Maryland Commission on Climate Change
Adaptation & Response Working Group

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Photo Credit: Lee Goodwin

- Charge: Implementing solutions for reducing Maryland's climate change vulnerability

- Membership: 7 state agencies; 2 public sector representatives; 2 MCCC liaisons; numerous technical advisors from across the State.

Amy McGovern, 2012

Access & Infrastructure

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Claudia Donegan

Wanda Cole, Maryland RC&D

Maryland's Climate Action Plan
Adaptation Elements

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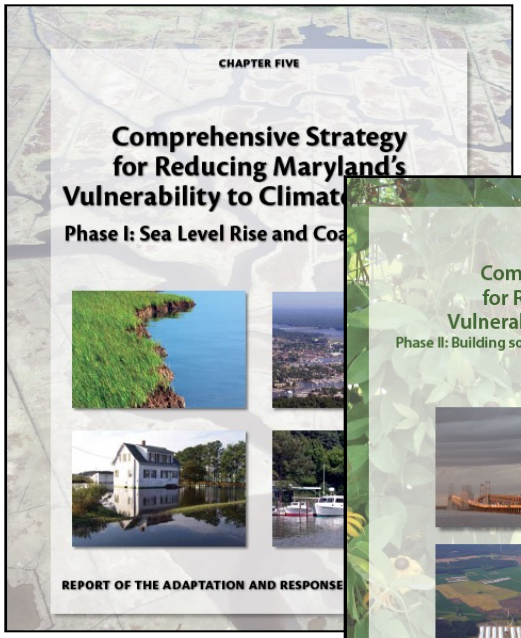
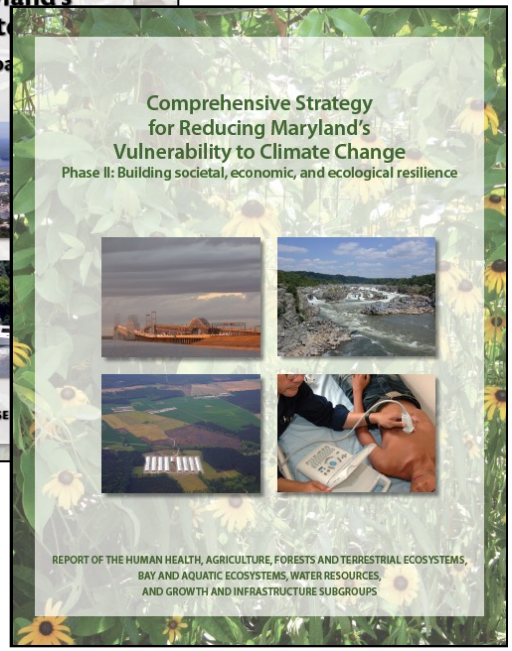
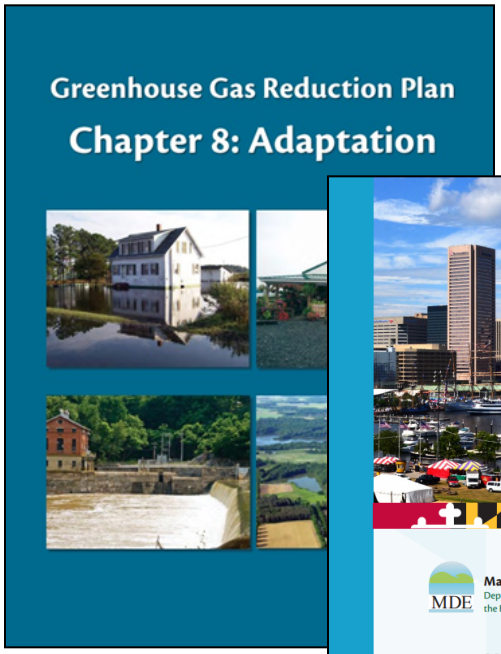


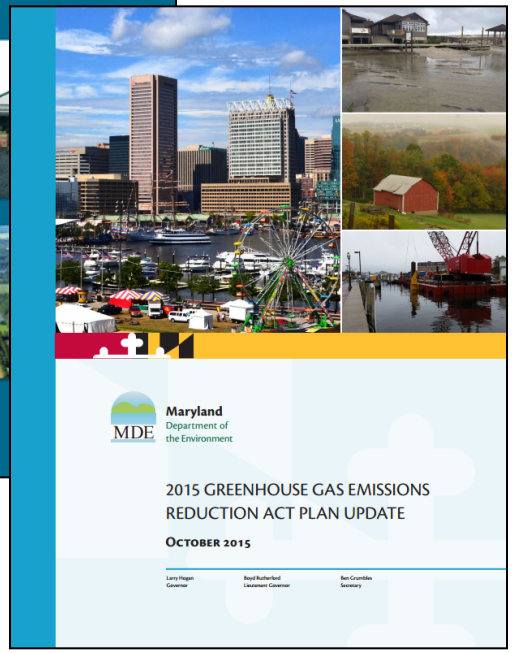
2008



2011



2012



2015

Climate change will affect all sectors of our economy, society and environment

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Sector-Based Adaptation Strategy

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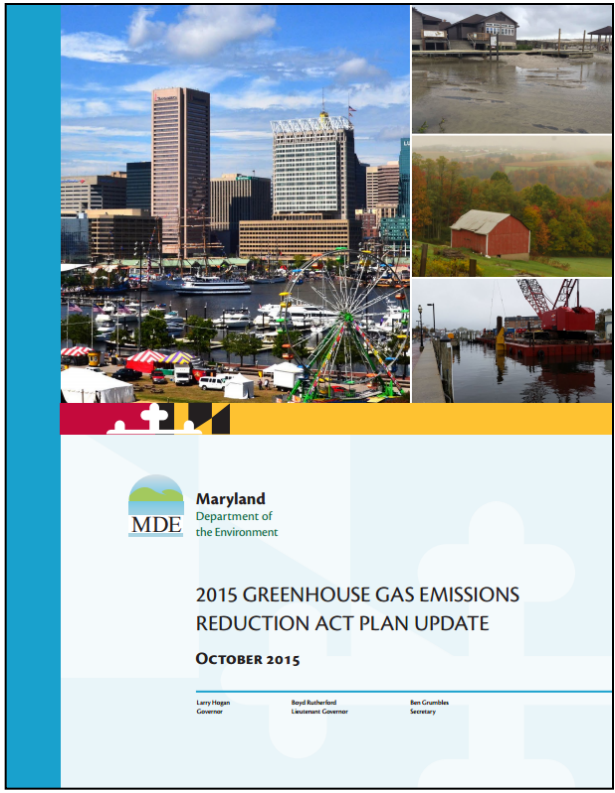
Adaptation: Phase I | Adaptation: Phase II

Affected Sectors	Climate Stressor	Climate Vulnerability	Adaptation Strategies
Water Resources	• Changes in precip. • Extreme events	• Decreased water supply • Increased flooding	• Create water markets • Improve flood control
Bay/Aquatic Ecosystems	• Sea level rise • Increased water temp	• Increased salinity • Habitat loss	• Install "living shorelines" • Protect critical habitat
Human Health	• Increased air temp. • Extreme events	• Vector-borne illness • Heat-related health effects	• Designate "cooling centers" • Vector-borne surveillance
Agriculture	• Changes in precip. • Sea level rise	• Drought • Salt-water intrusion	• Plant salt tolerant crops • Drought management
Forest/Terrestrial Ecosystems	• Changes in precip. • Increased air temp.	• Disease, Fire • Species shifts	• Fire mgmt. and control • Invasive species mgmt
Growth & Infrastructure	• Changes in precip. • Sea level rise	• Increased population growth • Increased flooding	• "Smart" site and building design • Retrofit storm water mgmt.
Coastal Zone	• Sea level rise • Extreme events	• Submergence of low-lying lands • Increased coastal flooding	• Protect coastal infrastructure • Increase natural vegetative buffers

State-Level Accomplishments

- Transportation Vulnerability Assessment (State Highway Administration)
- Climate Change Vulnerability Assessment and Recommendations (Maryland Port Administration)
- Historical, Archaeological, and Cultural Resources Vulnerability Study (Maryland Historical Trust)
- Higher Regulatory Standards for Floodplain Management (MD Dept. of Environment)
- Review of Current Statewide Building Codes and Recommendations for Enhancement in Coastal Regions of Maryland & "Sustainable Communities" Designation Reviews (Dept. of Housing and Community Development)
- State Hazard Mitigation Plan & State Disaster Recovery Operations Plan (Maryland Emergency Management Agency)
- DHMH: State Climate Change Environmental Health Capacity Building Grant (Dept. of Health and Mental Hygiene)
- Temperature Sensitive Stream Regulations (MD Dept. of Natural Resources)
- CoastSmart Construction Infrastructure Siting and Design Criteria (Multiple Agencies)



2015

Quarterly Forums to Address Consequences of Climate Change

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- **Quarter 1**: Delivering Tools and Assistance for Local Governments
- **Quarter 2**: Impacts on the State's economy, revenues and investment decisions
- **Quarter 3**: Developing broader public and private partnerships
- **Quarter 4**: Addressing the challenge that vulnerable communities will likely be disproportionally impacted by climate change

Strategy: Give partners the right tools to plan and adapt

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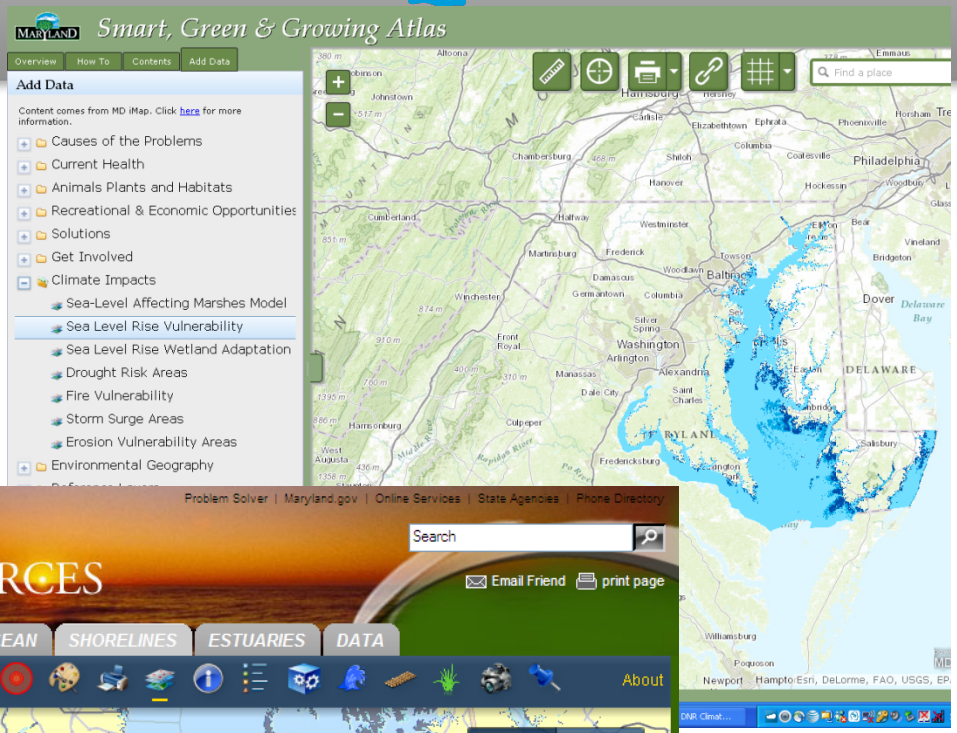

Strategy: Foster & Advise Local-Level Adaptation Planning

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The *CoastSmart* Communities Scorecard

A community self-assessment tool

This tool has been prepared by the Chesapeake & Coastal Service to provide Maryland's coastal communities a practical method to assess their preparedness to face the risks associated with coastal hazards and the potential increased impacts of those hazards in the future due to climate change

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Land-Use Planning — Yes / No

1. Does your community participate in the FEMA Community Rating System?
2. Does your community's comprehensive plan have a c… make recommendations to reduce coastal hazard vul…
   - *If yes, does the comprehensive plan discourage developme… used to respond to coastal hazard threats?*
3. Are frequently flooded areas zoned or planned for op… easements and acquisitions?
4. Does the comprehensive plan recommend subdivisio… *to coastal hazards?*
5. Does the comprehensive plan recommend subdivisio…
6. Does the comprehensive plan promote infill outside v…
7. Does the Sensitive Areas Element of the comprehensive…
8. Does the Water Resources Element of the comprehen… water availability?
9. Does the community have an adopted floodplain ma…
10. Are planning horizons extended to incorporate pote…
    - *Sea-level rise?*
    - *Coastal erosion?*
    - *Increased storm activity and severity?*
11. Does the water and sewer plan include recommendat… infrastructure at risk to coastal flooding or other coa…
12. Does the community have a certified floodplain man…
13. Does your community have a floodplain manager or … organizations?
    - *Association of State Floodplain Managers (ASFPM) or Ma… (MAFSM)?*
    - *American Planning Association (APA) or Maryland APA ch…*
    - *American Society of Civil Engineers (ASCE) or state or loca…*
    - *American Public Works Association?*
14. Does the community have technical or computer ma…
15. Has the community adopted the 2010 Maryland Buildin…
16. Has the community conducted a build-out analysis u…
    - *Has the community evaluated the build-out analysis for v…*
17. Does the community require disclosure statements for …
18. Does the community have a timeline or strategic pla… in areas at risk to coastal flooding or other coastal ha…
19. Does the community require the *elevation* of residen… be *above* base flood elevations, also known as freebo…
20. Does your community require *flood-proofing* of resid… within the 100-year floodplain?
21. Does your community restrict rebuilding of structure…
    - *If rebuilding is allowed, is it required to be more resilient t… back from the coast)?*
22. Does your community use an early flood warning sys…
    - *Do local communities have citizen action groups that aler… evacuation routes and help residents get out during an ev…*

Total number of yes and no answers

Infrastructure & Critical Facilities — Yes / No

1. Does the community have a capital improvements plan or an equivalent budgetary process?
2. Are professional planners, engineers, and/or certified floodplain managers involved in the capital improvements planning process?
3. Does the capital improvements plan identify the frequency necessary to update the plan?
4. Does your community have a detailed inventory, inclu… the structural components of emergency access routes… and culverts)?
5. Does your community have procedures for regularly e… components of emergency access routes for damage?
6. Does your community have a plan for upgrading/repa… transportation infrastructure?
7. When critical transportation infrastructure is repaire… considered to reduce future flood damages?
   - *Elevating roads above predicted flood levels?*
   - *Moving roads landward as erosion occurs?*
   - *Incorporating future flooding and sea-level rise into culvert size…*
8. When upgrading *existing* community infrastructure, d… improvements plan or the community consider the im… coastal hazards?
   - *Coastal erosion and/or shoreline change?*
   - *Sea-level rise?*
   - *Coastal flooding?*
   - *Storm surge?*
9. When planning *new* community infrastructure, does the … plan or the community consider the impact of the follow…
   - *Coastal erosion and/or shoreline change?*
   - *Sea-level rise?*
   - *Coastal flooding?*
   - *Storm surge?*
10. Has the community discussed at what point it will sto… community infrastructure to withstand increased coa… level rise?
11. Are maps (or other spatial tools like GIS) used to spati… vulnerability of the following to coastal hazards?
    11.1 Roads
    - *Coastal erosion and/or shoreline change?*
    - *Sea-level rise?*
    - *Coastal flooding?*
    - *Storm surge?*

    11.2 Public buildings (schools, hospitals, fire stations, etc.
    - *Coastal erosion and/or shoreline change?*
    - *Sea-level rise?*
    - *Coastal flooding?*
    - *Storm surge?*

    11.3 Public services (wastewater treatment, water distrib… transmission, etc.)
    - *Coastal erosion and/or shoreline change?*
    - *Sea-level rise?*
    - *Coastal flooding?*
    - *Storm surge?*

Total number of yes and no answers

Assessing Risk and Vulnerability — Yes / No

1. Has your community considered the following?
   - *Coastal erosion and/or shoreline change*
   - *Sea-level rise*
   - *Coastal flooding*
   - *Storm surge*
2. Has the past extent of the following coastal hazards been identified and mapped based on historical information, existing plans and reports, or scientific and local knowledge?
   - *Coastal erosion and/or shoreline change*
   - *Sea-level rise*
   - *Coastal flooding*
   - *Storm surge*
3. Do any plans describe the damage and cost of previous storms, floods, or erosion?
4. Does the community track repetitive loss properties within the National Flood Insurance Program (NFIP)?
5. Have historic rates of local sea-level rise been defined through tide-gauges or research?
6. Does the community have staff trained in mapping or monitoring the following?
   - *Coastal erosion and/or shoreline change*
   - *Sea-level rise*
   - *Coastal flooding*
   - *Storm surge*
7. Are maps or spatial data used to define the future extent of the following coastal hazards?
   - *Coastal erosion and/or shoreline change*
   - *Sea-level rise*
   - *Coastal flooding*
   - *Storm surge*
8. Do any plans estimate future financial losses that may result from sea-level rise?
9. Have the values of properties at risk from sea-level rise been evaluated?
10. Has the community assessed the vulnerability of the following to coastal hazards through mapping or GIS?
    - *Critical facilities (hospitals, fire stations, etc.)*
    - *At-Risk Populations (elderly, low-income, disabled)*
    - *Buildings (number and type of structures)*
    - *Infrastructure (roads, schools, hospitals, public works, etc.)*
    - *Natural resources (Critical Areas, unique ecosystems and habitats, etc.)*
    - *Historical resources (historic districts, properties, landmarks)*
    - *Cultural resources (libraries, museums, archeological)*
    - *Economic resources (business districts, factories, tourism areas)*
11. Does the community have staff trained in the use of FEMA's HAZUS-MH?
12. Have risk and vulnerability assessments been shared with these people and agencies?
    - *Planning staff*
    - *Public Works officials*
    - *Transportation planners*
    - *Emergency Management*
    - *Elected officials*
    - *General public*

Total number of yes and no answers

Community Rating System (CRS) points

- *Activity 410 - Floodplain Mapping* The objective of this activity is to improve the quality of the mapping that is used to identify and regulate floodplain development (e.g. Higher study standards (HSS), using future-conditions hydrology, including sea level rise), 160 points.
- *Activity 510 - Floodplain Management Planning* The objective of this activity is to credit the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of the hazard on the community and help meet other community needs (e.g. Repetitive loss area analysis (RLAA)), 140 points

ASSESSING RISK AND VULNERABILITY

CoastSmart rating: _____ of 36

Number of Yes answers:

CoastSmart ..... >25
On The Right Track 12–25
Getting Started ..... <12

http://dnrweb.dnr.state.md.us/CoastSmart/scorecard.asp