# Sustainable Shorelines and Community Management

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Roadmap for Adapting to Risks Training

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Northern Virginia Regional Commission

Virginia Coastal Zone MANAGEMENT PROGRAM

# Sustainable Shorelines & Community Management

- Collecting Data
- Assessing Vulnerability
  - Sea Level Rise
  - Storm Surge
- Developing Strategies
  - Protect
  - Accommodate
  - Retreat
- Adapting to Change

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# Scope of Work

## Phase I
Oct 08 – Sep 09

- Workgroup Establishment;
- Broad Vulnerability Analysis;
- Policy Review

## Phase II
Oct 09 – Sep 10

- Assessment Refinement;
- Strategy Development
  - Best Practices
  - Community Awareness

## Phase III
Oct 10 – Sep 11+

- Strategy Refinement;
- Implementation Framework;
- Outreach, as appropriate

***Lesson-learned: Recognize that this is an iterative process, each piece will build upon previous work.***

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*Photo courtesy of Fairfax County Police Department*

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# Workgroup

- Mostly land use planners
- Identify key targeted planning areas
- Provide data and information
- Shape the strategy and recommendations

Arlington County

City of Alexandria

Fairfax County

Prince William County

Town of Quantico

Town of Occoquan

George Mason University

Virginia Tech

NPS – Center for Urban Ecology

NPS – GW Memorial Parkway

Fort Belvoir

Quantico Marine Corps Base

VA DCR – Mason Neck

USFWS – Mason Neck Refuge

VA Dept of Transportation

***Lesson-learned: Ideas from diverse workgroup will strengthen the outcomes of any process. Learn together.***

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# Overall End Products

- Maps showing areas at risk of inundation from SLR and Storm Surge in the region.
- Quantification of specific elements vulnerable for both the built and natural environments.
  - Building, roadways, parks, tidal wetlands, critical infrastructure, wells, septic fields, etc…
  - Economic value/Ecosystem services
- Strategies to protect, adapt or retreat communities located in areas at risk.

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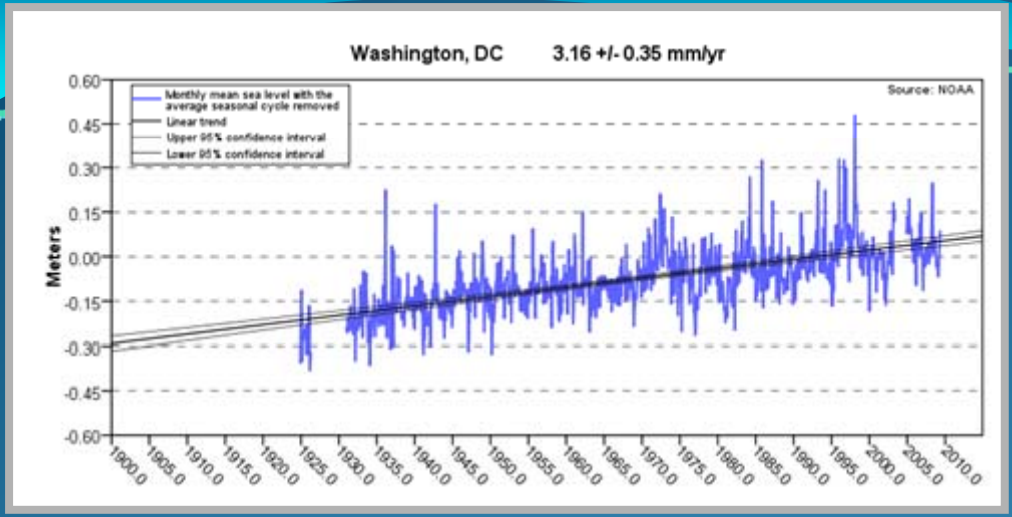


# SLR Scenarios

| Scenario | Definition | Relative Sea Level Rise Rate |
|---|---|---|
| **Steady State** | Observed historic trend at Washington, D.C. gage.<br><br>*(NOAA Tides and Currents, Station 8594900)* | 3.2 mm/year<br>(1 foot by 2100) |
| **Average Accelerated** | Average projected sea level rise rate for the Chesapeake Bay region.<br><br>*(IPCC, 2007; STAC, 2008; and GCCC, 2008)* | 11.6 mm/year<br>(1.9 feet by 2050;<br>3.8 feet by 2100) |
| **Worst Case** | Highest projected rate for the mid-Atlantic and Chesapeake Bay regions.<br><br>*(STAC, 2008; and GCCC, 2008)* | 16 mm/year<br>(2.6 feet by 2050;<br>5.2 feet by 2100) |

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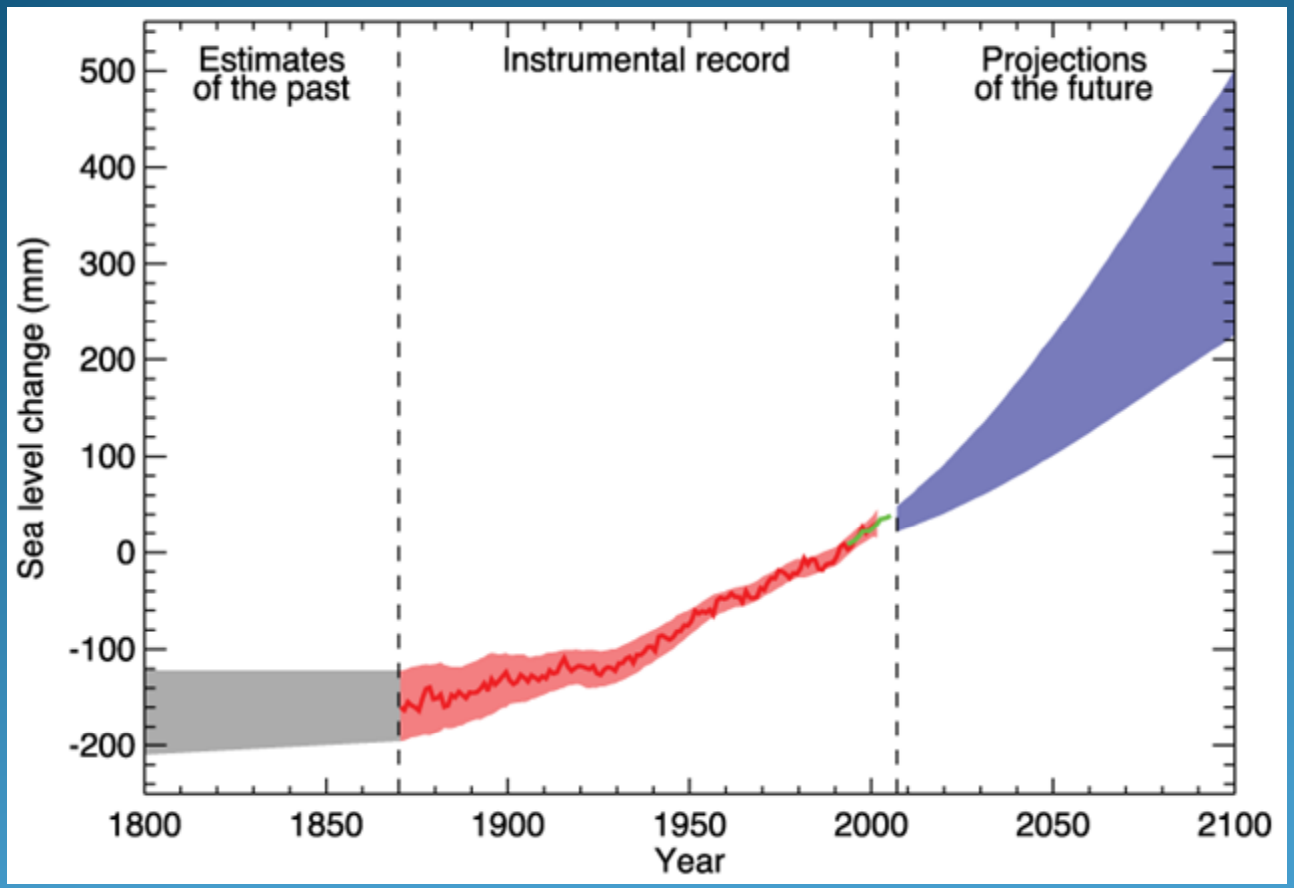
***Lesson-learned: Stick to the facts & recognize uncertainty.***

# Future Global Sea Level Rise Projections to 2100




100 mm = ~ 4 inches
Medium growth emissions scenario
Source: IPCC 2007 - http://www.epa.gov/climatechange/science/futureslc_fig1.html

Uncertainties lie with the magnitude and speed of changes in the future.

If the West Antarctic Ice Sheet and the Greenland Ice Sheet were to melt, there would be a global increase in sea level rise of at least 13 meters.

(IPCC 2007, NRC 2002).

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# Areas at Risk

- Sea Level Rise = Hot Spots (i.e. the lowest lying areas in the region

| Areas Most Impacted by Potential Sea Level Rise | |
|---|---|
| Arlington | • National Airport<br>• Four Mile Run |
| Alexandria | • Four Mile Run<br>• Dangerfield Island<br>• Old Town |
| | • Jones Point |
| Fairfax County | • Huntington<br>• Belle Haven/New Alexandria<br>• Dyke Marsh<br>• Several Tidal Embayments<br>• Hallowing Point |
| Prince William County | • Occoquan NWR<br>• Tidal Embayments<br>• Town of Quantico<br>• Occoquan River |

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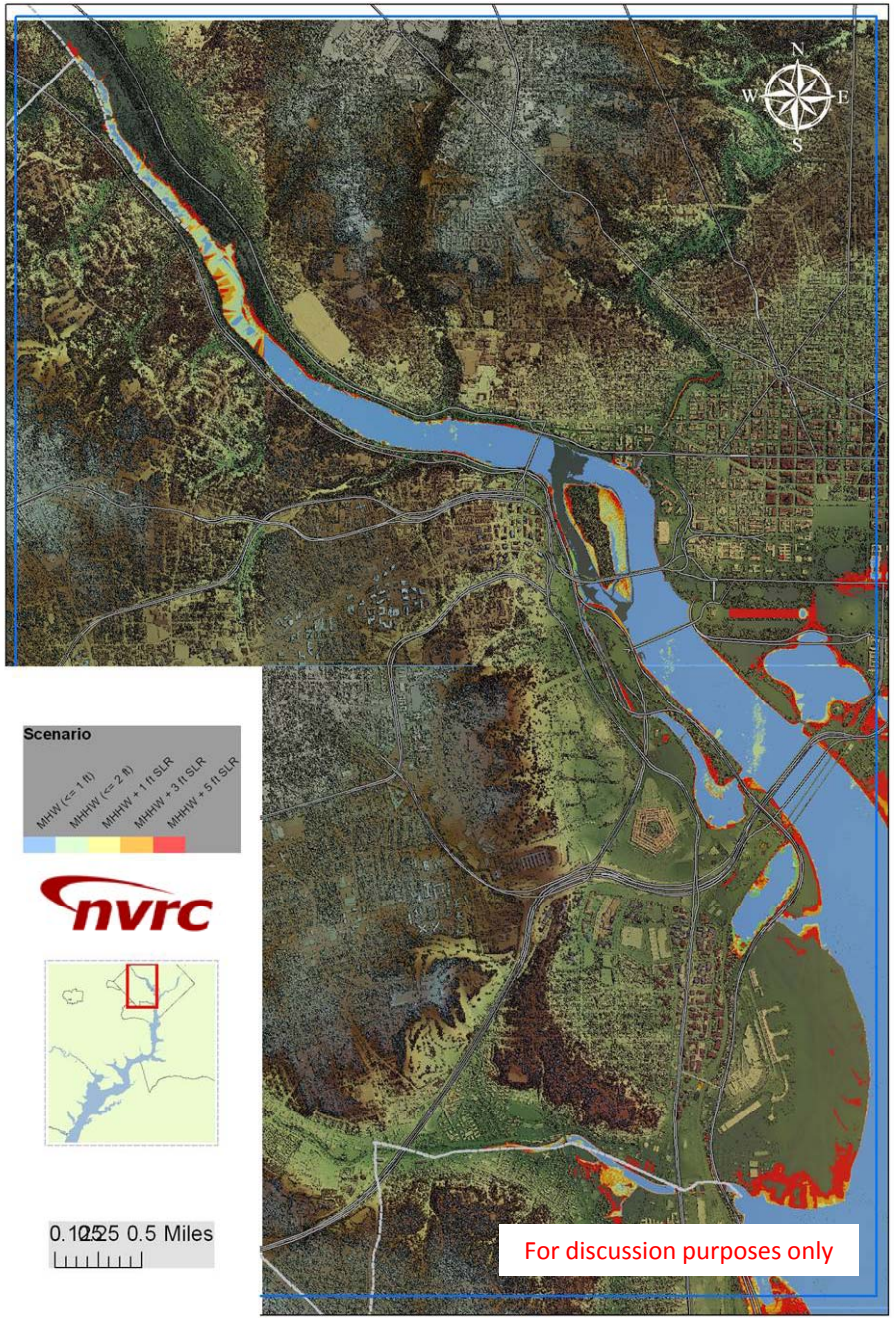
**Relative Sea Level Rise**

## Arlington County




## City of Alexandria

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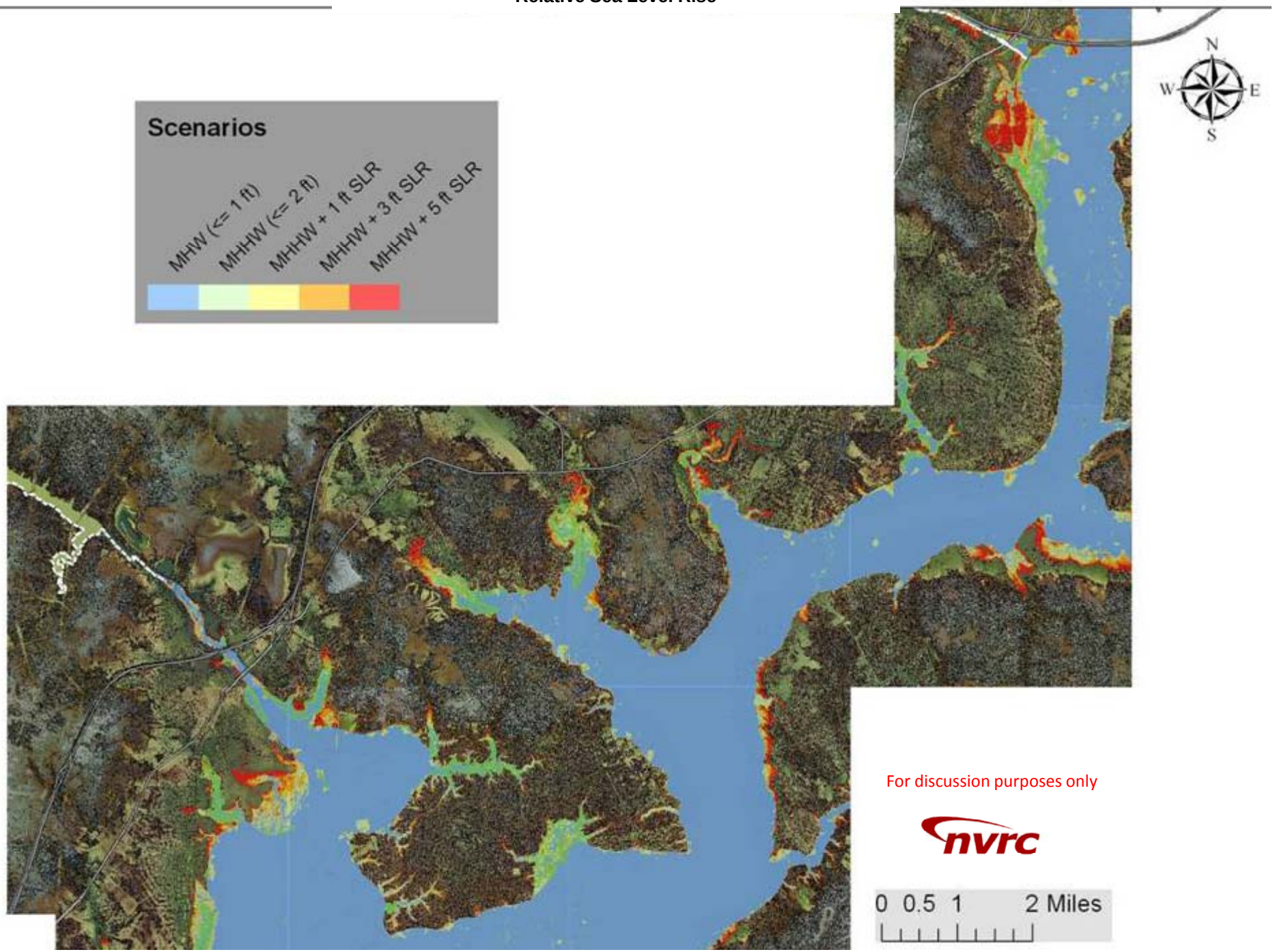
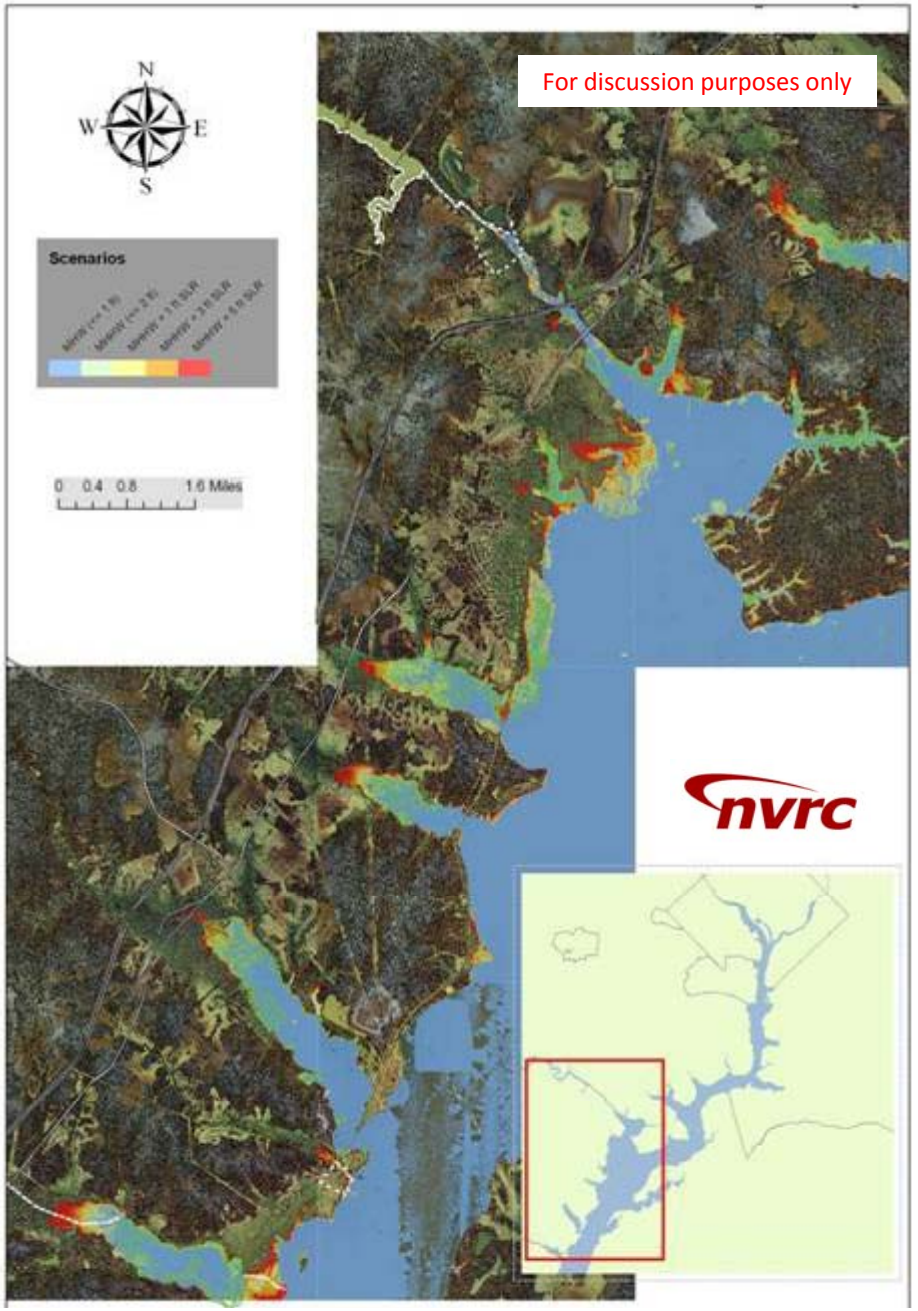
**Relative Sea Level Rise**



**Relative Sea Level Rise**

Prince William County

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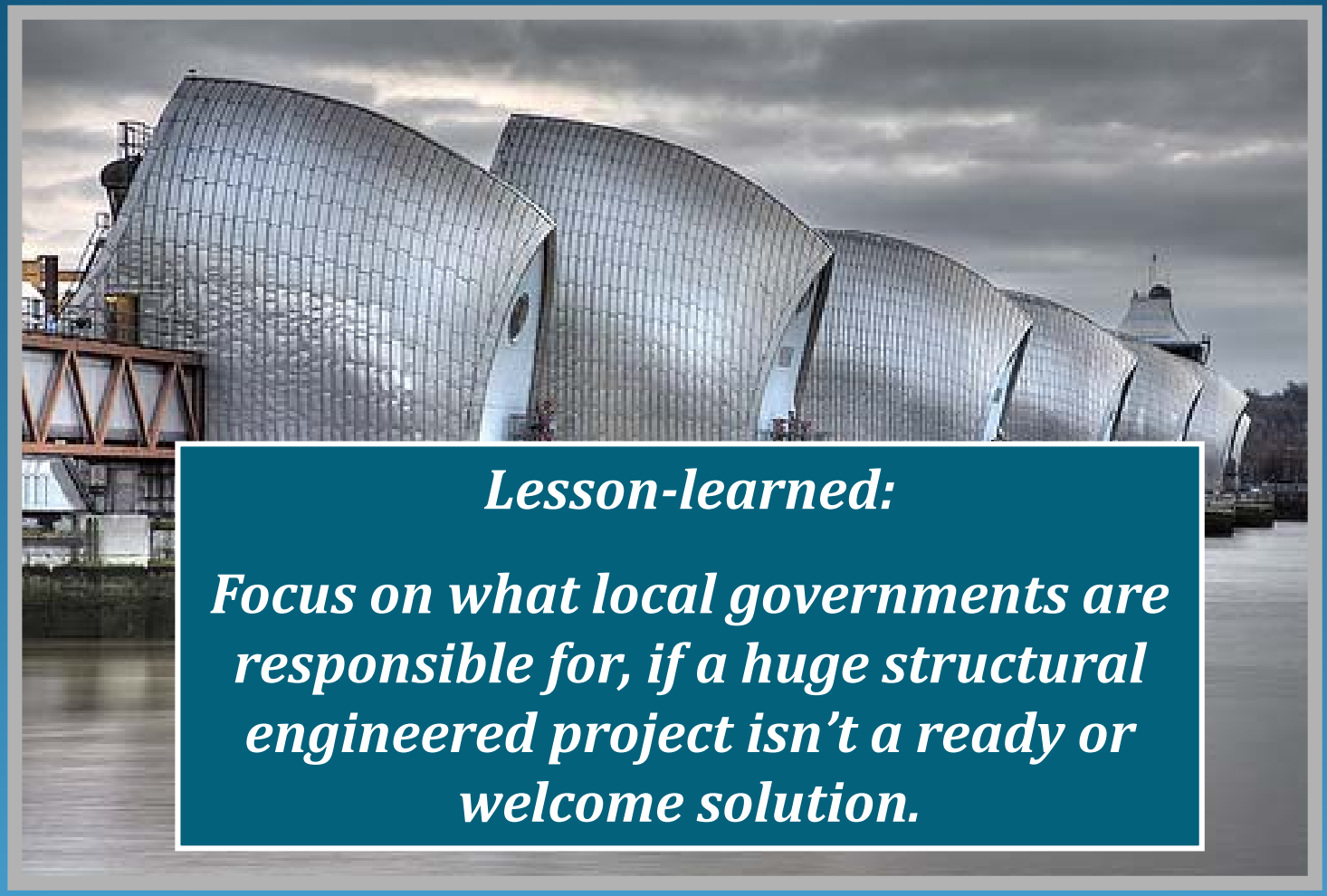

***Lesson-learned:***

***Focus on what local governments are responsible for, if a huge structural engineered project isn't a ready or welcome solution.***

Thames Barrier, London England

Photo credit: Marc Pinter (flickr.com)

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# Local Government Responsibilities

Health

Safety

Welfare

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# Adaptation Approach

- Built Environment
  - Existing Development
  - Future Development
- Natural Environment
- Health, Safety, and Awareness

- Protect
- Accommodate
- Retreat

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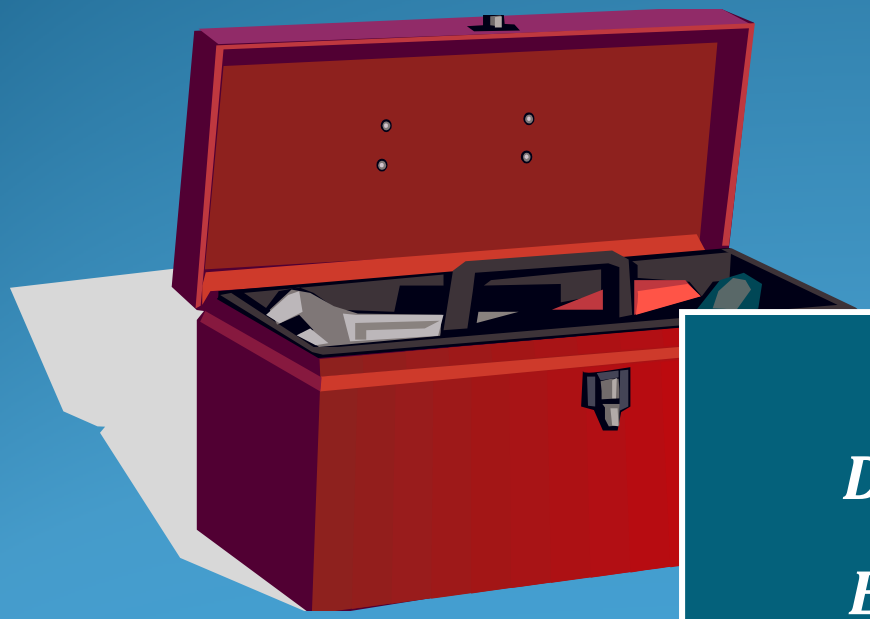
# Policy Inventory - Existing Toolbox

- Public Health Programs
- Hazard Mitigation Planning
- Land Use Planning



***Lesson-learned:***

***Don't create something new.***

***Explore to integrate climate change/SLR into existing efforts.***

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# Public Health Programs

CLEAN AIR PARTNERS

**AIR QUALITY ACTION GUIDE**

Your "how to" guide for cleaner air

| Air Quality Rating | Steps to Protect Your Health and Our Environment |
|---|---|
| **GOOD** 0-50 | Enjoy the great outdoors |
| **MODERATE** 51-100 | Some Pollution – poses risk to the highly sensitive<br>· Carpool, use public transit, bike, or walk<br>· Limit driving, consolidate trips<br>· Reduce car idling |
| **UNHEALTHY** for Sensitive Groups 101-150 | Pollution levels harmful to children, the elderly, and anyone with respiratory or heart conditions – limit activity outdoors<br>· Follow all action steps above<br>· Refuel after dusk, use fuel-efficient vehicles<br>· Avoid driving, use transit, telework<br>· Avoid using aerosol products |
| **UNHEALTHY** 151-200 | Pollution levels harmful to all – sensitive groups should avoid outdoor activities, others should limit outdoor exertion<br>· Follow all action steps above<br>· Avoid using any gas-powered equipment<br>· Wait to paint until air quality improves |
| **VERY UNHEALTHY** 201-300 | Pollution levels very unhealthy for everyone – avoid any physical activity outdoors |

- Awareness & Alerts
  - Air Quality
- Immunizations & Vaccinations
- Pollution Prevention
- Pest Surveillance & Control

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# Hazard Mitigation Planning

- Natural Hazards
  - Flooding
  - Winter Storms
  - Drought
  - Wildfires
- Mitigation Goals & Objectives
- Implementation Strategy


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# Land Use Planning

- Comprehensive Plan
  - Floodplain Management
  - Shoreline Management
  - Zoning Ordinances
  - Overlay Districts
  - Subdivision Ordinances
  - Wetlands Ordinances
  - Open Space & Recreation
  - Chesapeake Bay Preservation
- Master Plans
  - Public Space
  - Waterfront/Shoreline
  - Watershed
- Local Initiatives
  - Eco-City Charters
  - Smart Growth
  - Cool Counties
  - Cool Cities

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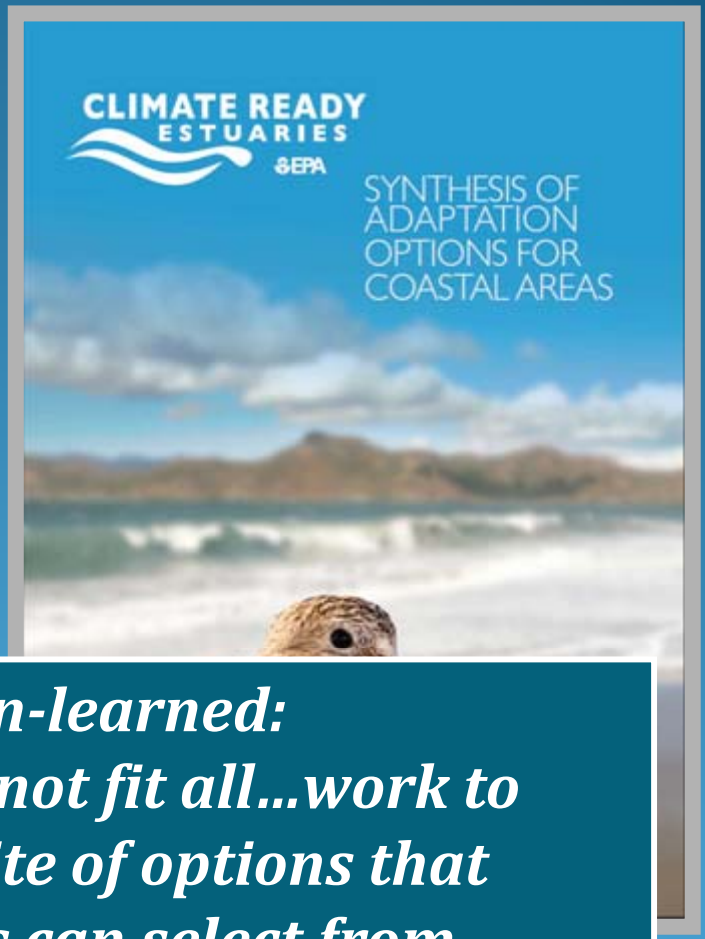
# Common Strategies & Resources

- Educating & reaching out
- Integrating vulnerability assessment and adaptation options into HazMit planning processes
- Increasing freeboard and setback requirements
- Encouraging the transfer of development righ
- Creating rolling e
  specific overlay di




***Lesson-learned:***
***One size does not fit all…work to develop a suite of options that jurisdictions can select from.***

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# Challenges to Implementation

- "Climategate" & Skeptics
- Enabling Authority
- Private Land Rights & By-Right Development
- Land Use Nomenclature
- Maintenance & Service Politics
- Engineering & Tradeoffs
- Funds

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# Lessons-Learned, in review

- Recognize that this is an iterative process, each piece will build upon previous work.
- Ideas from diverse workgroup will strengthen the outcomes of any process. Learn together.
- Stick to the facts & recognize uncertainty.
- Focus on what local governments are responsible for, if a huge structural engineered project isn't a ready or welcome solution.
- Don't create something new. Explore to integrate climate change/SLR into existing efforts.
- One size does not fit all…work to develop a suite of options that jurisdictions can select from.

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# On-going Efforts

- Regional Hazard Mitigation Plan development
  - Economic Evaluation
- Knowledge, attitudes, opinions of residents

- Continue assessment with VIMS August 2010 Shoreline Situation Reports for City of Alexandria, Fairfax & Prin

***Final lesson-learned:***
***This effort does not end after Phase III…this should continue to be revisited as new information becomes available.***

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# Acknowledgements

This project would not be possible, without

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# Thank you!

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