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

Local Solutions: Northeast Climate Change Preparedness Conference

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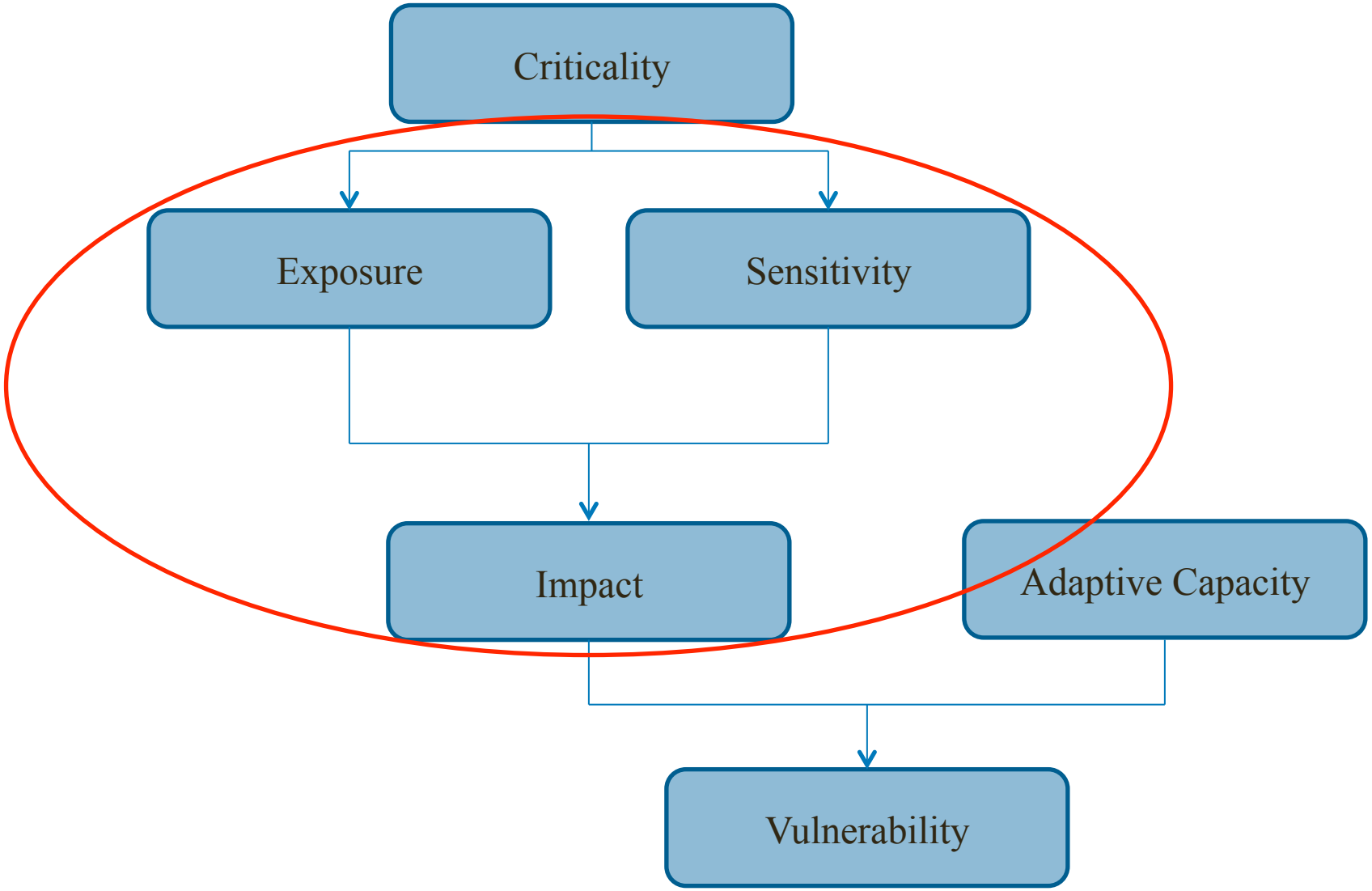
Tools/Resources

- **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

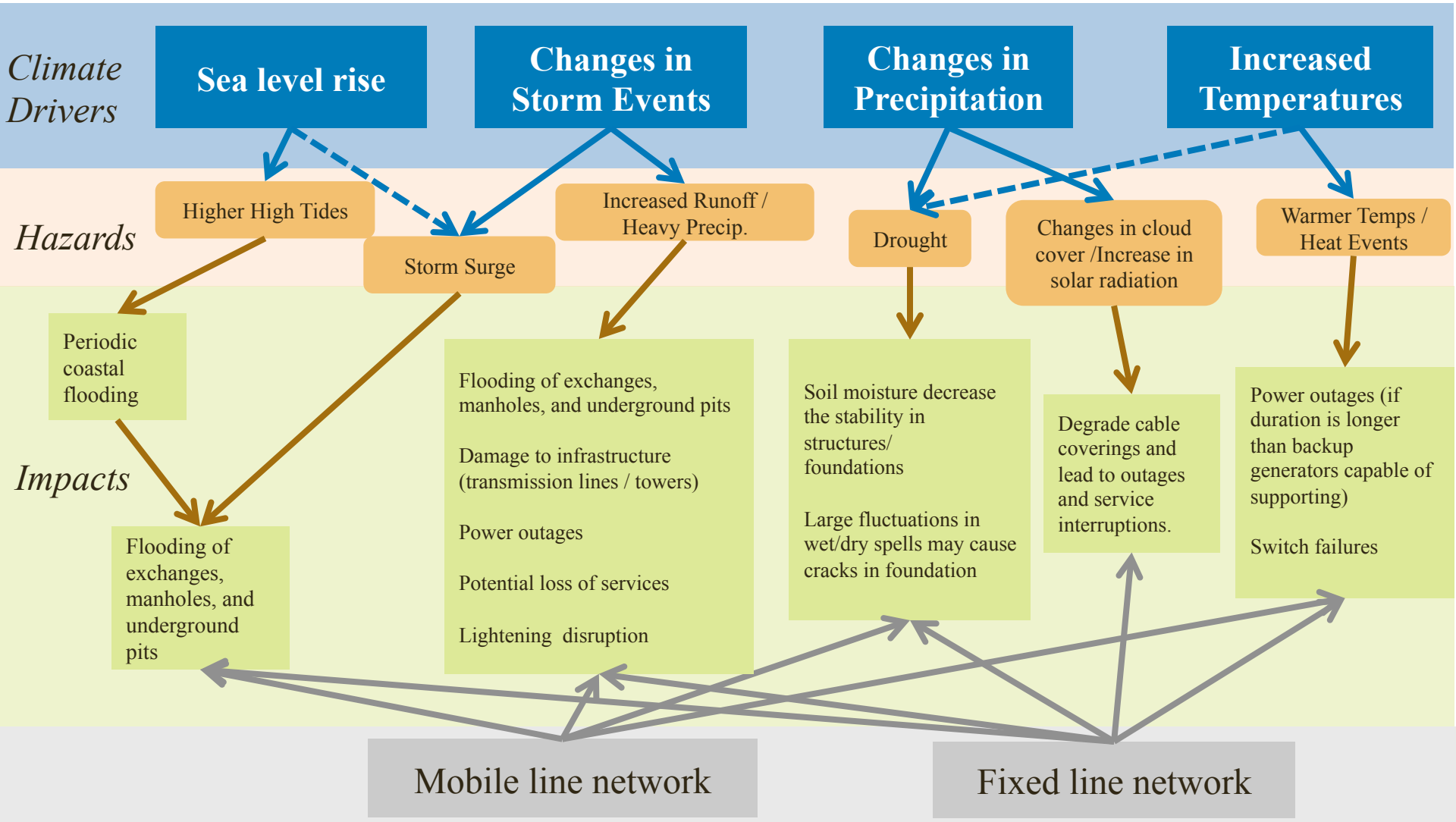
General Framework for Climate Assessments



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

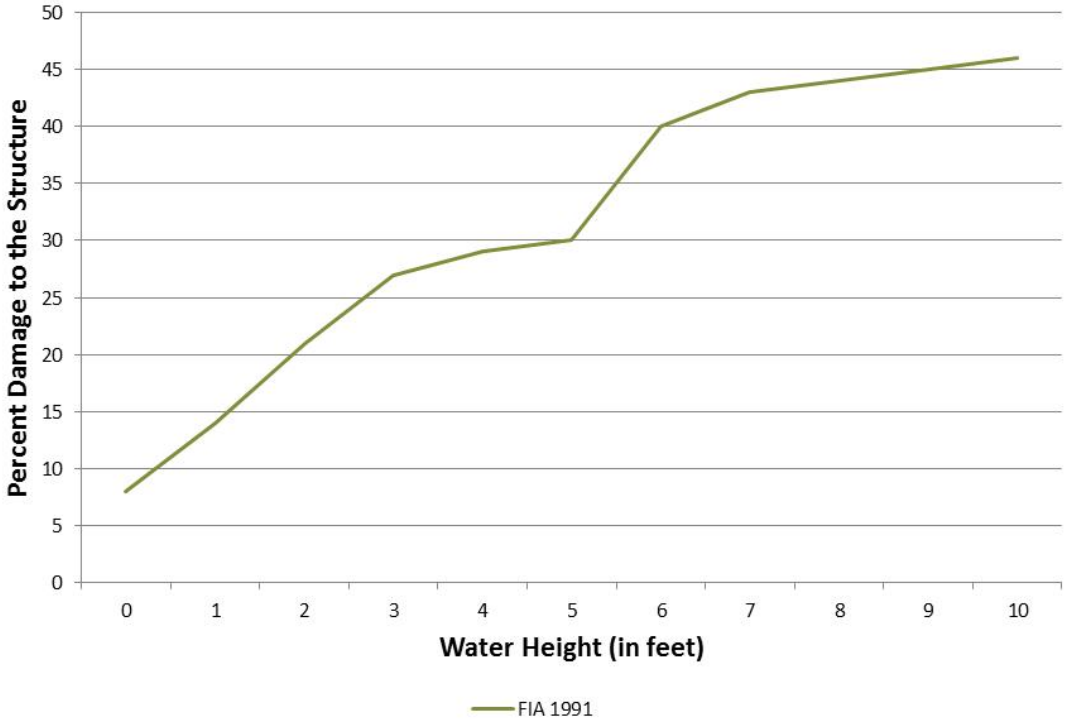
- Design standards
- Damage functions
- Early warning systems
- Impacts observed during/after past events
- Expert anecdotal evidence/understanding within the system
- Drawing from analysis conducted at similar municipalities
- Urban planning tools (zoning)
- Hazard susceptibility maps
- Old maps

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)

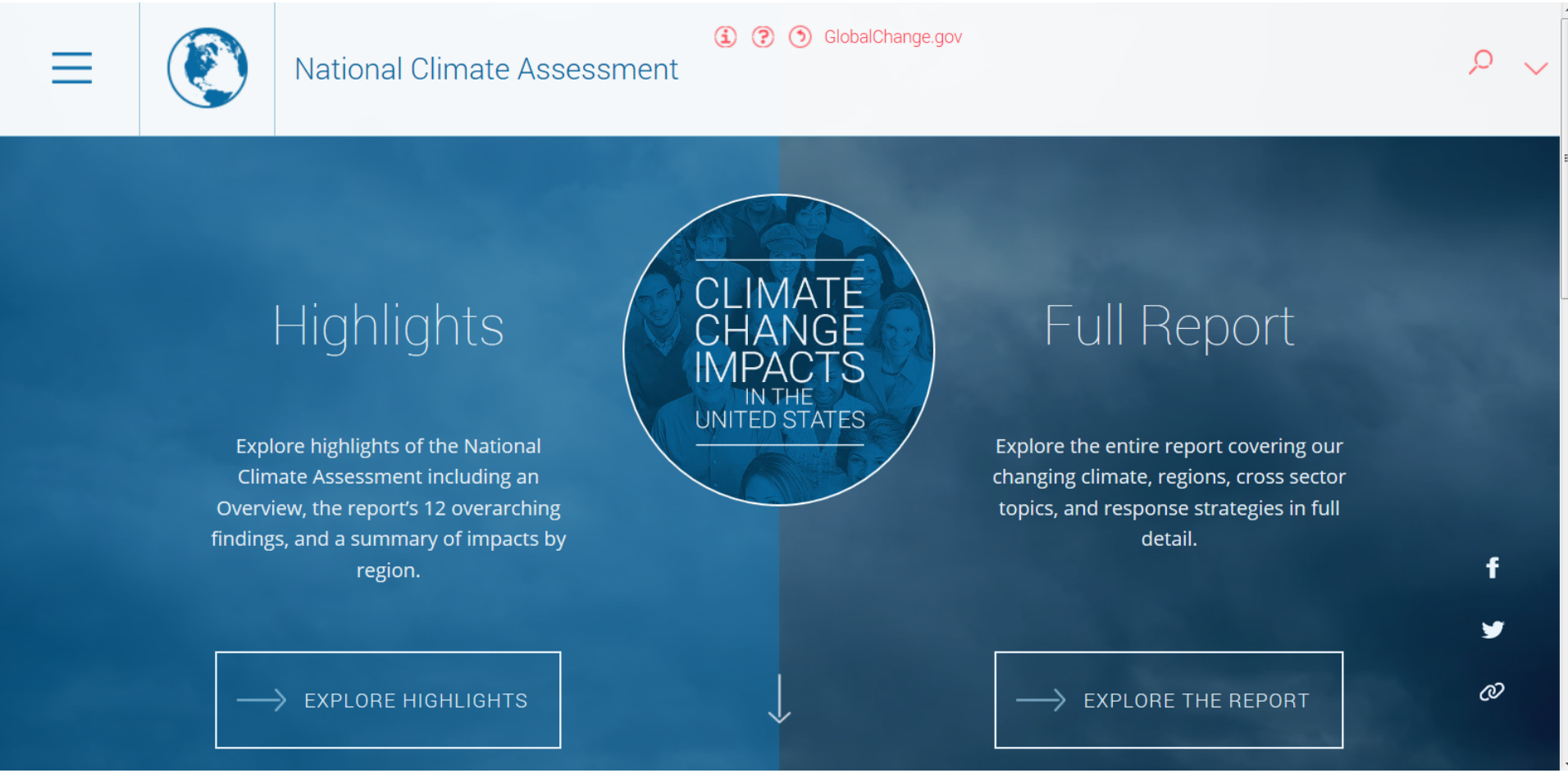


Considering Future Impacts

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

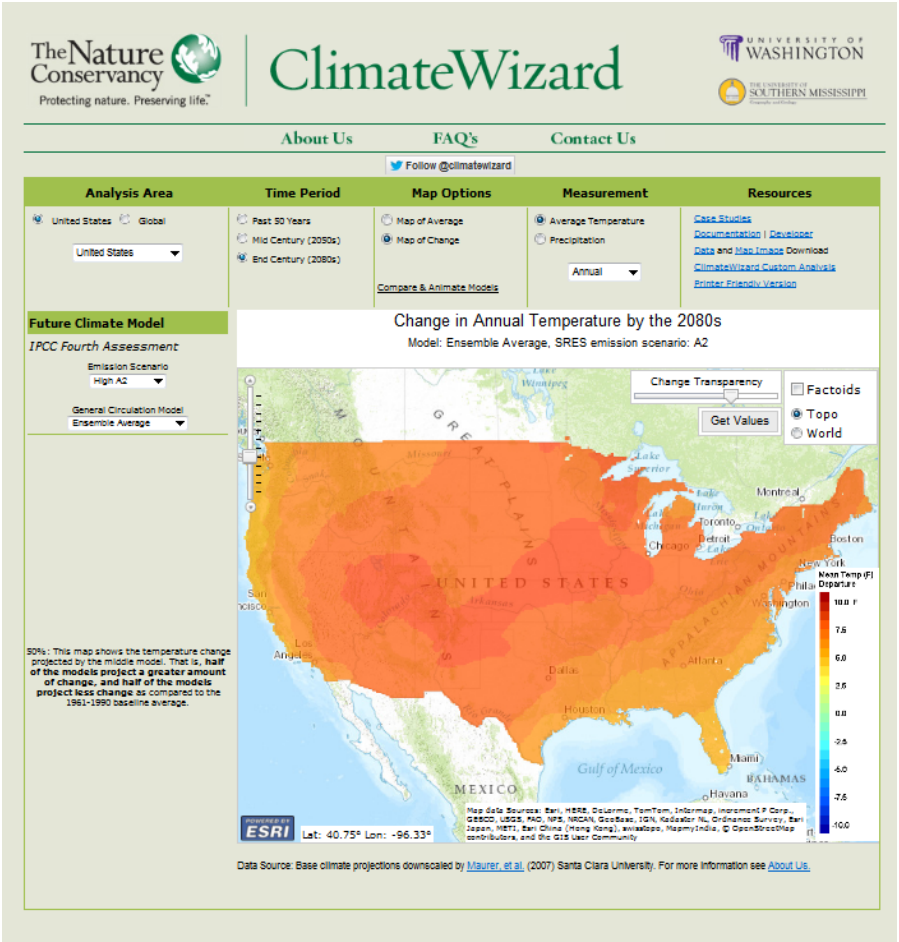


http://nca2014.globalchange.gov/

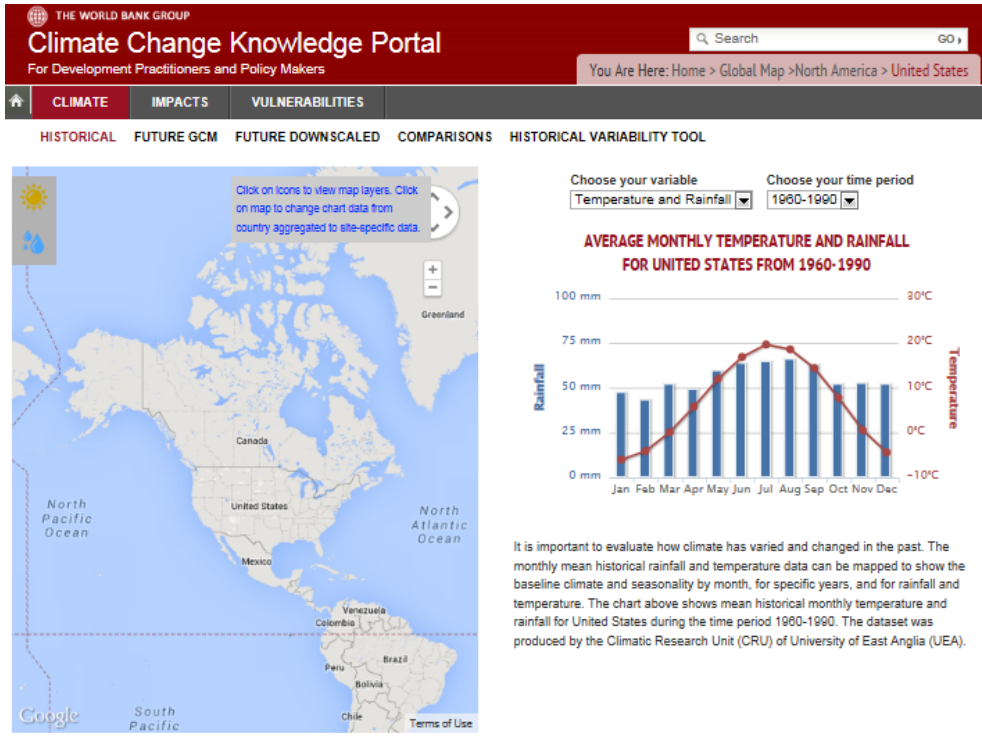
	Northeast	Communities are affected by heat waves, more extreme precipitation events, and coastal flooding due to sea level rise and storm surge.
	Southeast and Caribbean	Decreased water availability, exacerbated by population growth and land-use change, causes increased competition for water. There are 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

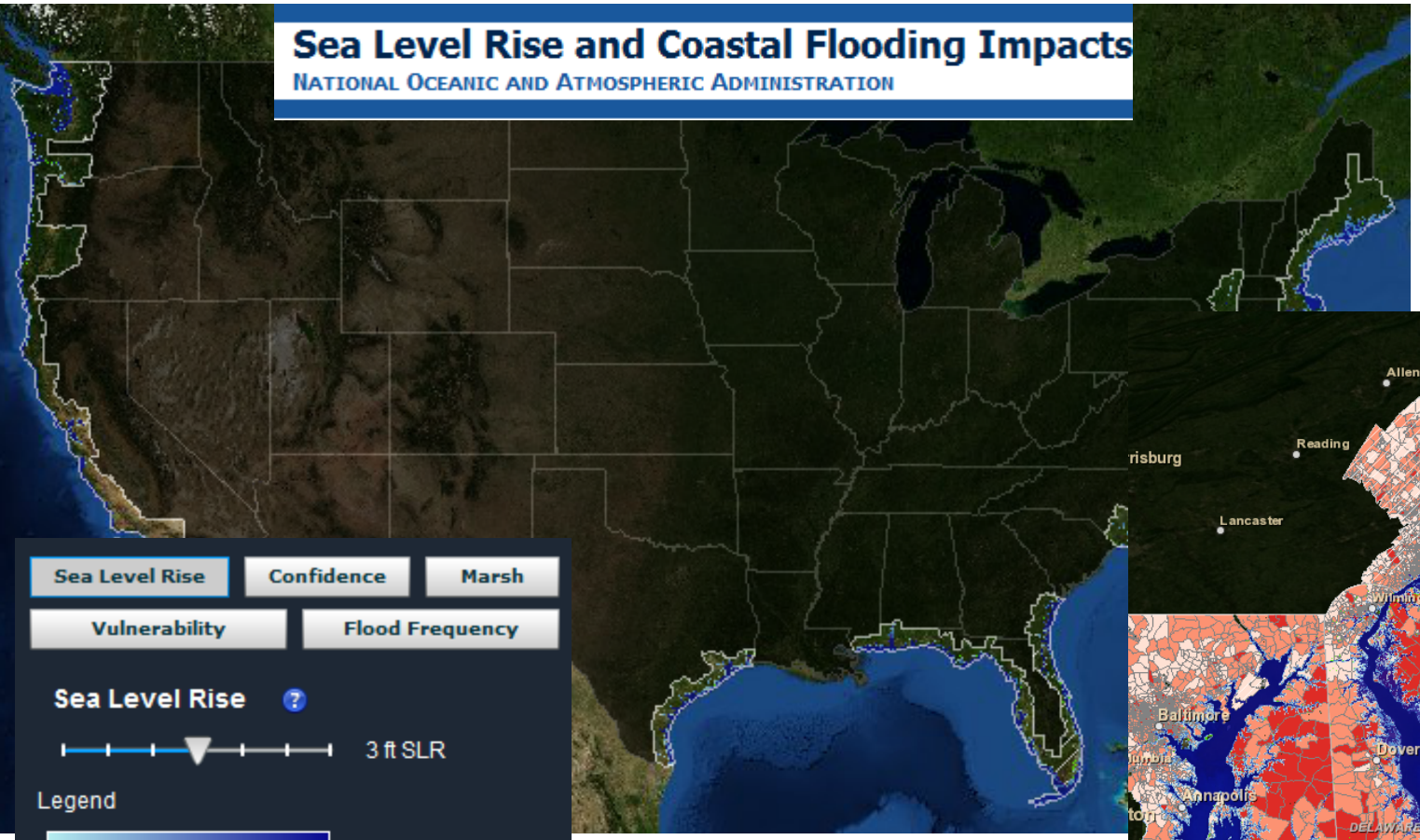
User-friendly Climate Data Portals

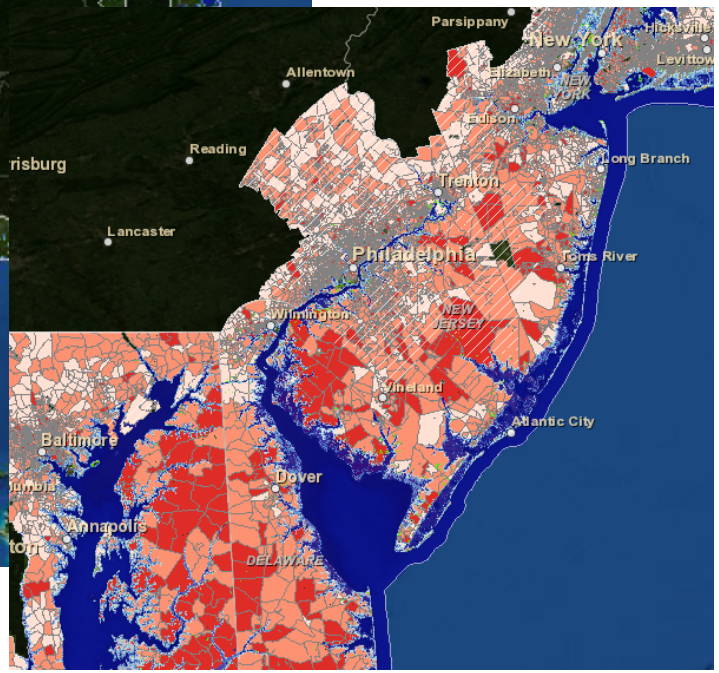


http://www.climatewizard.org/



http://sdwebx.worldbank.org/climateportal



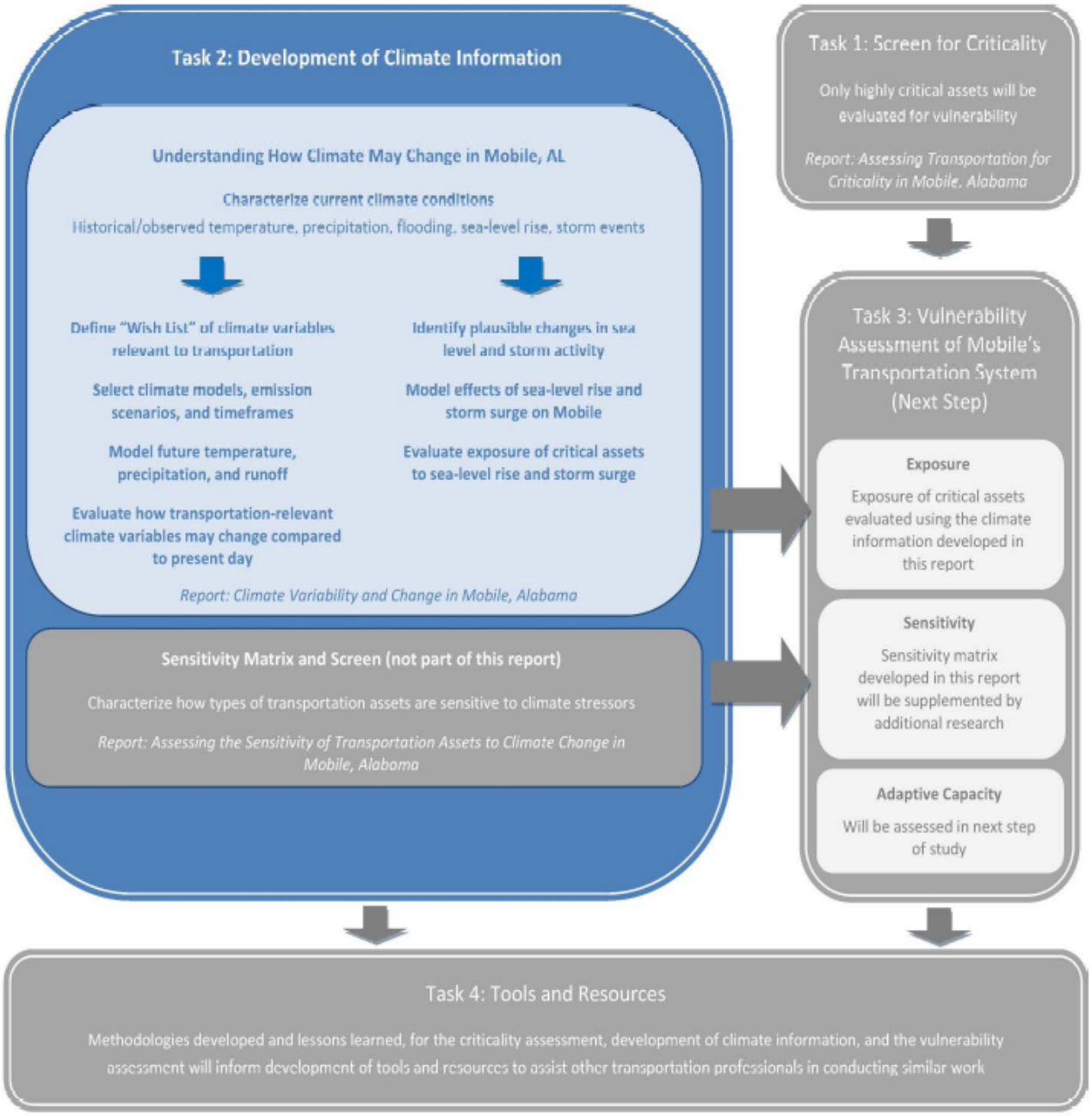


http://www.csc.noaa.gov/slr/viewer/#

Example:

DOT's Gulf Coast Project, Phase 2

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



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