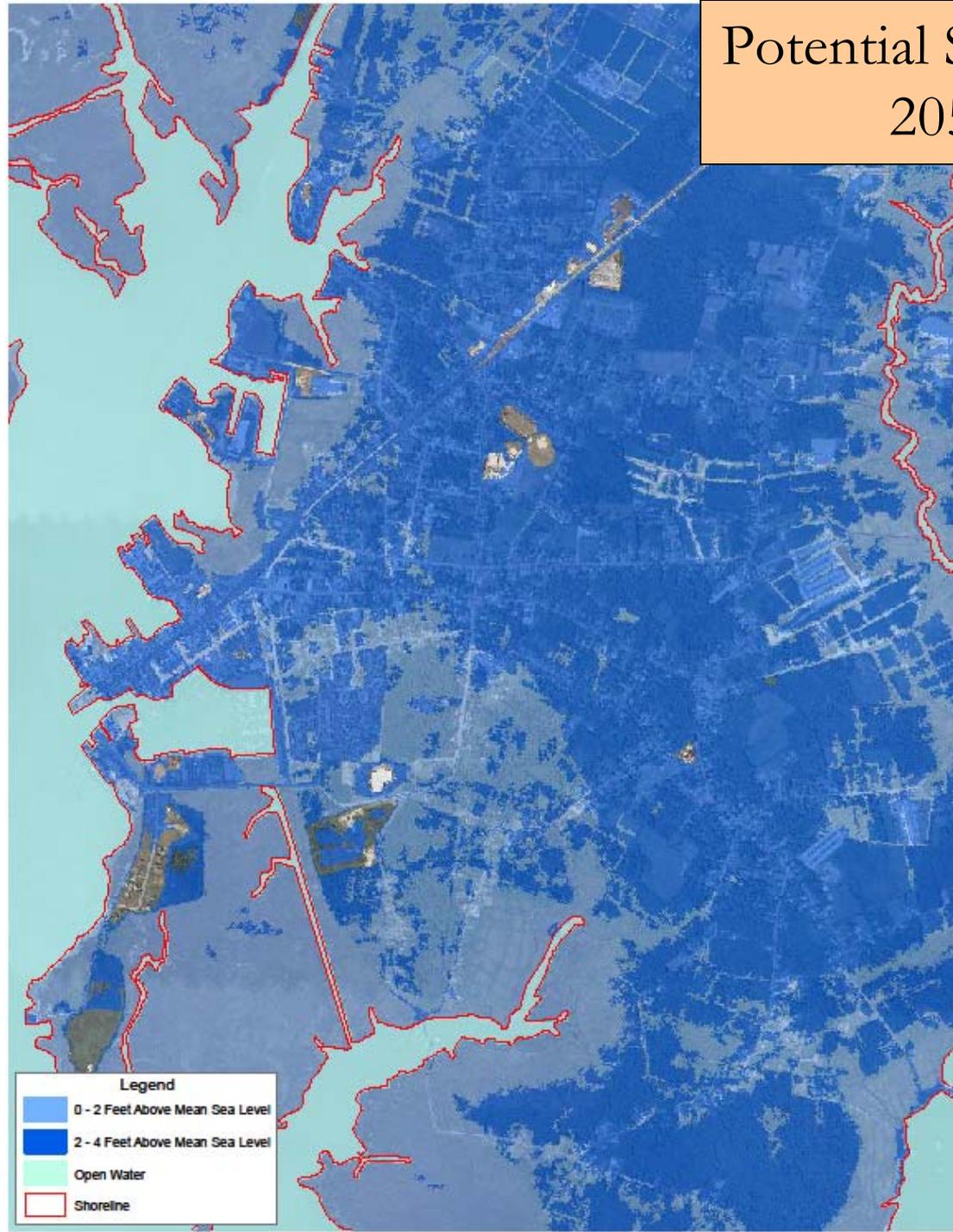
# Maryland's Risk to Sea Level Rise



# Potential SLR Inundation: 2050 - 2100



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# MD's Vulnerability: Erosion & Land Loss

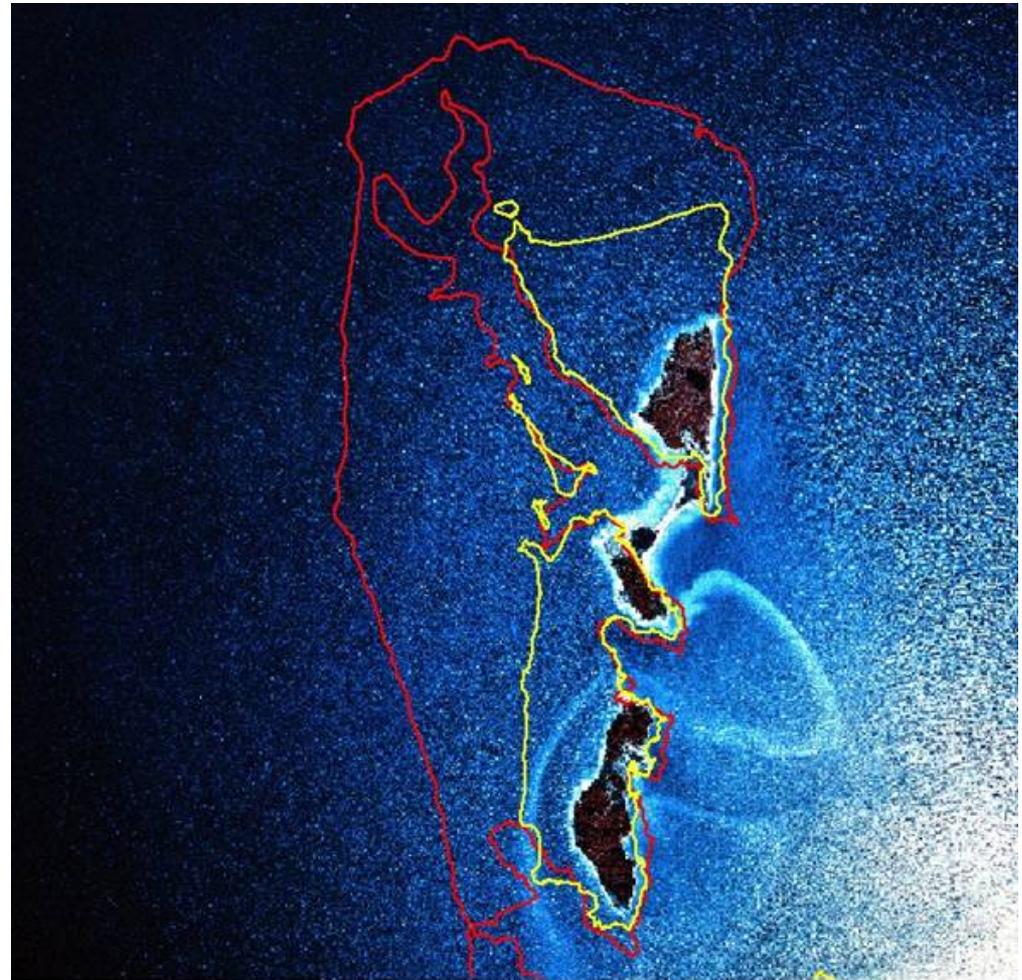
James Island

1847: 976 acres

1994: 92 acres

**884 acres lost**

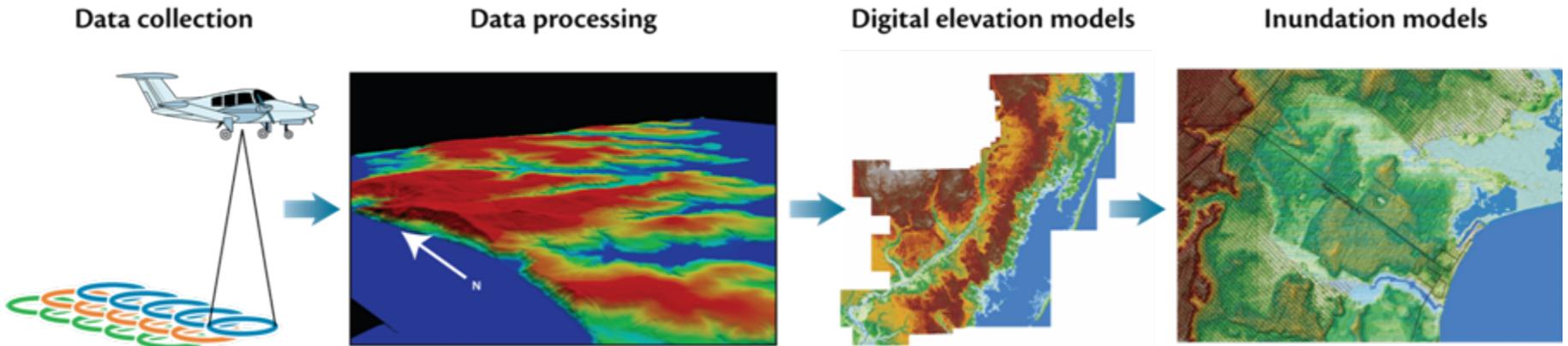
**6.0 acres/year**



— 1847  
— 1942

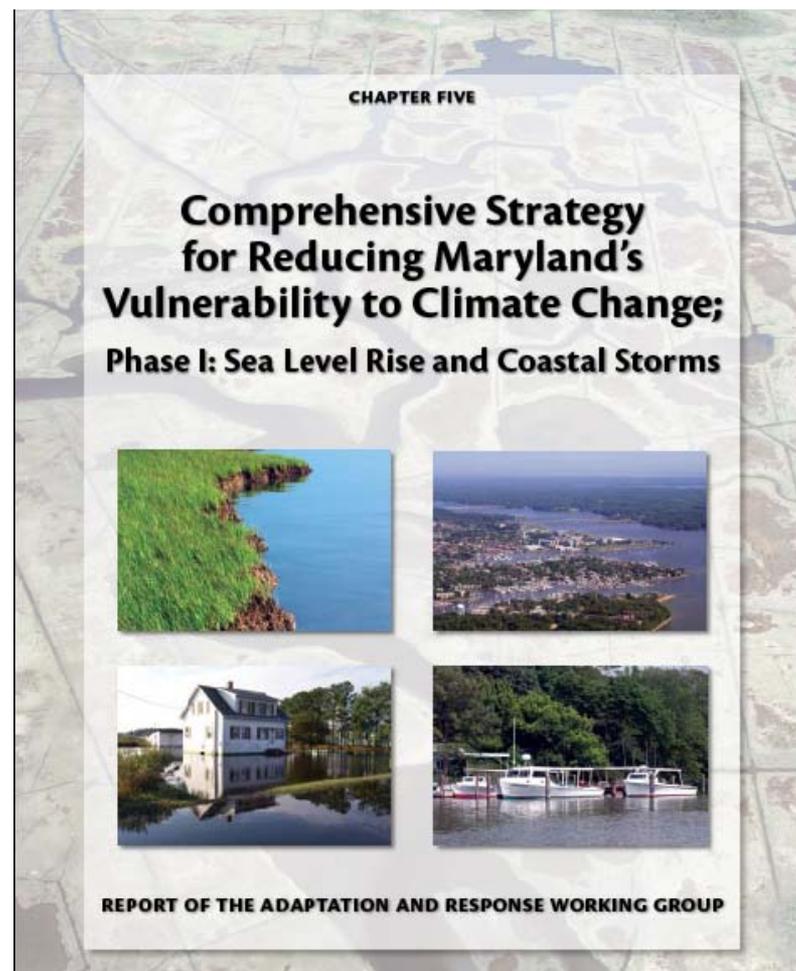
# Adaptation Toolbox

- High Resolution Topographic Mapping (LIDAR)
- Economic Cost of Sea Level Rise Study
- Shoreline Erosion and Change Mapping
- Comprehensive Shoreline Inventory
- Maryland Shorelines Online
- USACE Chesapeake Bay Shore Erosion Study
- Sea Level Rise Modeling: Worcester & Dorchester
- State-wide Sea Level Rise Vulnerability Mapping
- Living Shoreline Suitability Tools
- Sea Level Rise Visualizations

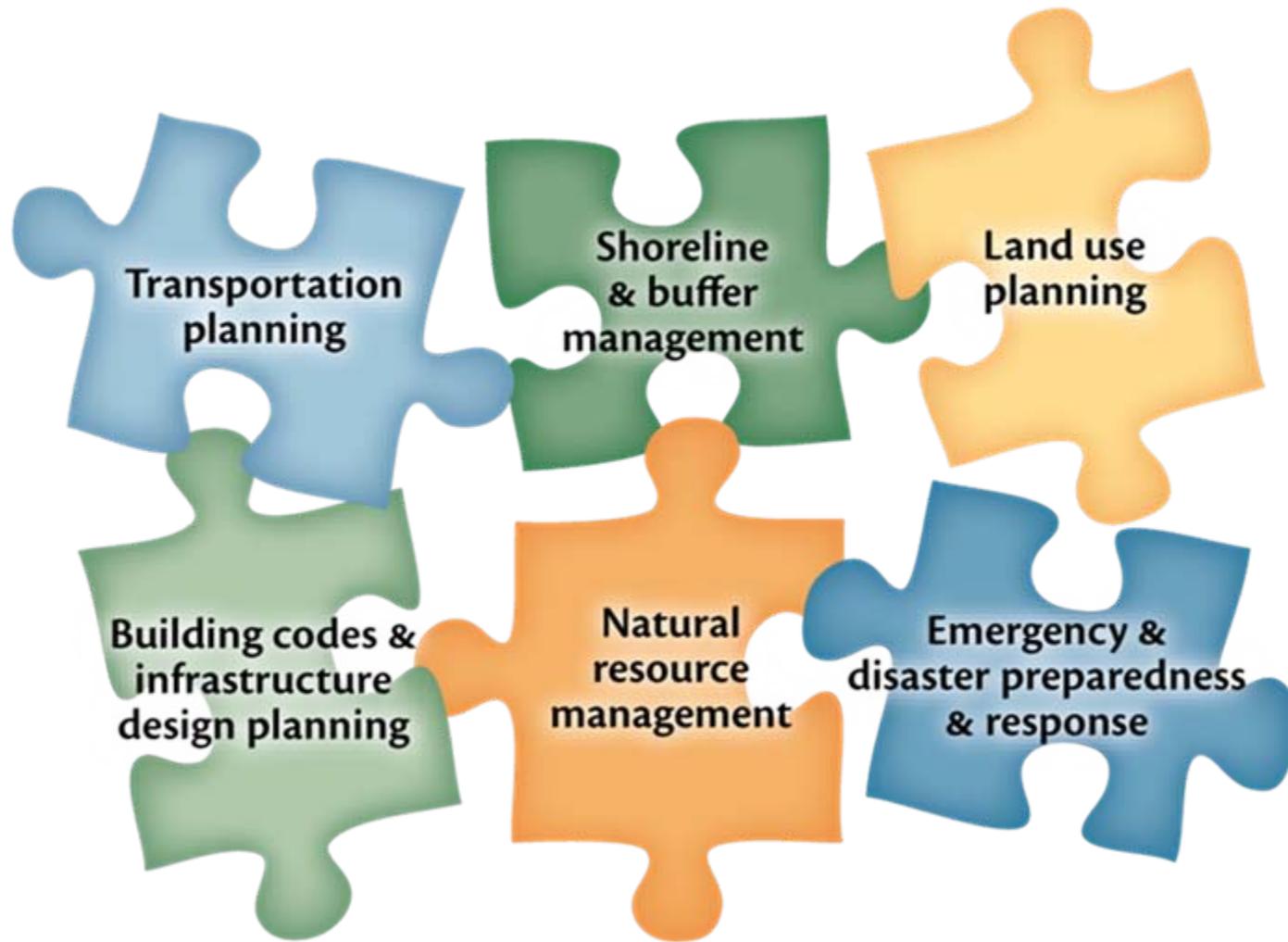


# Adaptation Strategy Development

- Sea Level Rise Response Strategy (2000)
- Shore Erosion Task Force Final Report (2000)
- MD CZMA § 309 Strategy (2000 & 2006)
- Coastal Communities Initiative (2004)
- Comprehensive Strategy to Reduce Maryland's Vulnerability to Climate Change: Phase I (2008)



# Climate Change Adaptation: An Integrated Approach



## Vision for the Future: Protect Maryland's People, Property, Natural Resources, and Public Investments



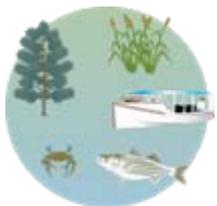
Promote programs and policies aimed at the avoidance and/or reduction of impact to the existing-built environment, as well as to future growth and development in vulnerable coastal areas



Shift to sustainable economies and investments; and, avoid assumption of the financial risk of development and redevelopment in highly hazardous coastal areas



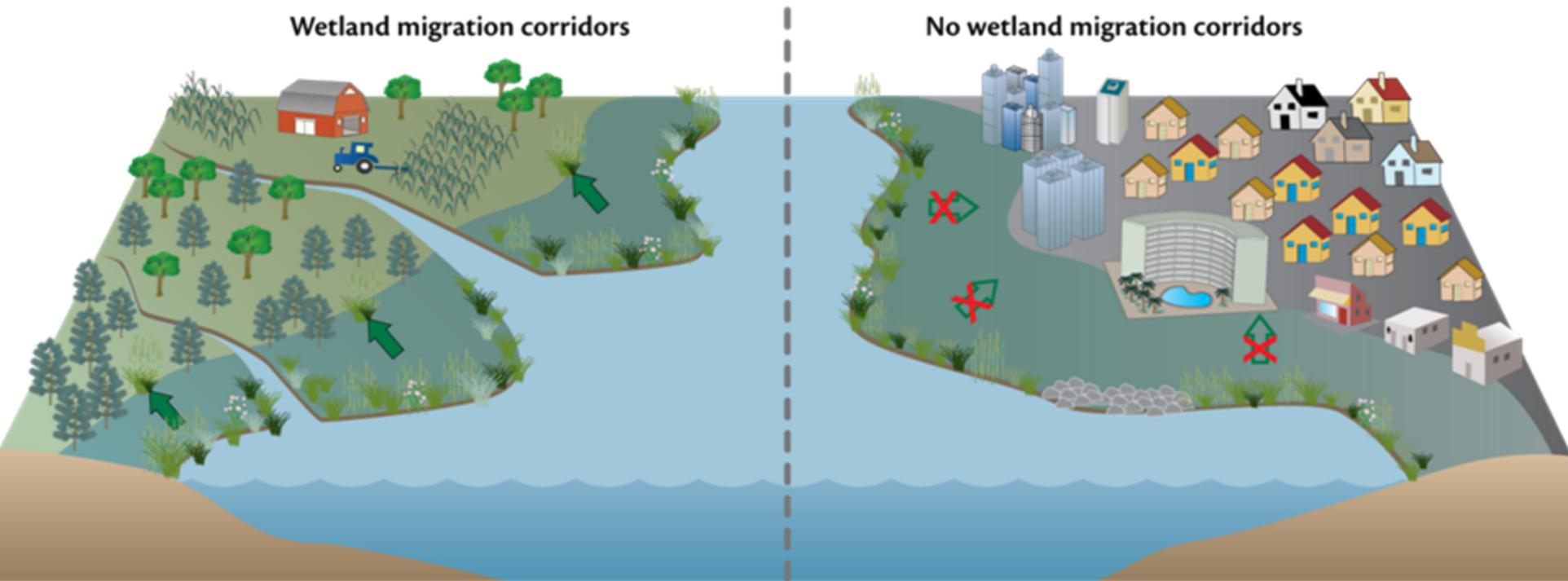
Enhance preparedness and planning efforts to protect human health, safety and welfare



Protect and restore Maryland's natural shoreline and its resources, including its tidal wetlands and marshes, vegetated buffers, and Bay Islands, that inherently shield Maryland's shoreline and interior

# Retain and expand forests, wetlands, and beaches to protect us from coastal flooding

## Habitat Migration Corridor



**Adaptation Strategy:** Facilitate landward movement of high priority coastal ecosystems subject to dislocation by sea level rise

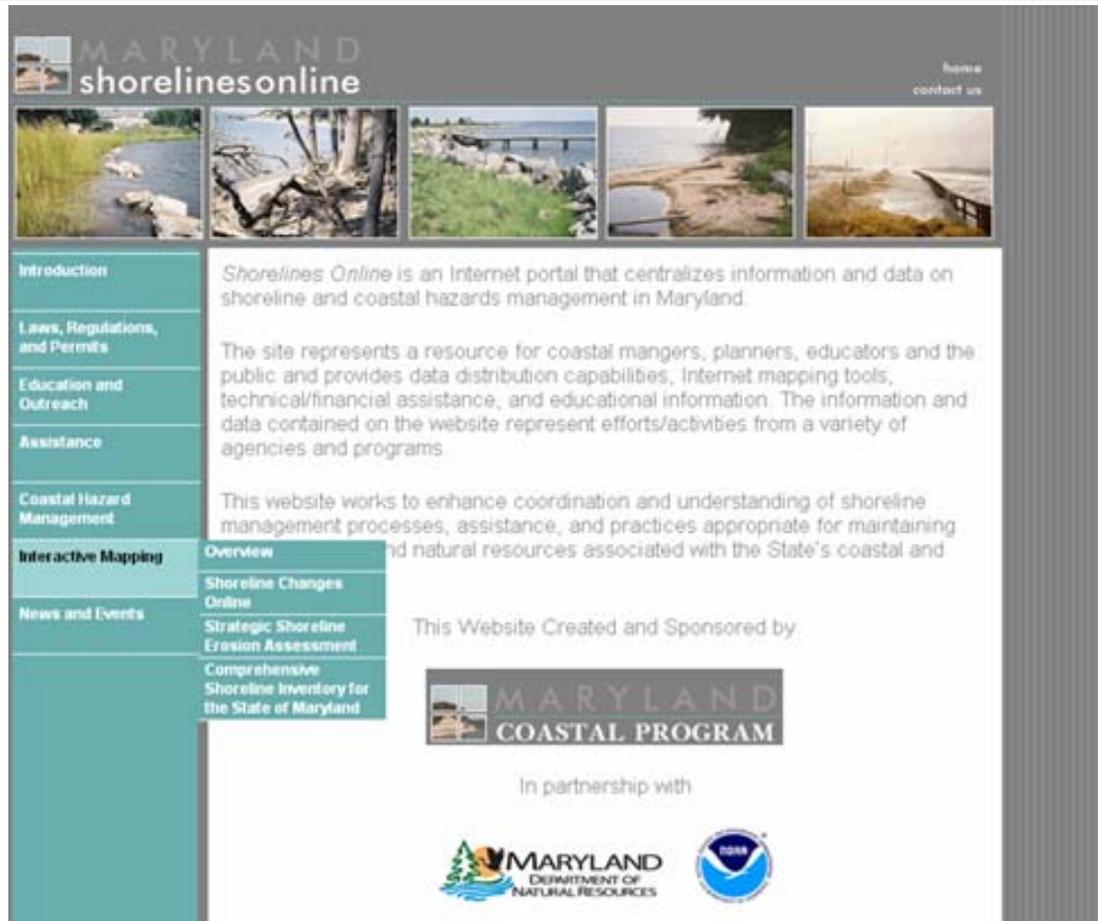
# Develop protect, retreat, and abandonment policies for vulnerable coastal infrastructure

## Freeboard standard



**Adaptation Strategy:** Elevate new and/or replacement structures 2+ feet above the current 100-year base flood elevation

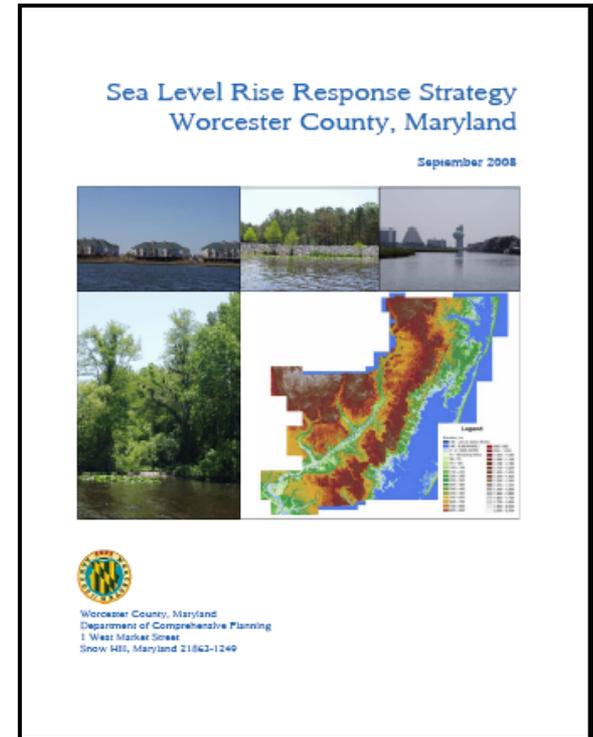
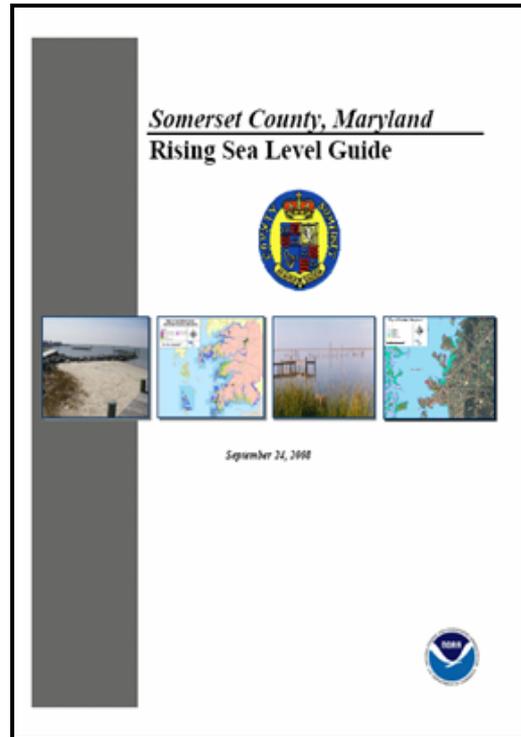
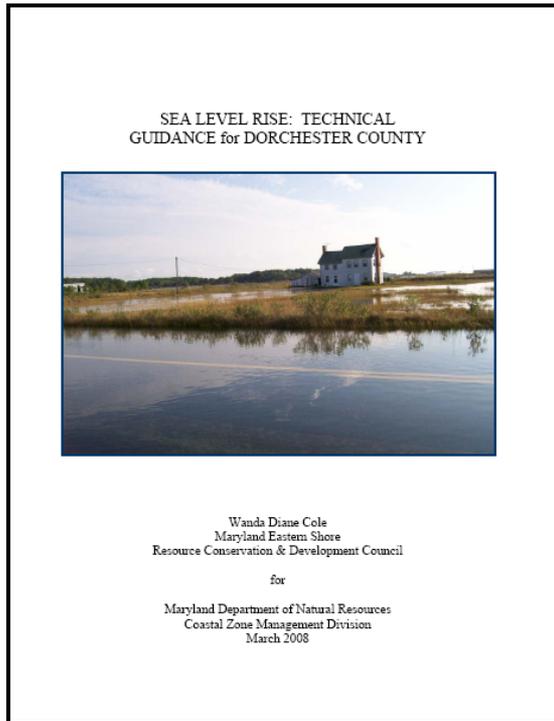
# Give State and local governments the right tools to plan and adapt

The screenshot shows the 'MARYLAND shorelinesonline' website. It features a navigation menu on the left with categories like 'Introduction', 'Laws, Regulations, and Permits', 'Education and Outreach', 'Assistance', 'Coastal Hazard Management', 'Interactive Mapping', and 'News and Events'. The main content area includes an introduction to the portal, a list of services, and a section for 'Interactive Mapping' with sub-links like 'Overview', 'Shoreline Changes Online', 'Strategic Shoreline Erosion Assessment', and 'Comprehensive Shoreline Inventory for the State of Maryland'. At the bottom, it states 'This Website Created and Sponsored by MARYLAND COASTAL PROGRAM' and lists partners: 'MARYLAND DEPARTMENT OF NATURAL RESOURCES' and 'NOAA'.

**Adaptation Strategy:** Update and maintain state-wide sea level rise mapping, modeling and monitoring products

# State and local governments must commit resources and time to assure progress



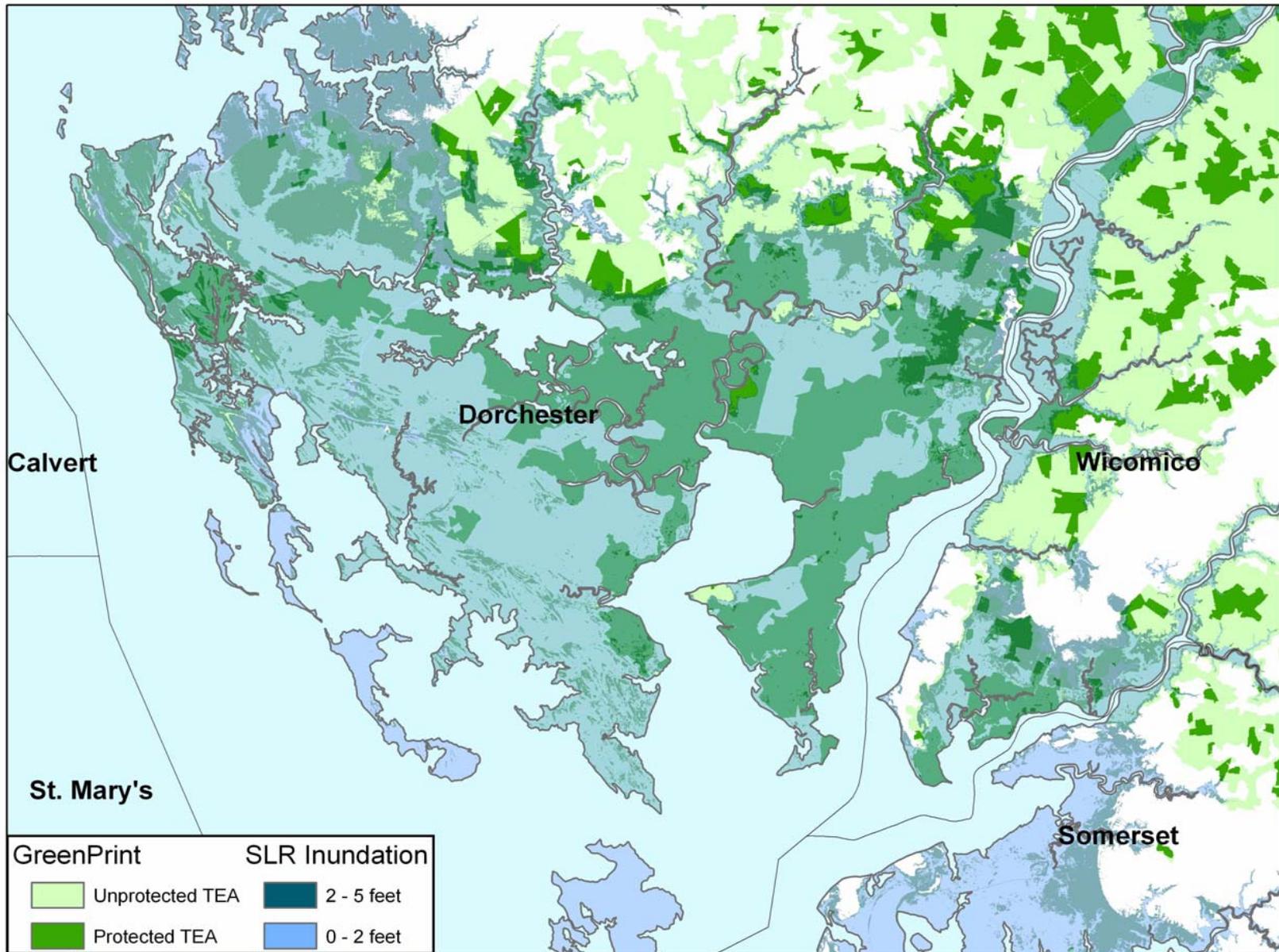
**Adaptation Strategy:** Develop technical planning guidance to advise adaptation planning at local level.

# Adaptation Policy Development: Recent Actions

- Living Shoreline Protection Act (2008)
  - Requires non-structural shore protection practices unless proven infeasible
- Chesapeake & Coastal Bays Critical Area Amendments (2008)
  - Increased vegetative buffers
  - Updated jurisdictional boundaries to account for sea level rise
  - Allows for consideration of coastal impacts during growth allocation decisions



# Next Step: Adapting to Climate Change through Coastal Land Conservation



Conservation  
Leadership  
Network



## THE CONSERVATION FUND

*America's Partner in Conservation*

### REGISTRATION DEADLINE:

April 1, 2010

*PILOT  
OFFERING!*

### PARTNERS:

National Oceanic  
and Atmospheric  
Administration

Maryland  
Department of  
Natural Resources

Northern  
Virginia Regional  
Commission

## Planning for Climate Change Using a Green Infrastructure Approach:

*Coastal Communities in the Chesapeake Bay Watershed*

APRIL 26-28, 2010 • SHEPHERDSTOWN, WV

Don't miss the opportunity to participate in this pilot offering! Participants will have the opportunity to plan for potential climate change impacts (storm surge/sea level rise, changes in precipitation and temperature) using a green infrastructure approach as a guide for developing effective adaptation and mitigation strategies. Through hands-on class projects using data layers for two coastal communities, and lectures from cutting edge experts and on-the-ground practitioners, participants will learn and experience first hand how Green Infrastructure can facilitate climate change planning.

### COURSE OBJECTIVES

- Describe how green infrastructure can be used to facilitate adaptation and mitigation of potential climate change impacts;
- Outline the potential impacts of climate change on coastal communities and identify effective communication strategies for conveying those impacts;
- Describe green infrastructure concepts and principles and explore techniques for planning and designing networks at the statewide, regional, and local levels

### WHO SHOULD ATTEND

This first pilot will focus on coastal communities in the Chesapeake Bay, therefore, preference will be given to those professionals living in and/or focusing their work on the Bay watershed. This course is designed to be a collaborative learning experience; as such it is applicable to individuals from a variety of disciplines, sectors, and scales (i.e., national, regional, statewide, local) who are engaged in land use planning and management.

# Adaptation 2010

- “Lead by Example” Investment Policy (Lead: DNR)
  - Coastal Land Conservation Evaluation Criteria: Targeting Tools for Climate Change Adaptation
  - Siting & Design Criteria for DNR Infrastructure
- Adaptation Toolbox: *The Coastal Atlas* (Lead: DNR)
- Local Government Technical & Financial Assistance: *Building Coast-Smart Communities*: (Lead: DNR)
- SHA Transportation Vulnerability Assessment (Lead: MDOT)
- Historical, Archaeological, and Cultural Resources Vulnerability Study (Lead: MDP)
- Climate Change Insurance Advisory Committee (Lead: MIA)
- Wildlife Action Plan – Climate Change Element (Lead: DNR)
- Maryland Commission on Climate Change: Phase II Adaptation Strategy Development – “*Beyond Our Coasts*” (Leads: UM & DNR)

# Thank You!

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**<http://www.dnr.state.md.us/dnrnews/infocus/climatechange.asp>**

