



Barriers and Opportunities for Local-level Action on Climate Change and Stormwater Management

AWRA-National Capital Region

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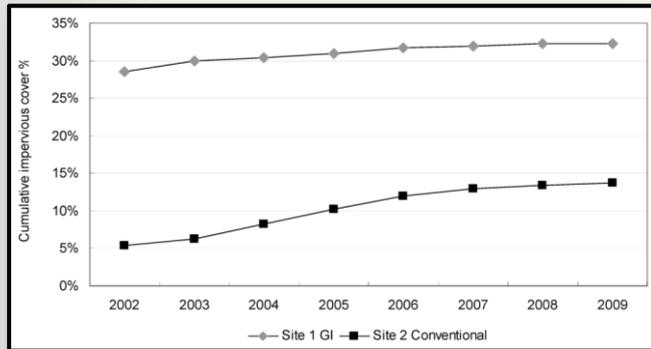
Goal and Approach

- Changes in rainfall will affect stormwater runoff
- Decision makers need information on incorporating projected changes into stormwater planning
- EPA and NOAA funded workshops in the Chesapeake and Great Lakes Regions to explore:
 - Impacts of projected climate and land use change on local water conditions
 - Ways to fit adaptation into existing planning processes
- Insights gained will improve our ability to provide useful climate change information to further adaptation





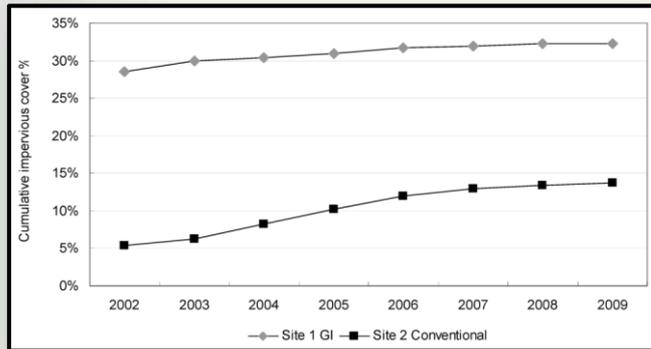
Key Takeaways from Workshops



- **Incorporating climate change into planning** – difficult to find and apply relevant climate change information to planning efforts
- **Building local capacity** – Integration of green infrastructure (GI) into stormwater planning requires more local-level capacity
- **Identifying and communicating costs and benefits of green infrastructure** – economic information is limited to justify implementing GI projects; where it exists, quantifying and articulating benefits to others is challenging
- **Implementation within current governance structure** – Existing priorities and regulatory requirements can be a barrier to voluntarily incorporating climate change into planning



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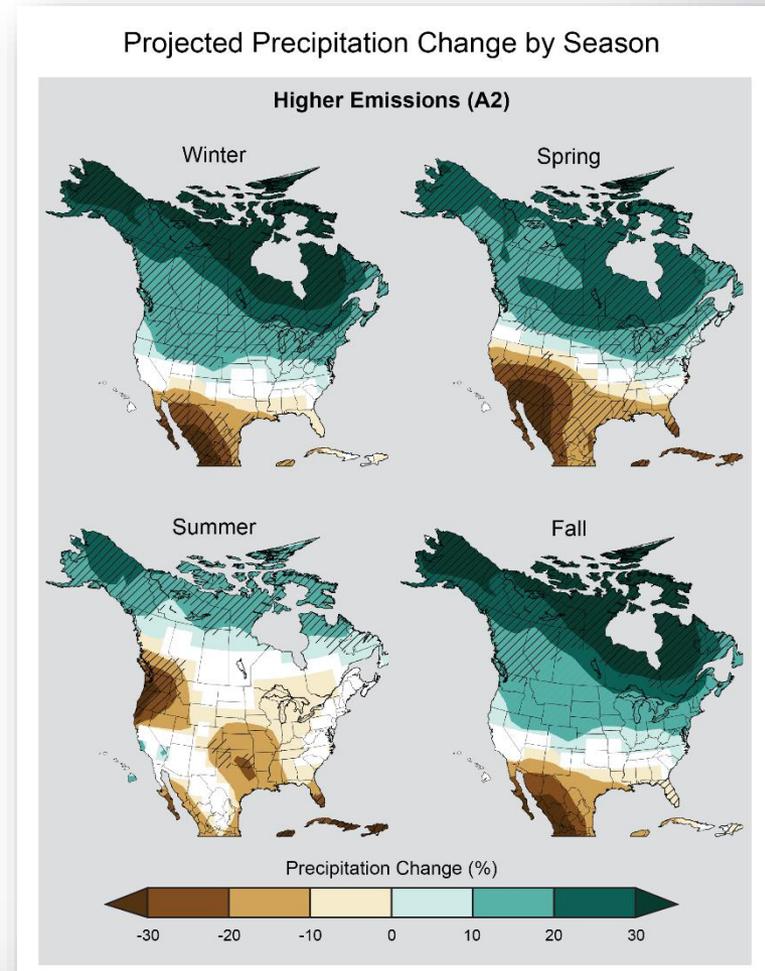


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Incorporating Climate Change into Planning -- Issues

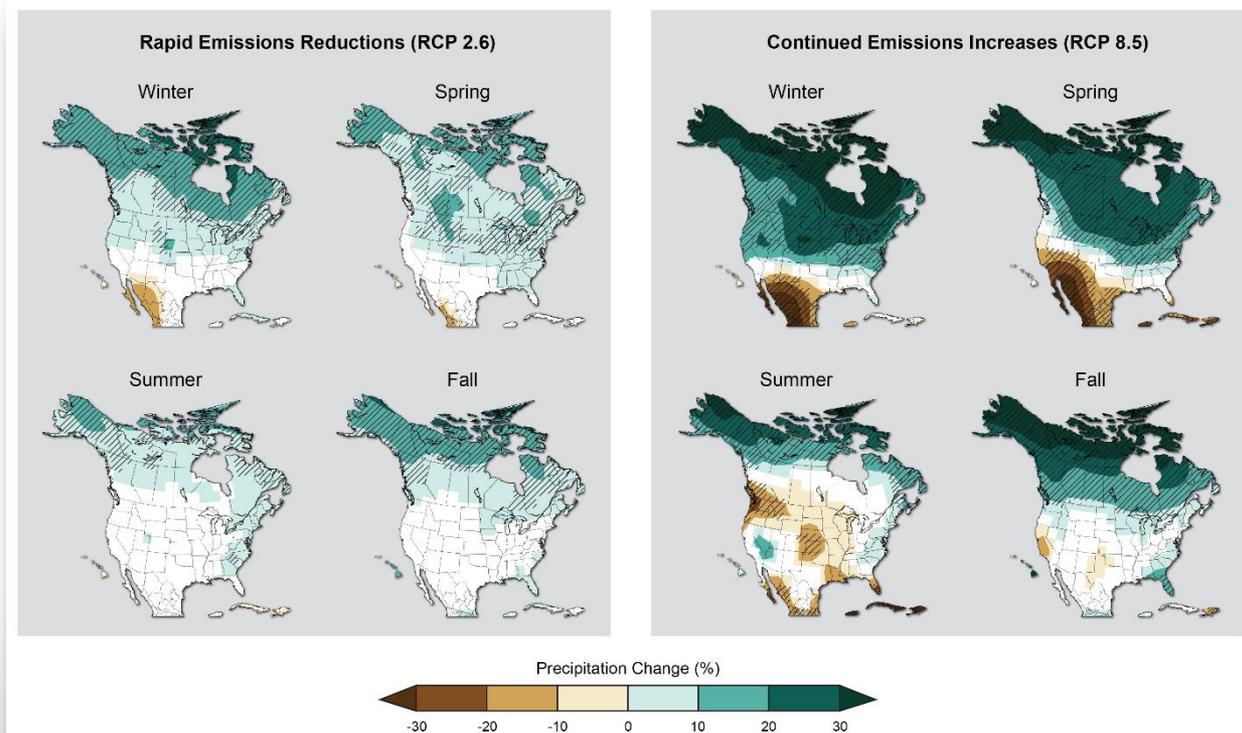
- **Challenge:** Climate change data not available at desired geographic or temporal scale and may not inform on relevant endpoints for decision makers
- **Observations from the Local Level:**
 - Stormwater managers perceive a need for better projections of local precipitation
 - Local conditions and concerns vary concerning types of events that will most impede effective stormwater management
 - Long-term climate projections are relevant to short-term infrastructure; making this link is necessary to affect local action
 - Stormwater codes have been created based on historical data





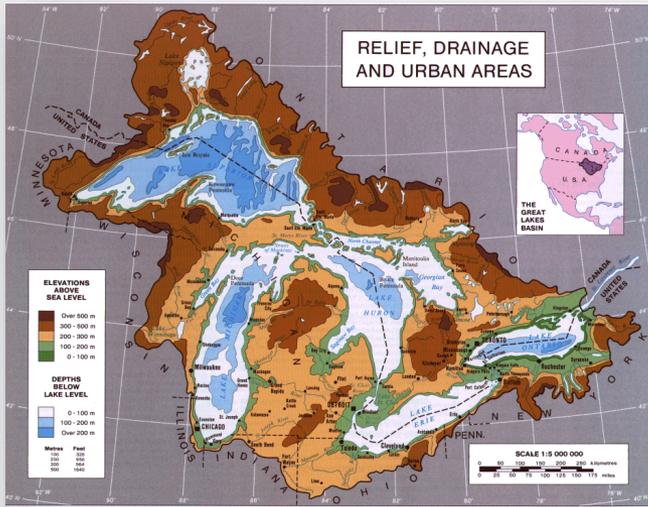
Incorporating Climate Change into Planning -- Issues

- **Challenge:** Projections of future climate change and land use change are uncertain
- **Observations from the Local Level:**
 - Stormwater managers want to know with certainty what they are planning for and perceive uncertainty as a barrier to action
 - Climate models are complex, producing a range of projections
 - Different regions face similar challenges but varying sources of uncertainty
 - Climate change will interact with other existing stressors





Incorporating Climate Change into Planning -- Issues



- **Challenge:** Reliable and up-to-date land use data are critical to understanding how changes in precipitation-driven flooding will impact stormwater management
- **Observations from the Local Level:** Existing land-use data may be outdated or incomplete

● **Challenge:** Communication, Coordination, and Education

● **Observation:**

- Greater interdepartmental cooperation at the municipal level
- Adaptation training at the local level to share and communicate positive examples of adaptation strategies to leverage successes

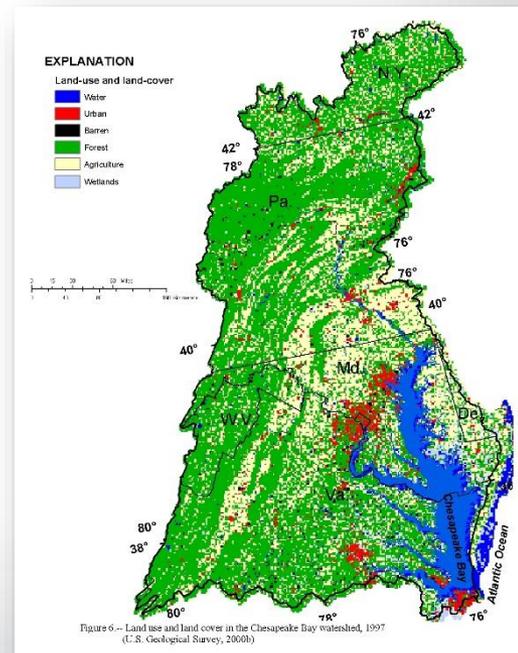


Figure 6 -- Land use and land cover in the Chesapeake Bay watershed, 1997 (U.S. Geological Survey, 2000b)



Incorporating Climate Change into Planning – Near Term Solutions

- Use existing sources to ensure decisions are based on the best available data
 - Update storm standards to match *current* precipitation patterns
 - Obtain historical climate information to aid in discussions of future changes
 - Illustrate climate changes using approaches that resonate with local experiences (e.g., analogue events; sensitivity and threshold information)
 - Use visual resources to show historical and future trends (e.g., land-use change maps)
- Start with what stormwater managers are planning for and seek agreement on a threshold change (e.g., the community will prepare for X storm)
 - Informed by historic data
 - Reflects risk tolerance of the community
- In communicating climate change information use scenarios to develop possible futures rather than a particular projection



Incorporating Climate Change into Planning – Near Term Solutions

- Improve database of land use and development information
 - Assemble existing datasets on land use, planned development, topography, and floodplains to understand future stormwater management needs
 - Use models to understand maximum allowable use and increases in impervious surfaces
 - Update land use maps, focusing on areas of rapid development
- Develop networking opportunities for information exchange
 - Create opportunities for staff to exchange experiences and ideas for programs
 - Connect communities at varying stages of implementation to take advantage of available resources



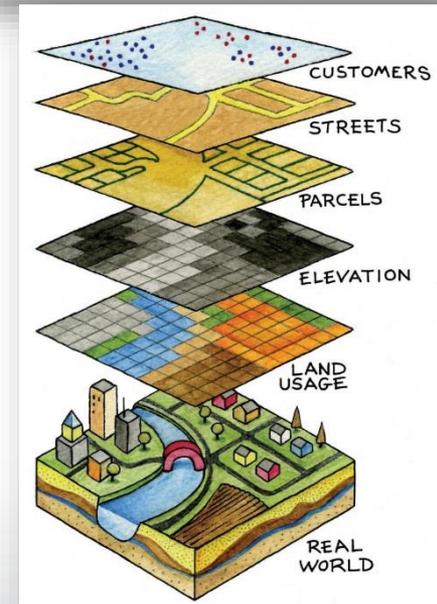
Incorporating Climate Change into Planning – Long Term Needs

- Identify data and methods to improve understanding of and responding to potential climate change impacts
 - Establish more local weather gauges and monitoring stations
 - Pool resources with other jurisdictions interested in developing or improving climate-relevant datasets
 - Seek partnerships that can contribute to the field of knowledge:
 - U.S.ACE helps communities better understand hydrologic modeling
 - FEMA helps with pre-disaster planning
 - Partner with universities to identify solutions using local data
 - Develop regional scenarios (complete with uncertainty bounds)
- Employ analytic methods/tools that enable action in the face of uncertainties



Incorporating Climate Change into Planning – Long Term Needs

- Increase educational opportunities
 - Expand staff expertise in GIS or other data management processes
 - Build awareness and increase knowledge via curriculum taught at educational institutions
 - Provide on-the-job training and continuing education opportunities, to increase climate literacy and ensure timely application of research designed to address decision-maker needs





Building Local Capacity -- Issues

- **Challenge:** Stormwater managers, engineers, and contractors may have limited experience or expertise with relatively newer solutions such as green infrastructure
- **Observations from the Local Level:**
 - Stormwater managers have only recently started to accept green infrastructure
 - Green infrastructure may require different construction and maintenance methods
 - There is limited information about the performance of green infrastructure techniques on poorly draining soil





Building Local Capacity -- Issues

- **Challenge:** Competing priorities (e.g., attracting development to a local area) are a barrier to establishing stringent local policies that benefit stormwater management
- **Observations from the Local Level:**
 - Implementing stormwater fees or strict development standards to limit impervious surfaces may be beneficial for managing stormwater in a community but can also be a disincentive for developers to work in that community
 - “Home-Rule” style governance can be an obstacle to cooperation and coordinated decision-making within counties



Building Local Capacity -- Issues

- **Challenge:** Planning, construction, and management of a geographically dispersed network of green infrastructure may require a different management approach than for conventional systems
- **Observations from the Local Level:**
 - Green infrastructure is often geographically dispersed
 - Green infrastructure relies on a network of landscape-scale solutions, many of which are on private property and the responsibility for maintenance costs may not be clearly defined
 - Difficult to identify which department(s) should cover upfront and ongoing maintenance costs for green infrastructure
- **Challenge:** Watersheds are not confined to political boundaries; Flooding issues may be exacerbated by upstream development beyond jurisdictional boundaries



Building Local Capacity – Near Term Solutions

- Training
 - Provide training for municipal staff on green infrastructure, which will better equip staff to assess green infrastructure proposals
 - Develop a methodology and schedule for maintenance that includes details about who is responsible for maintenance and new protocols. Establish this protocol early in the project planning phase to avoid future confusion or mismanagement
- Incorporate into existing plans
 - Jurisdictions with Municipal Separate Storm Sewer Systems (MS4s) can include green infrastructure as a control measure
 - Incorporate green infrastructure and low impact development (LID) into existing plans



Building Local Capacity – Near Term Solutions

- Incentives
 - Offer incentives for engineers or contractors to use GI designs, rather than relying on pipe-based systems
 - Offer alternative incentives such as fast track permitting for projects that adhere to a more strict set of requirements (e.g. projects that manage 80% of runoff onsite or incorporate a green roof)





Building Local Capacity – Near Term Solutions

- Support for individual homeowners and businesses
 - Provide them with information about how to correctly maintain GI design elements (e.g., rain gardens, vegetated swales, and other installations).
 - Offer financial incentives to help pay for installation and maintenance of this public good
 - Publicize a list of "certified" or "qualified" GI contractors and engineers to connect experienced professionals with potential projects that could benefit from alternative design solutions.





Building Local Capacity – Near Term Solutions

- Regional coordination
 - Coordinate policies to minimize impact on individual communities and not deter development
 - Convene relevant entities responsible for stormwater management decisions to help address barriers presented by different regulations, budget limitations, and expectations for growth
 - Develop regional or watershed-scale plan for stormwater management
 - Incorporate climate change adaptation measures into existing plans (e.g., Comprehensive Plans; watershed-scale plans) to scale up adaptation to climate change





Building Local Capacity – Long Term Needs

- Provide some blueprints
 - Develop a Regional Stormwater Model Ordinance for local jurisdictions seeking to incorporate climate change projections or green infrastructure incentives into local legislation.
 - Seek ways to minimize variance regarding stormwater infrastructure guidance and regulations among communities
 - Find ways that the state or county may be able to provide incentives for regions to develop watershed-scale plans
- Show examples
 - Conduct pilot studies and publish results and lessons learned to increase awareness and provide specific examples of how alternative stormwater management solutions perform.
 - Modify designs and monitor results to determine if performance can be enhanced for projects in the region (particularly in areas with poorly draining soils).



Thank you!

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