Threats to our Coasts:

Climate Change-Driven Sea Level Rise and Extreme Weather Events

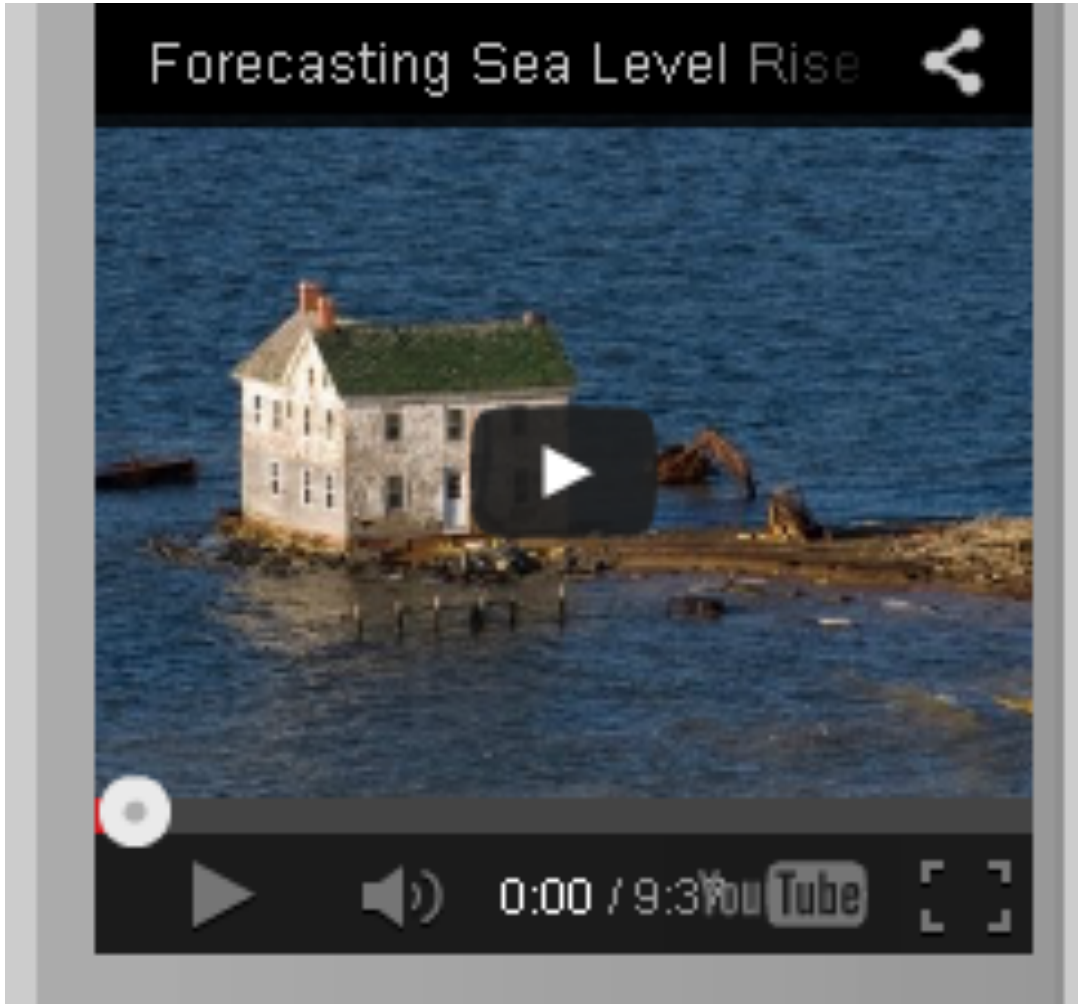
RNRF Congress on Coastal Resilience and Risk

December 11-12, 2013

Photo: Jane Thomas, UMCES

Zoë Johnson

Maryland Department of Natural Resources



https://www.youtube.com/watch?v=RCc3C89qxOM

U. S. Coast Survey
A. D. Bache Superintendent –

SHARPS ISLAND.

Surveyed 20th and 22nd of May. 1848.

Topography by Geo: D. Wiss

Scale 1/10.000

Maryland

Register No. 951.

Shore line 10 miles

Dec 9, 1924. The P.S

438 ACRES LOST

6.2 ACRES/YEAR

Courtesy of Curtis Larsen. 1998. USGS

JAMES ISLAND (1847 - 1994)

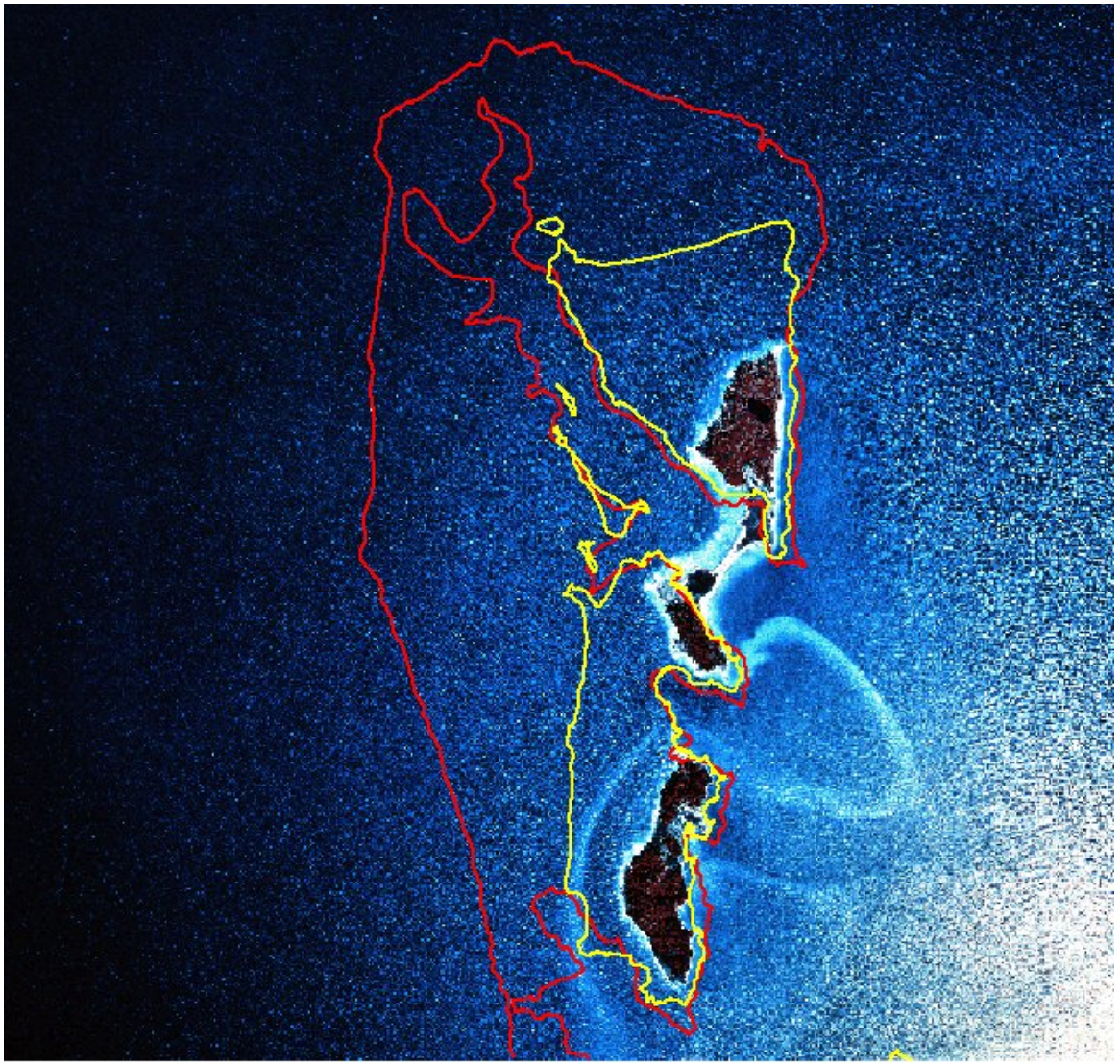
147 years

976 acres (1847)

92 acres (1994)

884 acres lost

6.0 acres/year



Date of Photography: 1994


NO
STOPPING
ANY
TIME


DO NOT
ENTER


IZZY
WAS
BUSY!
9314
ATLANTIC
AVE.


9310

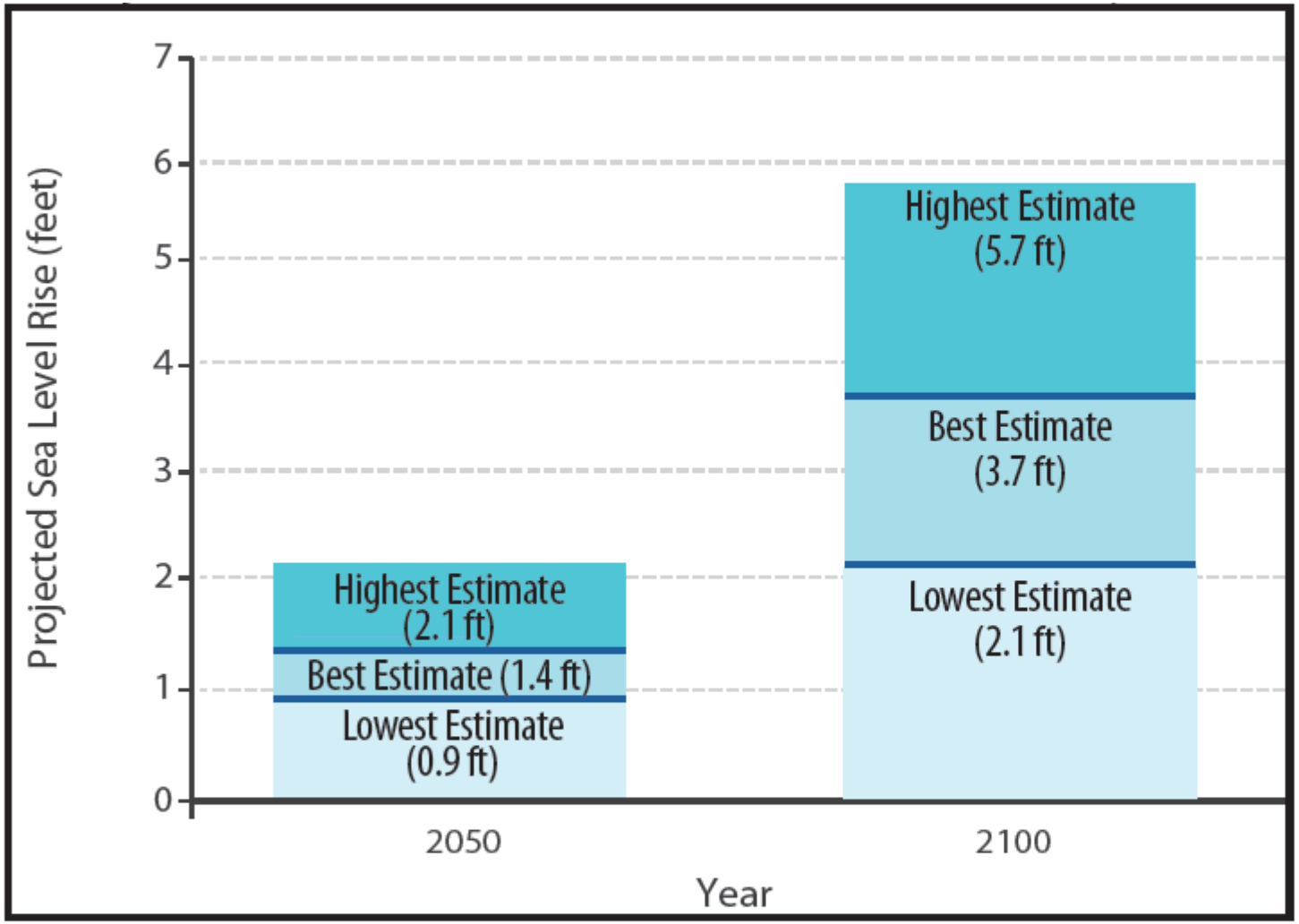

SCENIC DRIVE
MUSEUM
SPEED
LIMIT
25

Climate Change in the Maryland
A 2100 Snapshot

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

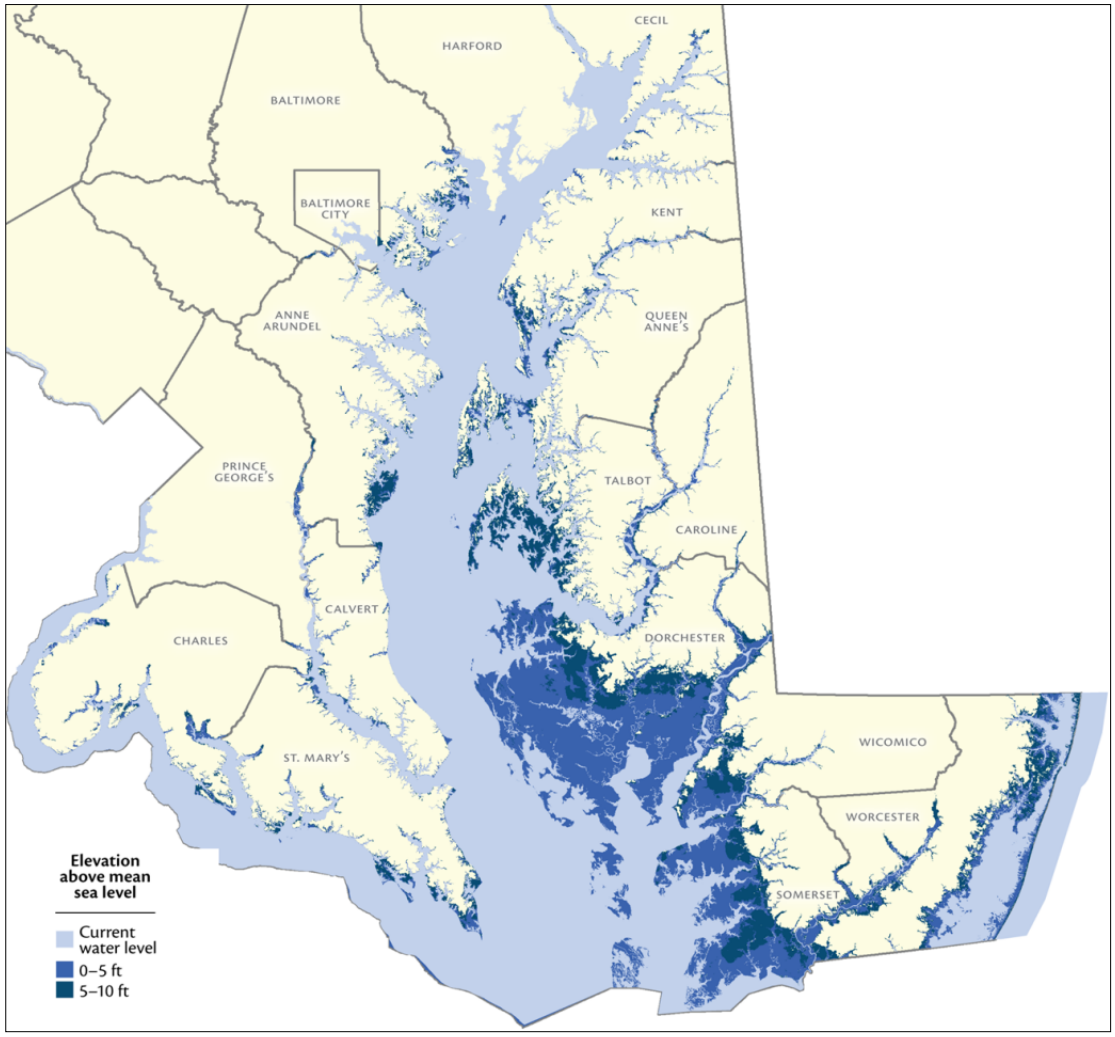
Global Climate Change = Real Consequences for our Coasts

Sea Level Rise Projections for MD



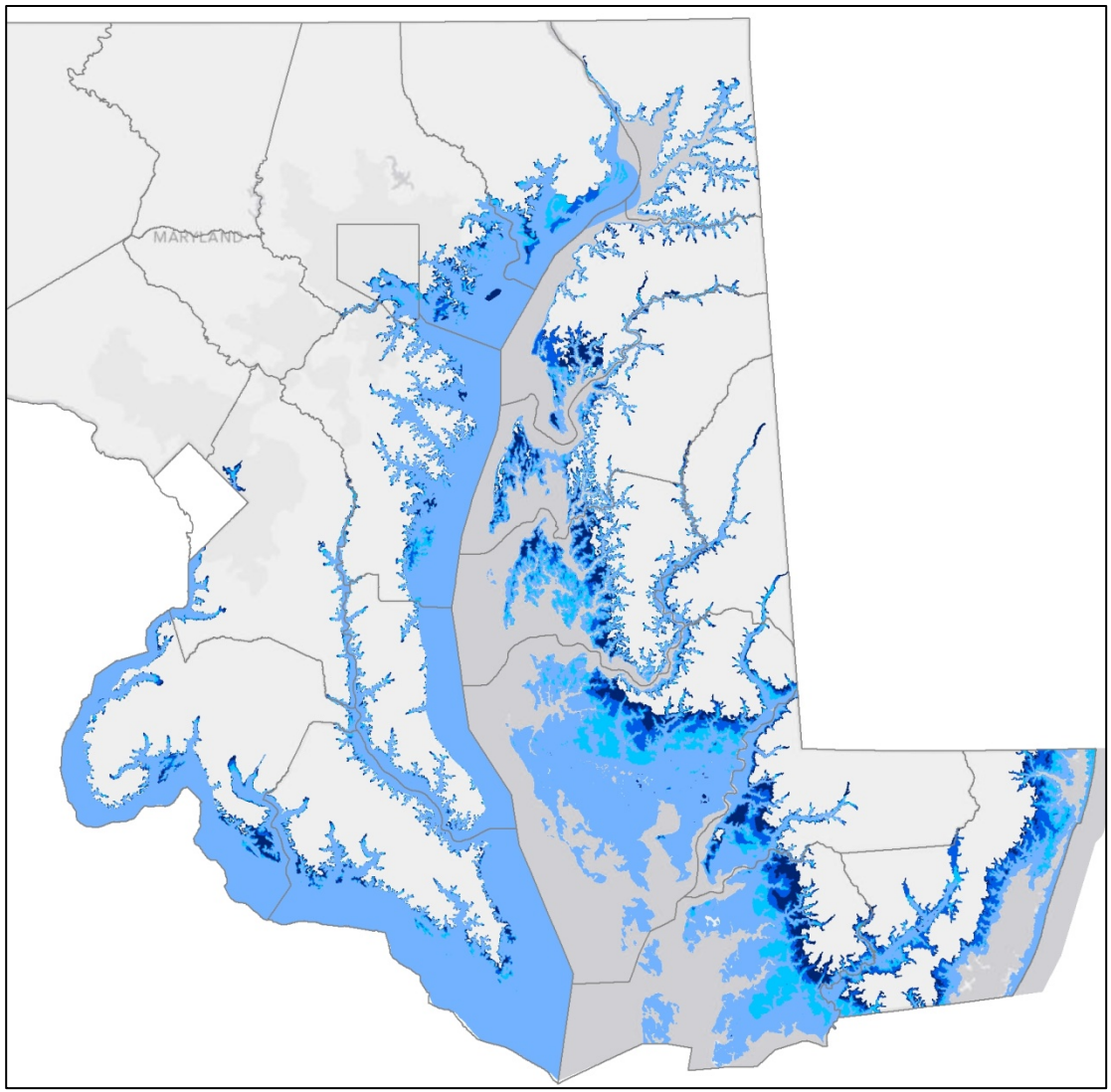
Source: Boesch et al., 2013

Vulnerability to Sea Level Rise



Storm Surge Risk

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

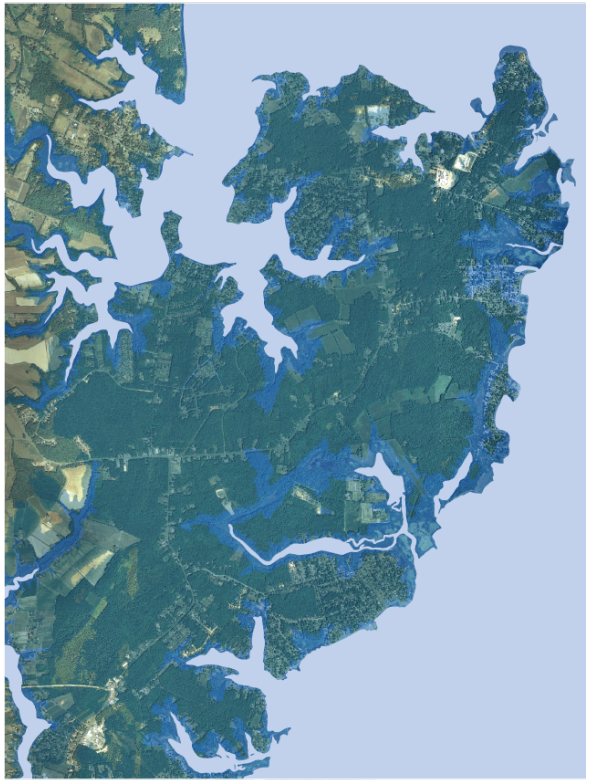


Vulnerability at the Community- Scale

Annapolis

Crisfield

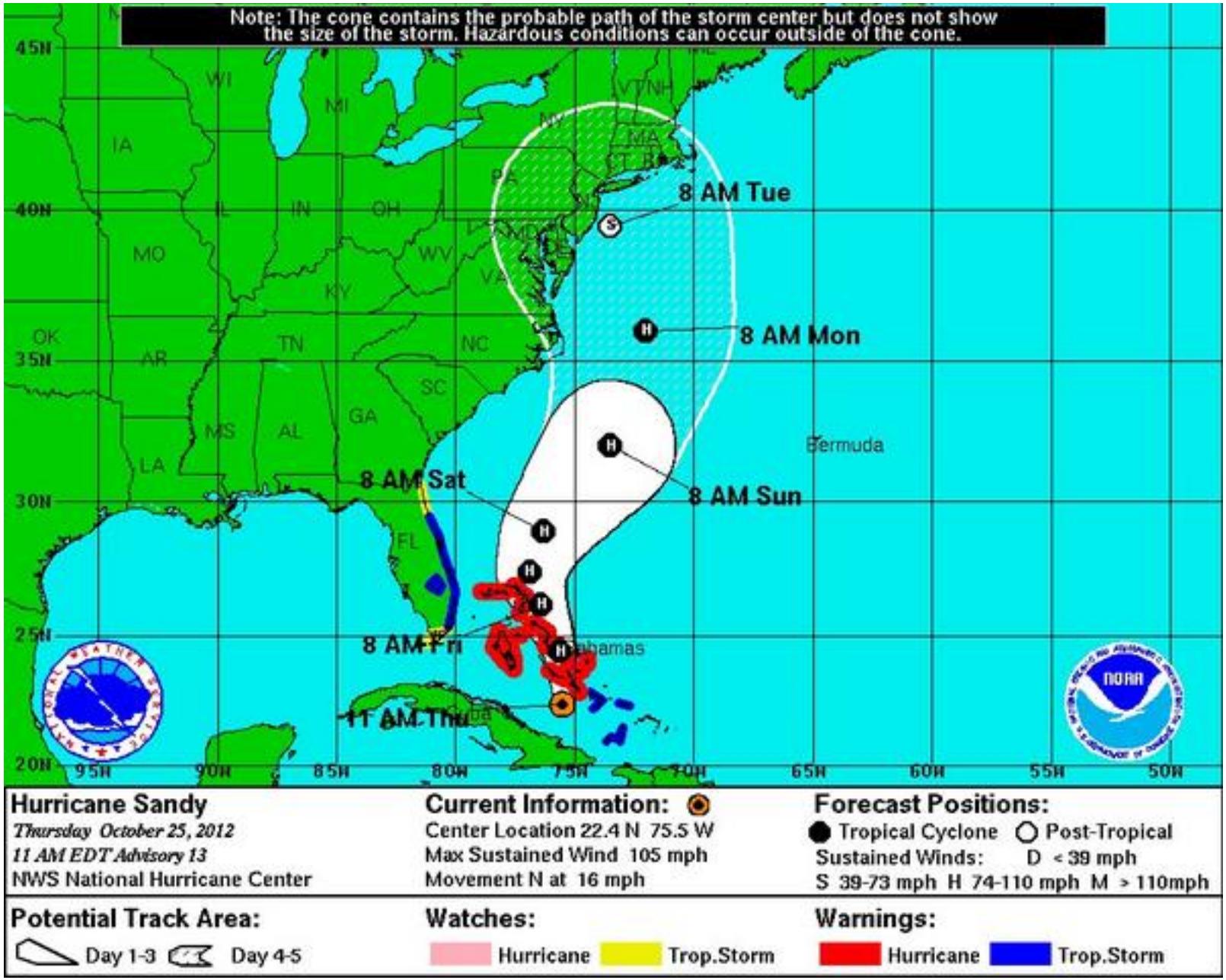
Shady Side



Elevation above mean sea level

- Current water level
- 0–5 ft
- 5–10 ft


HURRICANE
SANDY



Hurricane Sandy
Thursday October 25, 2012
11 AM EDT Advisory 13
NWS National Hurricane Center

Current Information:
Center Location 22.4 N 75.5 W
Max Sustained Wind 105 mph
Movement N at 16 mph

Forecast Positions:
● Tropical Cyclone ○ Post-Tropical
Sustained Winds: D < 39 mph
S 39-73 mph H 74-110 mph M > 110mph

Potential Track Area:
Day 1-3 Day 4-5

Watches:
Hurricane Trop.Storm

Warnings:
Hurricane Trop.Storm


ONE WAY


RULES:

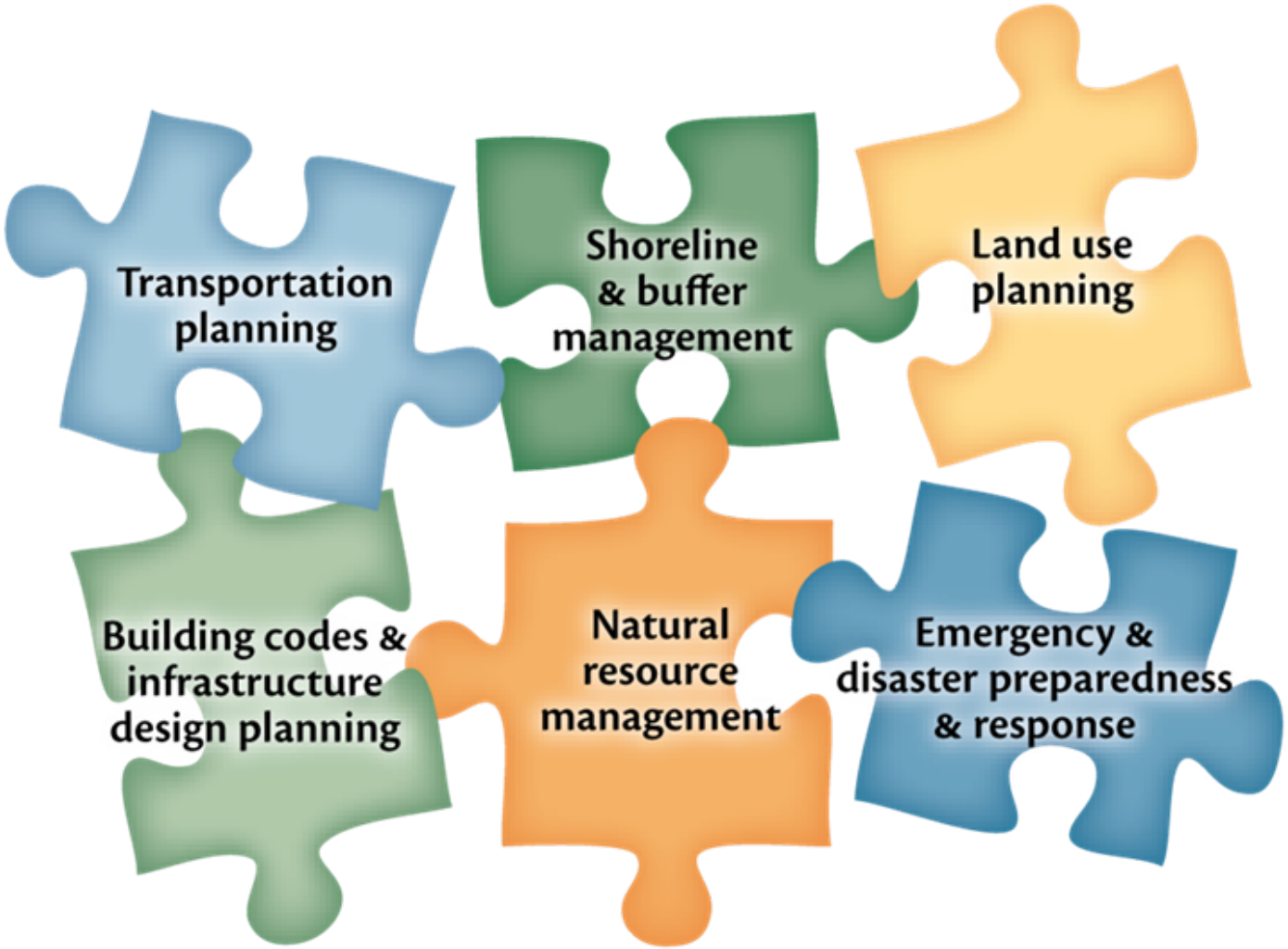

CRISFIELD POLICE
NO
PARKING


health
weather
culture
flooding
vulnerability
climate
bluecrabs
SmithIsland
inundation
tourism
resiliency
damage
home
sea-level-rise
risk
recovery
poverty
future
erosion
economy
mold
Crisfield

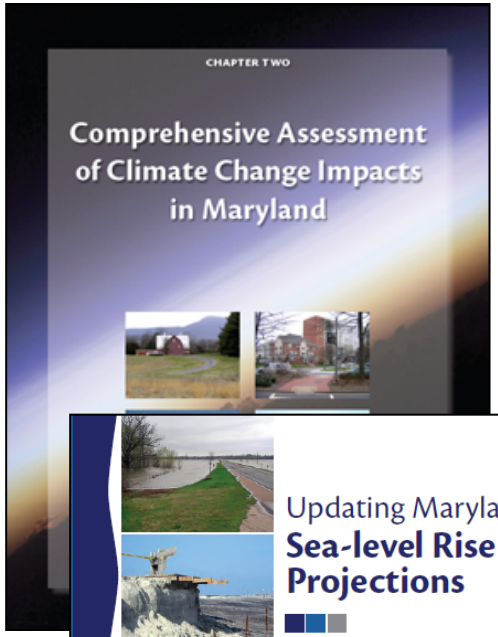
Challenges to Recovery

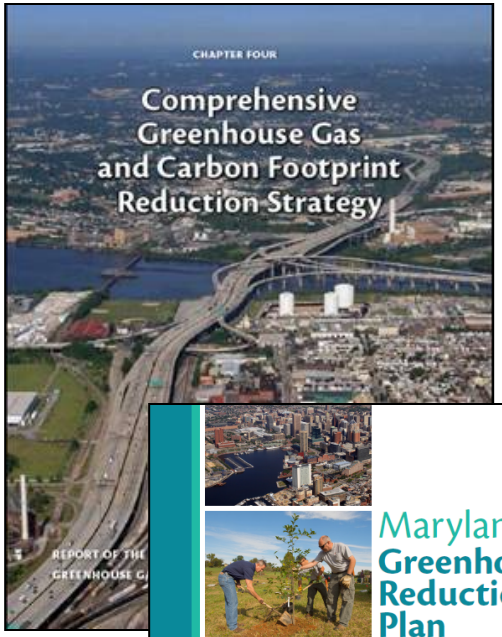
- Majority of Crisfield is at 3 feet or lower with few buildable areas above 5 feet of mean sea level.
- All major trends including population, tax revenues, commercial establishments are negative.
- Fiscally constrained City.
- Uncertainty about loss of residents and businesses due to Sandy.
- Extremely week downtown core-high vacancy rate.
- Potential for leadership turnover.
- Crisfield has adopted a 2-foot freeboard requirement for residential structures.
- FEMA releasing new flood maps and reforming NFIP; preliminary flood maps for Crisfield show an approximate 2-foot increase in the 100-year Base flood elevation.
- Smith Island did not suffer significant damage from Sandy but it is extremely vulnerable to future storms.
- Crisfield and Smith Island are iconic Chesapeake Bay communities with significant cultural and historic value.

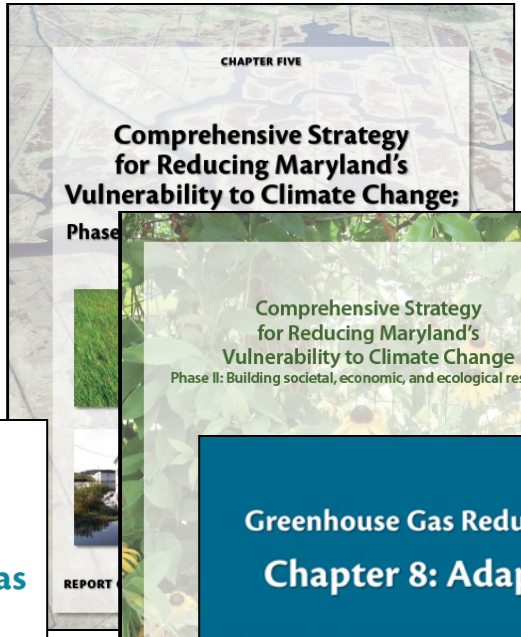
Coastal Resiliency: An Integrated Approach

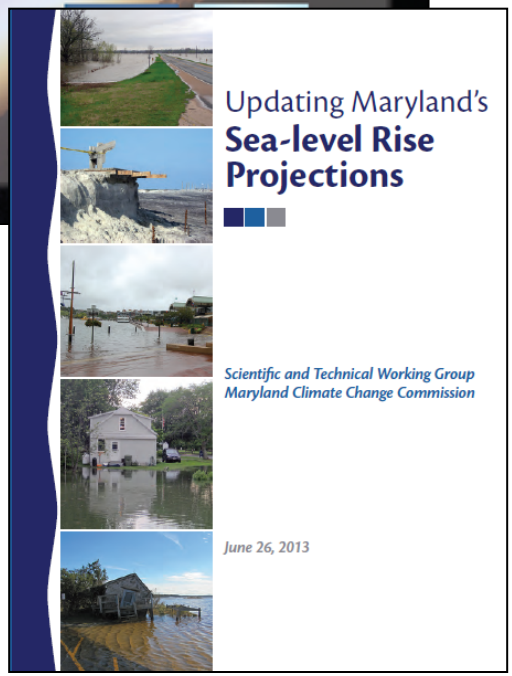


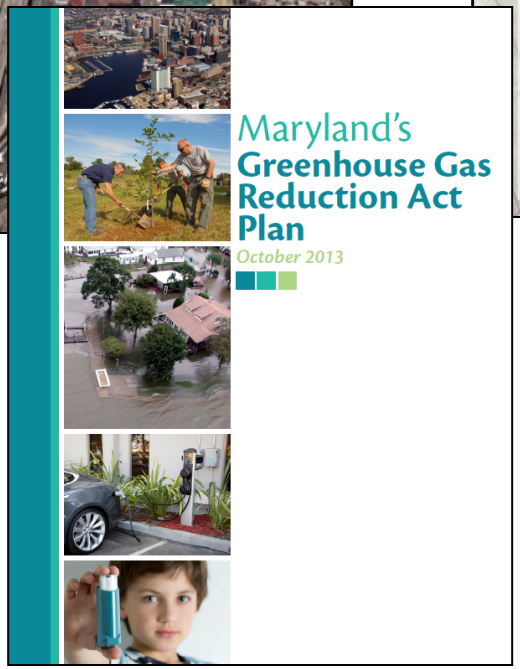
Maryland's Climate Action Plan









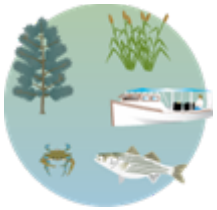


Vision for the Future:
Protect Maryland's People, Property, Natural Resources, and Public Investments

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

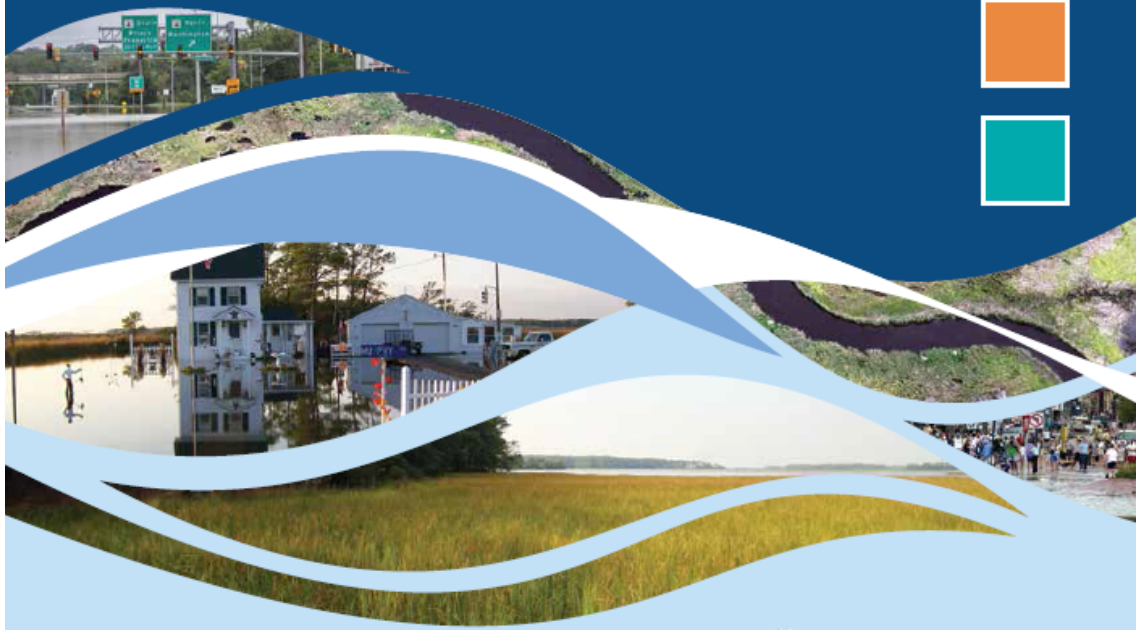
Shift to sustainable economies and investments; and, avoid assumption of the financial risk of development and redevelopment in highly hazardous coastal areas

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

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

NOAA

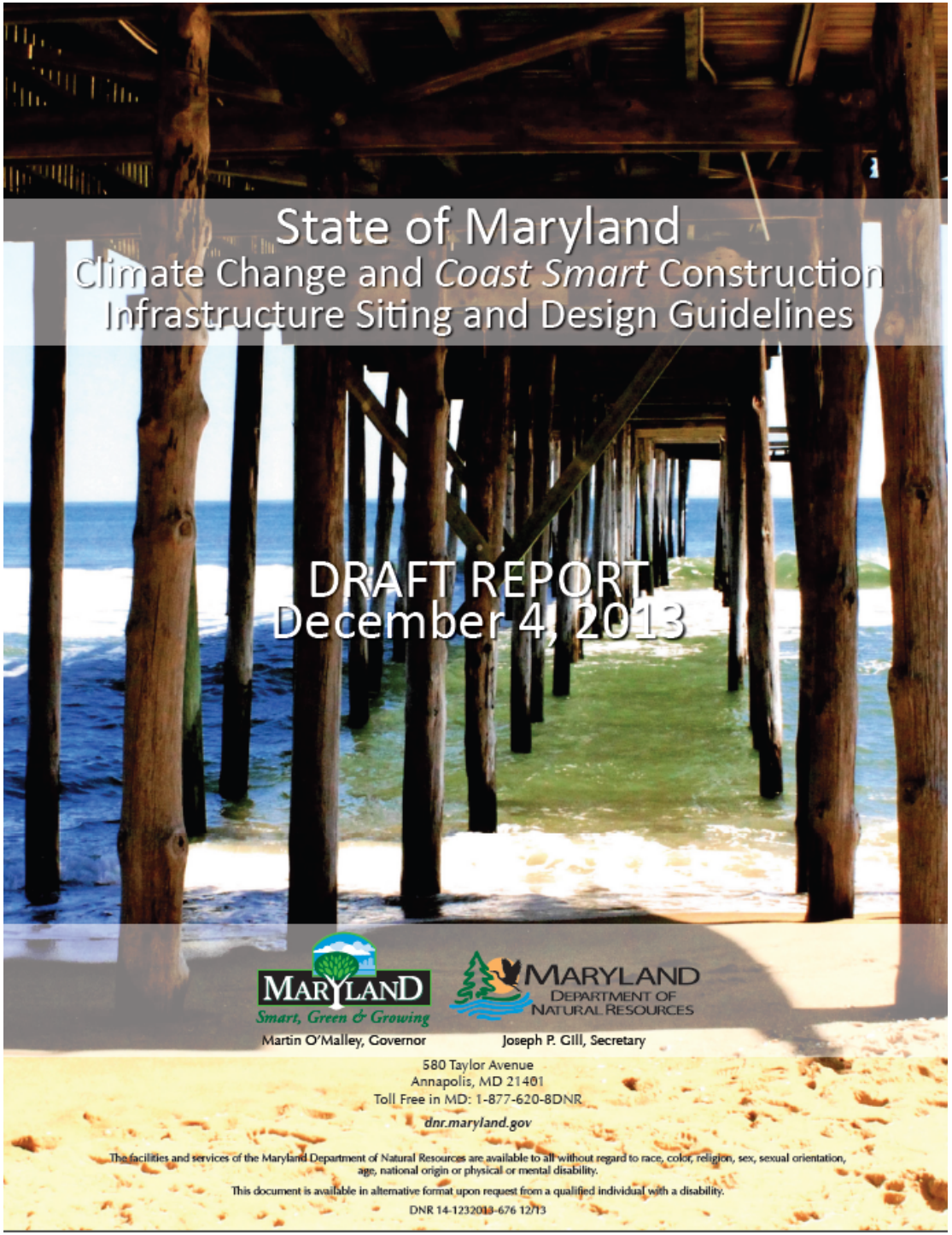
MARYLAND
Smart, Green & Growing

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Maryland's Chesapeake & Coastal Service

Areas of Special Designation:
Climate Change Impact Areas

- Sea Level Rise Vulnerability
- Erosion Vulnerability
- Wetland Adaptation Areas
- Storm Surge Risk
- 100 and 500-Year Floodplain
- Drought Hazard Risk
- Wildfire Priority Risk
- High Quality Cold Water Resource Areas
- Climate Sensitive Wildlife and Rare Species Habitats (coming soon)



State of Maryland
Climate Change and *Coast Smart* Construction Infrastructure Siting and Design Guidelines

DRAFT REPORT
December 4, 2013

MARYLAND
Smart, Green & Growing

MARYLAND DEPARTMENT OF NATURAL RESOURCES

Martin O'Malley, Governor Joseph P. Gill, Secretary

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Annapolis, MD 21401
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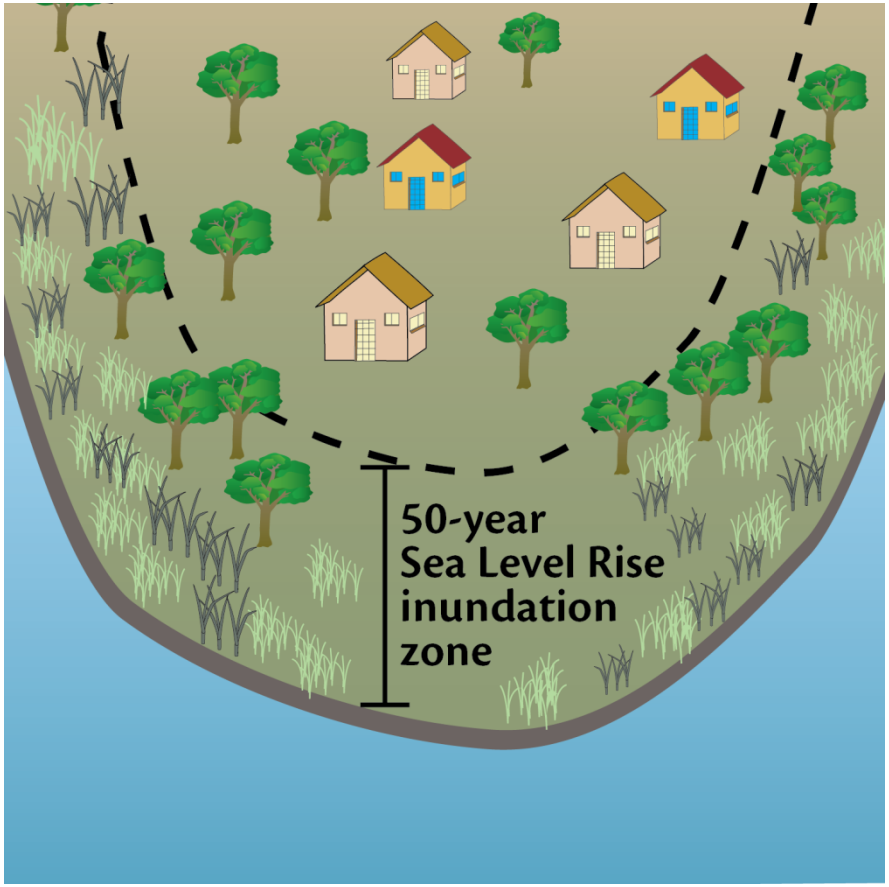
dnr.maryland.gov

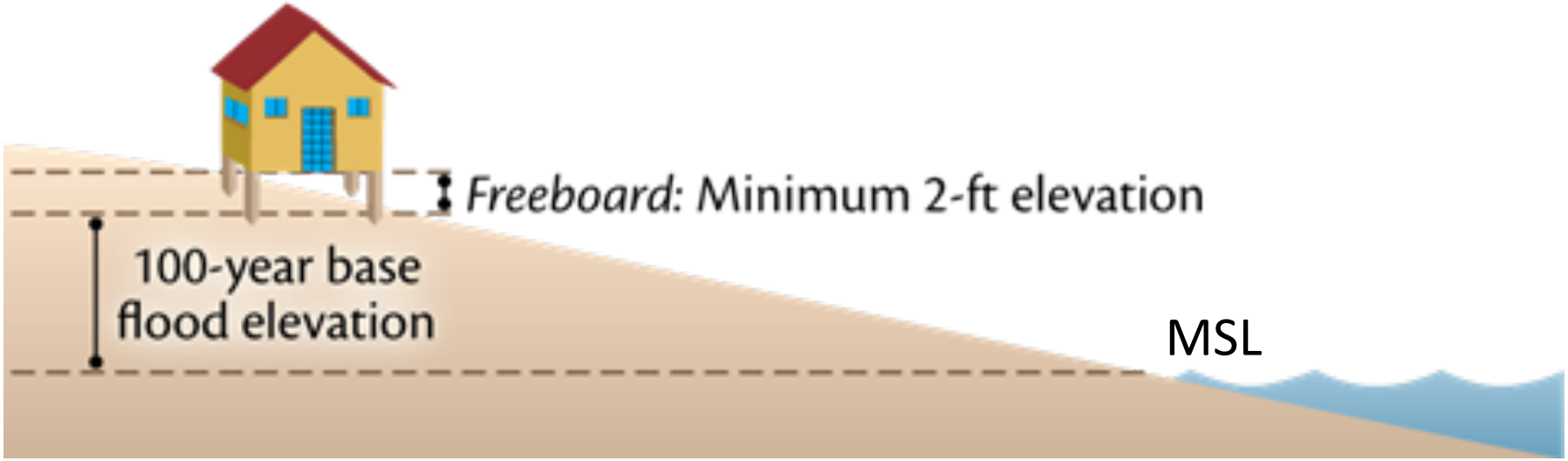
DNR 14-1232013-676 12/13

Where to Build and Re-Build ?



Policy Question: Should publicly funded new/rebuilt structures be restricted from being located in highly vulnerable areas ?

How to Build and Re-Build?



Policy Question: Should new and/or replacement structures be required to be built higher than the 100-year base flood elevation? How high?

How to promote green vs. gray protection mechanisms

- "Living Shorelines" or non-structural shore protection practices to deal with erosion.
- Increased vegetative and forested buffers to increase storm protection.
- Use of erosion or elevation-based setbacks to site structures.
- Protection of wildlife habitat and wetland migration corridors.

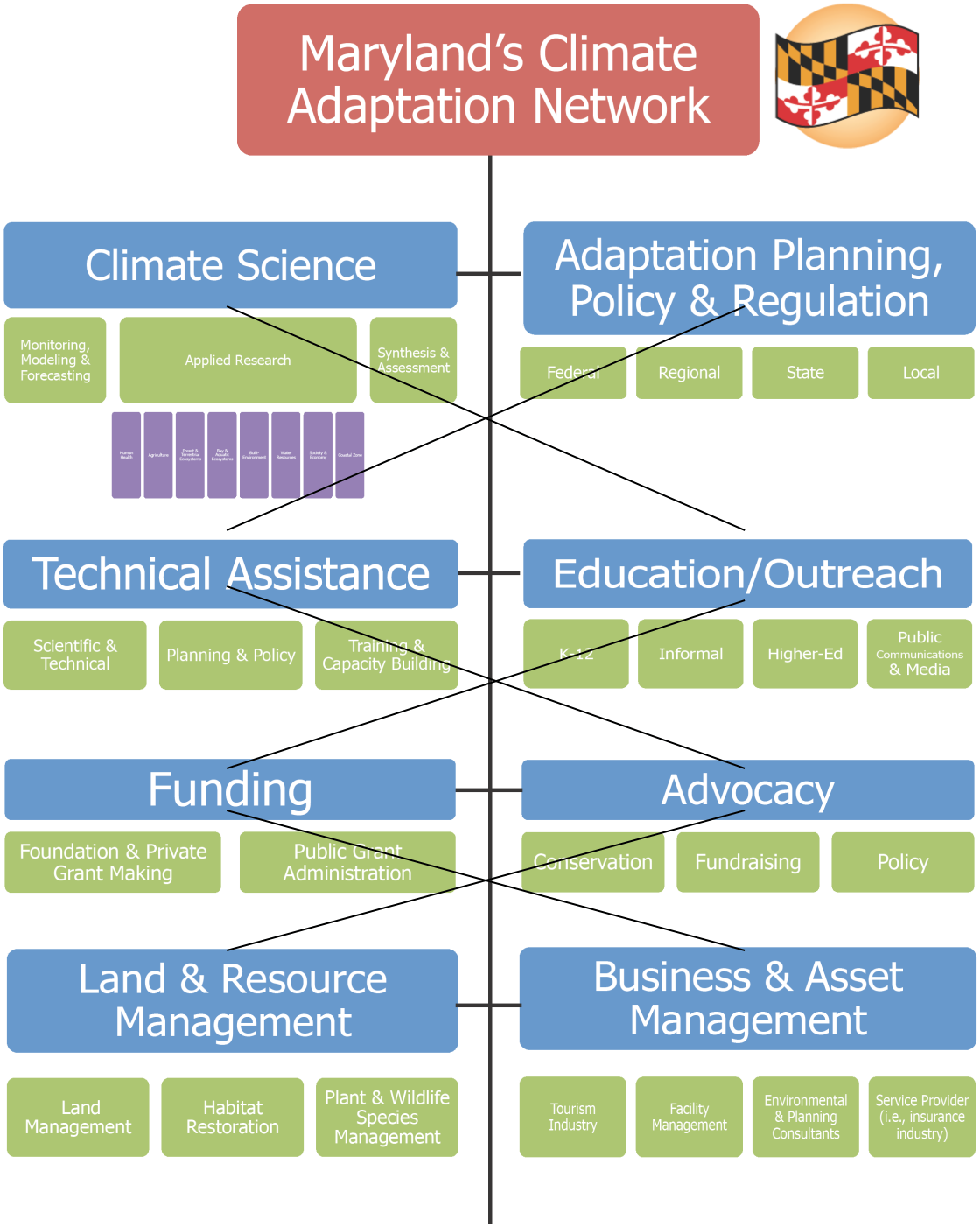
Policy Question: What policy changes are needed to institutionalize consideration of the "coast smart" practices?

How to revitalize communities along the way?

- How do we balance the reality of sea level rise and extreme events with historic and cultural values and the need for community revitalization?

Policy Question: What type of investments should public dollars be used to support within areas likely to be impacted by sea level rise within 50 or 100 years?

How can you help?


Maryland's Climate Adaptation Network
Climate Science
Monitoring, Modeling & Forecasting
Applied Research
Synthesis & Assessment
Adaptation Planning, Policy & Regulation
Federal
Regional
State
Local
Technical Assistance
Scientific & Technical
Planning & Policy
Training & Capacity Building
Education/Outreach
K-12
Informal
Higher-Ed
Public Communications & Media
Funding
Foundation & Private Grant Making
Public Grant Administration
Advocacy
Conservation
Fundraising
Policy
Land & Resource Management
Land Management
Habitat Restoration
Plant & Wildlife Species Management
Business & Asset Management
Tourism Industry
Facility Management
Environmental & Planning Consultants
Service Provider (i.e., insurance industry)

Questions and Discussion

For more information, visit:

climatechange.maryland.gov

dnr.state.md.us/climatechange

Wanda Cole, Maryland RC&D