

# **Tools / Resources for Considering Climate Change Impacts on the Built Environment**

**Local Solutions: Northeast Climate Change Preparedness  
Conference**

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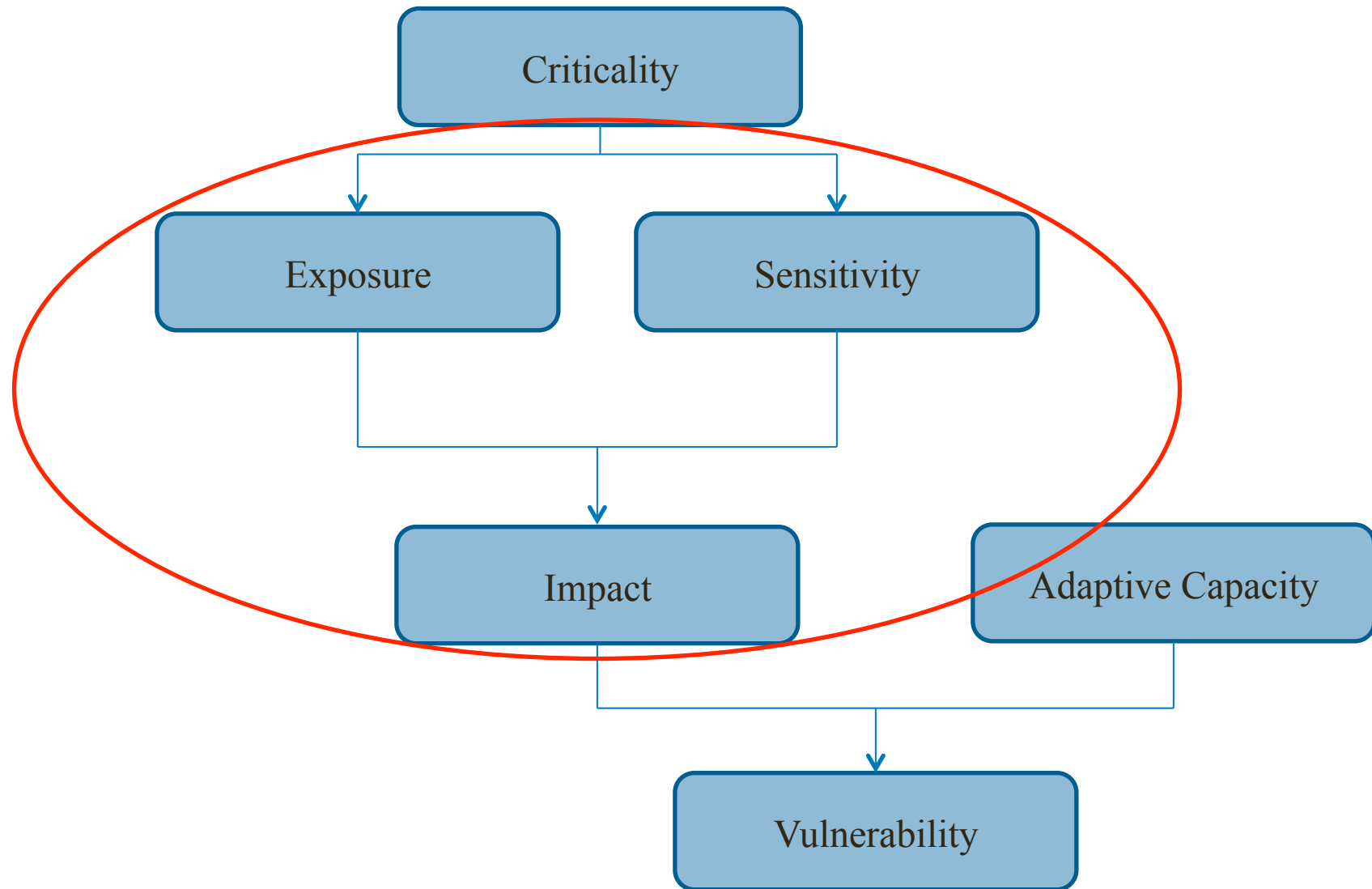
# Tools/Resources

- **Challenge:** Our systems are designed for a static environment – yet moving forward, stationarity will not hold true
- Processes to identify important pathways of climate impacts on the built environment
- Resources for understanding infrastructure sensitivities to climate-related hazards





# General Framework for Climate Assessments



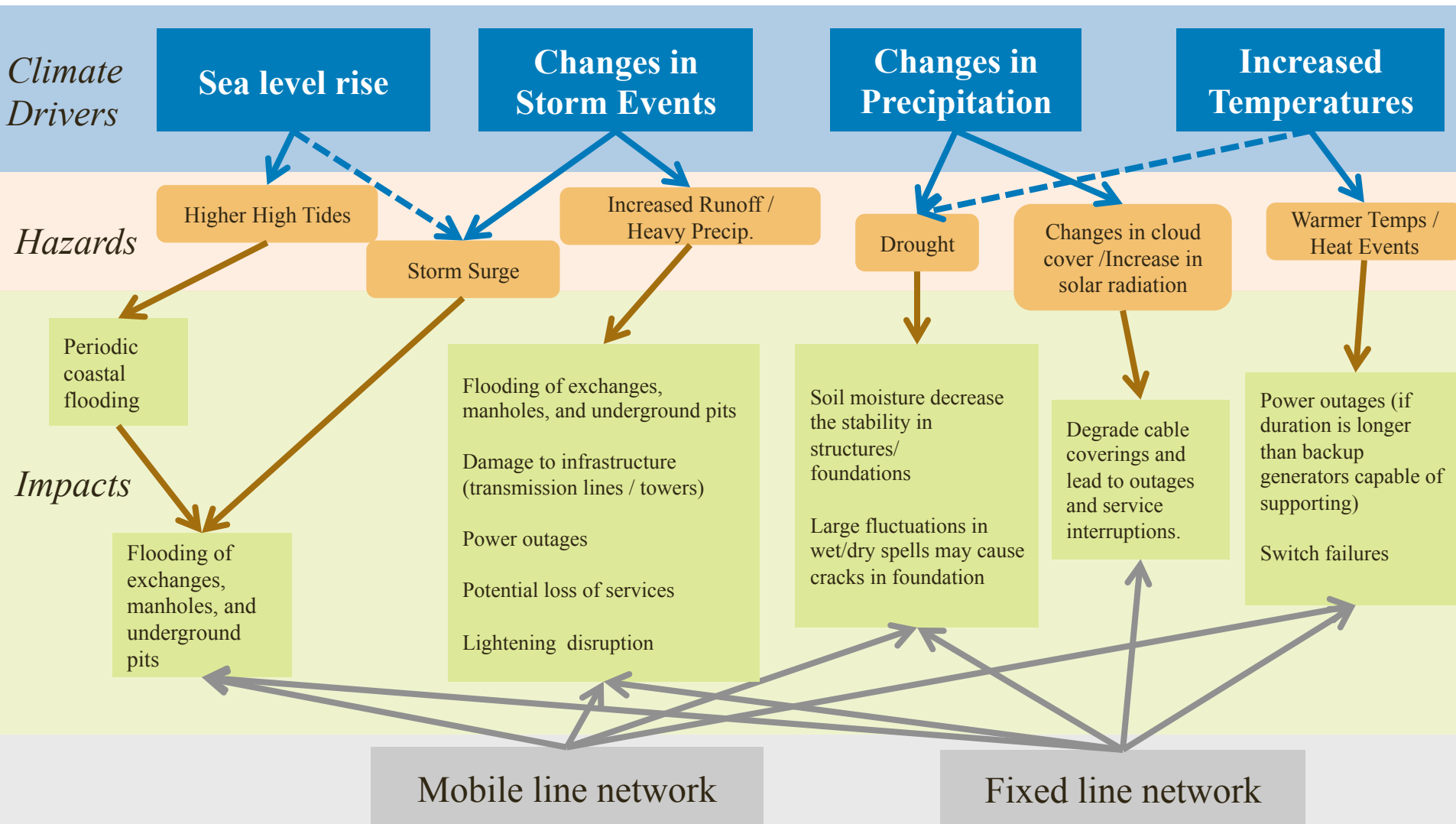


# Impacts on the Built Environment

- Identify *which elements* in the built environment may be susceptible to *what hazards* potentially affected by climate change
- Match time horizons
- Consider non-climate drivers



# Conceptualize the System





# Understanding Today's Impacts



## Identify hazards of concern

- Local National Weather Service office – records of past events
- Newspaper clippings
- Discussions with engineers, operators, etc.

## “Quantify” the identified hazards

- Design standards
- Damage functions
- Early warning systems
- Impacts observed during/after past events
- Expert anecdotal evidence/understanding within the system
- Drawing from analysis conducted at similar municipalities
- Urban planning tools (zoning)
- Hazard susceptibility maps
- Old maps



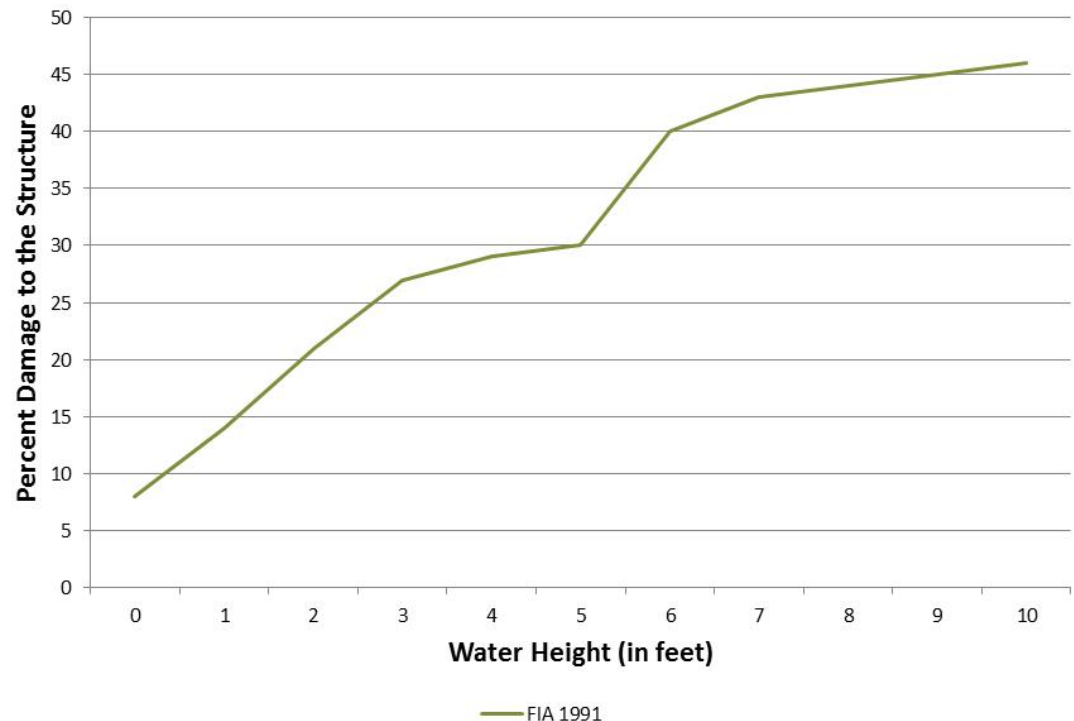
# Examples to Identify Thresholds/Relationships



## Pavement (design)

PERFORMANCE GRADE	PG 46			PG 52							PG 58					PG 64						
	34	40	46	10	16	22	28	34	40	46	16	22	28	34	40	10	16	22	28	34	40	
Average 7-day Maximum Pavement Design Temperature, °C*	<46			<52							<58					<64						
Minimum Pavement Design Temperature, °C*	>-34	>-40	>-46	>-10	>-16	>-22	>-28	>-34	>-40	>-46	>-16	>-22	>-28	>-34	>-40	>-10	>-16	>-22	>-28	>-34	>-40	

## Flooding of a 1-story house w/out basement (Damage Function)





# Considering Future Impacts



Using the key thresholds/relationships, consider how the exposure to these thresholds/relationships may change in the future.

*Where can I easily access future climate information?*



# Impacts in the United States

The screenshot displays the National Climate Assessment website. At the top, there is a navigation bar with a hamburger menu icon, a globe icon, the text 'National Climate Assessment', and the 'GlobalChange.gov' logo. A search icon is also present. The main content area is split into two columns. The left column is titled 'Highlights' and contains the text: 'Explore highlights of the National Climate Assessment including an Overview, the report's 12 overarching findings, and a summary of impacts by region.' Below this text is a button that says '→ EXPLORE HIGHLIGHTS'. The right column is titled 'Full Report' and contains the text: 'Explore the entire report covering our changing climate, regions, cross sector topics, and response strategies in full detail.' Below this text is a button that says '→ EXPLORE THE REPORT'. In the center, overlapping both columns, is a circular graphic with the text 'CLIMATE CHANGE IMPACTS IN THE UNITED STATES' and a background image of a diverse group of people. A downward-pointing arrow is located between the two main content columns. On the far right, there are social media icons for Facebook, Twitter, and a link icon.

Highlights

Explore highlights of the National Climate Assessment including an Overview, the report's 12 overarching findings, and a summary of impacts by region.

→ EXPLORE HIGHLIGHTS

CLIMATE CHANGE IMPACTS IN THE UNITED STATES






Full Report

Explore the entire report covering our changing climate, regions, cross sector topics, and response strategies in full detail.

→ EXPLORE THE REPORT

<http://nca2014.globalchange.gov/>

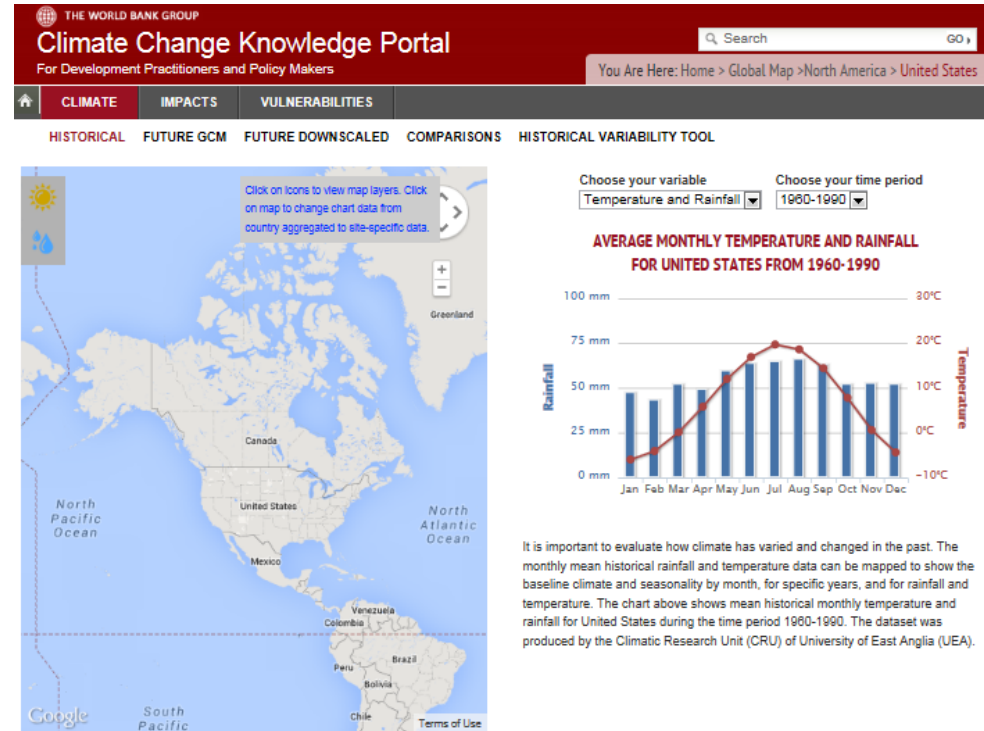
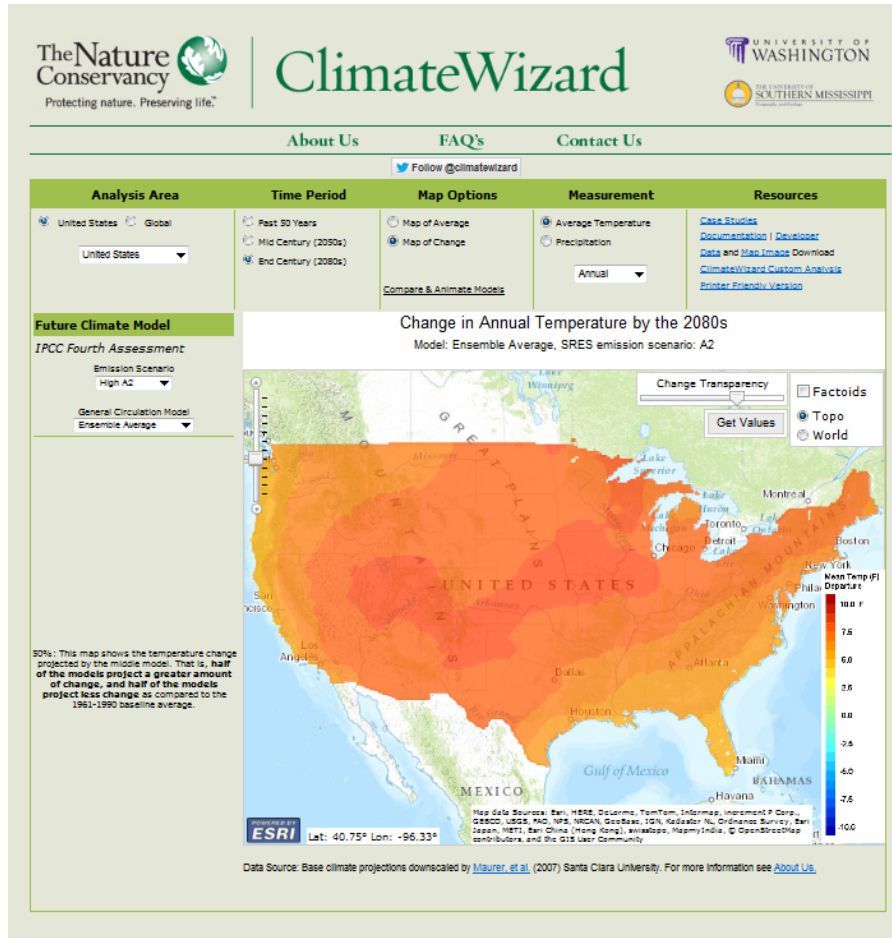


	Northeast	Communities are affected by heat waves, more extreme precipitation events, and coastal flooding due to sea level rise and storm surge.
	Southeast and Caribbean	Decreased water availability, exacerbated by population growth and land-use change, causes increased competition for water. There are increased risks associated with extreme events such as hurricanes.
	Midwest	Longer growing seasons and rising carbon dioxide levels increase yields of some crops, although these benefits have already been offset in some instances by occurrence of extreme events such as heat waves, droughts, and floods.
	Great Plains	Rising temperatures lead to increased demand for water and energy and impacts on agricultural practices.
	Southwest	Drought and increased warming foster wildfires and increased competition for scarce water resources for people and ecosystems.

*Melillo et al., 2014*



# User-friendly Climate Data Portals



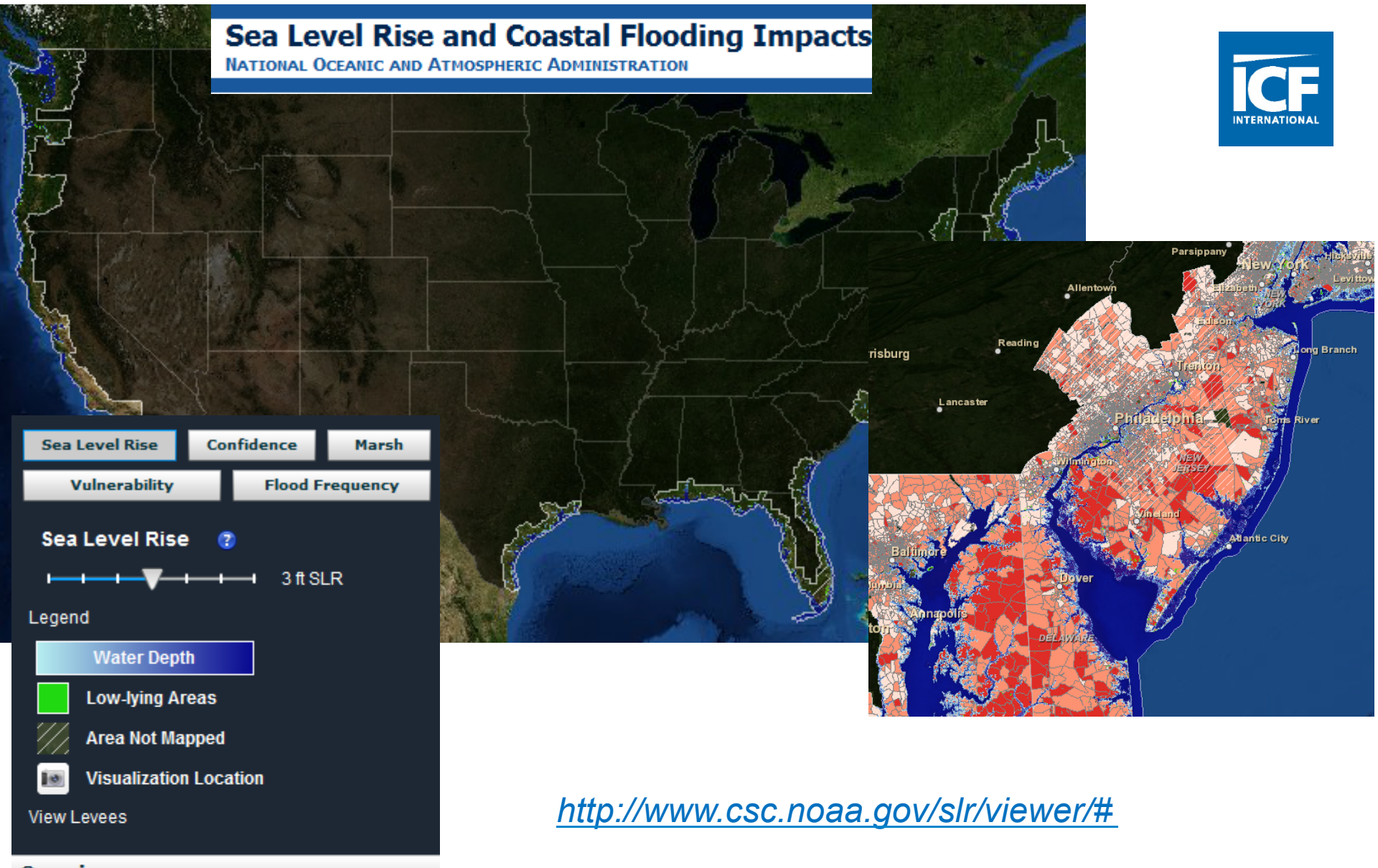
<http://sdwebx.worldbank.org/climateportal>

<http://www.climatewizard.org/>



# Sea Level Rise and Coastal Flooding Impacts

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION



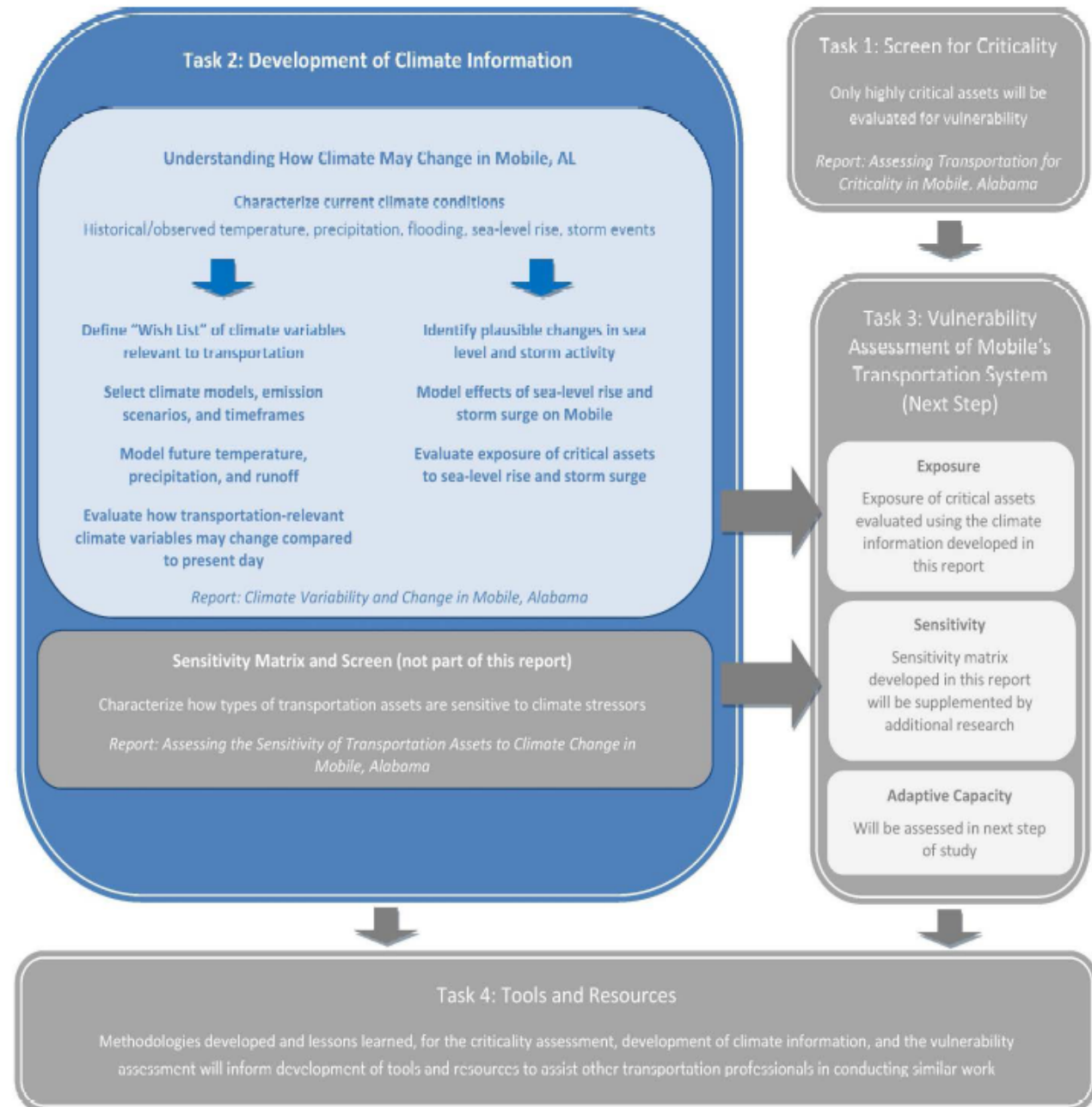
<http://www.csc.noaa.gov/slr/viewer/#>



Figure 1: Roadmap for Phase 2 of the Gulf Coast Project

Example:

## DOT's Gulf Coast Project, Phase 2





# In Sum, Considering Future Impacts



- Use the projections to consider how to the identified hazards/ indicators may change in the future
- Also consider are the non-climate stressors that dampen or increase the vulnerability to the hazard
- Consider the planning horizon / infrastructure lifetime
- Actionable in light of uncertainty