

Climate Change and Transportation

Impacts and Adaptation Options

Climate Change Preparedness in New
Jersey: Leading Practices and Policy
Priorities

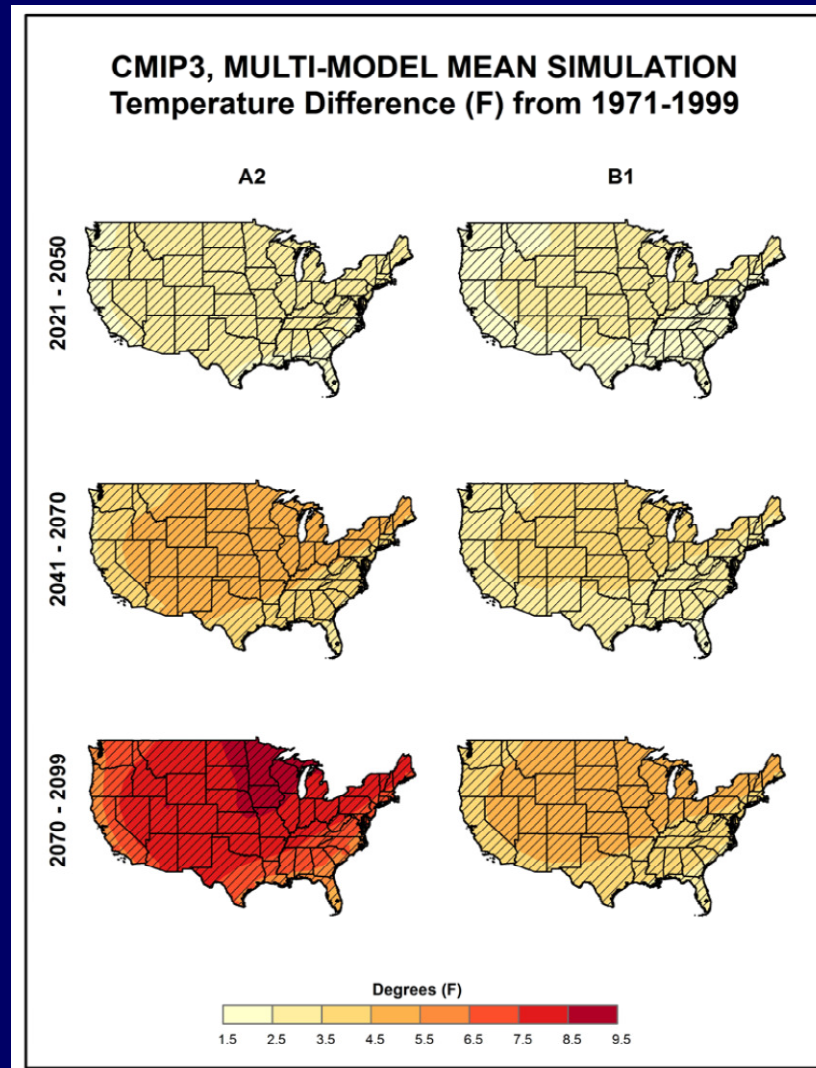
May 22, 2013

John Posey, Ph.D.

Disclaimer: Opinions expressed are my own, and do not represent the National Climate Assessment or my employers.

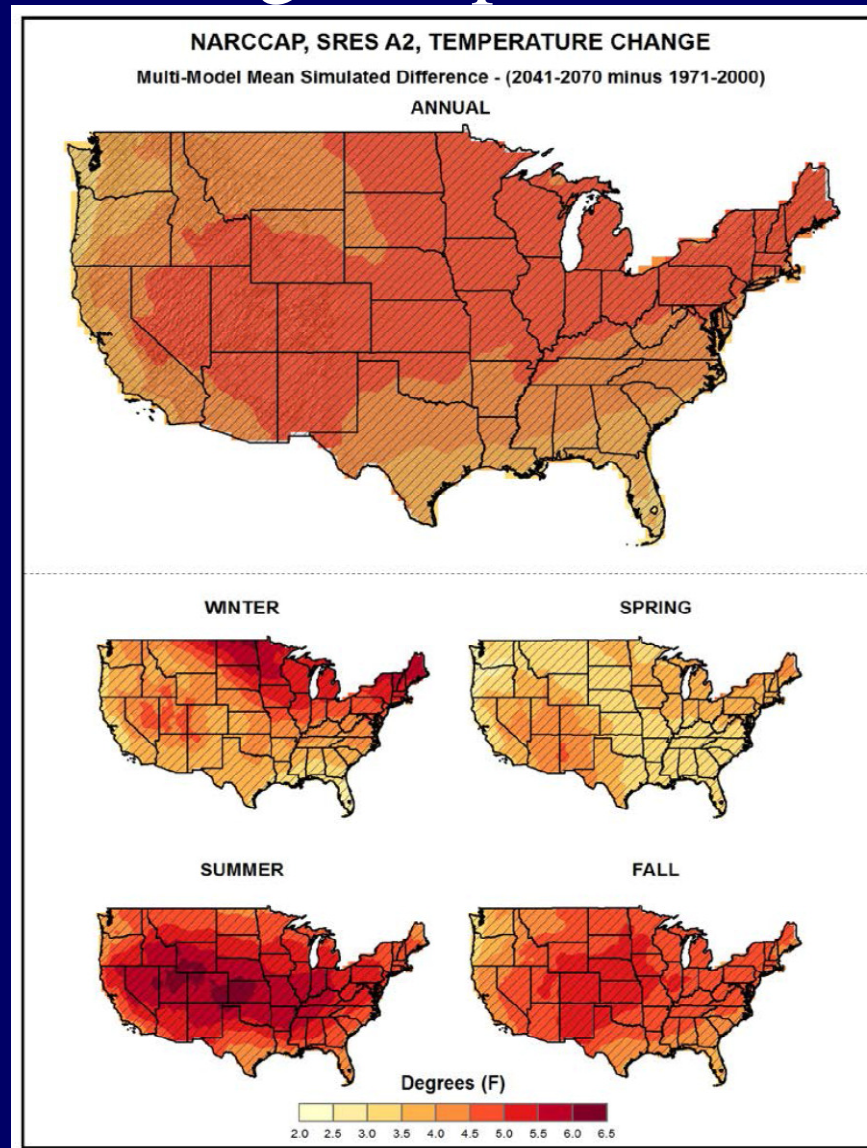
Climate Impacts

Rising Temperatures



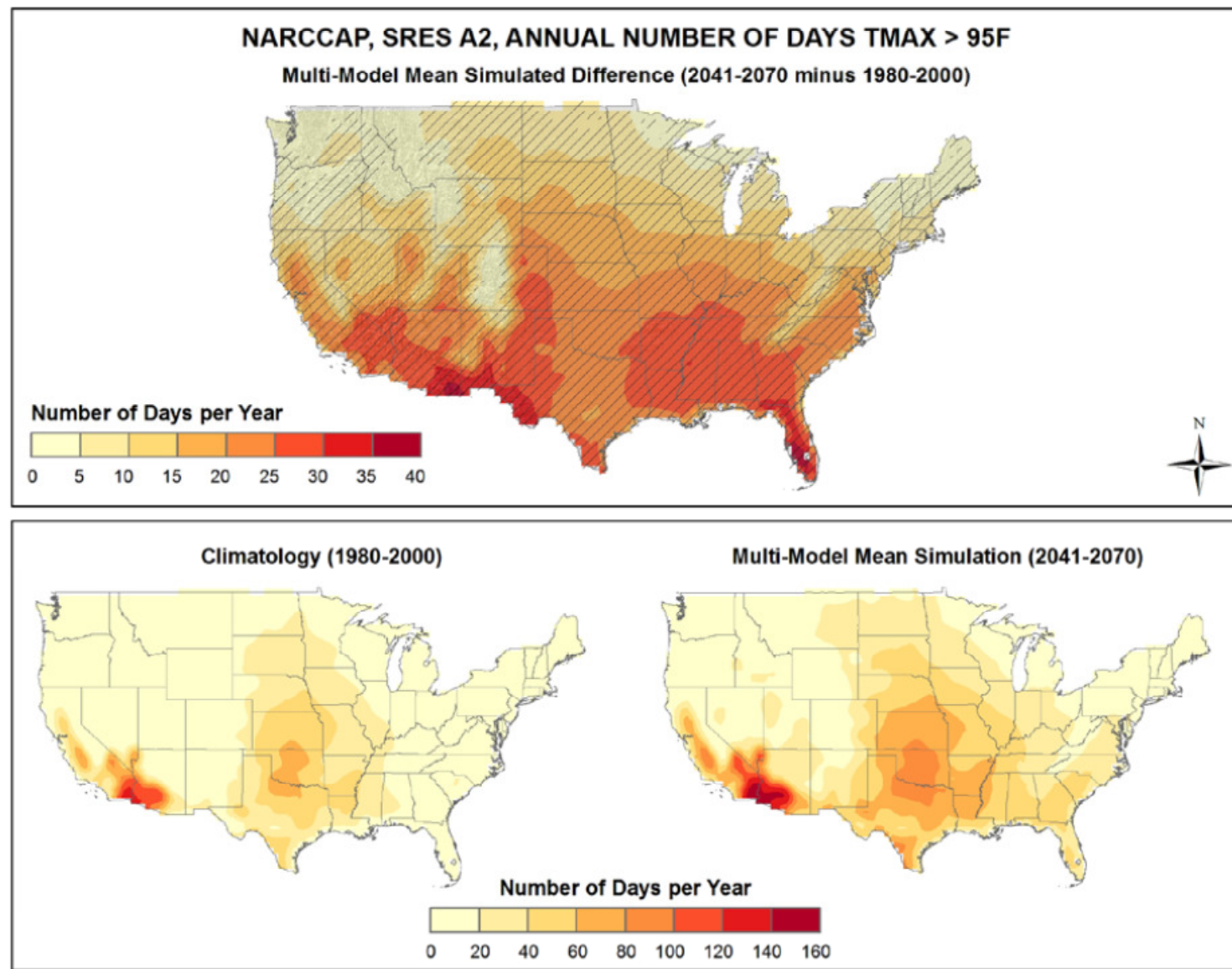
Source: K. Kunkel et al., Regional Climate Trends and Scenarios for the National Climate Assessment, Part 9: Climate of the Contiguous United States. NOAA Technical Report NESDIS 142-9, 2013.

Rising Temperatures



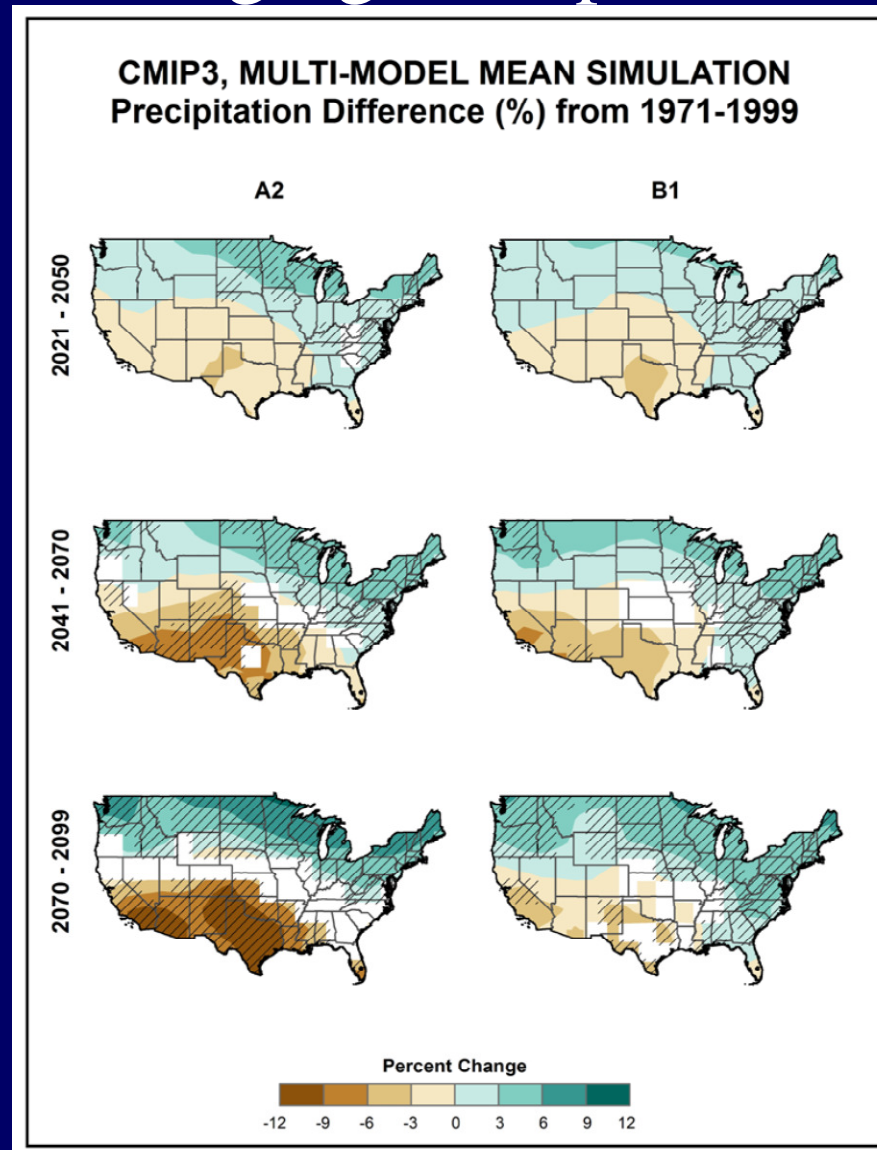
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Extreme Heat



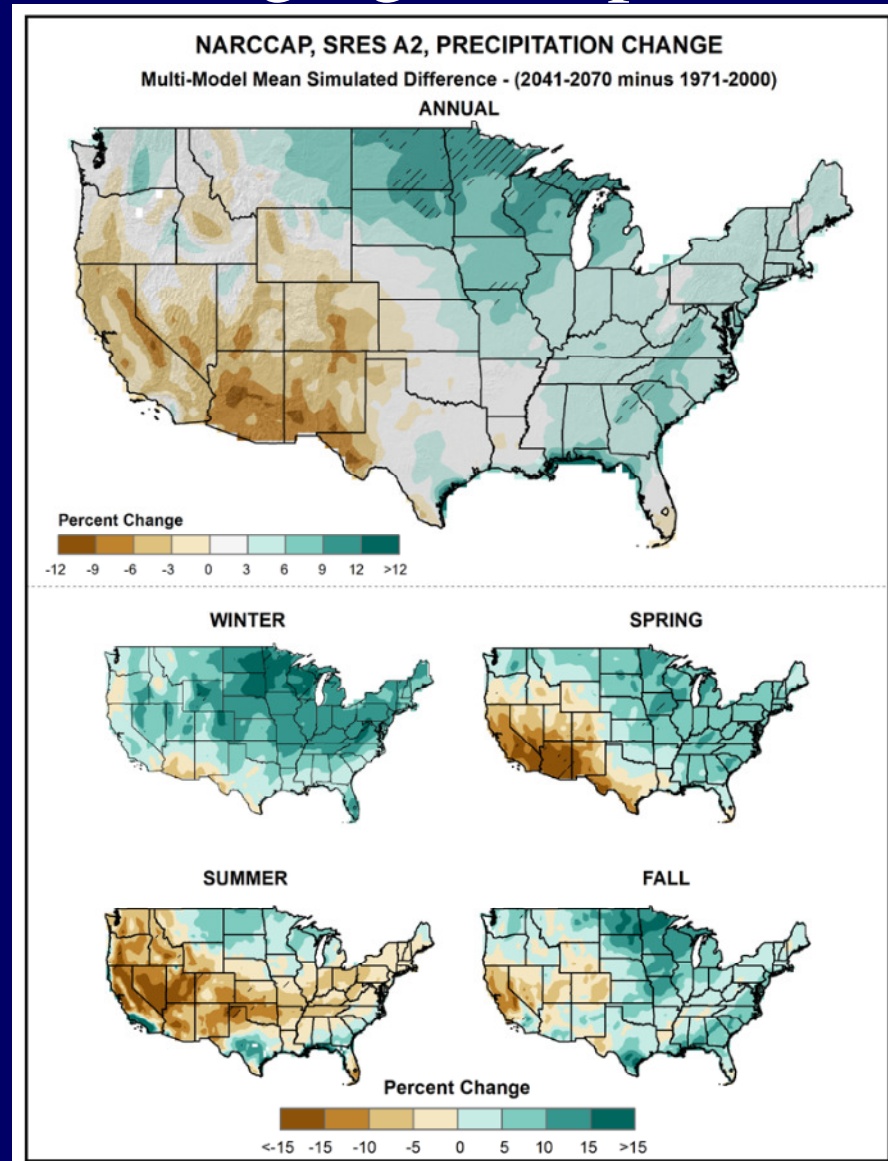
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Changing Precipitation



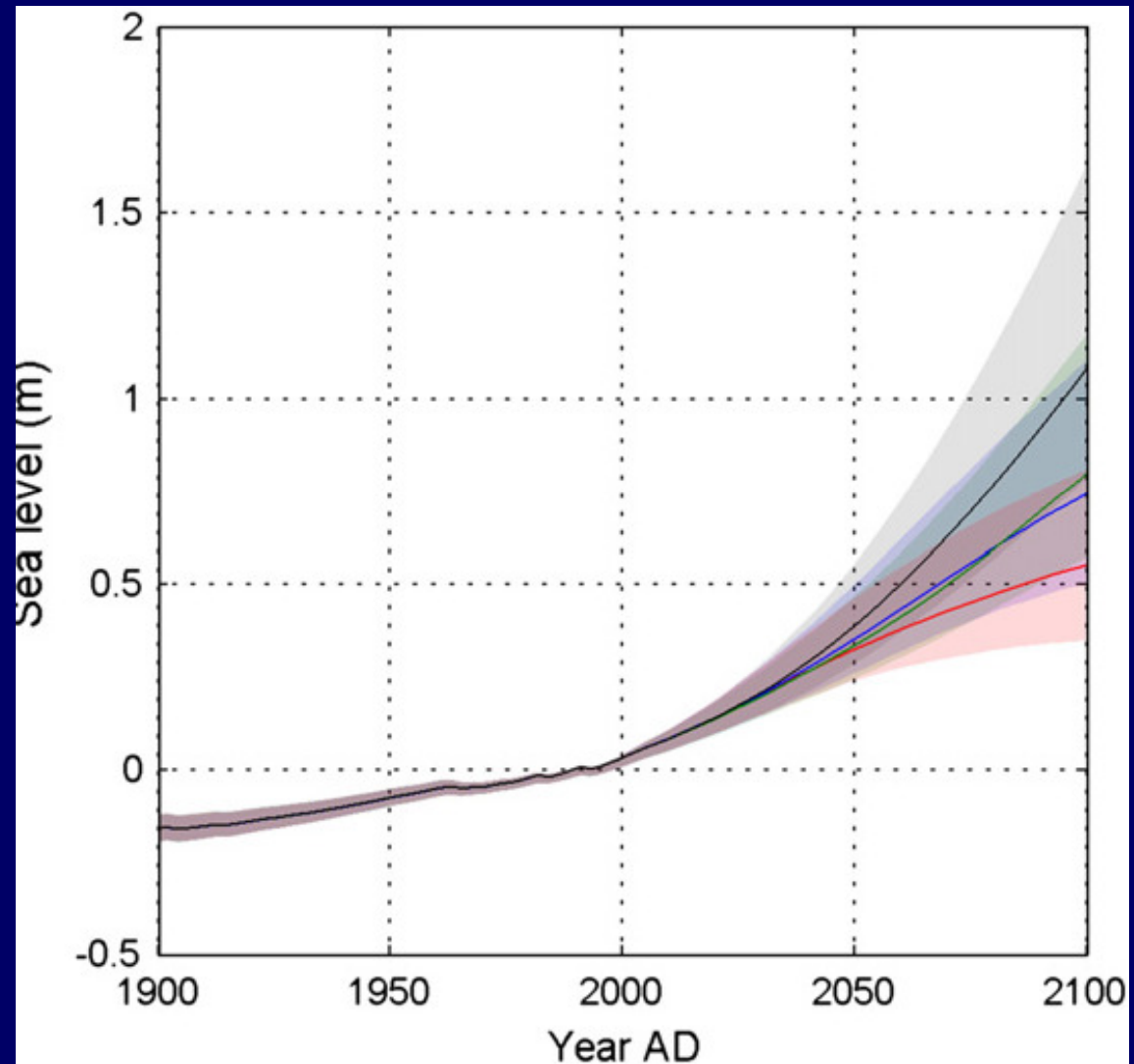
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Changing Precipitation



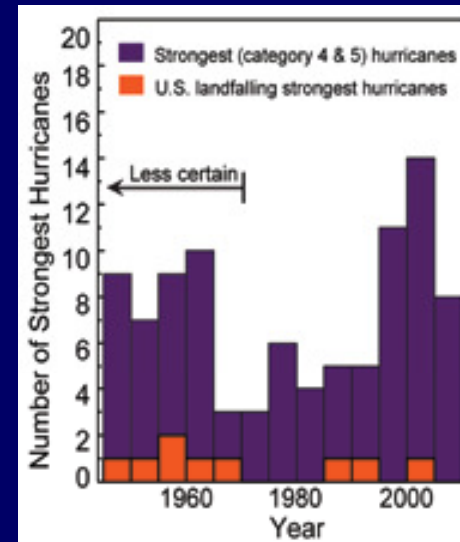
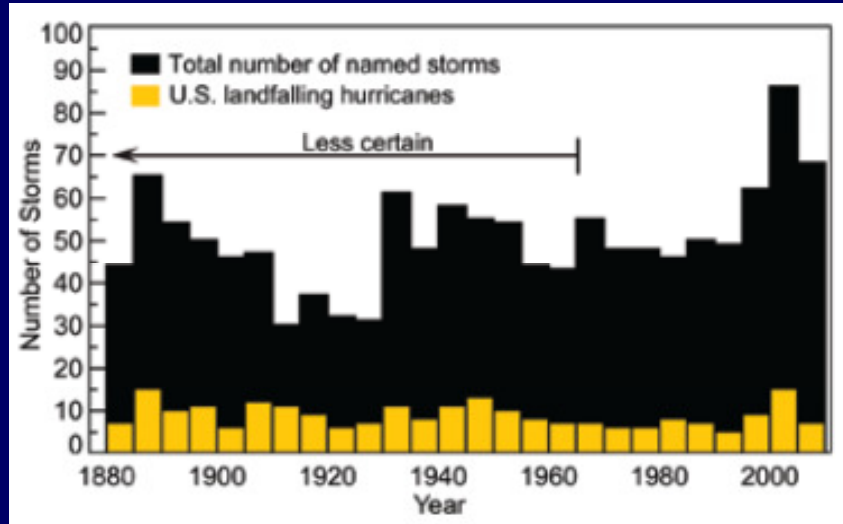
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Sea Level Rise



S. Jevrejeva et al., 2012, Sea level projections to AD2500 with a new generation of climate change scenarios. *Global and Planetary Change* 80-81, 14-20.

Hurricanes



“The destructive energy of Atlantic hurricanes has increased in recent decades. The intensity of these storms is likely to increase in this century.”

Source: National Climate Assessment, 2009

Transportation Impacts

Rising Temperatures: Material Stress

Bridge Expansion Joints



Source: Washington State Department of Transportation

Buckled Rails



Source: Federal Transit Administration

Precipitation Changes

Barge Traffic



System Performance



Source: NCDOT

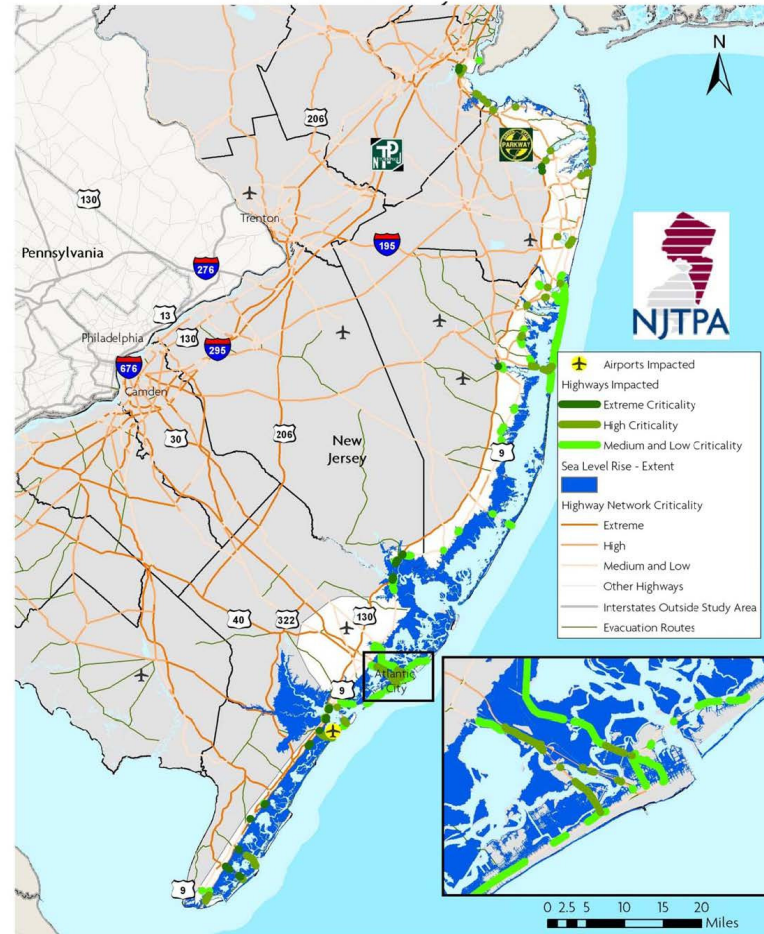
Road Closures



National Weather Service

Sea Level Rise

Figure 14. SLR 1 Meter Scenario, 2100, Coastal Study Area (Roadways)



66 Cambridge Systematics

Source: NJTPA/Cambridge Systematics, Climate Change Vulnerability and Risk Assessment of New Jersey's Transportation Infrastructure.

Extreme Weather



FTA



USDOT

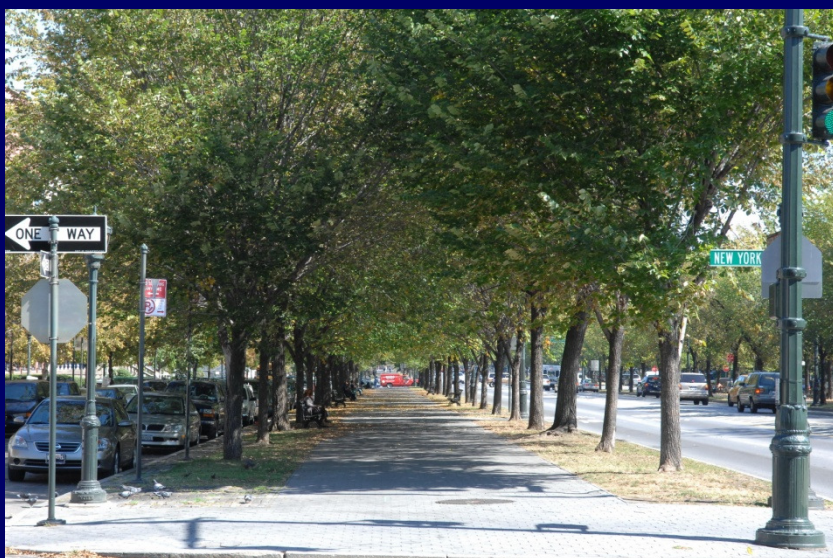
Positive and Indirect Effects

- Arctic shipping
- Great Lakes shipping
- Less snow (some places)
- Changing crop zones
- Greenhouse gas mitigation

Adaptation

Material Stress

Street Trees



Source: MilliontreesNYC

Transportation Asset Management



Source: Federal Highway Administration

Changing Precipitation

Green Infrastructure



Ritter, Ohio Public Library



City of Raleigh, North Carolina

Intelligent Transportation Systems



Florida DOT



Amanda Riddell, Wisconsin DOT

Changing Precipitation

Levee Repair



State of California

Community Rating System

Community Rating System Premium Discounts

Class	Premium Discount	
	SFHA*	Non-SFHA
1	45%	10%
2	40%	10%
3	35%	10%
4	30%	10%
5	25%	10%
6	20%	10%
7	15%	5%
8	10%	5%
9	5%	5%
10	0	0

* Special Flood Hazard Area. Non-SFHA premium reductions apply to B, C, D, X, A99, and AR Zones.

Sea Level Rise/Extreme Weather

Flood Gates



Source: Tina Hodges, Flooded Bus Barns and Buckled Rails, FTA

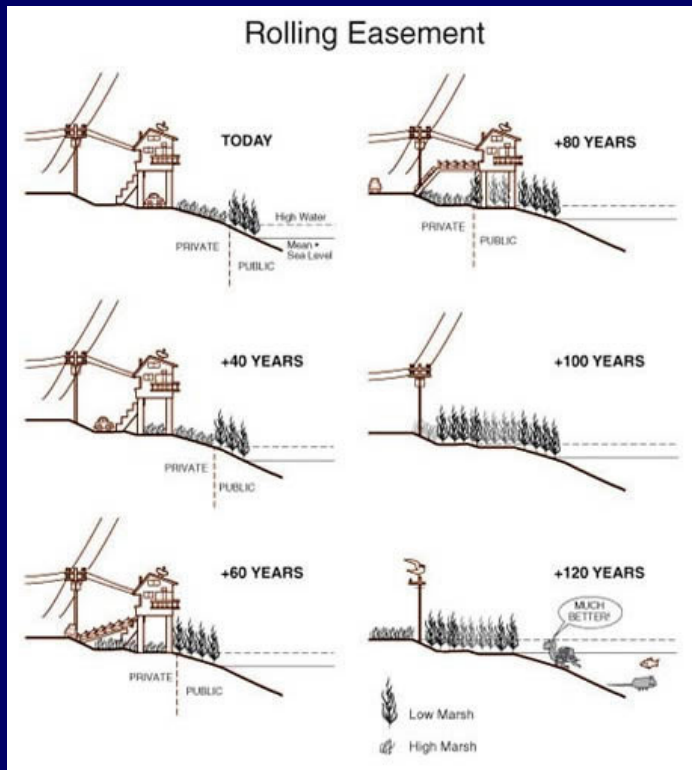
Bridge Elevation



Source: Confederation Bridge, NB/PEI

Sea Level Rise/Extreme Weather

Retreat/Abandonment



Source: James Titus, risingsea.net

Evacuation Planning



Federal Highways Administration

Extreme Weather

Ventilation Grate Elevation



Source: Tina Hodges, Flooded Bus Barns and Bucked Rails, FTA



Source: Projjal Dutta, FTA

Concluding Thoughts

- High uncertainty
 - Need for Robust Decision Making
- Green vs. gray infrastructure:
 - Room for both.
- Many challenges not new
 - Many adaptation tools already in use.

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