Confronting Climate Change in New Jersey and the Northeast

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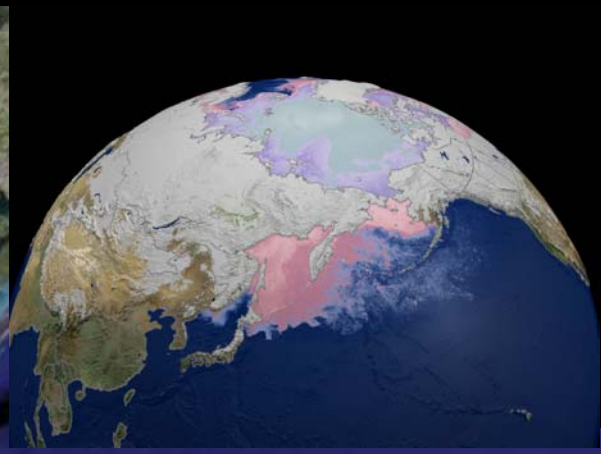
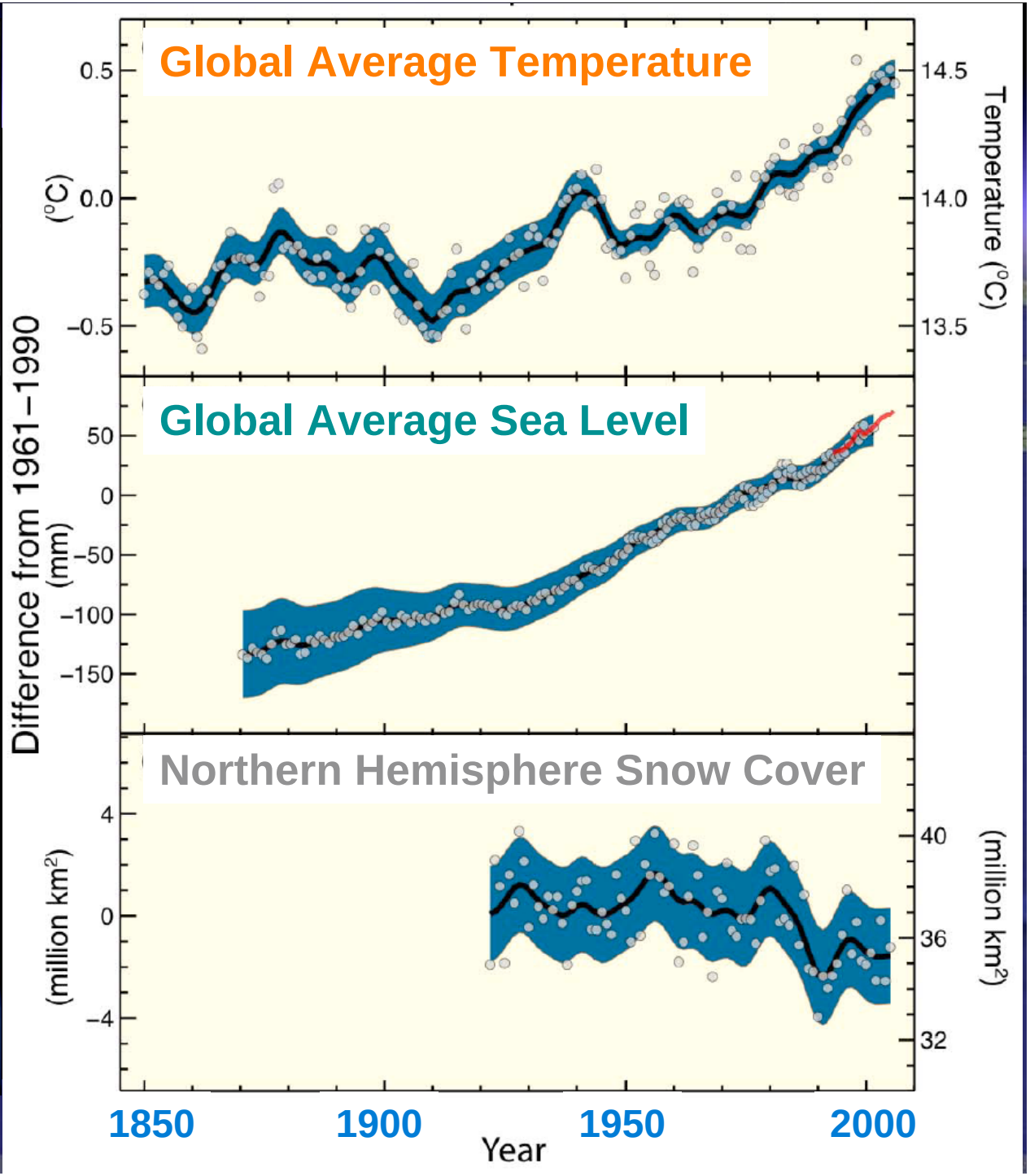
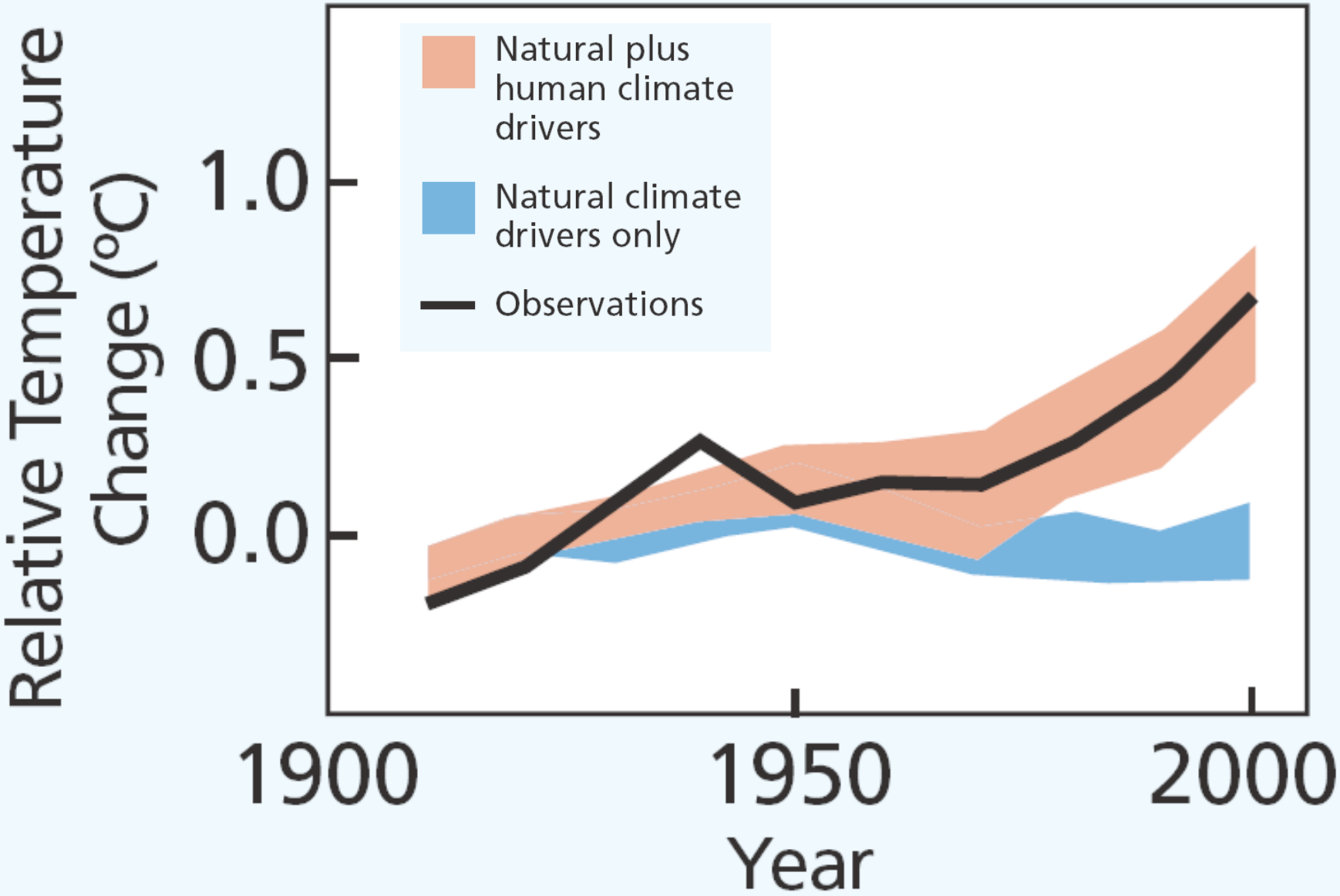
30 January 2008





Source: IPCC *Climate Change 2007: The Physical Science Basis*—Summary for Policymakers

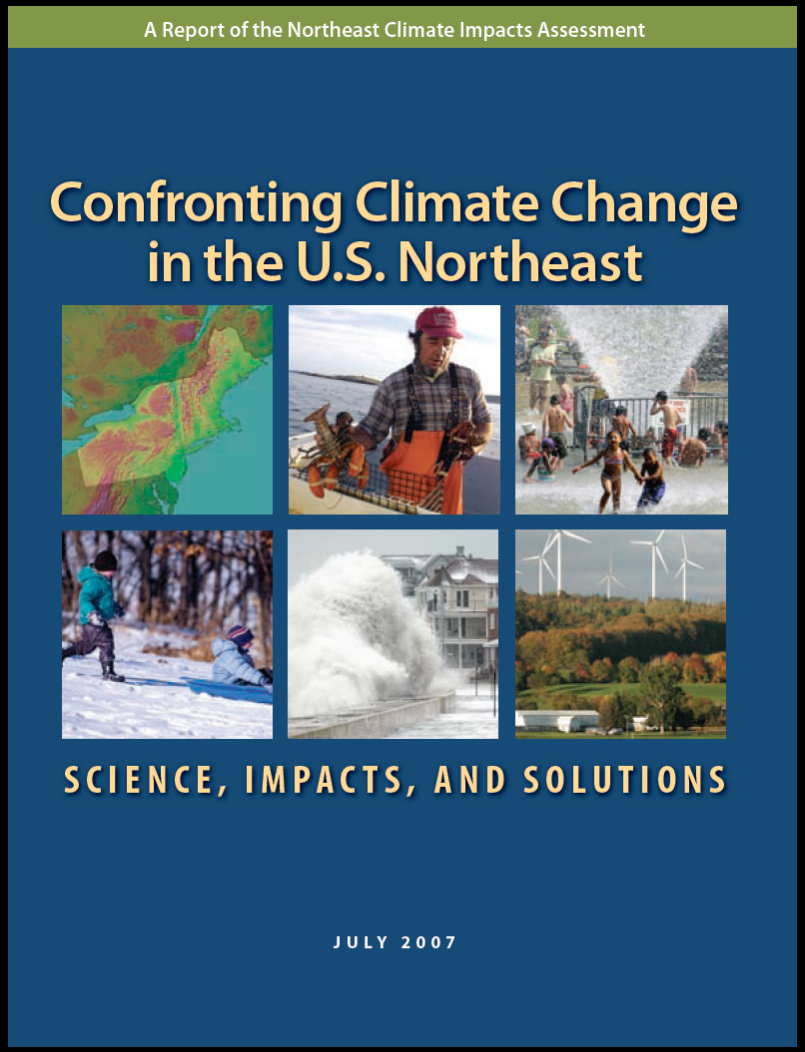
Global Average Surface Temperature



Source: IPCC *Climate Change 2007: The Physical Science Basis*—Summary for Policymakers.

Climate across the Northeast is also changing

- Annual temperatures have warmed ~ 2°F since 1970
- Winters have been warming fastest, at 1.3°F per decade since 1970
- Winter snowpack is decreasing
- Plants are flowering earlier in the spring
- More frequent extreme heat days in summer
- Rising sea surface temperature (1°F since 1900)



Available for download at: http://www.climatechoices.org

Institutions of NECIA Collaborators

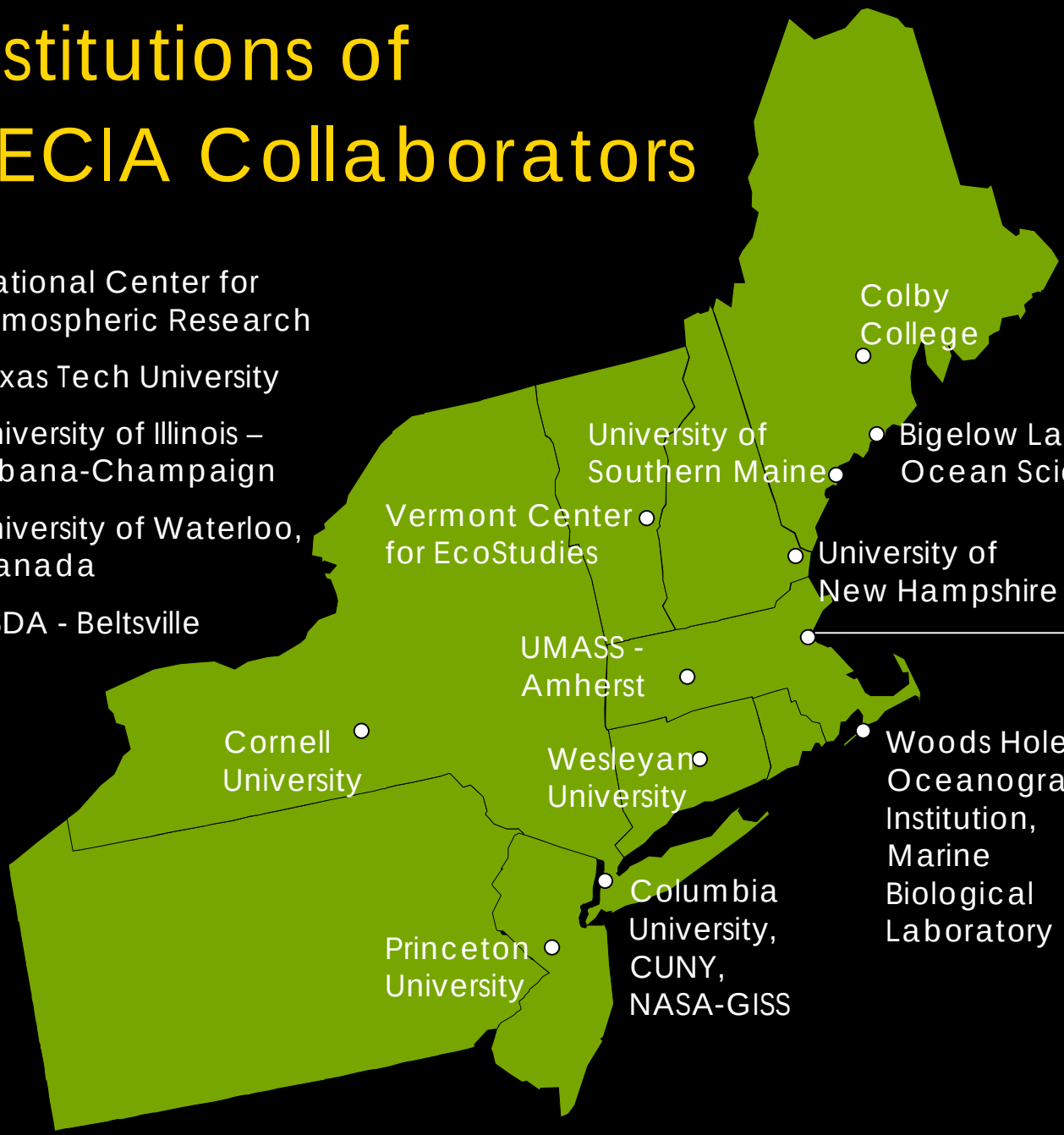
National Center for Atmospheric Research

Texas Tech University

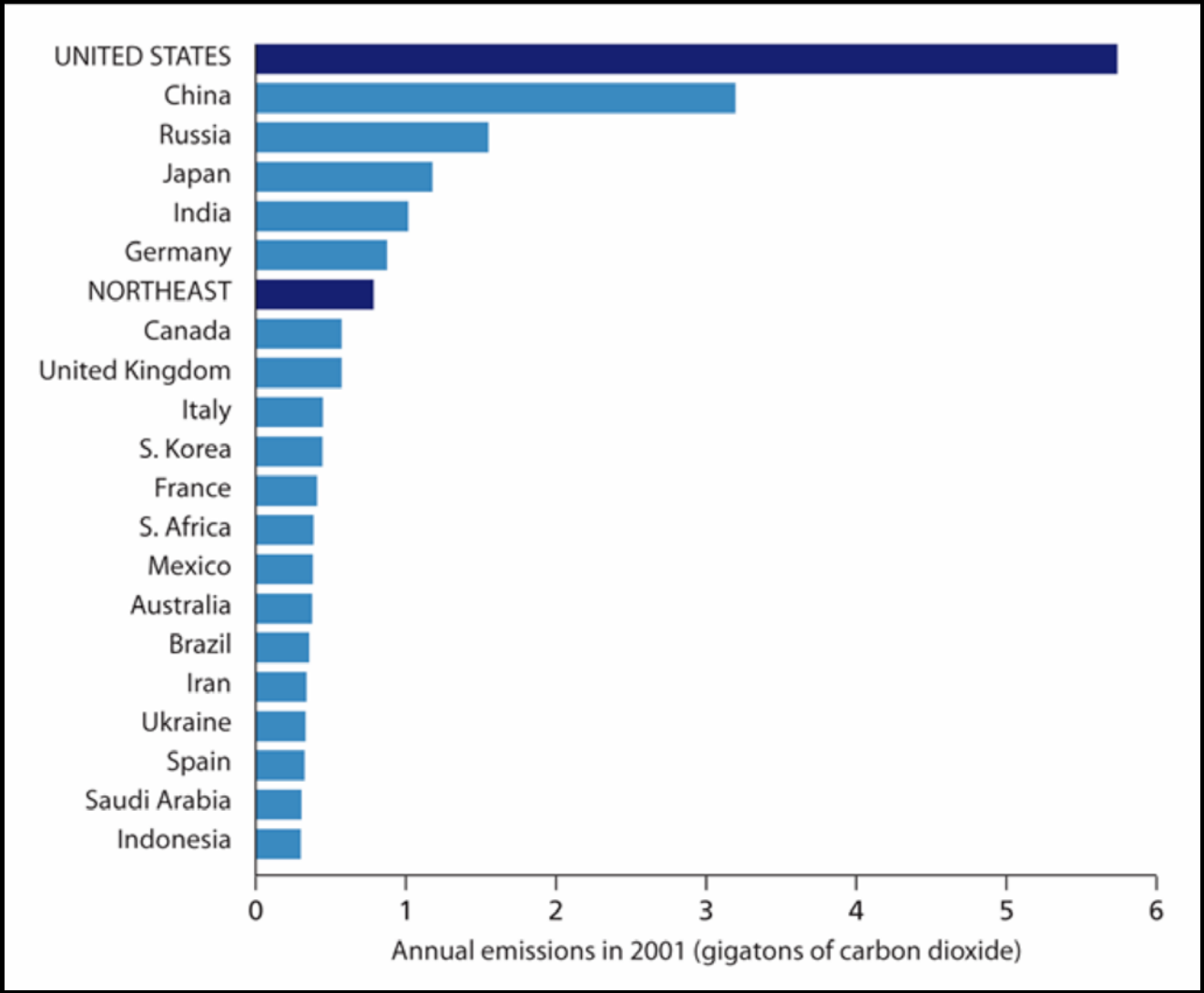
University of Illinois – Urbana-Champaign

University of Waterloo, Canada

USDA - Beltsville

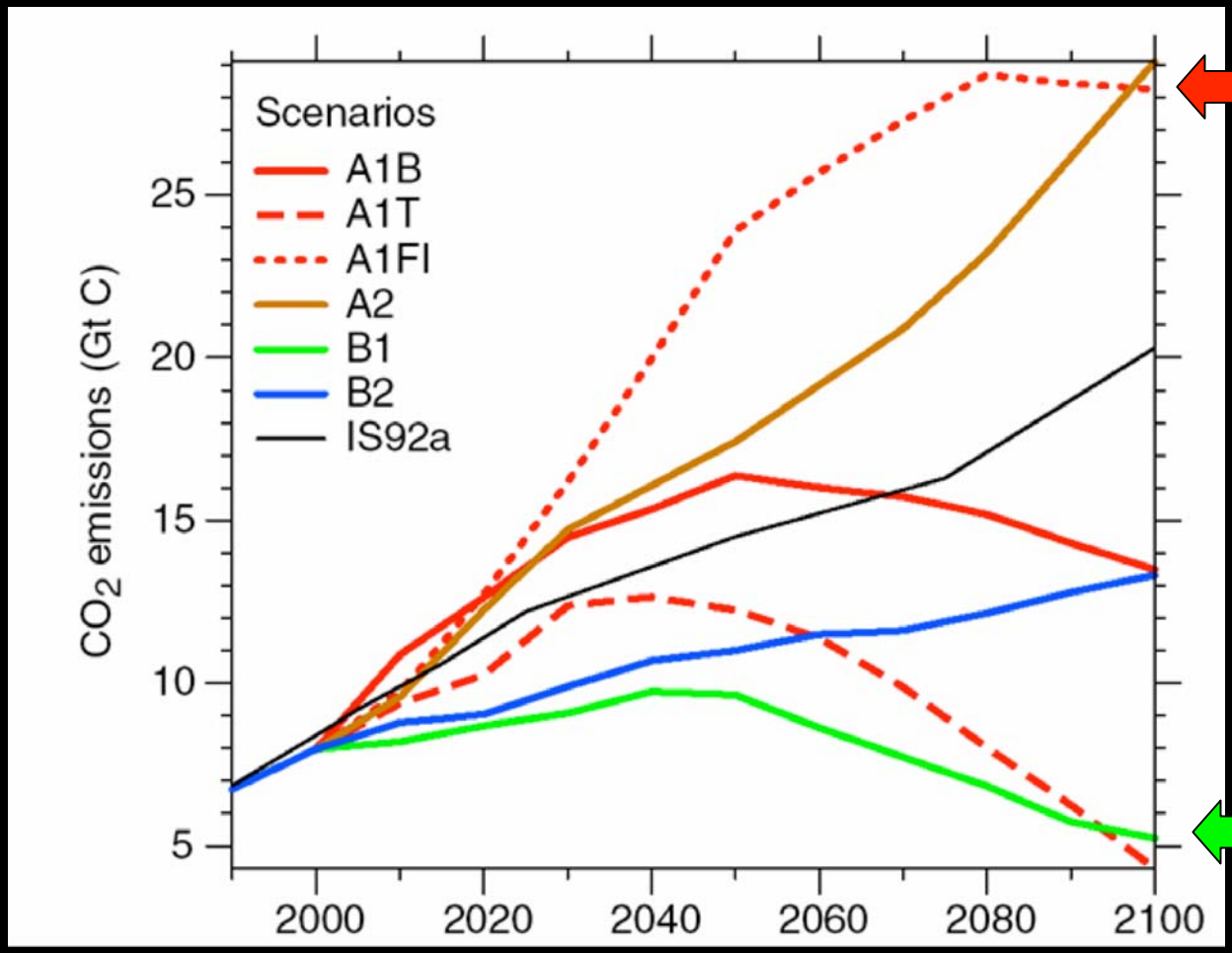


Northeast U.S. Emissions: Significant on a Global Scale



Source: Emissions data for 2001 from Energy Information Administration (EIA), *International energy annual* (2003), and EIA, *Emissions of greenhouse gases in the United States* (2004).

Further warming depends on our emissions choices



HIGHER

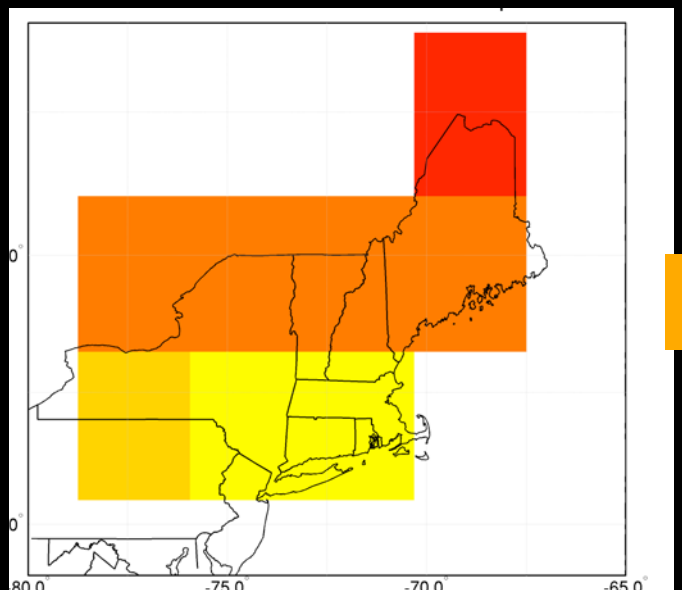
A1FI

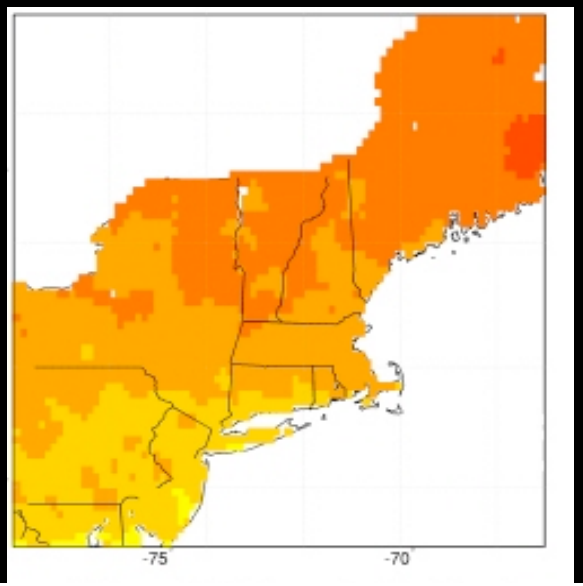
LOWER

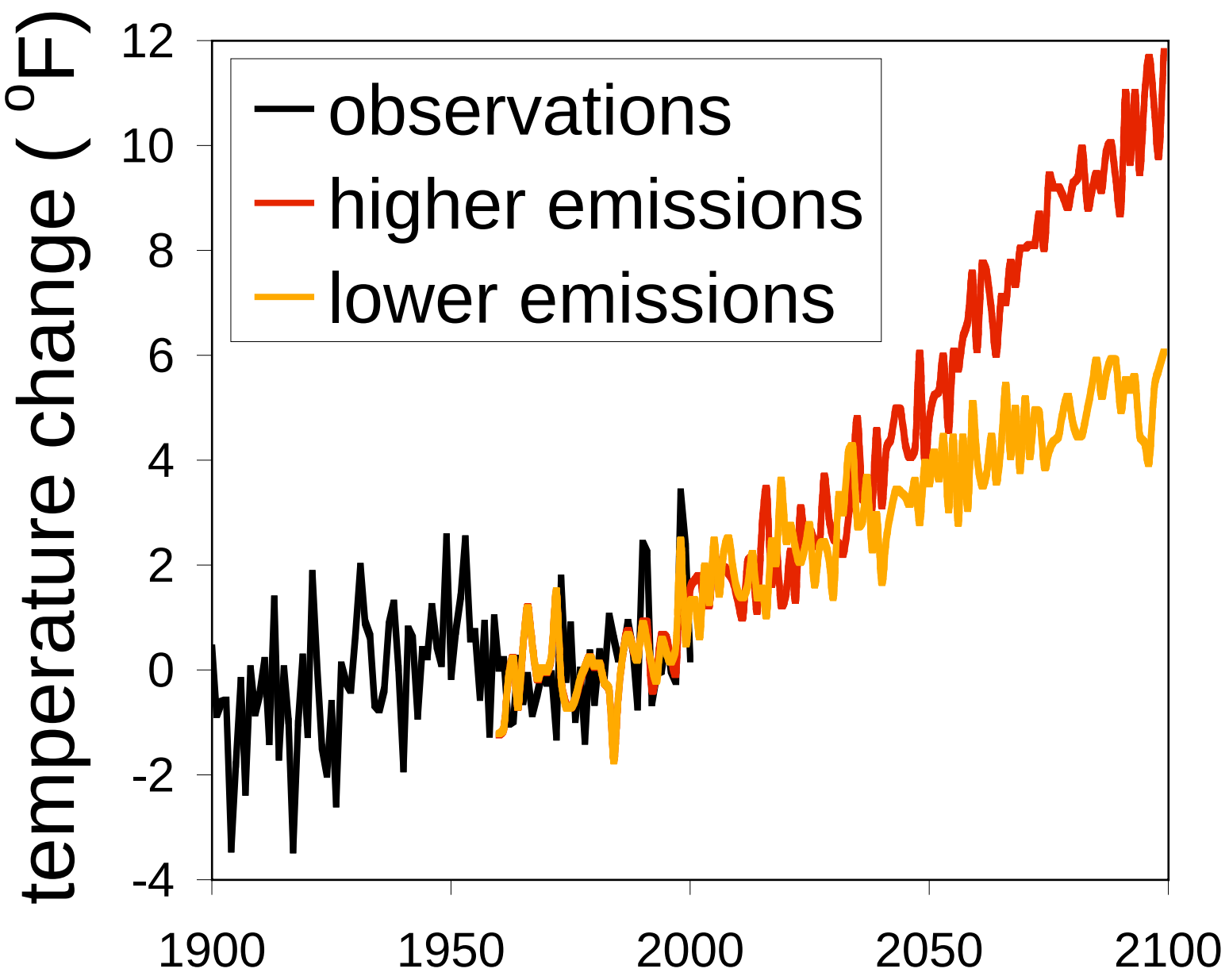
B1

Projecting future climate change for the Northeast

1. Obtain scenarios of future emissions from human activities
2. Use scenarios as input to global climate model simulations
3. Downscale global-scale projections to the regional level

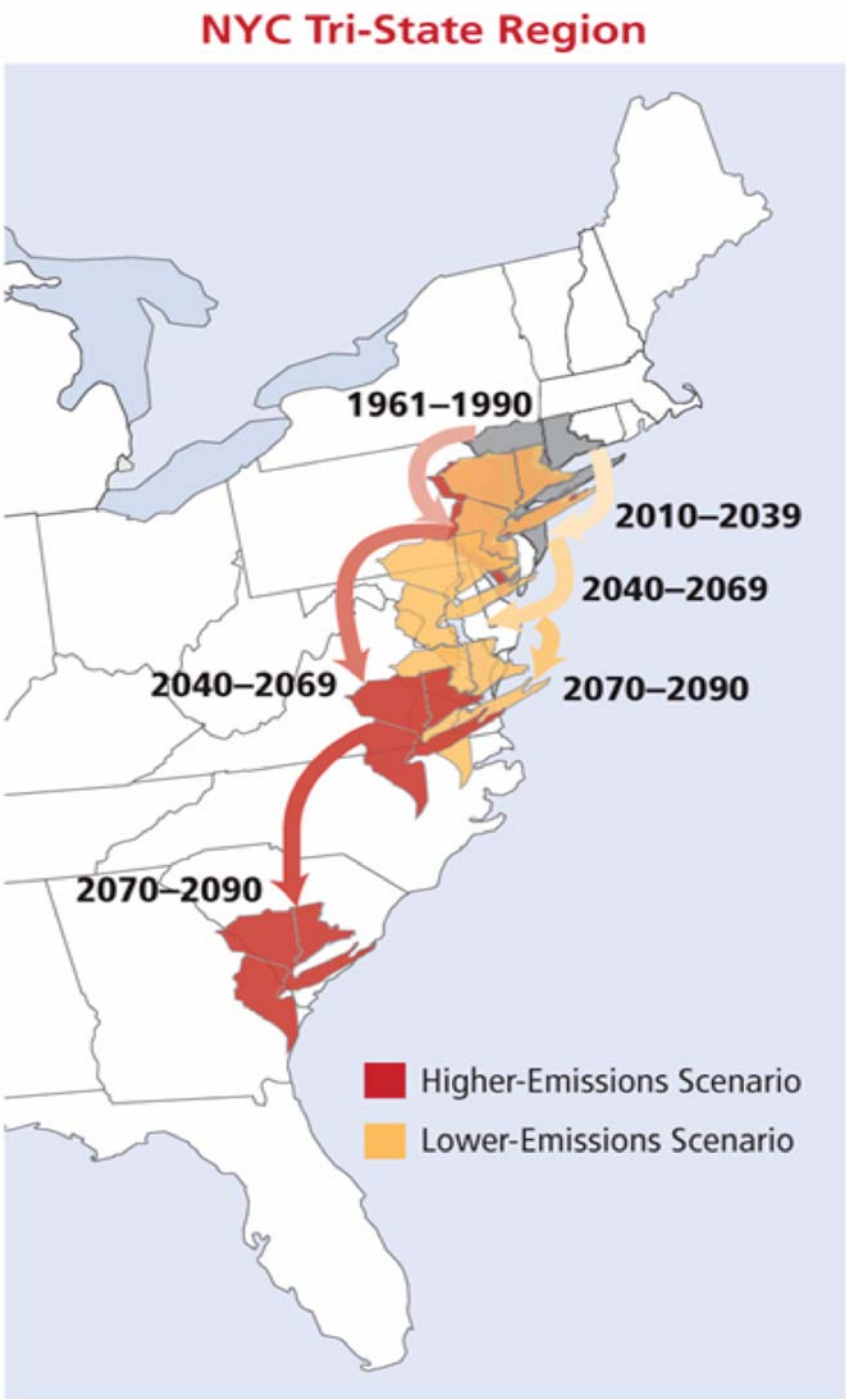




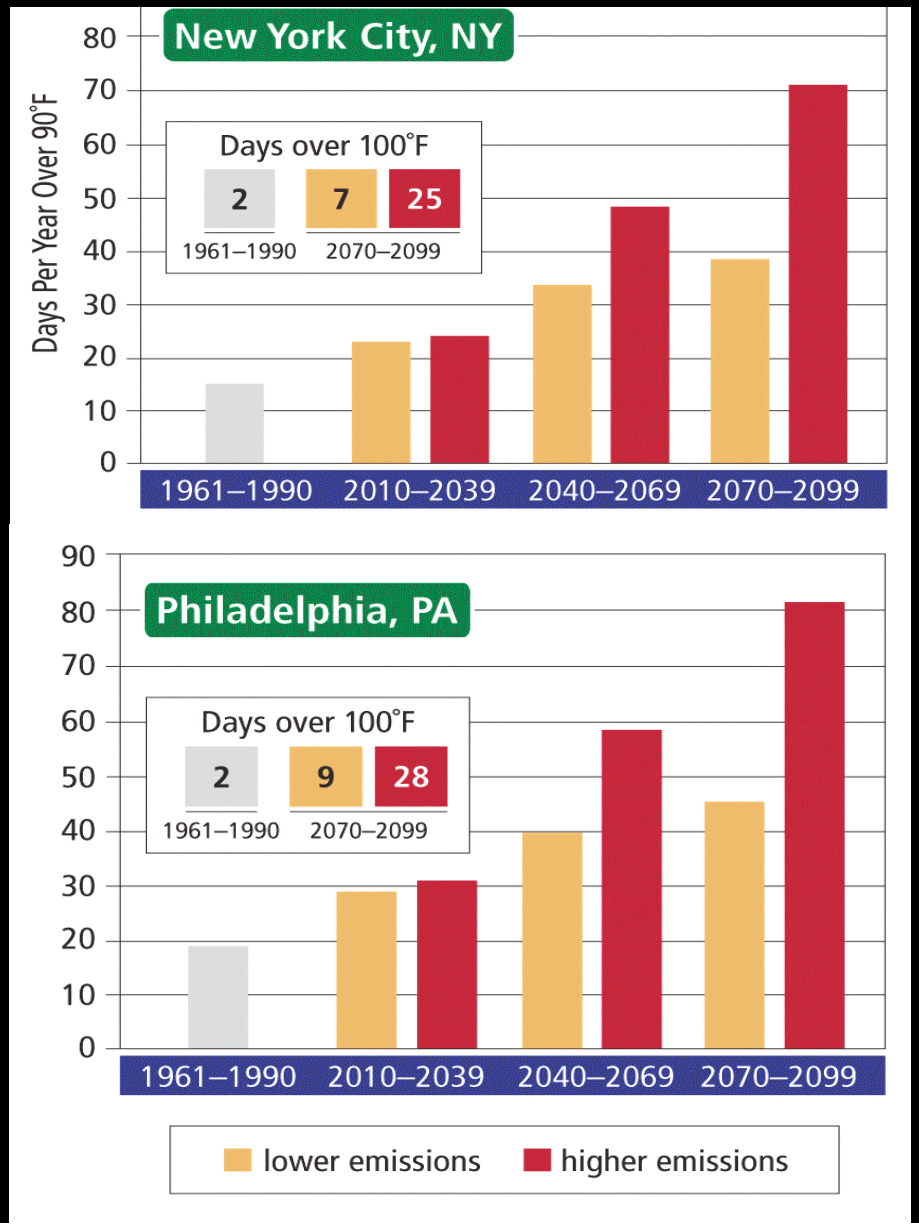


Source: NECIA/UCS, 2007 (see: www.climatechoices.org/ne/)

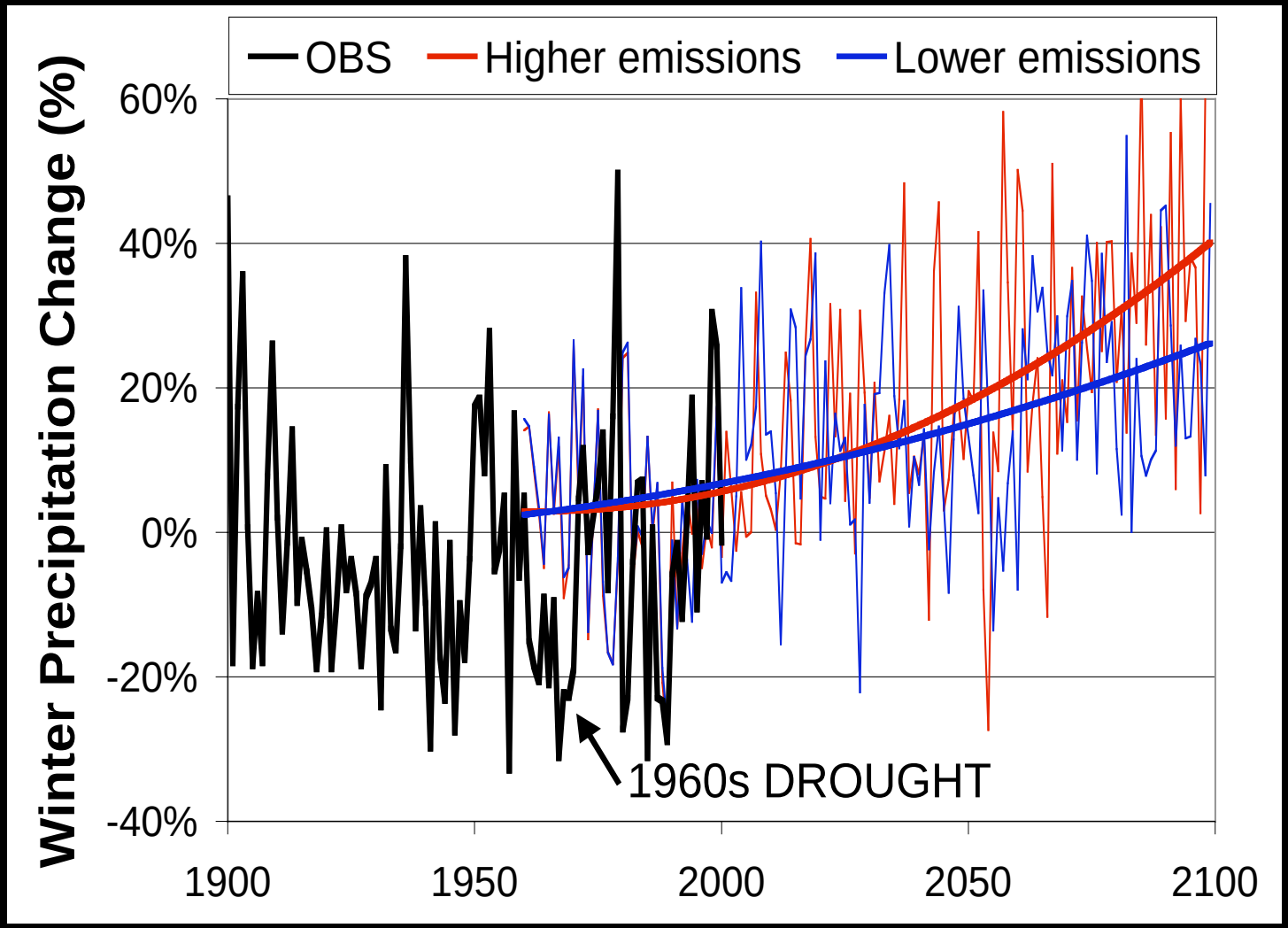
Summer Heat Index:
How hot will an average summer day "feel"?



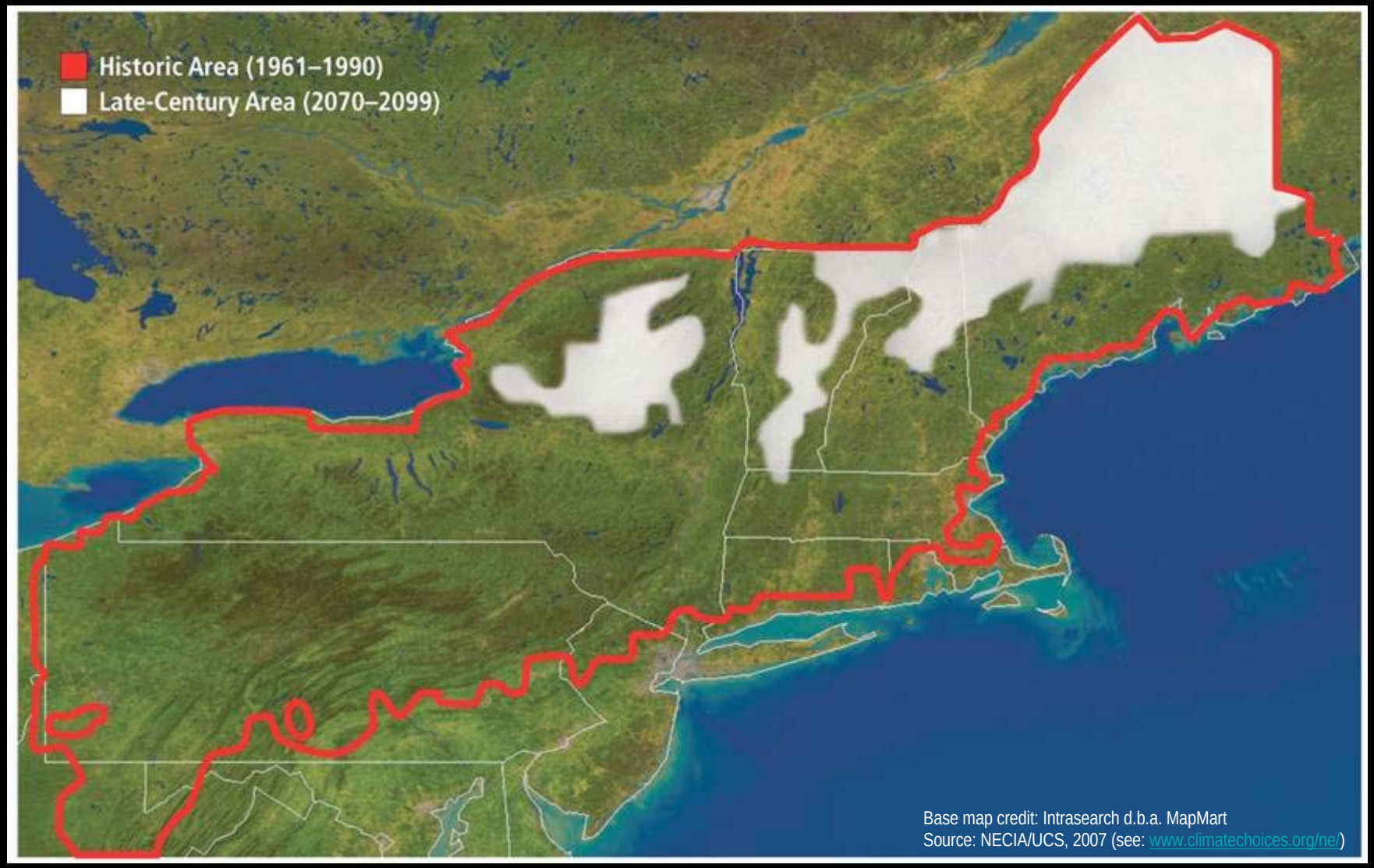
Heat-Waves and Temperature Extremes



Increasing winter precipitation



Declining Snow Cover



Extreme Precipitation

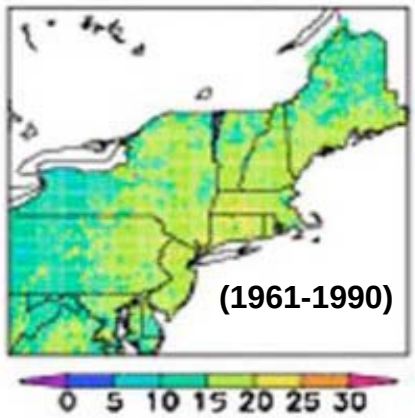
- Heavy rainfall events are becoming more frequent across the Northeast
- Under both emissions scenarios
  - rainfall is expected to become more intense
  - periods of heavy rainfall are expected to become more frequent

Changing Northeast Hydrology

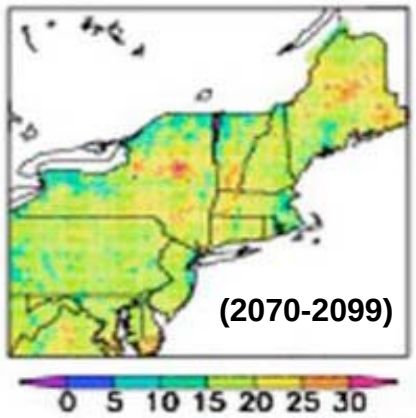
Nancy Brammer

USGS/David Armstrong

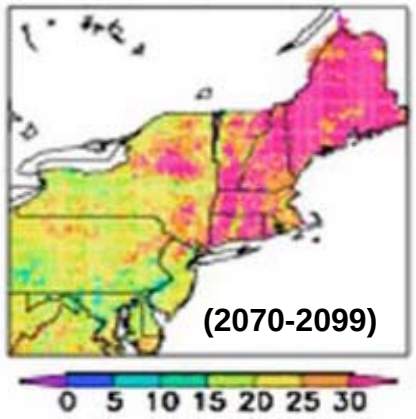
Short-term drought (1-3 months)



Lower emissions



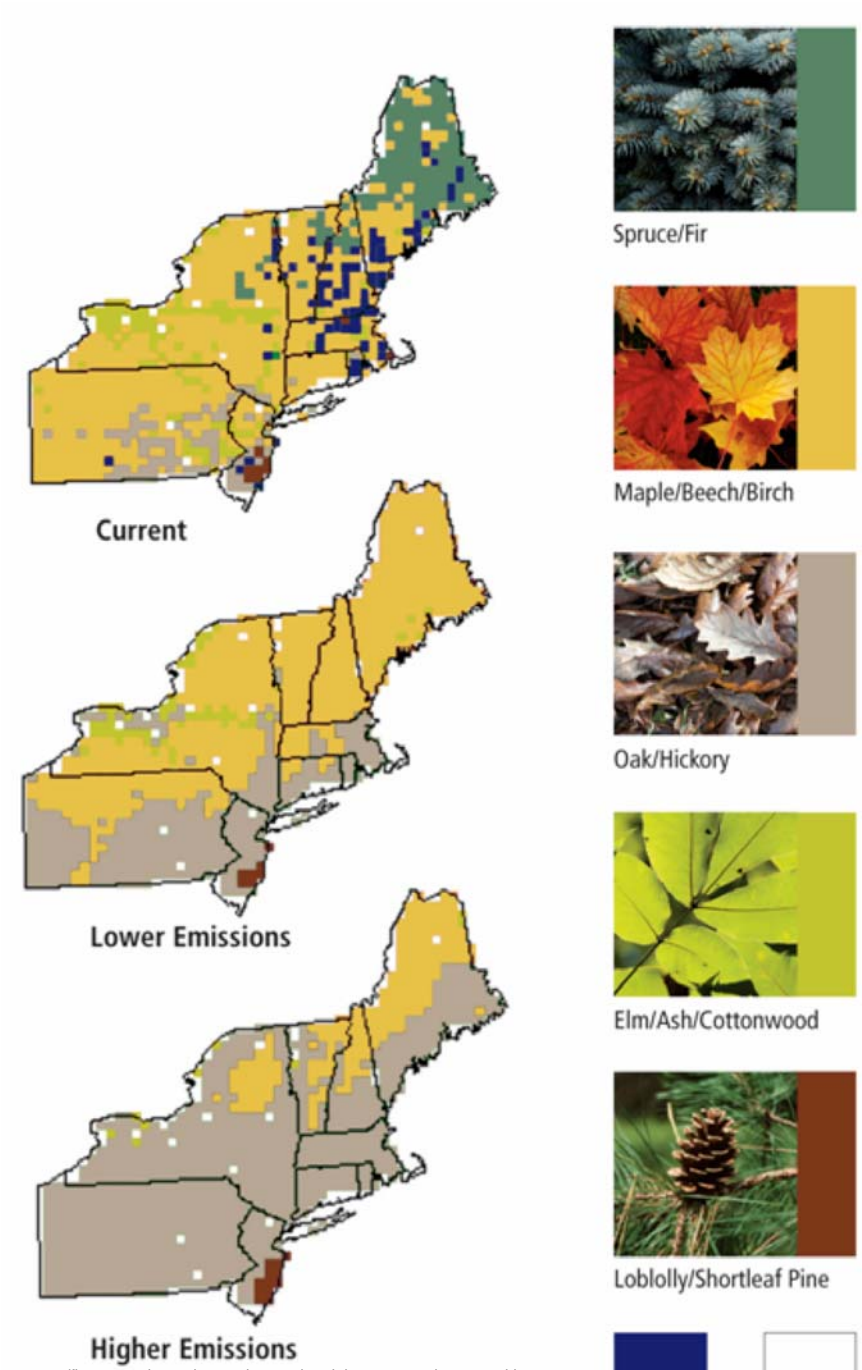
Higher emissions



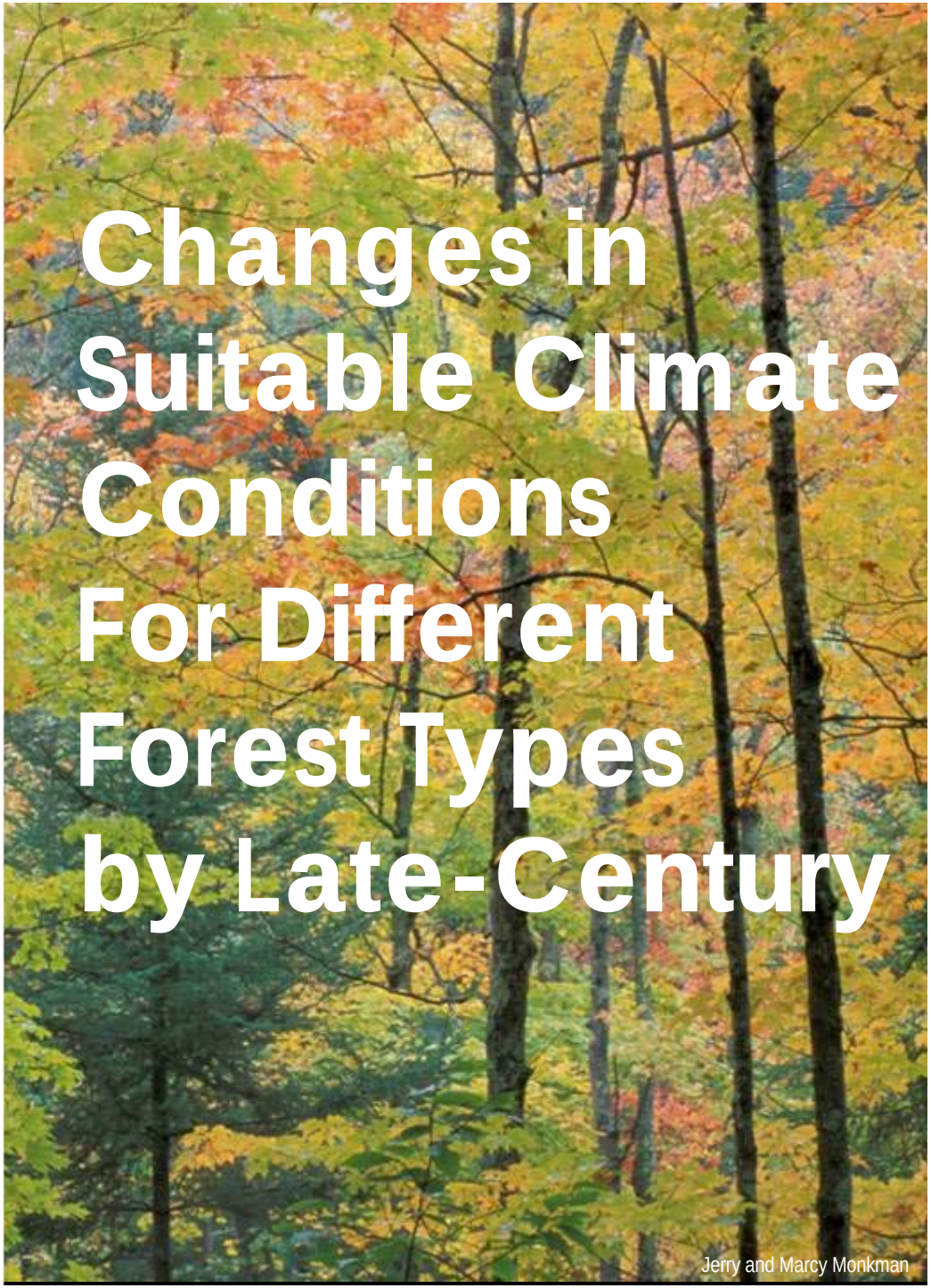
Increasing Summer Drought

- Hotter summers increase evaporation rates and reduce soil moisture
- With higher emissions, project annual short-term droughts across much of the Northeast by end-of-century.

Changes in Suitable Climate Conditions For Different Forest Types by Late-Century



spruce/fir: Anastasiya Maksymenko; maple: Birthe Lunau; oak: Dave White; ash: Chad Davis; loblolly: Kentucky Division of Forestry.
Source: NECIA, 2007 (see: www.climatechoices.org/ne/).



Jerry and Marcy Monkman

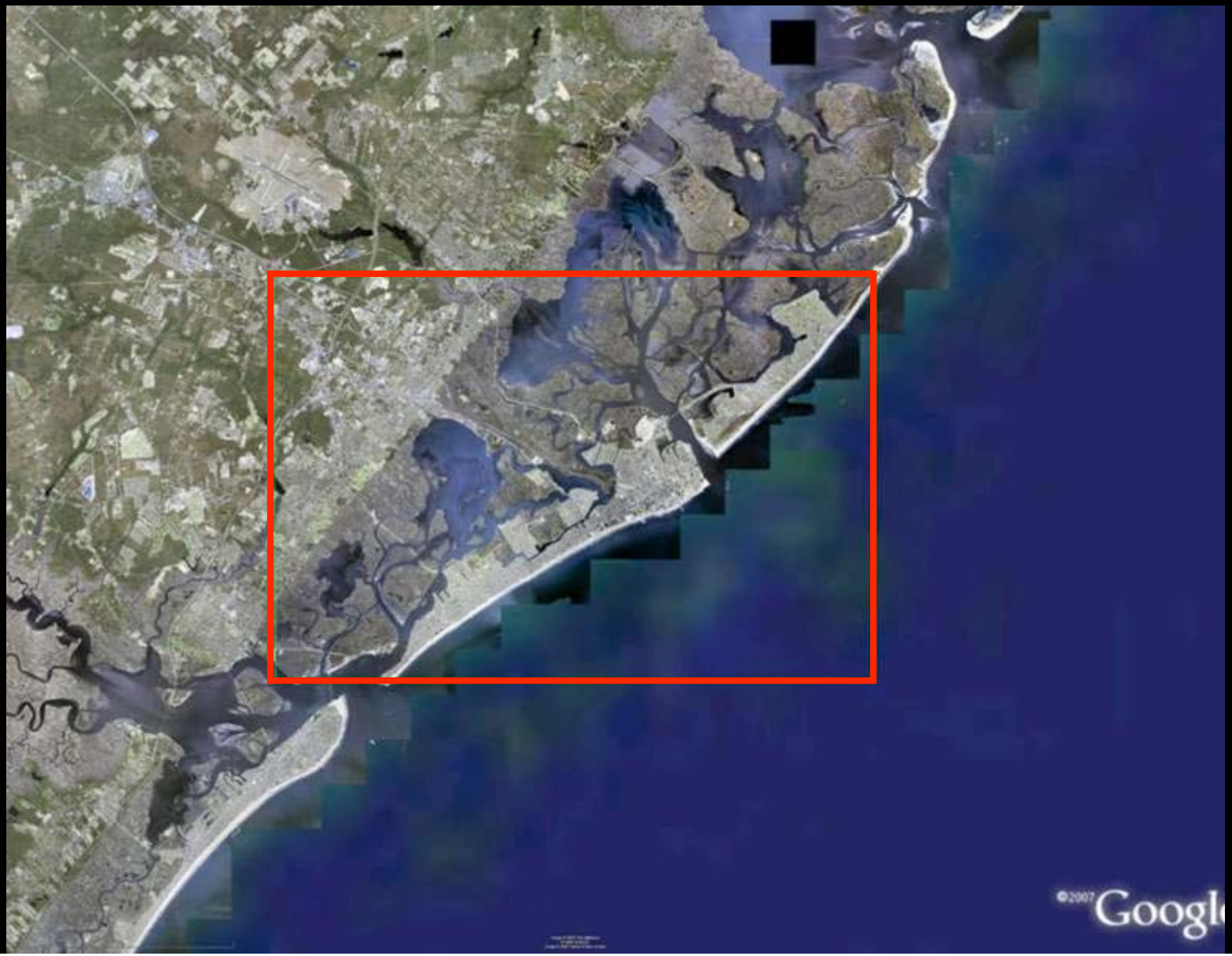
For Gardeners, Landscapers and Farmers . . .

Climate change will bring new opportunities

And new risks and costs

AP Photo/Steven Senne

TAJ MAHAL
SHOWBOAT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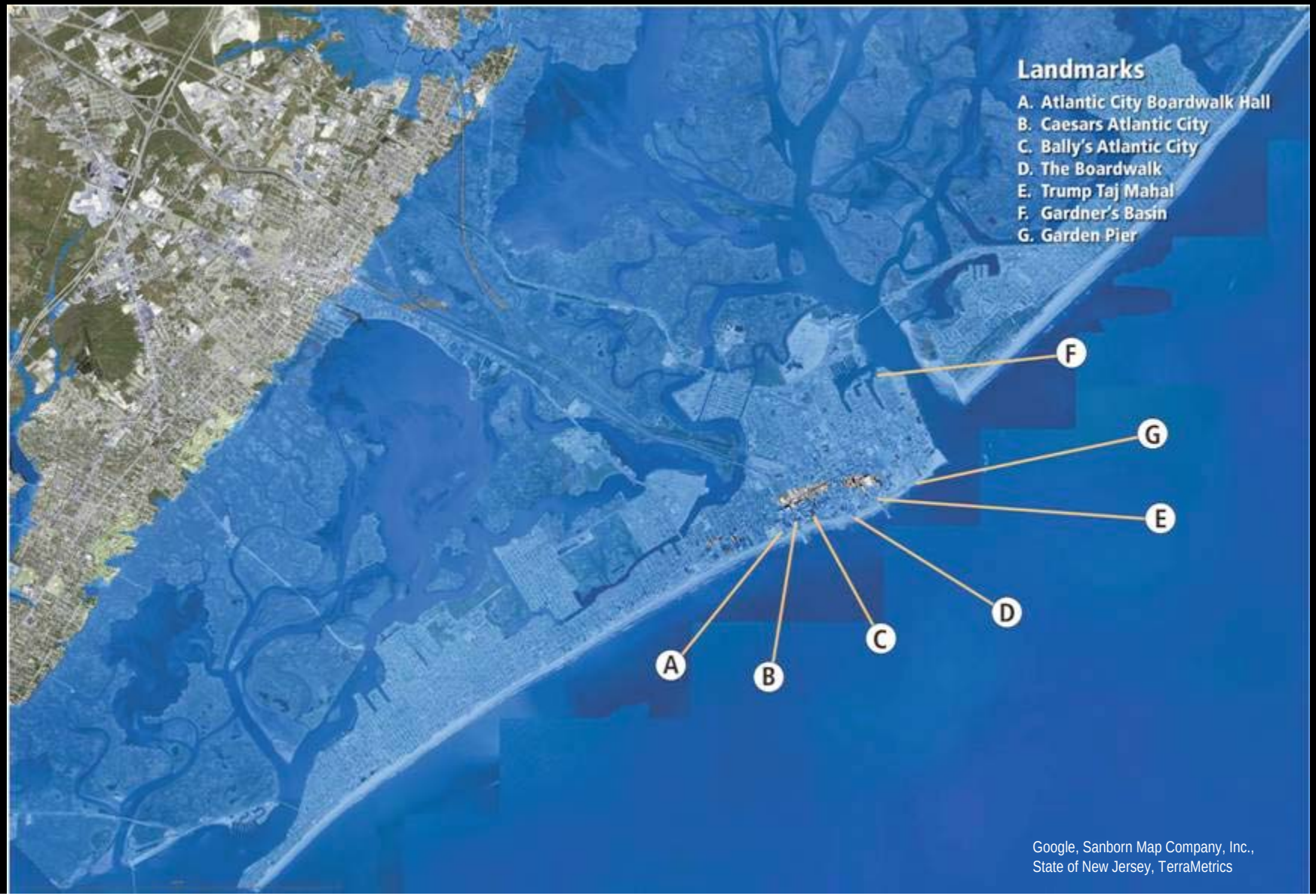
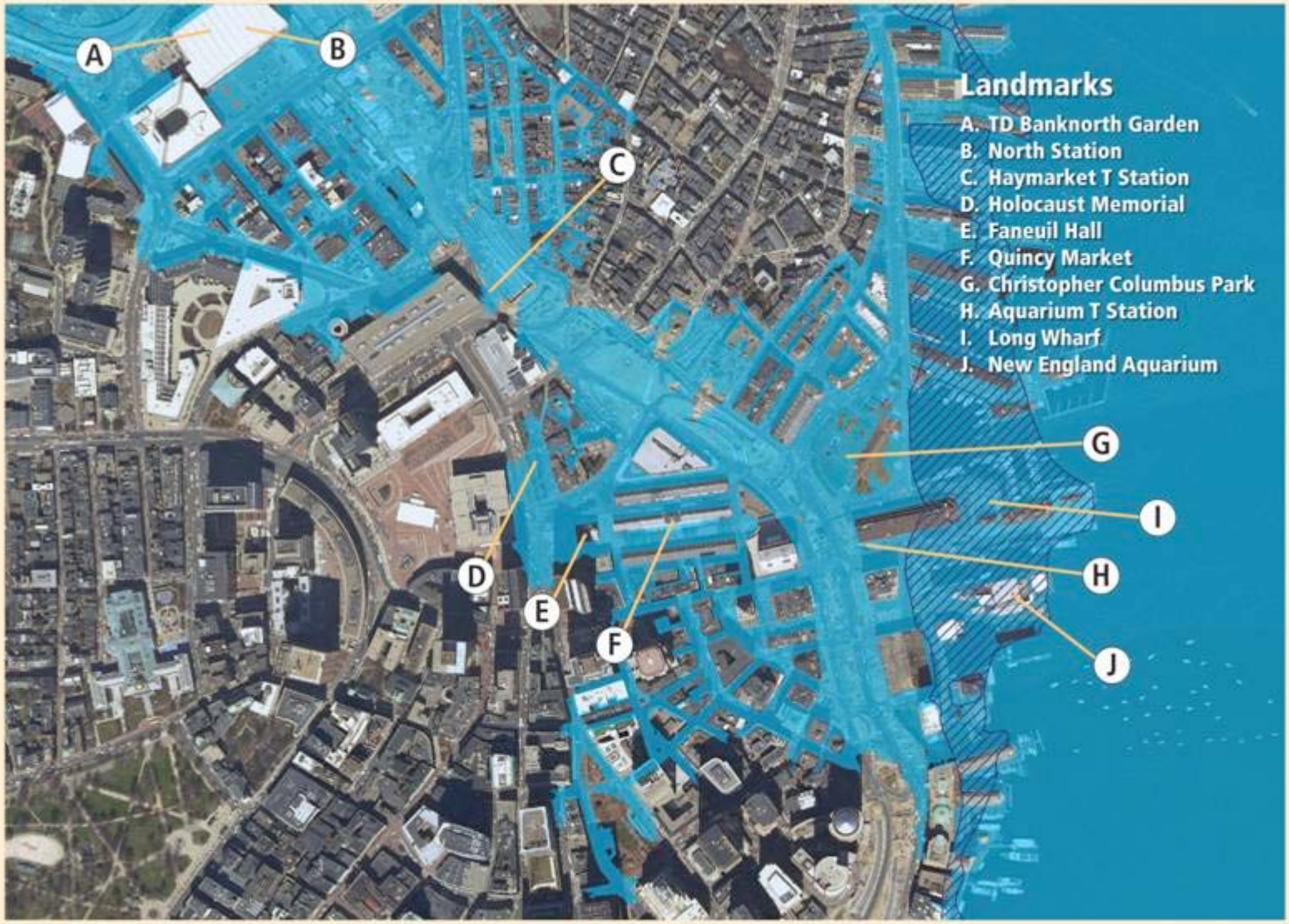
Atlantic City: Today's 100-Year Flood



Boston: The Future 100-Year Flood Zone Under the Higher-Emissions Scenario

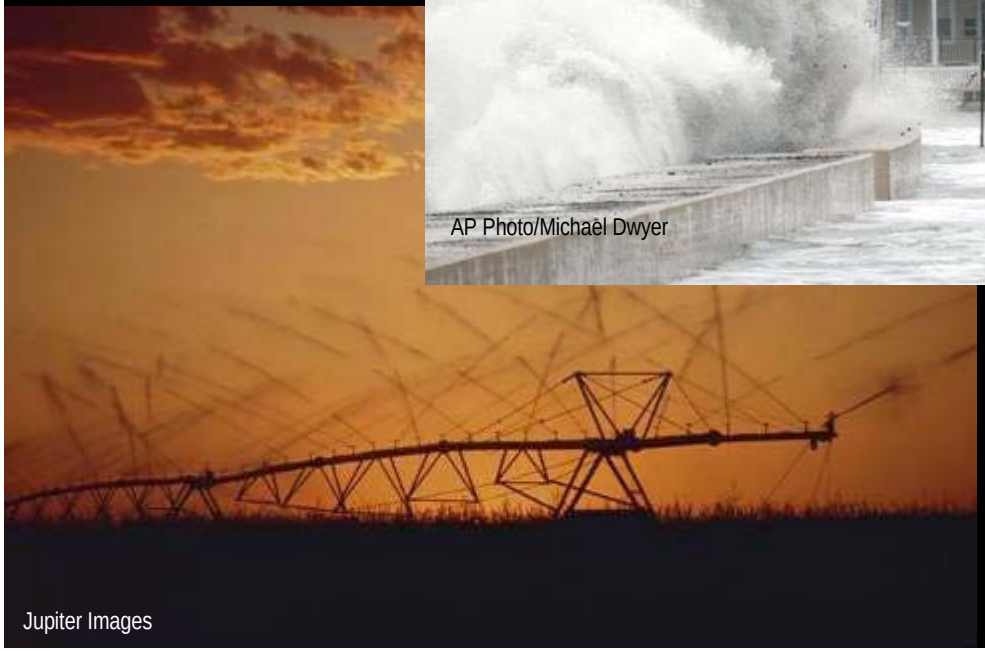


Current 100-year flood zone
Projected 100-year flooded area (higher-emissions scenario)

Meeting the Climate Challenge

- We must adapt to unavoidable change set in motion by past emissions.

AP Photo/Michael Dwyer


Jupiter Images

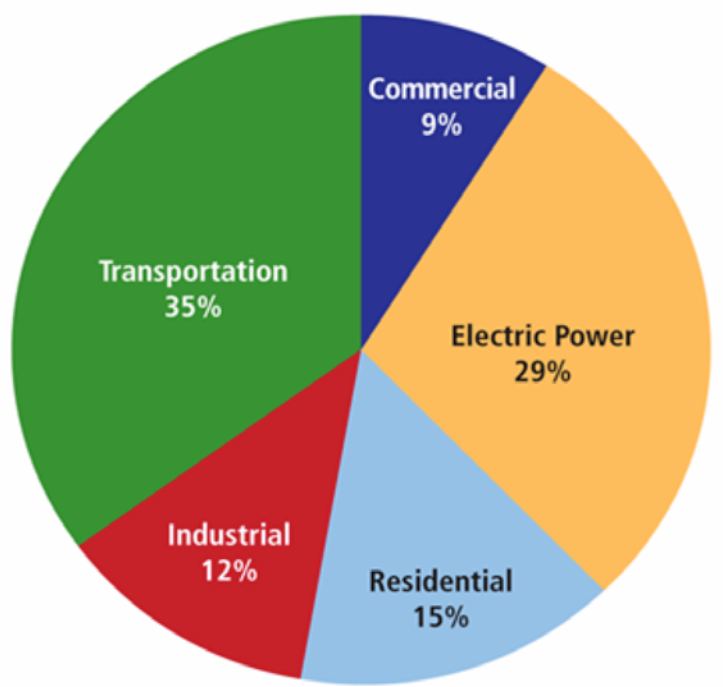
Andrew F. Kazmierski

There are limits to adaptation

Meeting the Climate Challenge

- But the extent of further change depends greatly on emissions choices we make today.

Reducing New Jersey's Emissions



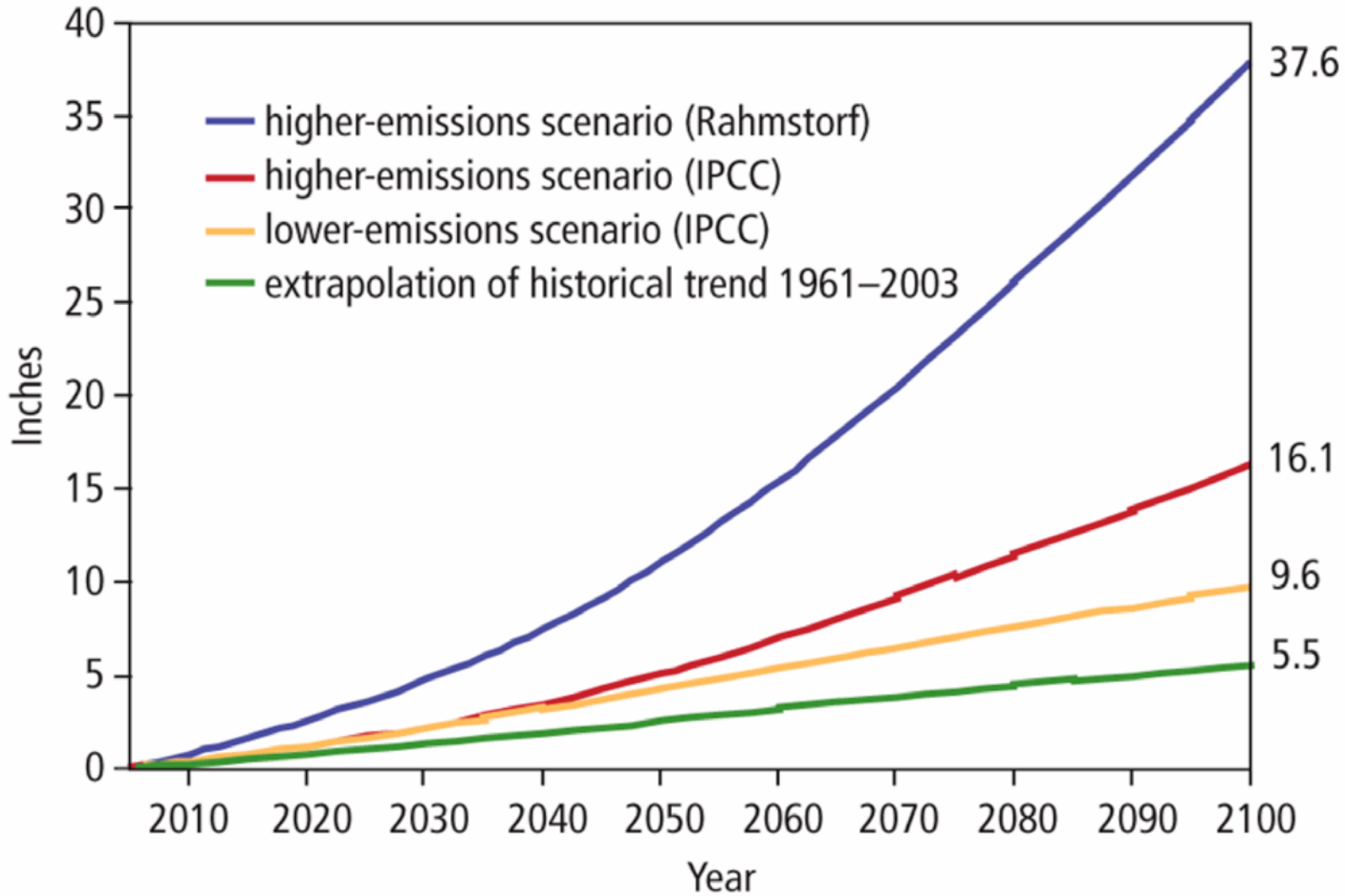
Source: State Energy Data System. Table 2, 2003 State Emissions by Sector.

For more information

- About the NECIA
  www.climatechoices.org/ne

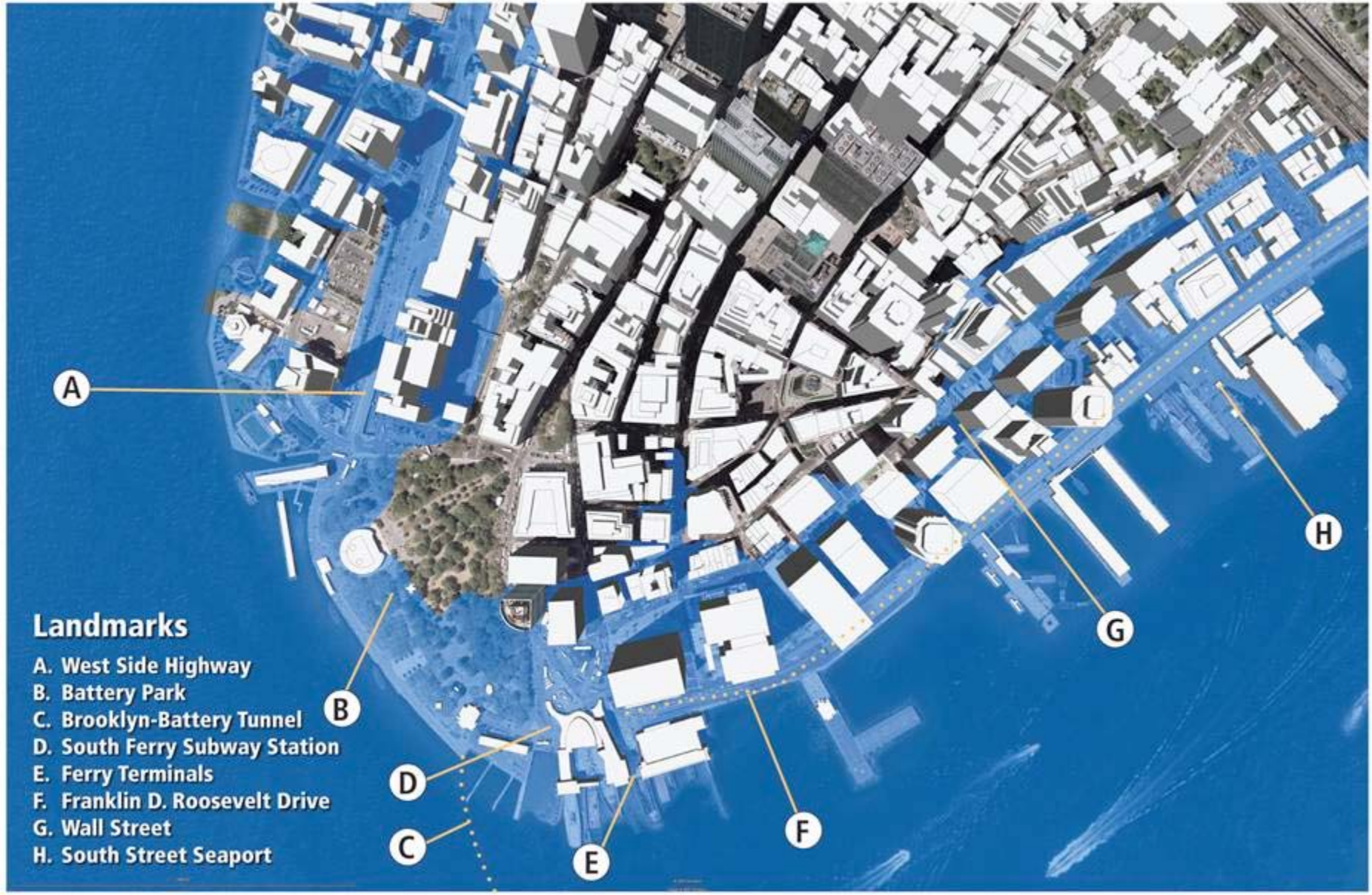
- About UCS
  www.ucsusa.org

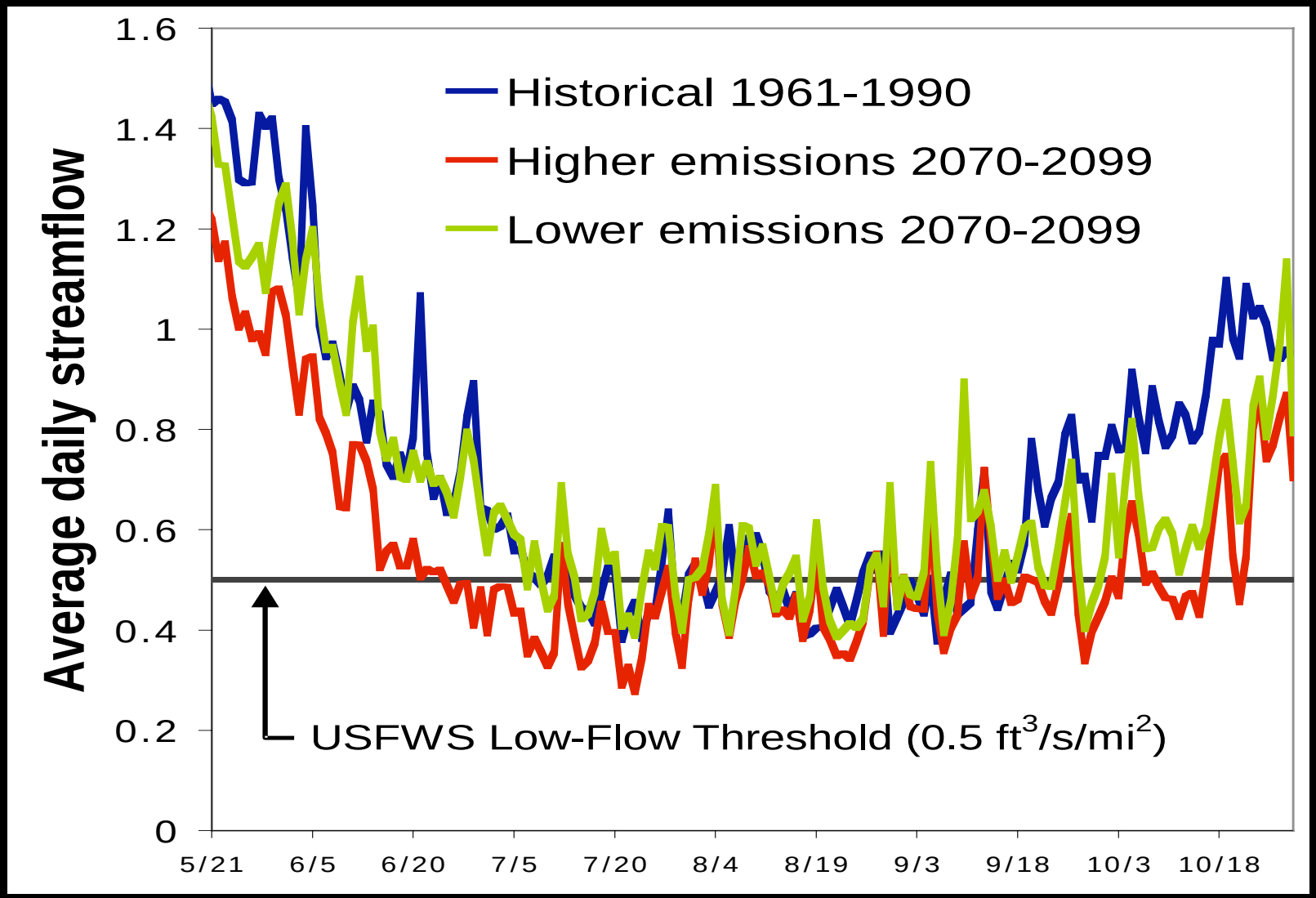
Projected Rise in Global Sea Level Relative to 2005



Source: NECIA/UCS, 2007 (see: www.climatechoices.org/ne/)

NYC: Today's 100-Year Flood



Credit: Applied Science Associates, Inc.. Source: Google, Sanborn Map Company, Inc.. NECIA, 2007 (see: www.climatechoices.org/ne/).

Streamflow and Water Supply