Climate Change and Coast Smart Construction Working Group

April 19, 2013

Zoë Johnson, Office for a Sustainable Future

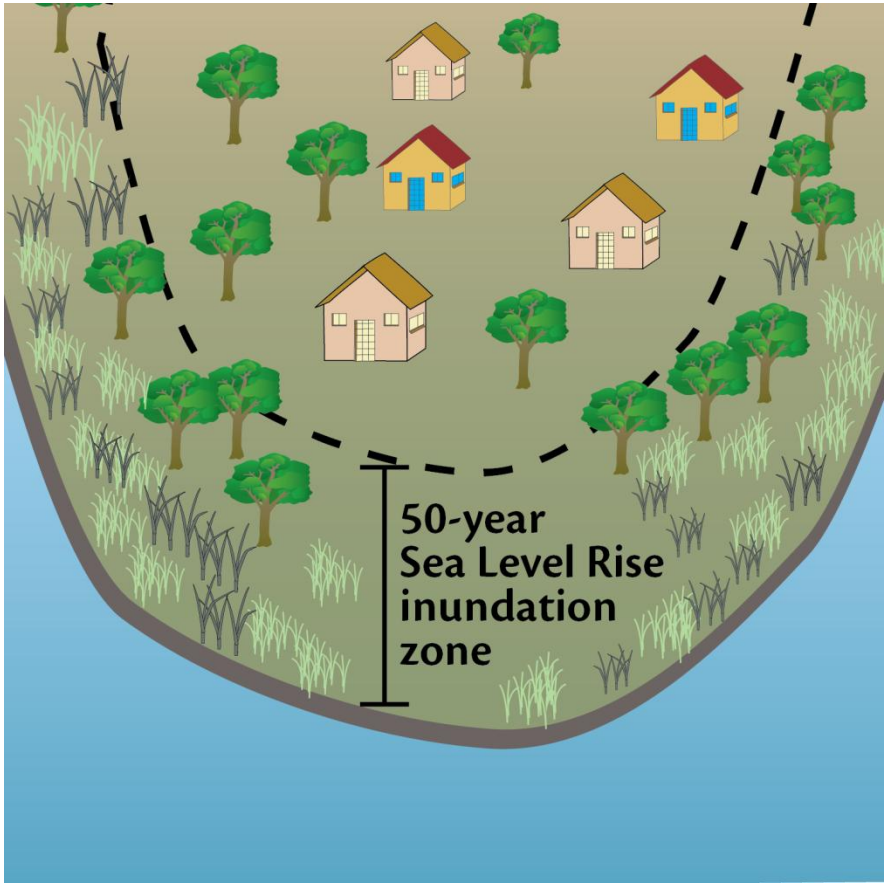
Working Group Tasks

D. DNR in consultation with the Maryland Commission on Climate Change and other relevant parties, as necessary, shall develop additional proposed guidelines concerning Climate Change and Coast Smart Construction. The report shall include:

- Recommendations for additional Coast Smart criteria for the siting and design of new, reconstructed or rehabilitated state structures, as well as other infrastructure improvements such as roads, bridges, sewer and water systems, drainage systems , and essential public utilities.
- Recommendations concerning the potential application of "Coast Smart" guidelines to non-state infrastructure projects that are partially or fully funded by State agencies.
- Other recommendations for executive and/or legislative action.

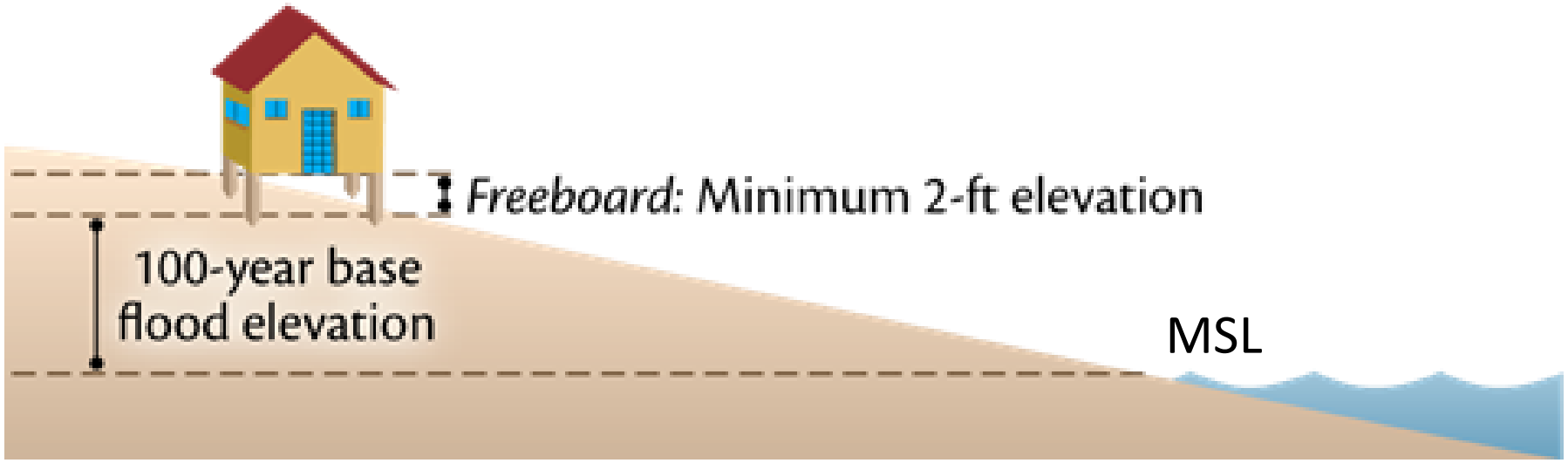
An initial report is due on or before September 28, 2013.

Siting Criteria: Where to Build?



Example: Site new structures outside areas likely to be inundated by sea-level rise within a 50-year time horizon

Design Standards: How to Build?



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

Meeting #2 Recap

Structures

- Walled or roofed buildings
- Storage tanks
- Critical facilities
- Historic properties

Transportation

- Roads
- Bridges
- Tunnels
- Aviation
- Public Transit

Water Dependent Uses

- Port facilities
- Docks, piers, wharfs, berths
- Shore protection projects
- Public access projects

Essential Public Utilities

- Water Supply
- Wastewater and Stormwater
- Energy Supply
- Telecommunications

Key Points

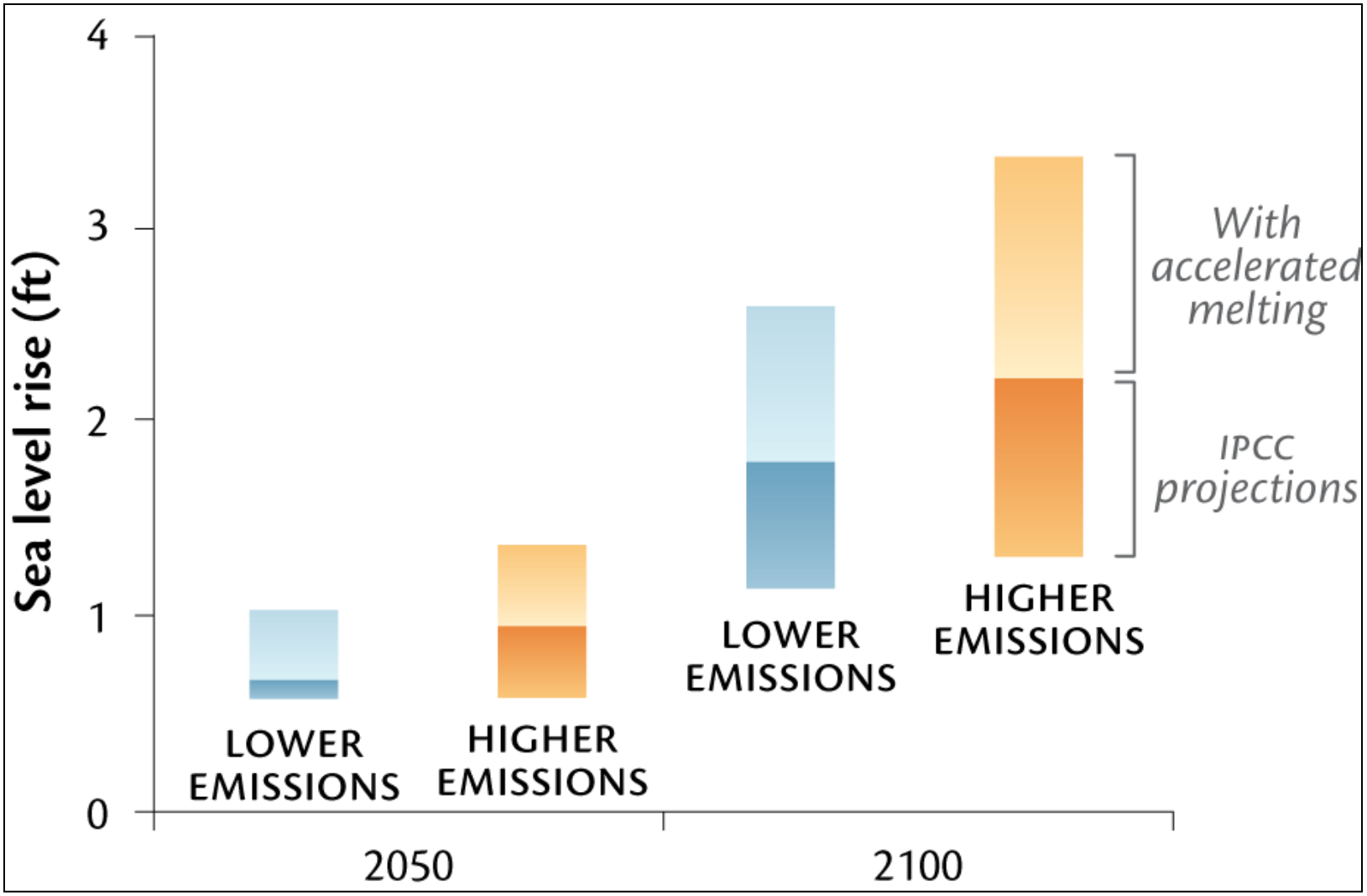
- Need to develop considerations for existing infrastructure
- Differences in siting and design based on critical/noncritical facilities and life expectancy
- Suggest adding greater standards for critical facilities and other facilities that state may use such as schools as emergency shelters
- Long-term planning for large scale facilities (i.e., Blue Plains) in coastal zone
- Need to maintain eligibility or listing on National Register of Historic Places
- Need to understand what you are designing for: Use, Design life
- Need to define: New significant structure, Redevelopment, Fullest extent practicable, Design Life
- Increase in freeboard leads to other design changes which in turn can lead to greater costs
- Need to know when to apply varying datum: 0'-2'+ SLR, 2' base elevation, Storm surge, Storm Surge + sea level rise
- Look to NYC for ideas (post-Sandy)
- Develop project review guidelines instead of strict siting/design criteria because all transportation projects are unique in nature
- Economics behind protection, restoration, and helping to maintain areas like Ocean City
- What's the next phase?
  - Past 50 years, strategic retreat?
  - Comes in when talking about shoreline protection, especially for critical facilities and critical research facilities
  - How to set aside $$$
  - 'Hardest' management technique for most essential facilities
  - Rankings to make these choices

General Policy

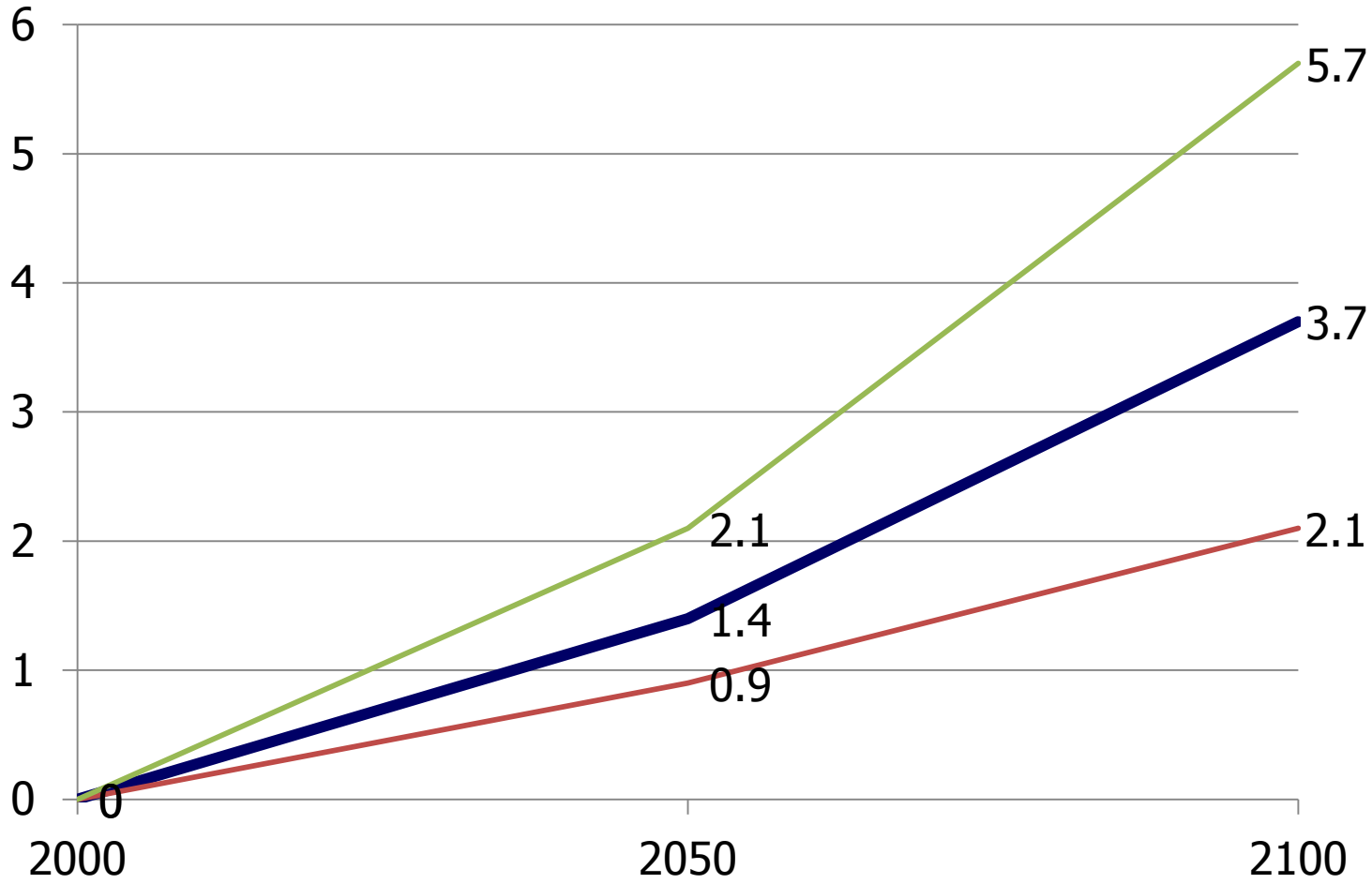
State agencies that propose capital projects for new State structures, the reconstruction or rehabilitation of substantially damaged State structure, as well as other infrastructure improvements, shall consider the risk of sea level rise, coastal flooding and storm surge to the project and should be sited and designed to avoid or minimize associated impacts.

Future Sea Level Rise Projections

MCCC, 2008



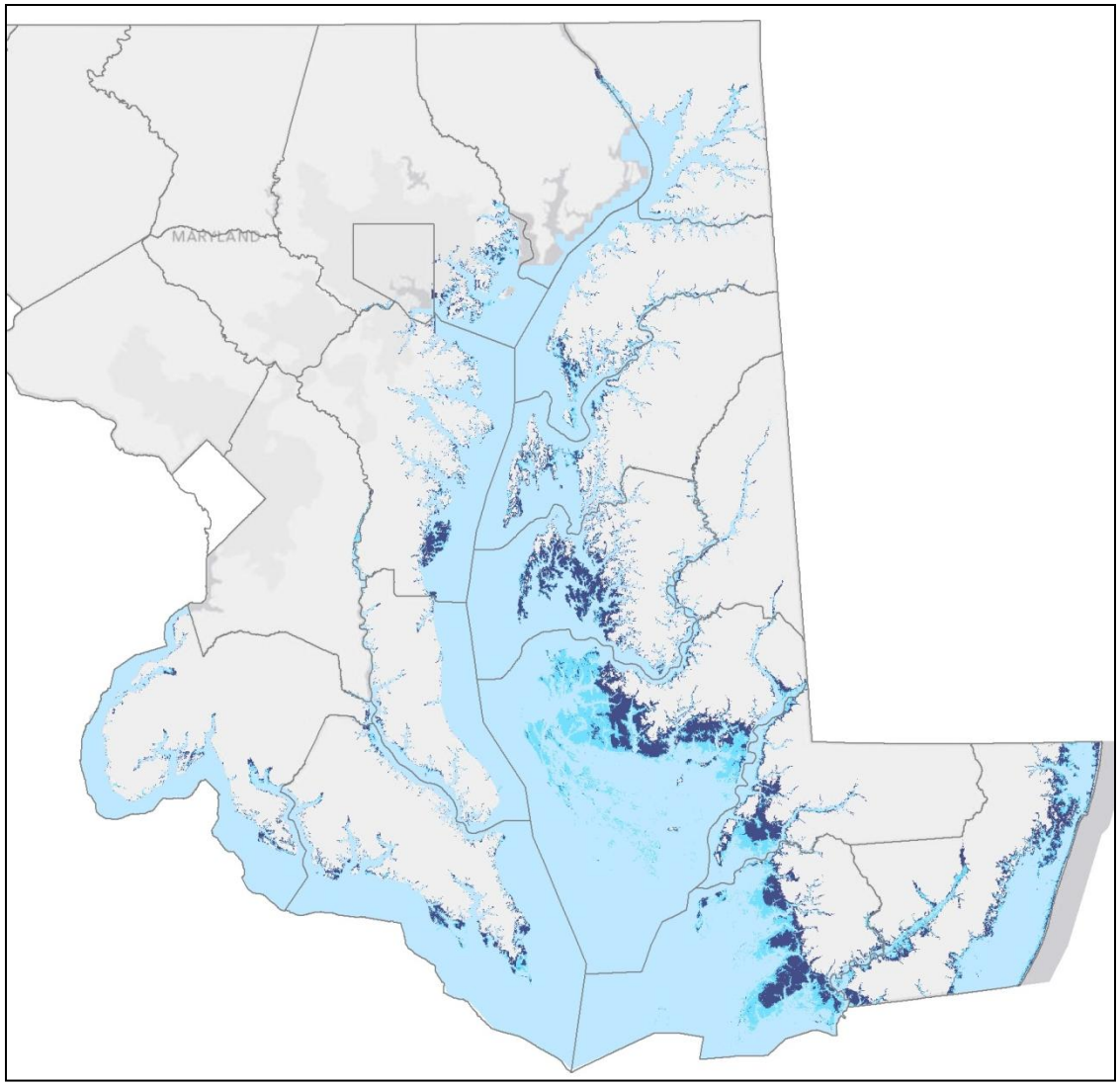
Revised Sea level Rise Scenarios
Very Preliminary Data



NOT FOR PUBLIC DISTRIBUTION

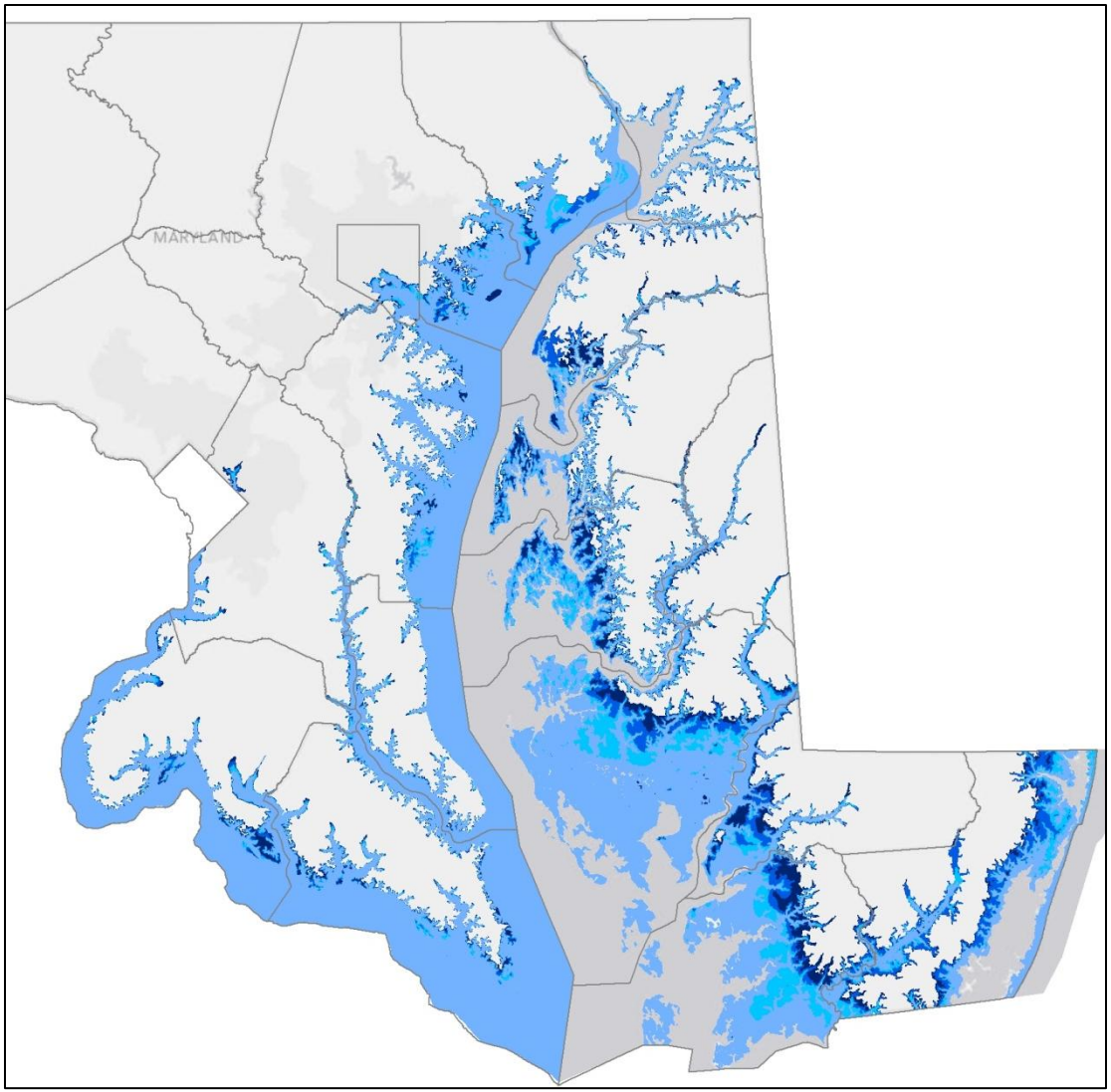
Sea Level Rise Vulnerable Areas

- 0-2 Foot Inundation Areas
- 2-5 Foot Inundation Areas
- 5-10 Foot Inundation Areas

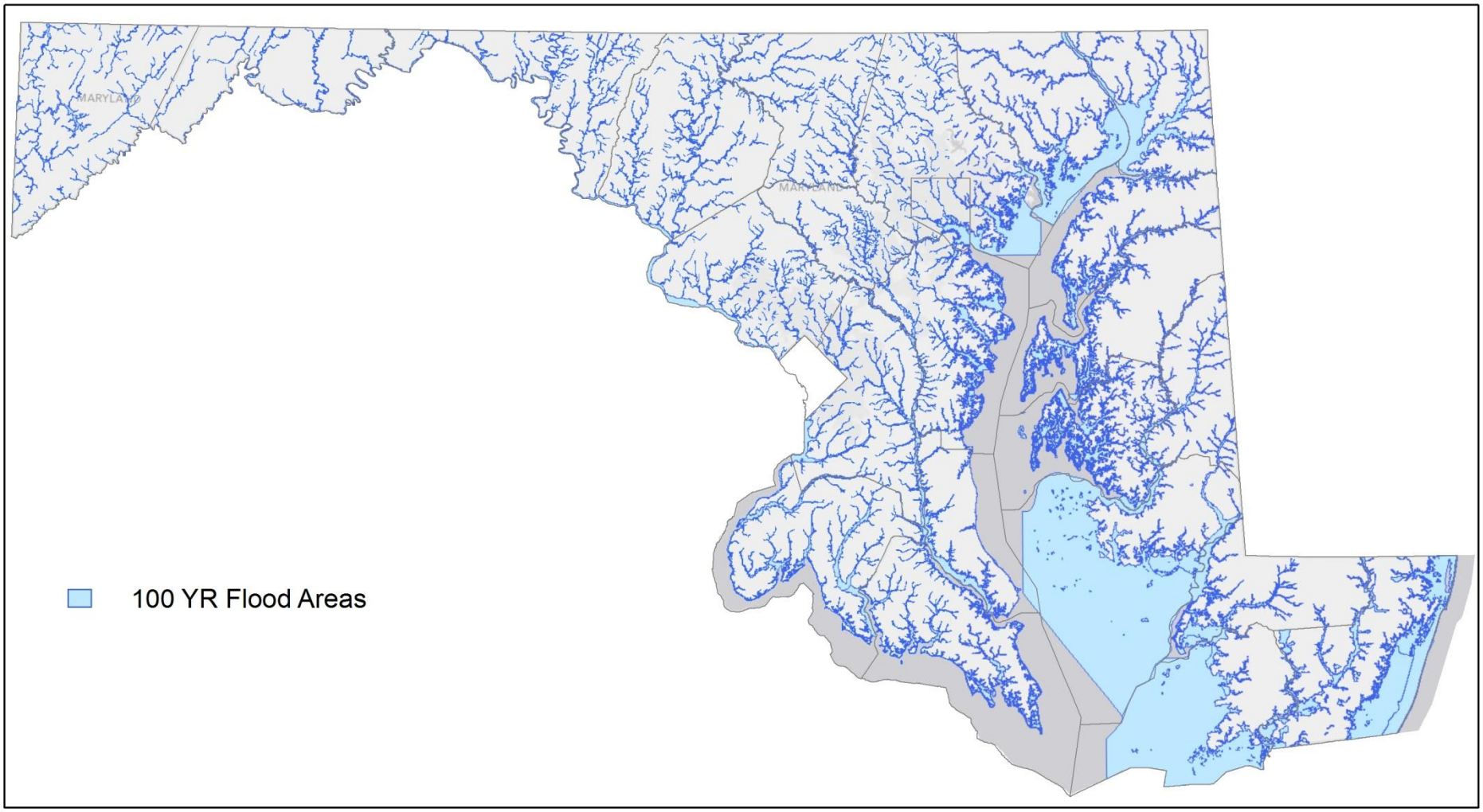


Storm Surge Risk

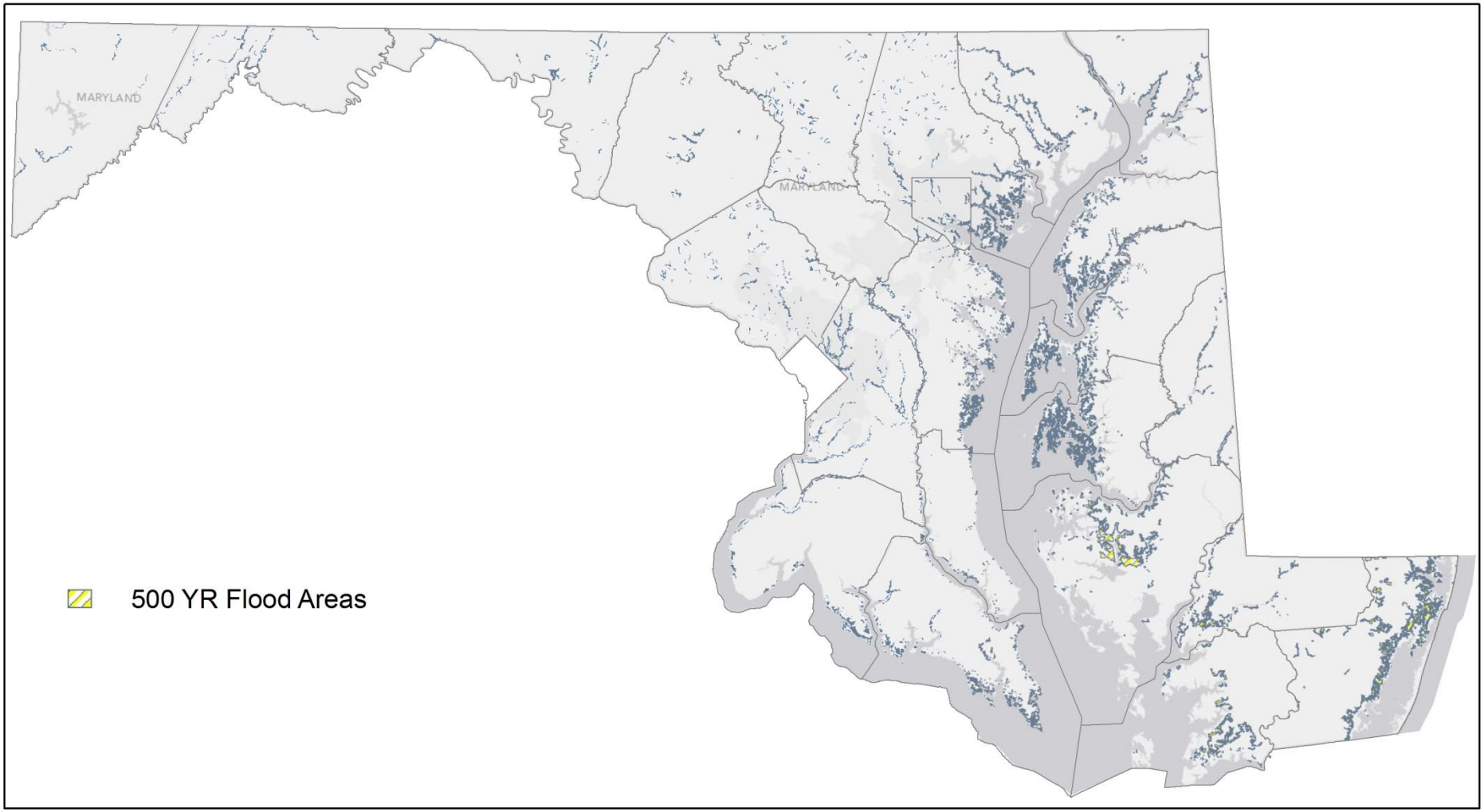
- Category 1 (5-7 feet)
- Category 2 (7-11 feet)
- Category 3 (11-19 feet)
- Category 4 (19-24 feet)



100-Year Floodplain



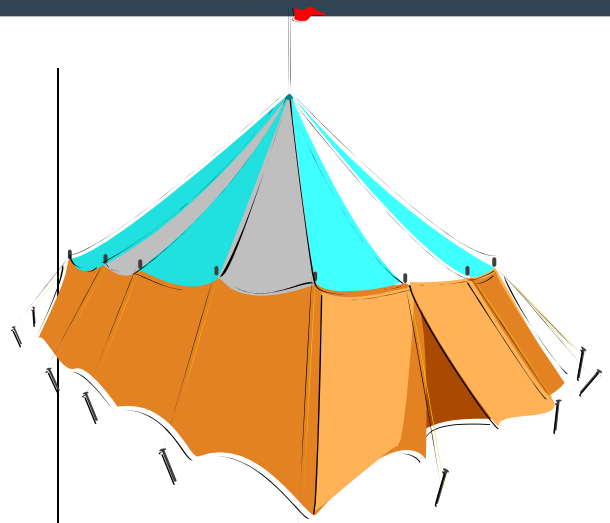
500-Year Floodplain

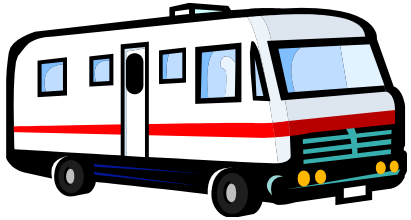


Sea Level Rise, Tides & Storm Surge

- As sea level rise, storm surge heights and high tides will also generally increase
- However, the sums of these are not additive
- The projected amount of storm surge or changes in tidal range increase due to SLR has not been modeled for the Chesapeake Bay
- One study in shallow water bays and wetlands in Louisiana suggests there could be a 20%-50% increase in storm surge

Risk Tolerance





Low ⟶ High

Risk Tolerance

- The amount of risk involved in a decision depends on both the consequences and the likelihood of realized impacts that may result from sea level rise.
- These realized impacts, in turn, depend on the extent to which the project design integrates an accurate projection of sea level rise.
- However, current sea level rise projections provide a range of potential sea level rise values.
- Therefore, agencies must consider and balance the relative risk associated with under and overestimating sea level rise when making decisions.
- Harmful impacts are more likely to occur if the project design is based upon a low projection of sea level rise and less likely if the higher estimates of sea level rise are used.

Source: California Dept. of Transportation (2011)

State Policy Concepts for Discussion

- Proposed projects should be avoided within areas less than 2 feet above mean sea level.

- Proposed projects located within areas 2-5 feet in elevation above mean sea level should be assessed to vulnerability of the project over the anticipated design life and should be sited and designed to the fullest extent feasible to avoid or minimize impact.

What about storm surge?

Exception Criteria:

- Infrastructure projects intended to provide passive public access to water bodies or shoreline areas ;
- Water-dependent uses (those which require continued direct access to the water as an integral part of the use);
- Historic structures as defined by the U.S. Department of the Interior and/or the Maryland Historic Trust;
- Maintenance of transportation networks; and
- The reconstruction or rehabilitation of substantially damaged or existing infrastructure, including structures.

Screening/Review Process

- Identify the timescale for which infrastructure and operational decisions are being made.
- Identify the limits of the risk tolerance for the investment/project.
- Assess proposed project's vulnerability to sea level rise impacts (i.e., inundation, flooding and storm surge).
  - Short-term (design life < 25 years): 7-8 mm\year
  - Medium-term (functional through mid century): 1.4 – 2.1 feet by 2050
  - Long-term investment (functional through this century): 3.7 by 2100
  - Very long-term (functional beyond this century) or those that are "high risk" or have a low risk tolerance: 5.7 feet by 2100

Issues/Factors to Consider

- New Construction
- Existing Infrastructure
  - Reconstruction or rehabilitation of substantially damaged structures or infrastructure
- Threshold Qualifications
  - Size (square footage)
  - Construction Cost (dollar value)
  - Design Life (life expectancy of structure in relation to anticipated sea level rise)
- Vulnerability (magnitude, timing, during and cost)
  - Anticipated impact from sea level rise, flooding and/or storm surge over the expected design life of an investment
- Risk Tolerance
  - Short, Medium and Long-term Investments

Schedule

Meeting Date	Task
February 15, 2013	Initial Scoping
March 15, 2013	Review/discuss "Best Practices" for Siting and Design
April 19, 2013	Applicability: Establish project types
May 17, 2013	Methodology: Discuss review processes, tools , and resources
June 14, 2013	Institutionalization: Discuss implementation mechanisms
July 19, 2013	Draft Initial Report
August 16, 2013	Finalize Initial Report & Establish legislative priorities
Sept. - Oct. 18, 2013	Engage Maryland Commission on Climate Change and other relevant parties
Nov. 15., 2013	Refine Recommendations
December 13, 2013	Approve Final Report