Reality and Perceptions about Climate Change in New Hampshire

Cameron Wake
Institute for the Study of Earth, Oceans, and Space (EOS)
University of New Hampshire
@TheClimateDr
http://CarbonSolutionsNE.org

Coastal NH Climate Summit, Greenland NH
#nhcoastalclimate

UNIVERSITY of NEW HAMPSHIRE

CARBON SOLUTIONS NEW ENGLAND™
CarbonSolutionsNE.org

"Although they produce distinct types of challenges, climate change, energy security, and economic stability are inextricably linked"

QUADRENNIAL DEFENSE REVIEW REPORT

FEBRUARY 2010

http://www.defense.gov/qdr/

2013 Worldwide Threat Assessment
US Intelligence Community

Climate change, food insecurity, & drought fuel tensions and conflicts around world

Atmospheric Carbon Dioxide

Business as Usual

Clean Energy & Efficiency

Current

Vostok Ice Core

carbon dioxide (ppmv)

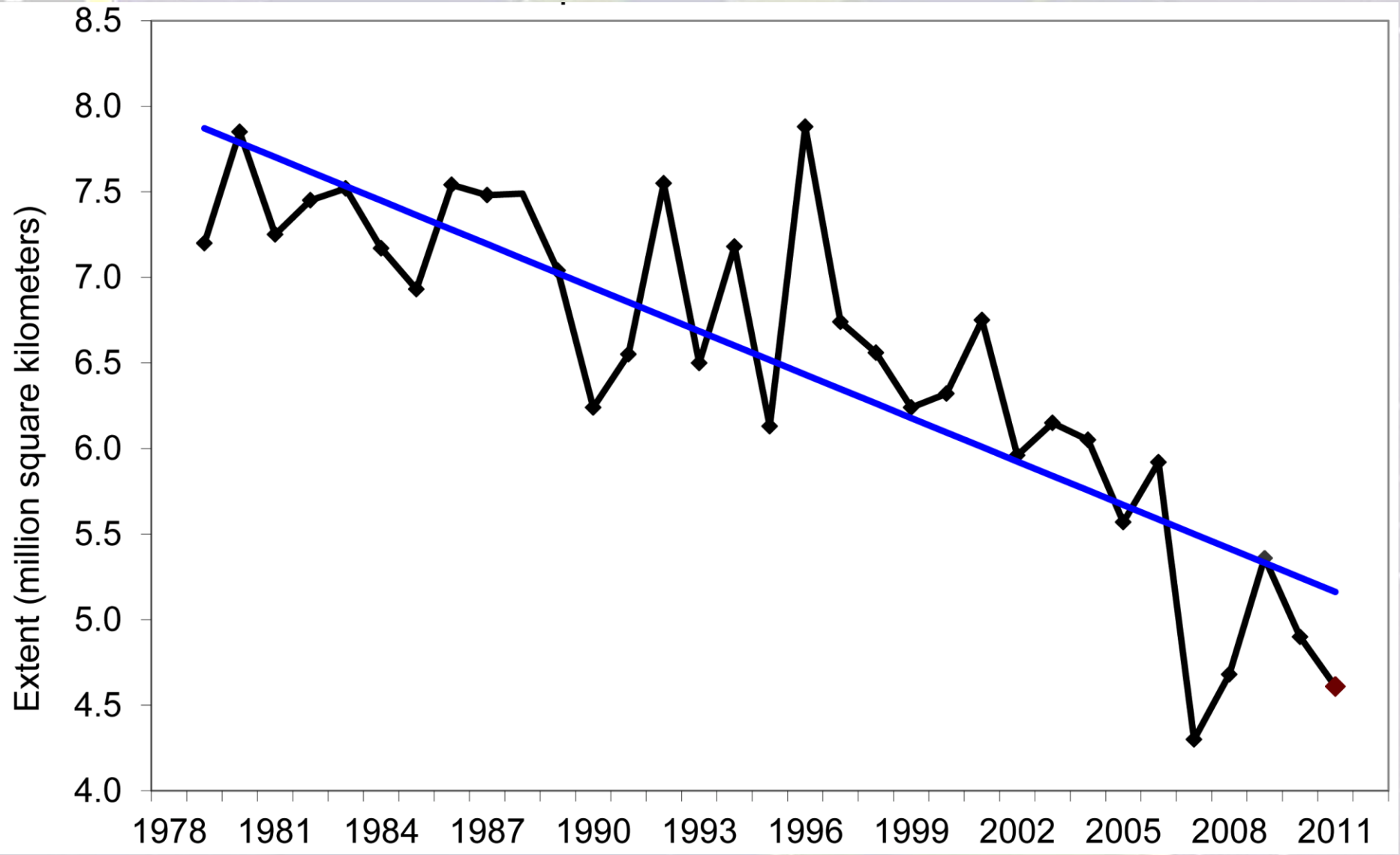
1000
800
600
400
200

400,000
300,000
200,000
100,000
0

Years Before 2100 AD

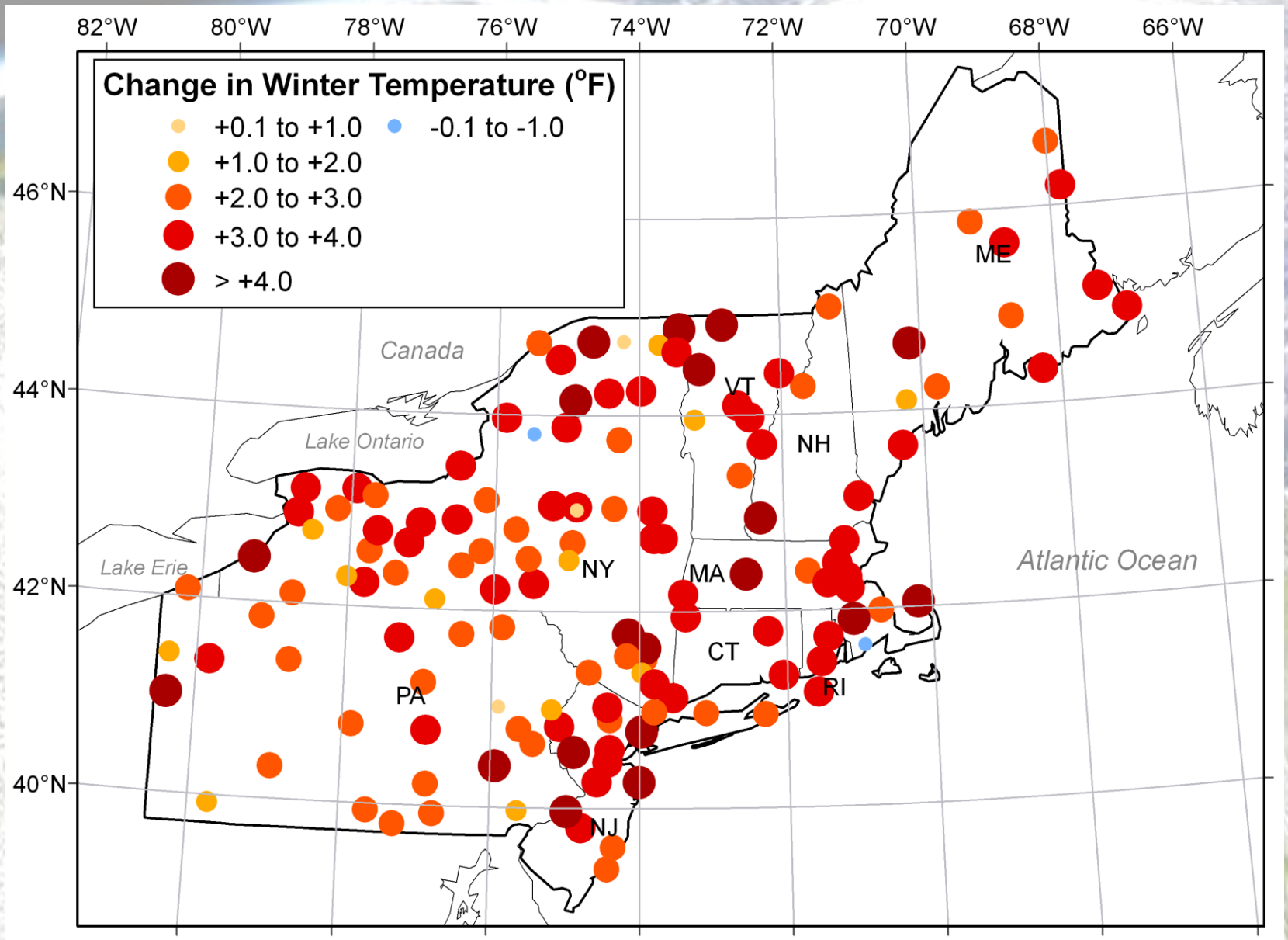
IPCC 2001

September Arctic Sea Ice Extent 1979 - 2011



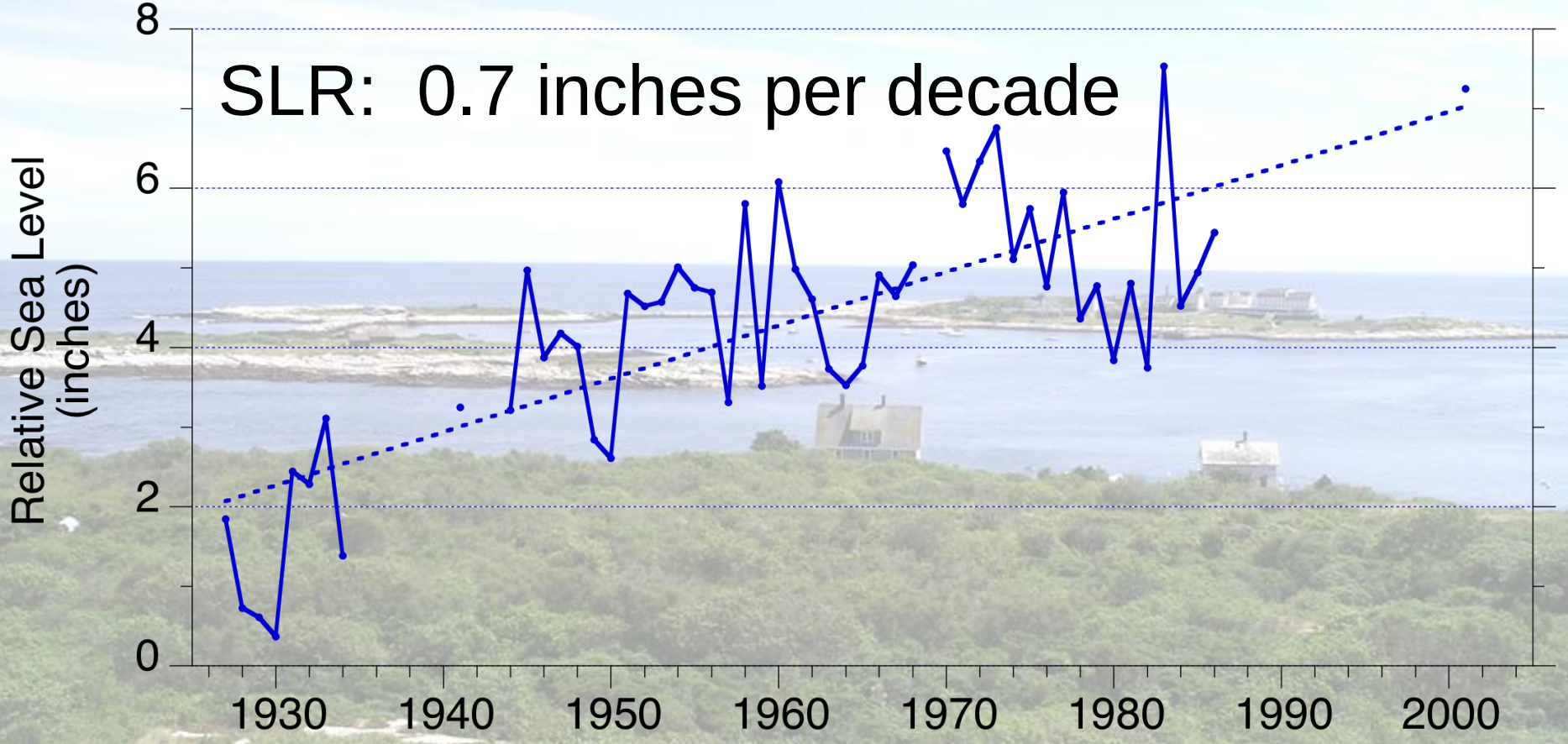
National Snow and Ice Data Center http://nsidc.org

Northeast Winter Temperature Trends 1965-2008



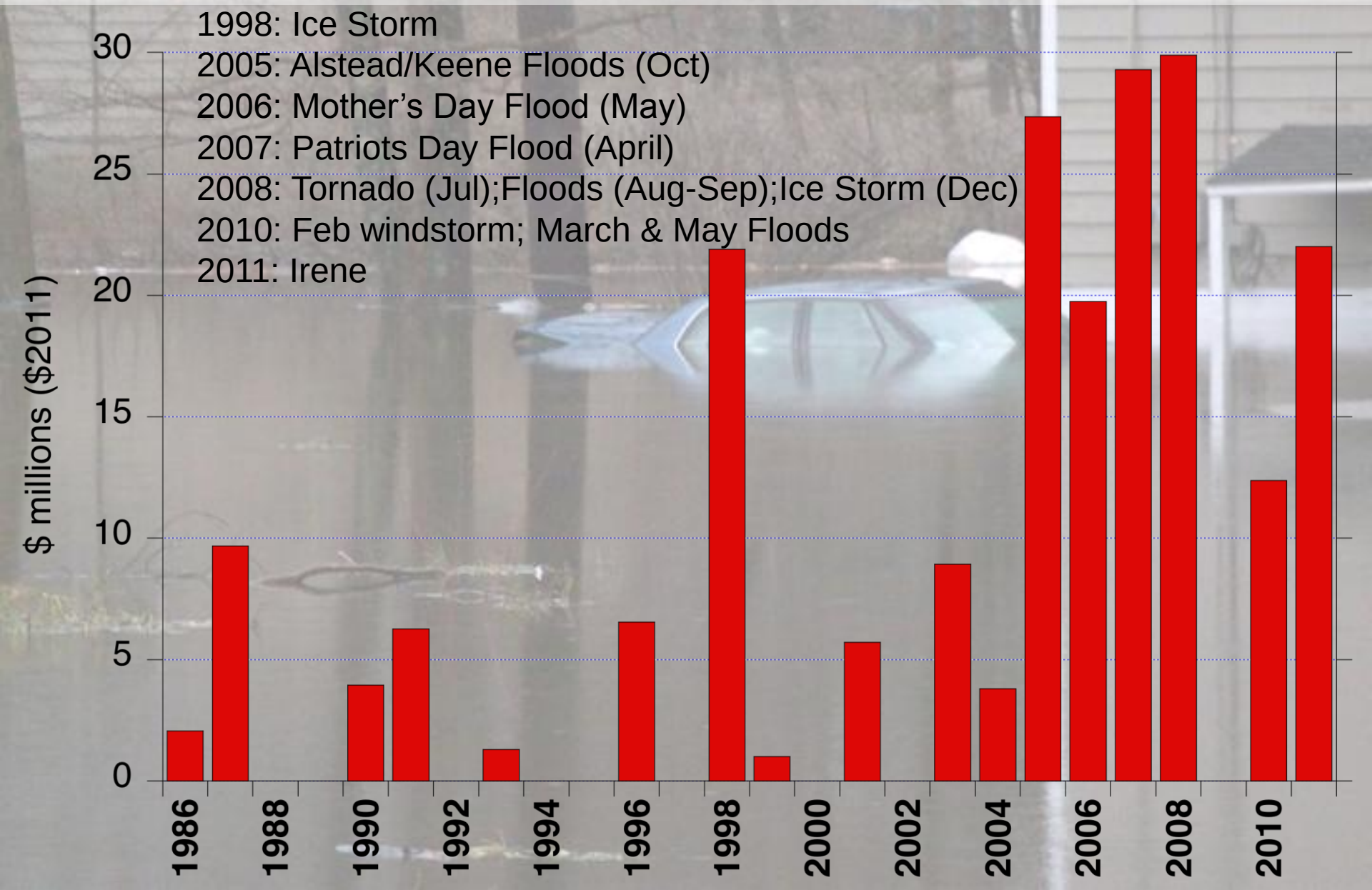
Burakowski et al., 2008, JGR

Sea Level Rise at Portsmouth Harbor 1927 - 2001

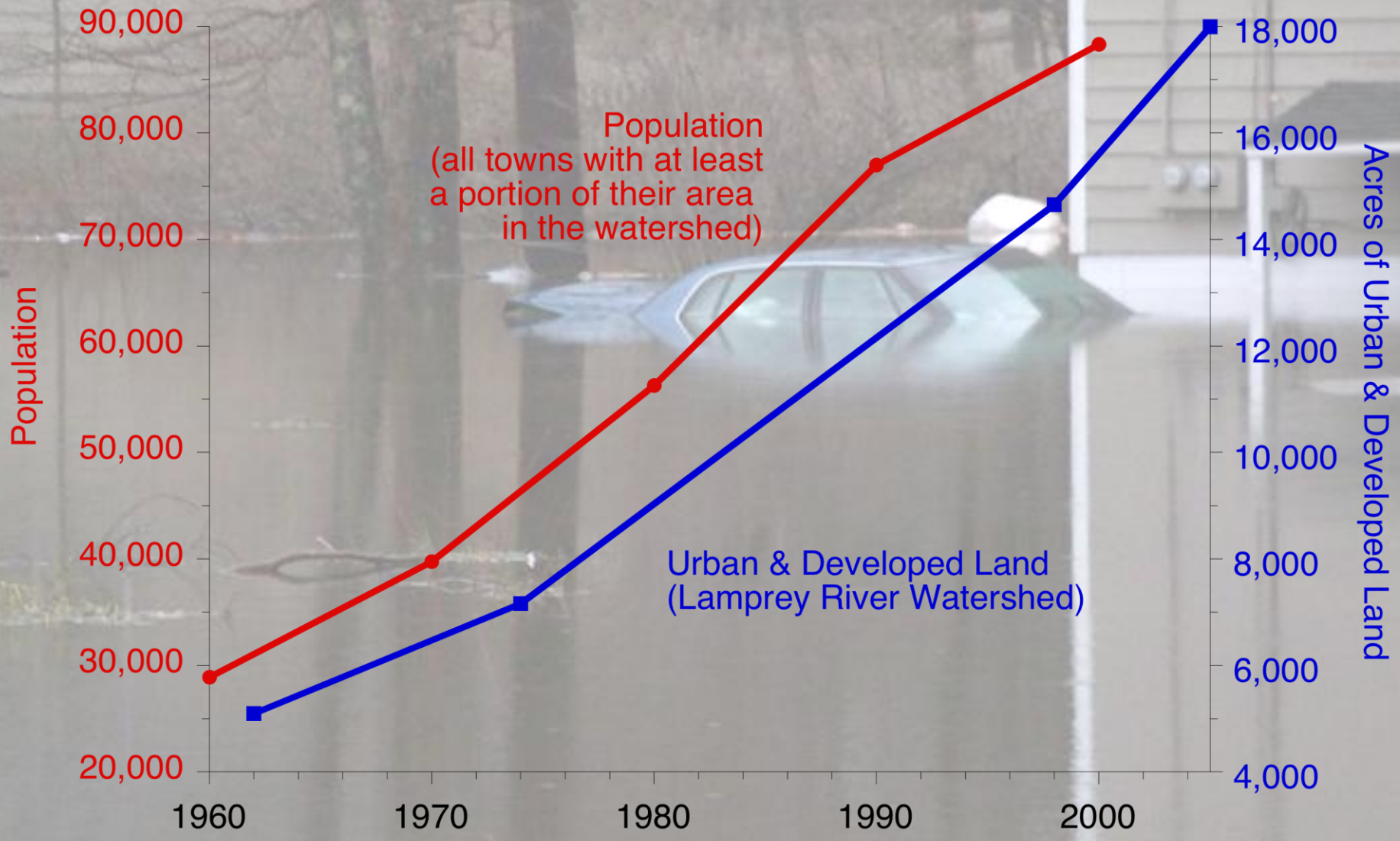


http://tidesandcurrents.noaa.gov/

Costs from Presidentially Declared Disasters And Emergency Declarations in NH

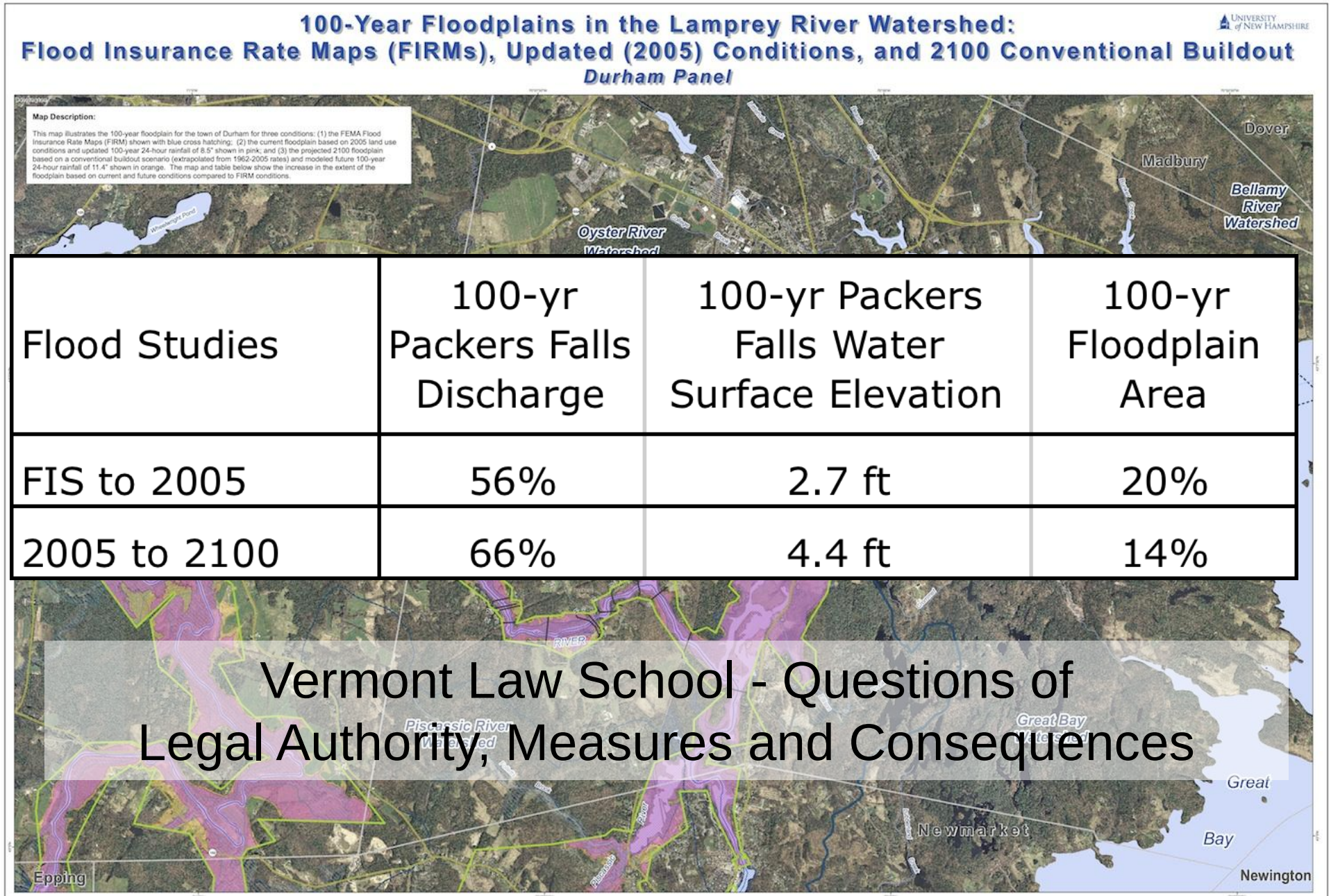


5 Decades of Population Growth and Development



Assessing Flood Risk in the Lamprey River Watershed, NH

http://100yearfloods.org



Flood Studies	100-yr Packers Falls Discharge	100-yr Packers Falls Water Surface Elevation	100-yr Floodplain Area
FIS to 2005	56%	2.7 ft	20%
2005 to 2100	66%	4.4 ft	14%

Vermont Law School - Questions of Legal Authority, Measures and Consequences

CARBON SOLUTIONS NEW ENGLAND
CarbonSolutionsNE.org

GREAT BAY STEWARDS

Climate Change in the Piscataqua/Great Bay Region: Past, Present, and Future

UNIVERSITY of NEW HAMPSHIRE

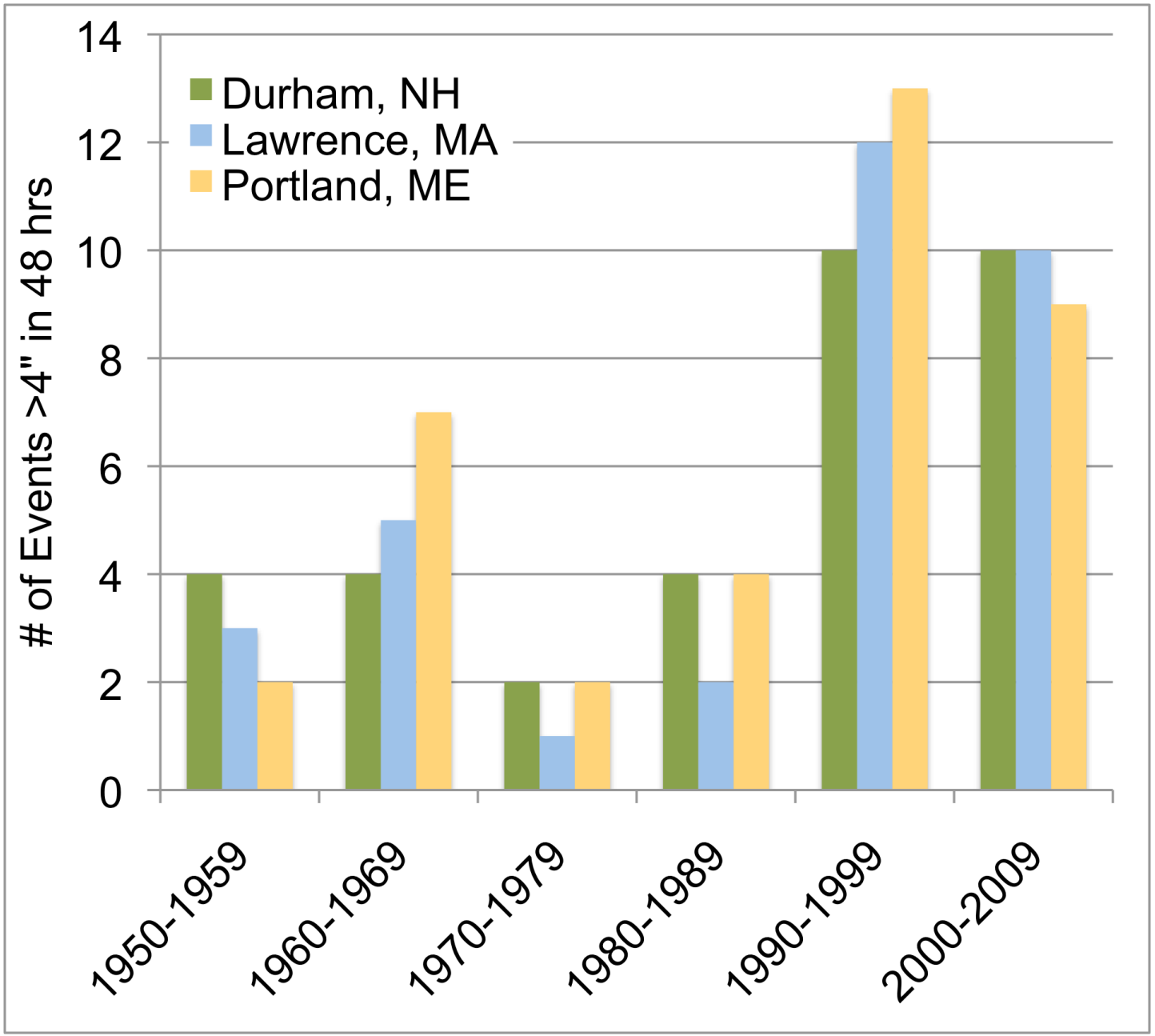
Cameron Wake
Elizabeth Burakowski
Eric Kelsey
Carbon Solutions New England
Institute for the Study of Earth, Oceans, and Space
University of New Hampshire

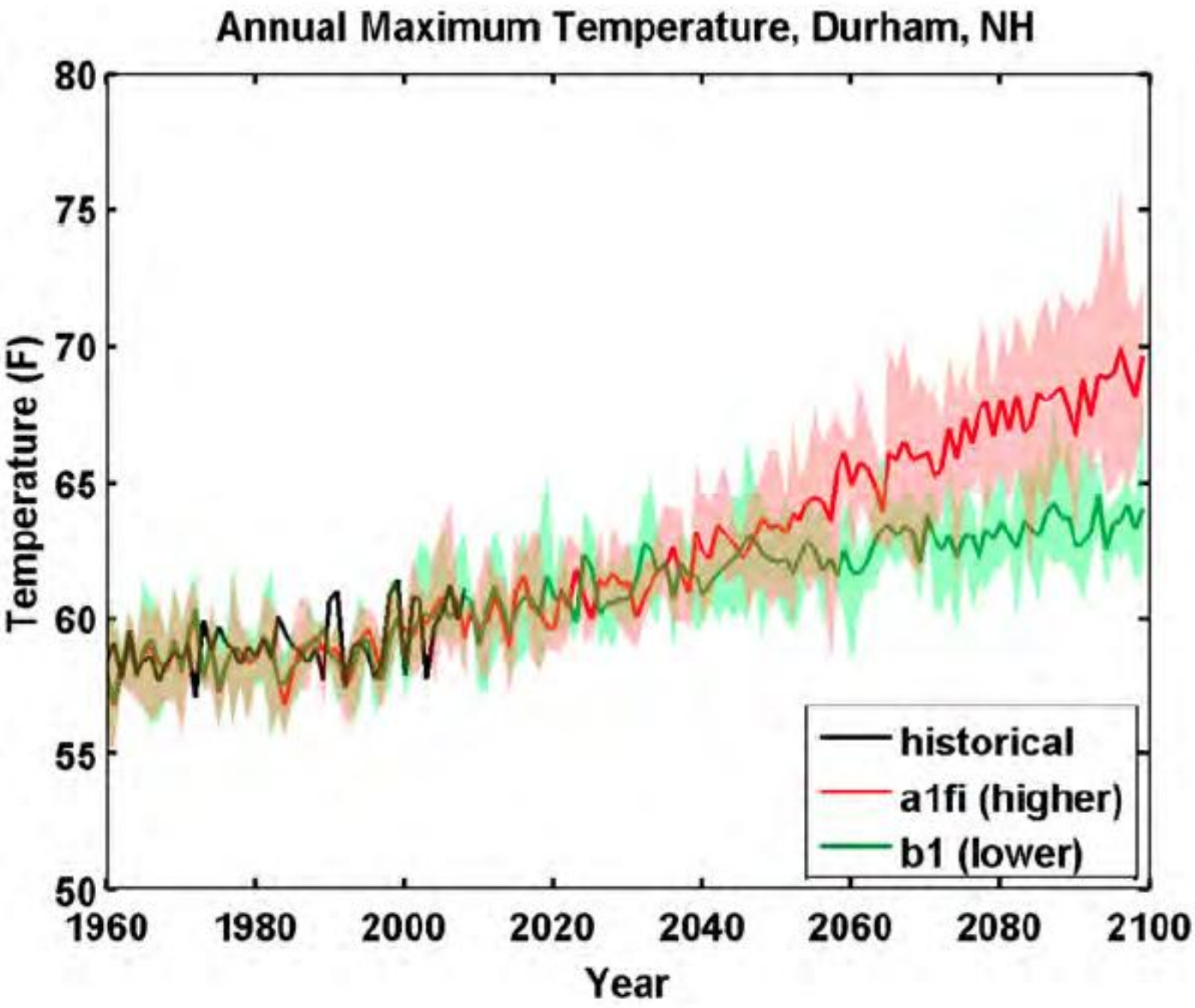
Katharine Hayhoe& Anne Stoner
Texas Tech University

Chris Watson& Ellen Douglas
UMass Boston

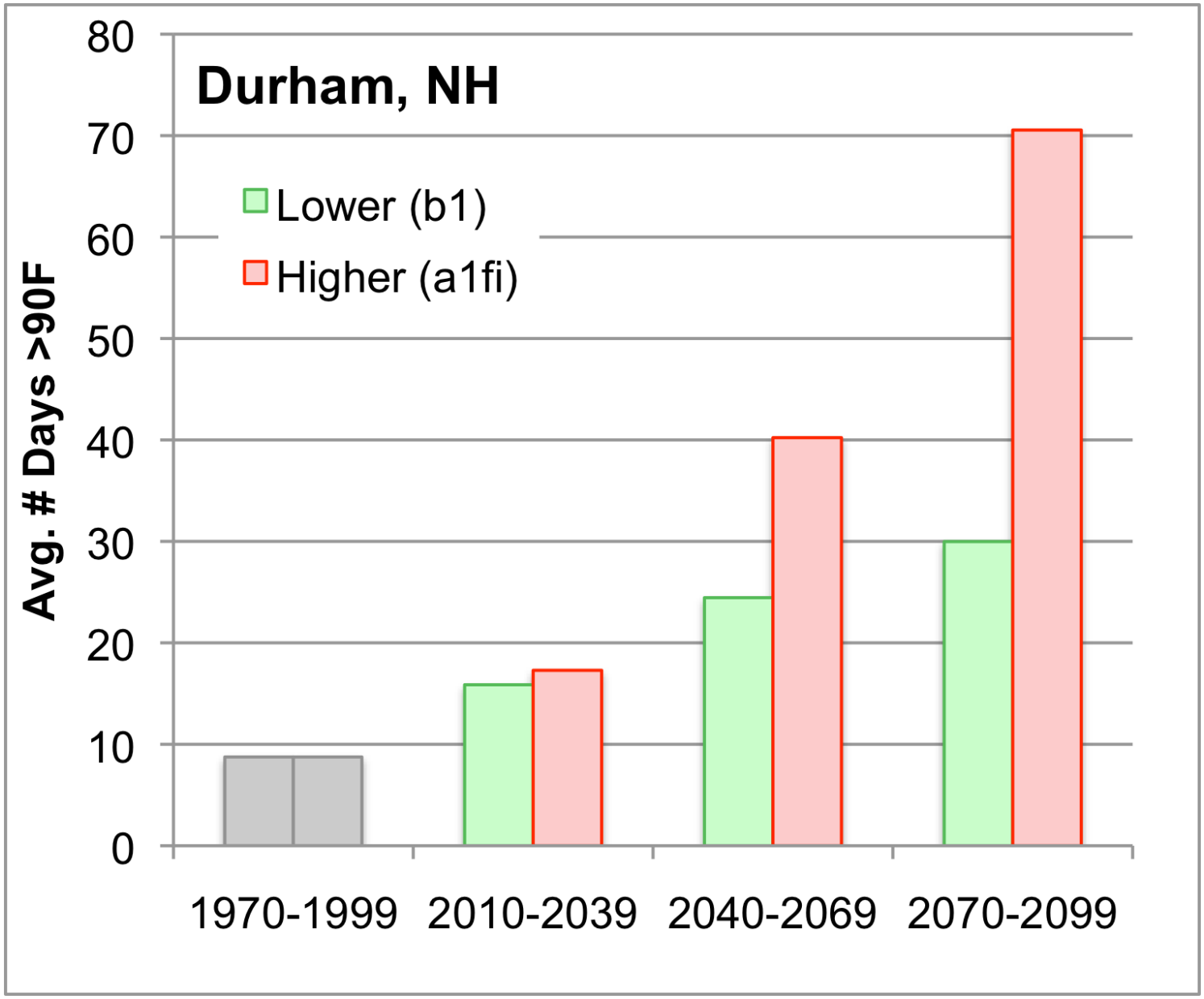
http://CarbonSolutionsNE.org

Extreme Precipitation Events (>4”) 1950-2009

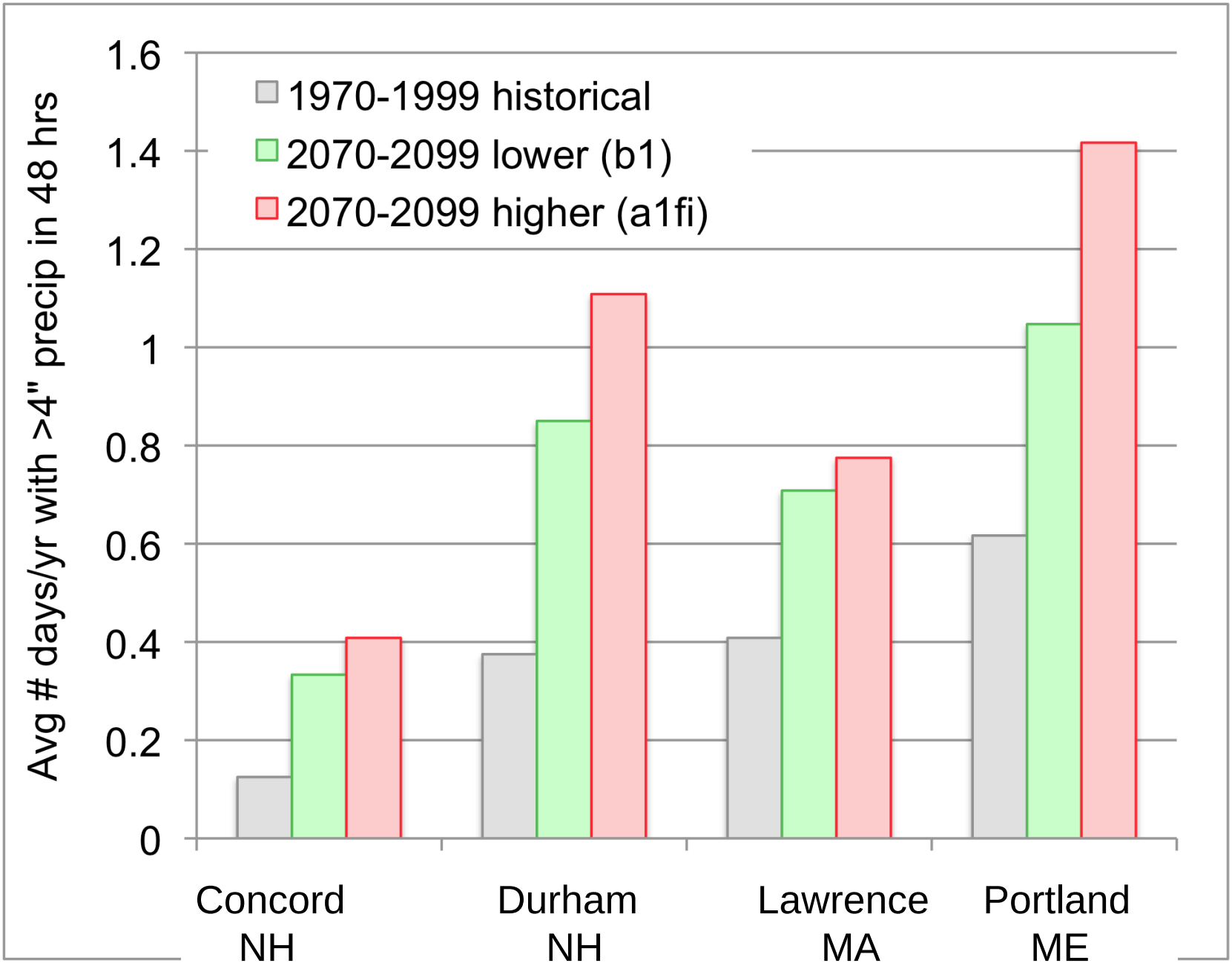



Annual Maximum Temperature, Durham, NH
Temperature (F)
80
75
70
65
60
55
50
1960
1980
2000
2020
2040
2060
2080
2100
Year
historical
a1fi (higher)
b1 (lower)

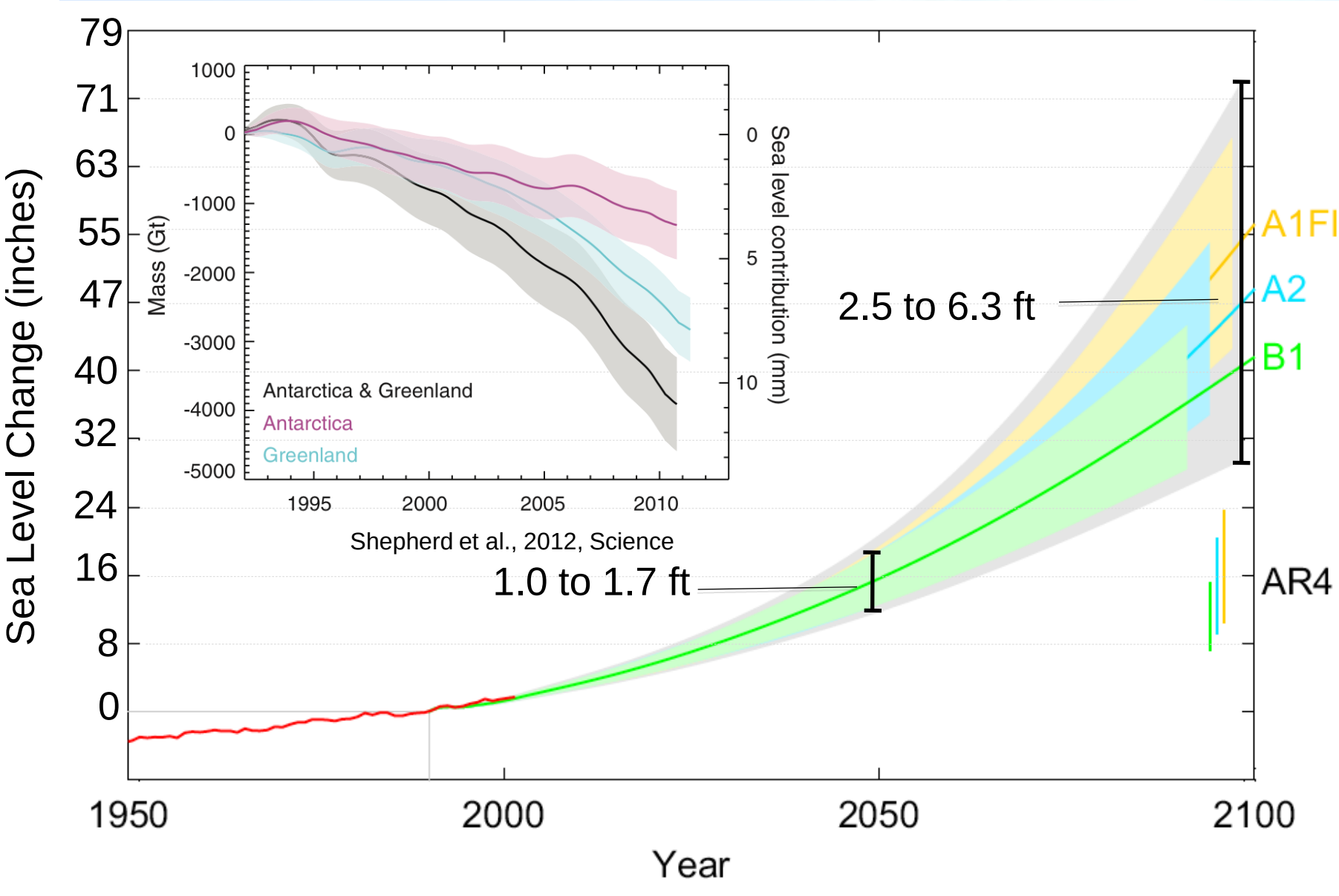
How Hot Will Summer be in Durham, NH??



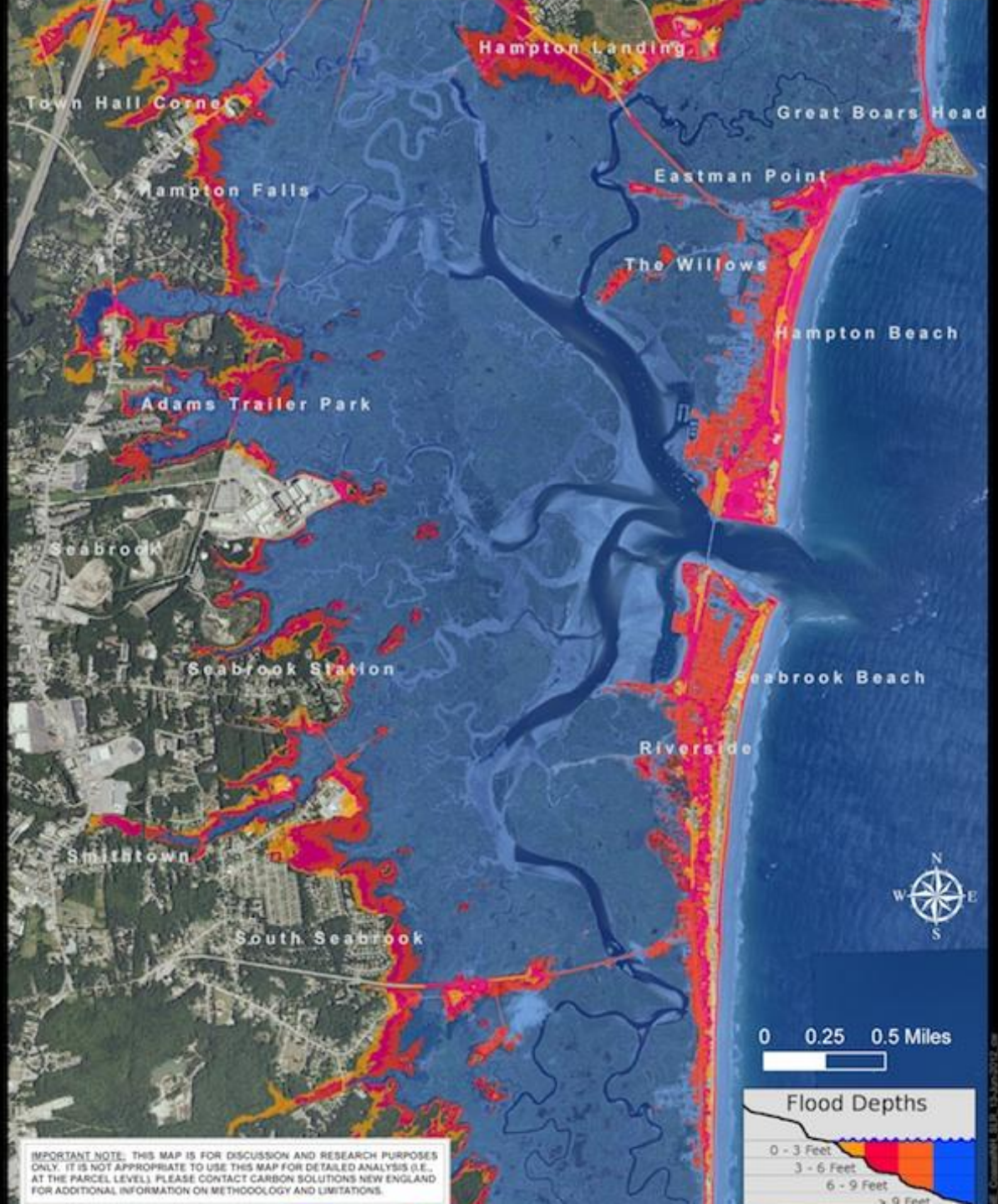
Projected Changes in Extreme Precipitation



Projection of Sea Level Rise from 1990 to 2100



Vermeer and Rahmstorf 2009 PNAS

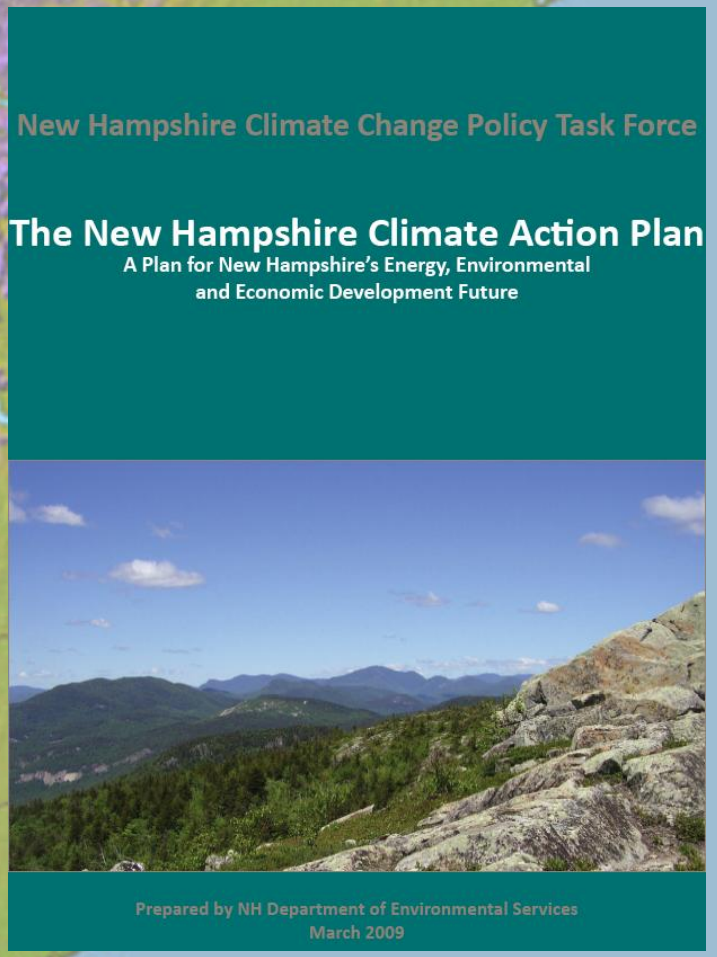


High Tide + 12 feet Hampton & Seabrook, NH

NHPR Story
9 April 2013 Rising Tides in Seabrook, NH
#nhcoastalclimate

NH Climate Action Plan

- One of the largest, most diverse collections of leading NH citizens
- Promotes growth of new jobs and renewable energy development
- Reduces energy costs
- Identifies 67 recommended actions
  - buildings
  - electricity generation,
  - transportation & land use
  - natural resources
  - government action
  - **adaptation**
- Reduce greenhouse gas emissions
  - 44% below 2005 levels by 2025
  - 86% below 2005 levels by 2050

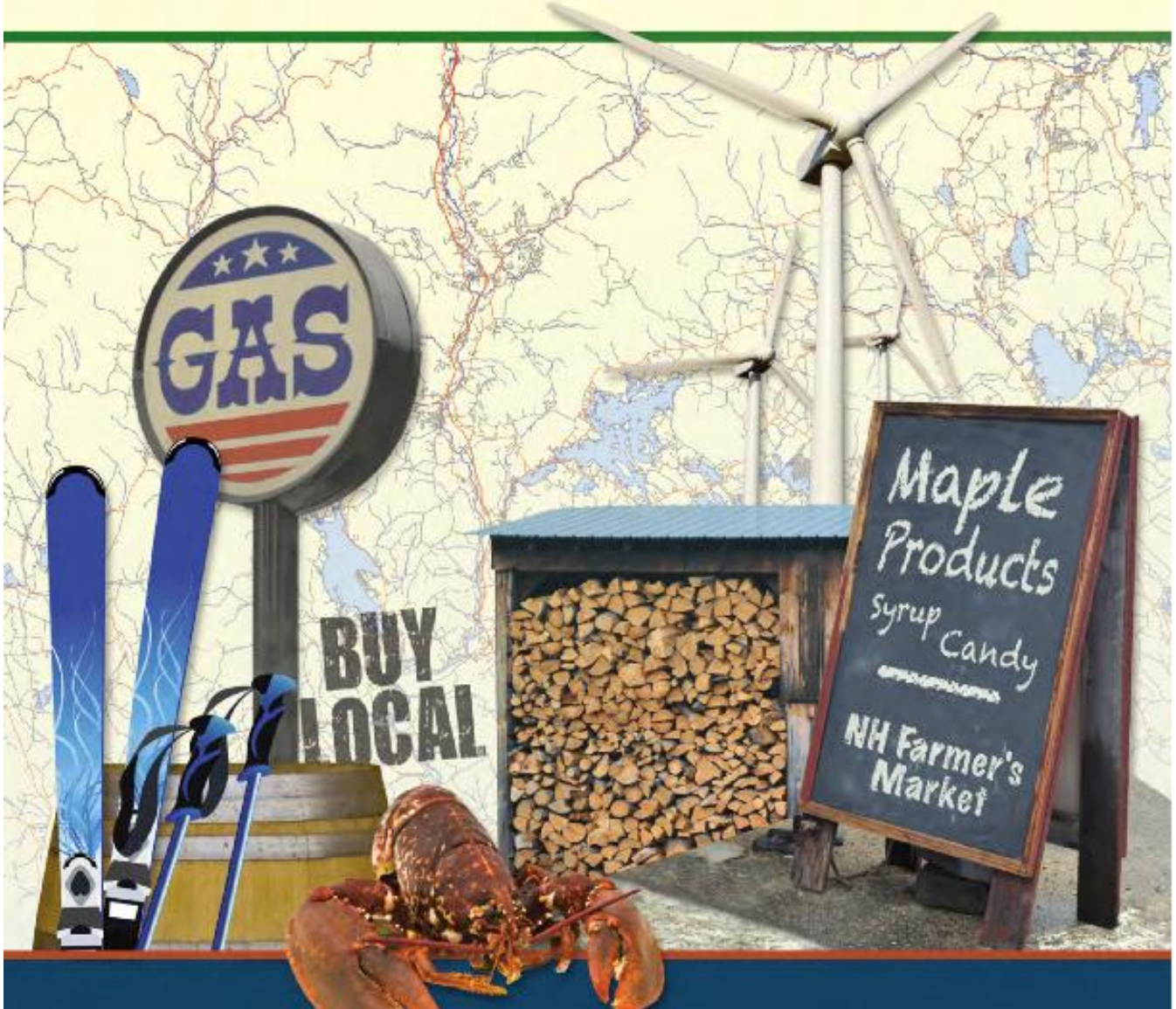


More info at:
http://CarbonSolutionsNE.org

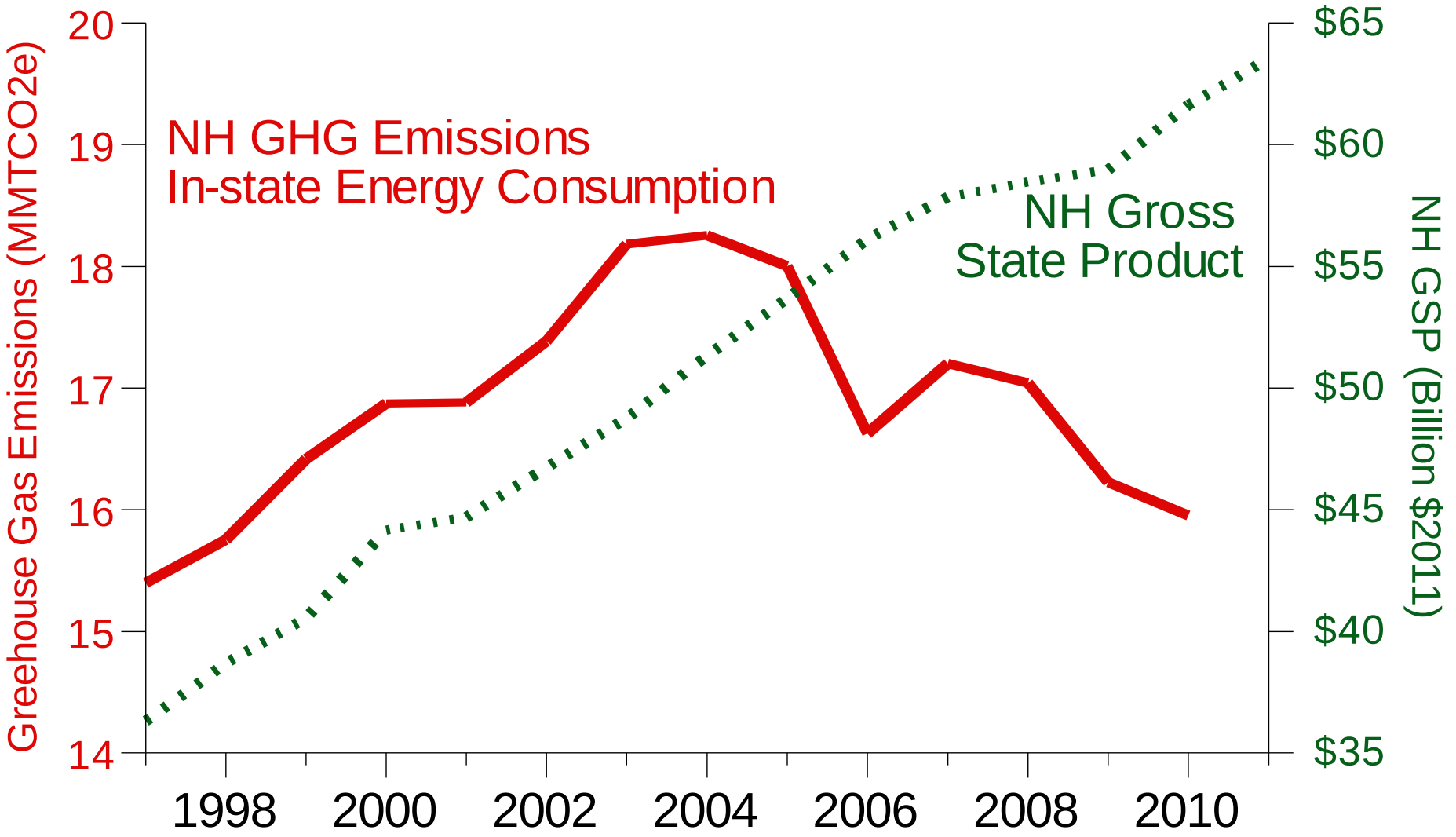
CARBON SOLUTIONS NEW ENGLAND™
CarbonSolutionsNE.org

NEW HAMPSHIRE ENERGY & CLIMATE COLLABORATIVE

New Hampshire's Energy, Environmental, and Economic Development Benchmark Report



Gross State Product & Greenhouse Gas Emissions



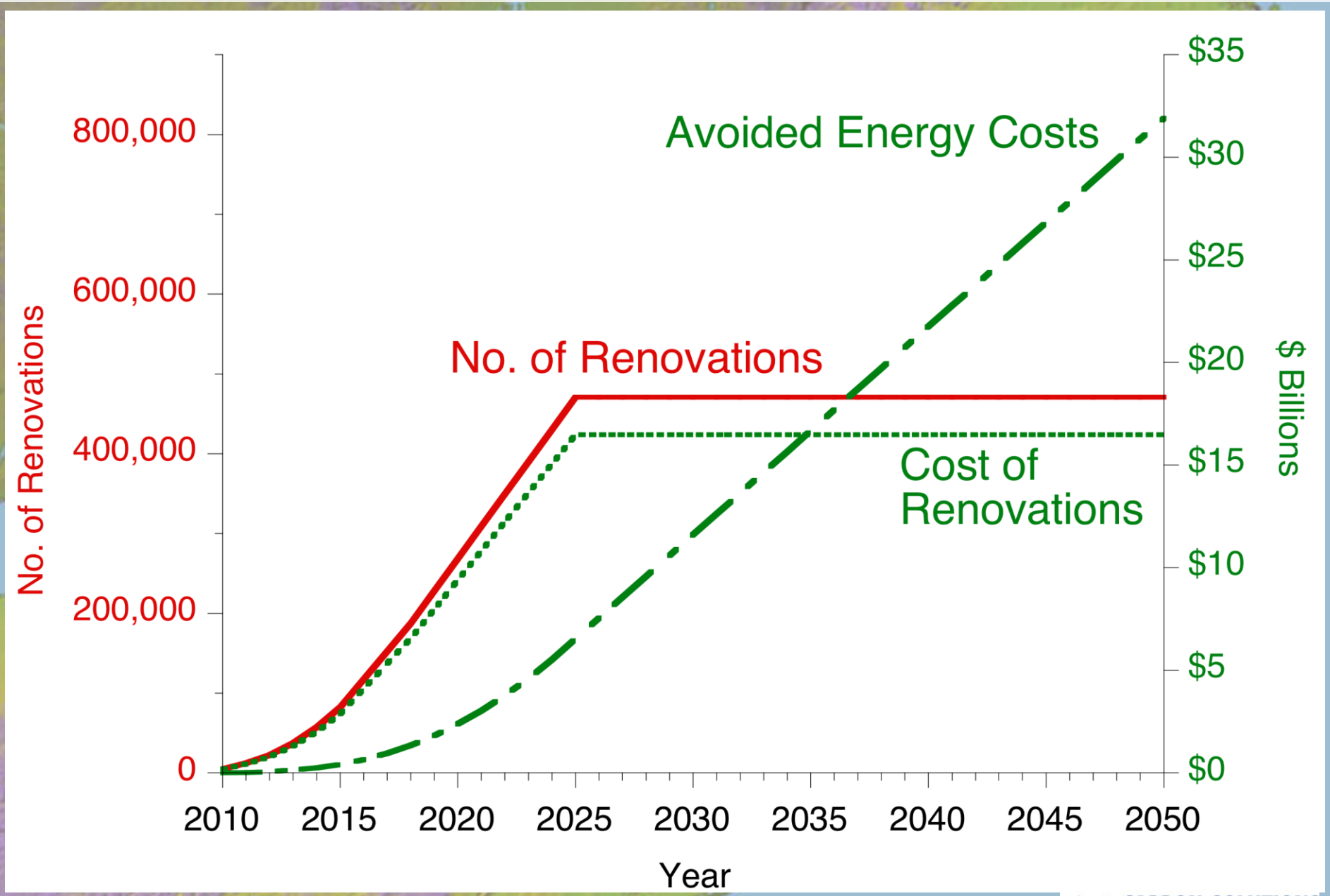
What path will we take to the future?

Two roads diverged in a wood, and I -
I took the one less traveled by,
And that has made all the difference.

Robert Frost


AN INCONVENIENT TRUTH
A REASSURING LIE
THE CHRISTIAN SCIENCE MONITOR
Bennett

Cumulative Costs – NH Residential Building Renovations



CARBON SOLUTIONS NEW ENGLAND™
CarbonSolutionsNE.org

SIGNIFICANT IMPACT!

THE STATE OF NEW HAMPSHIRE
DEPARTMENT OF ENVIRONMENTAL SERVICES
LAND RESOURCES MANAGEMENT
ALTERATION of TERRAIN BUREAU
29 Hazen Drive, PO Box 95, Concord, NH 03302-0095
Phone: (603) 271-2147 Fax: (603) 271-6588
Website: http://des.nh.gov/organization/divisions/water/aot/index.htm
For Permit Status: http://www2.des.state.nh.us/OneStop/Wastewater_Engineering_Site_Specific_Query.aspx

ALTERATION OF TERRAIN PERMIT APPLICATION

DRAINAGE ANALYSES

Please double-side 8 ½" x 11" sheets where possible but, **do not** reduce the text such that more than one page fits on one side.

☐ PE stamp

☐ Rainfall amount obtained from the Northeast Regional Climate Center- http://precip.eas.cornell.edu/. Include extreme precipitation table as obtained from the above referenced website.

☐ Drainage analyses, in the following order:

- Pre-development analysis: Drainage diagram
- Pre-development analysis: Area Listing and Soil Listing
- Pre-development analysis: Node listing 1-year (if applicable), 2-year, 10-year and 50-year
- Pre-development analysis: Full summary of the 10-year storm
- Post-development analysis: Drainage diagram
- Post-development analysis: Area Listing and Soil Listing
- Post-development analysis: Node listing for the 2-year, 10-year and 50-year
- Post-development analysis: Full summary of the 10-year storm

New Flood Plain Maps and Questions of Legal Authority, Measures and Consequences

In Collaboration with Vermont Law School

1. What is the potential liability of government if they fail to reduce vulnerability to flood risk based on UNH's information?

2. What legal and policy approaches may communities adopt to reduce flood risks in the expanded flood hazard area?

3. Do NH communities have the legal authority under state legislation to design and implement regulatory controls based on current and projected flooding levels?

4. What legal standard of scientific and technical reliability must be met to support regulatory measures based on current and future environmental conditions?

5. What is the potential regulatory takings exposure of communities if they impose regulatory controls that are designed to address anticipated future environmental conditions?

NH Climate Action Plan Targets