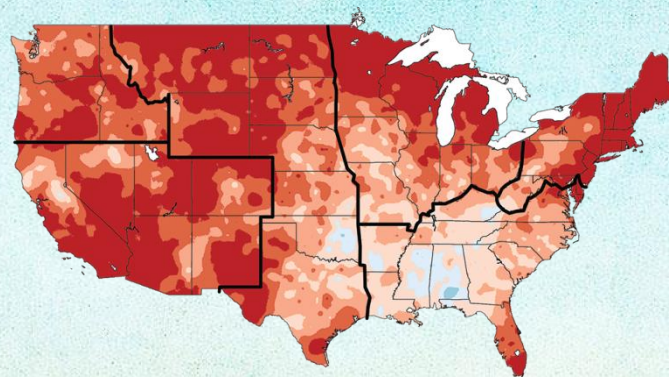


Third National Climate Assessment

Climate Change Impacts in the United States



Emily Therese Cloyd
May 13, 2014



GlobalChange.gov
U.S. Global Change Research Program



Overview

- Background on the US Global Change Research Program & National Climate Assessment
- Findings from the Third National Climate Assessment
- Sustaining the assessment process

BACKGROUND



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U.S. Global Change Research Program



US Global Change Research Program



Global Change Research Act (1990):

“To provide for development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to **understand, assess, predict, and respond** to human-induced and natural processes of global change.”



United States
Global Change
Research Program

13 Federal Departments &
Agencies + Executive Office of
the President

More information:

<http://www.globalchange.gov>



National Climate Assessment: GCRA (1990), Section 106

...not less frequently than every 4 years, the Council... shall prepare... an assessment which –

- **integrates, evaluates, and interprets** the findings of the Program (USGCRP) and discusses the scientific uncertainties associated with such findings;
- **analyzes the effects of global change** on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and
- analyzes current trends in global change, both human- induced and natural, and **projects major trends for the subsequent 25 to 100 years.**



The Third National Climate Assessment

Goal

- Enhance the ability of the United States to **anticipate, mitigate, and adapt** to changes in the global environment.

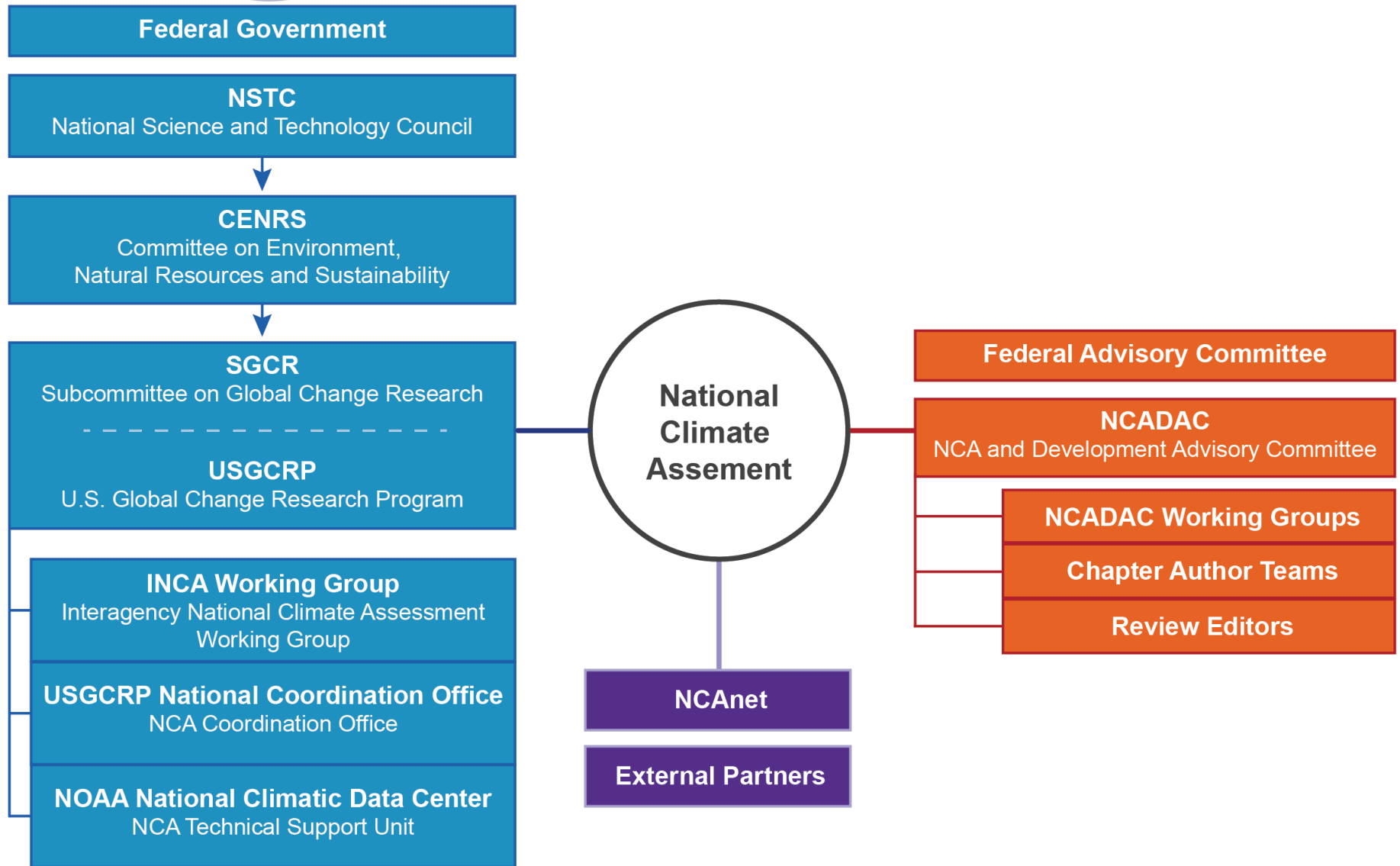
Vision

- Advance an **inclusive, broad-based, and sustained process** for assessing and communicating scientific knowledge of the impacts, risks, and vulnerabilities associated with a changing global climate in support of decision-making across the United States.





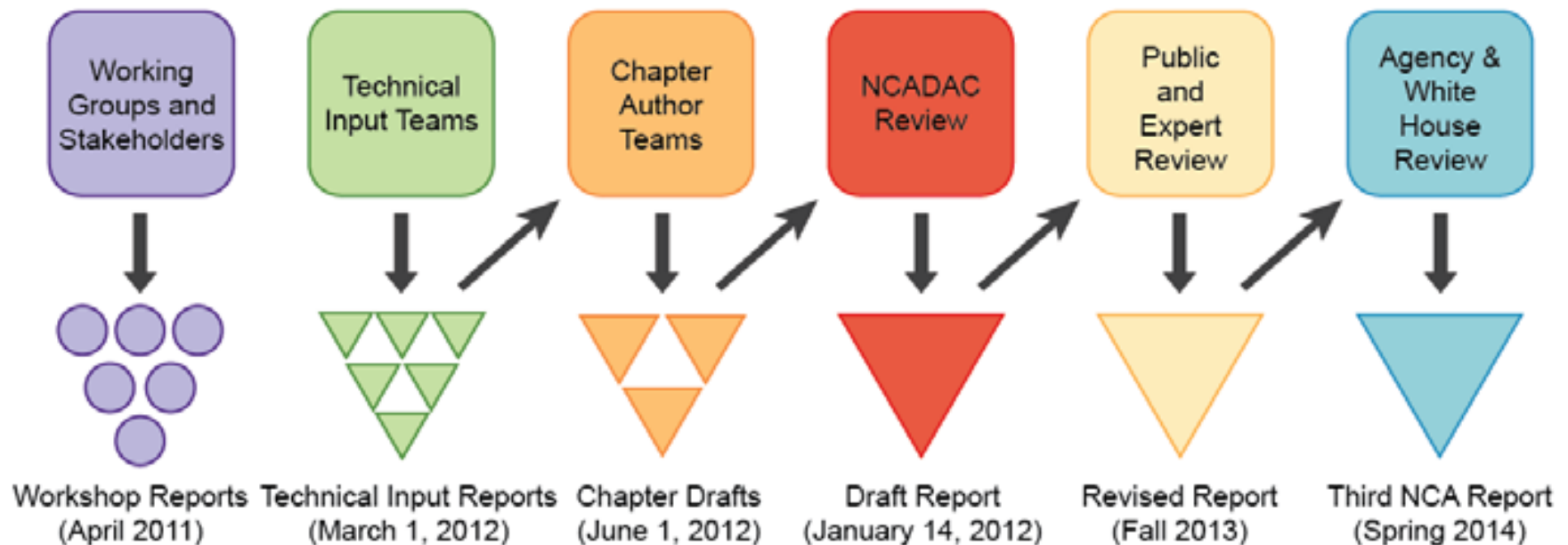
NCA Structure





Third NCA Report Process

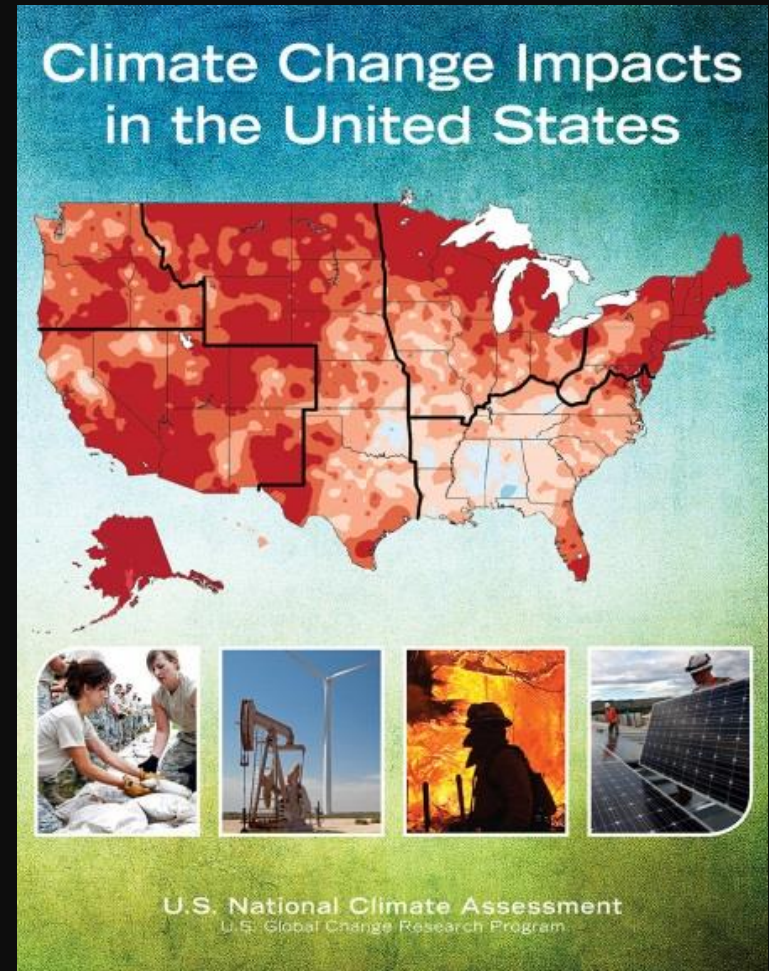
Third National Climate Assessment Report Process





Outline for Third NCA Report

- Climate Change and the American People
- Overview and Report Findings
- Our Changing Climate
- Sectors & Sectoral Cross-cuts
- Regions & Biogeographical Cross-cuts
- Responses
- Appendices



Read online or download at:

<http://nca2014.globalchange.gov>



Sectors

- Water Resources
- Energy Supply and Use
- Transportation
- Agriculture
- Forests
- Ecosystems and Biodiversity
- Human Health



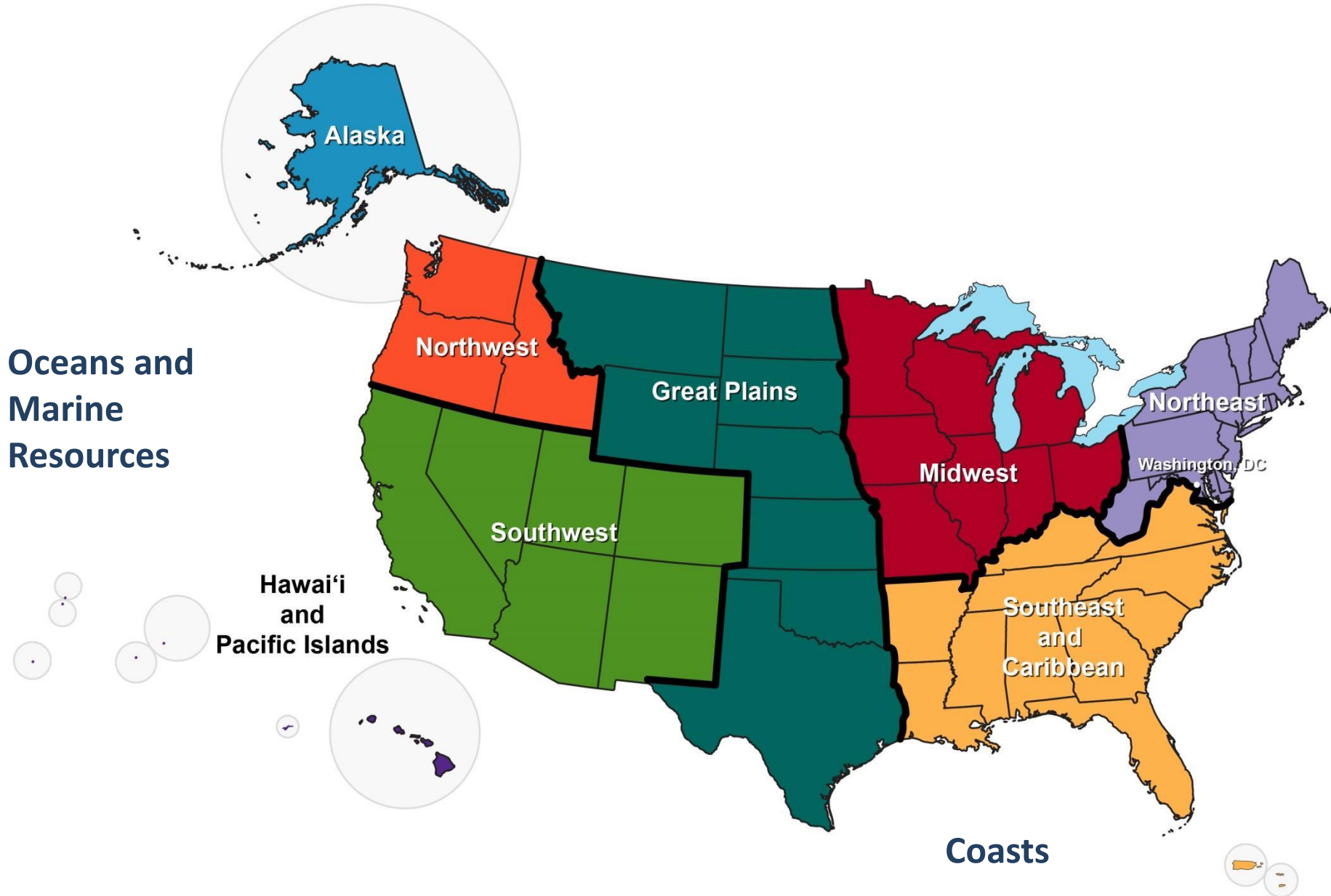


Sectoral Cross-Cuts



- Energy, Water, and Land Use
- Urban Systems and Infrastructure
- Indigenous Peoples, Lands, and Resources
- Land Use and Land Cover Change
- Rural Communities
- Biogeochemical Cycles

Regions & Biogeographical Cross-Cuts





Responses

- Decision Support
- Mitigation
- Adaptation
- Research Needs
- Sustained Assessment



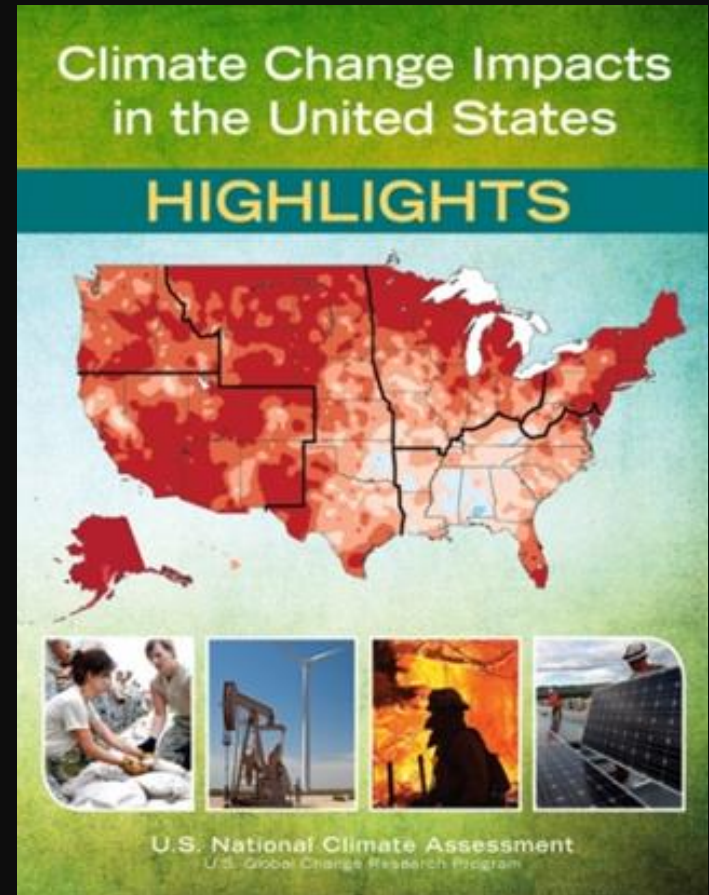


Appendices

- Process
- Information Quality
- Climate Science Supplement
- Frequently Asked Questions
- Scenarios and Models
- Future Assessment Topics



REPORT FINDINGS



OUR CHANGING CLIMATE

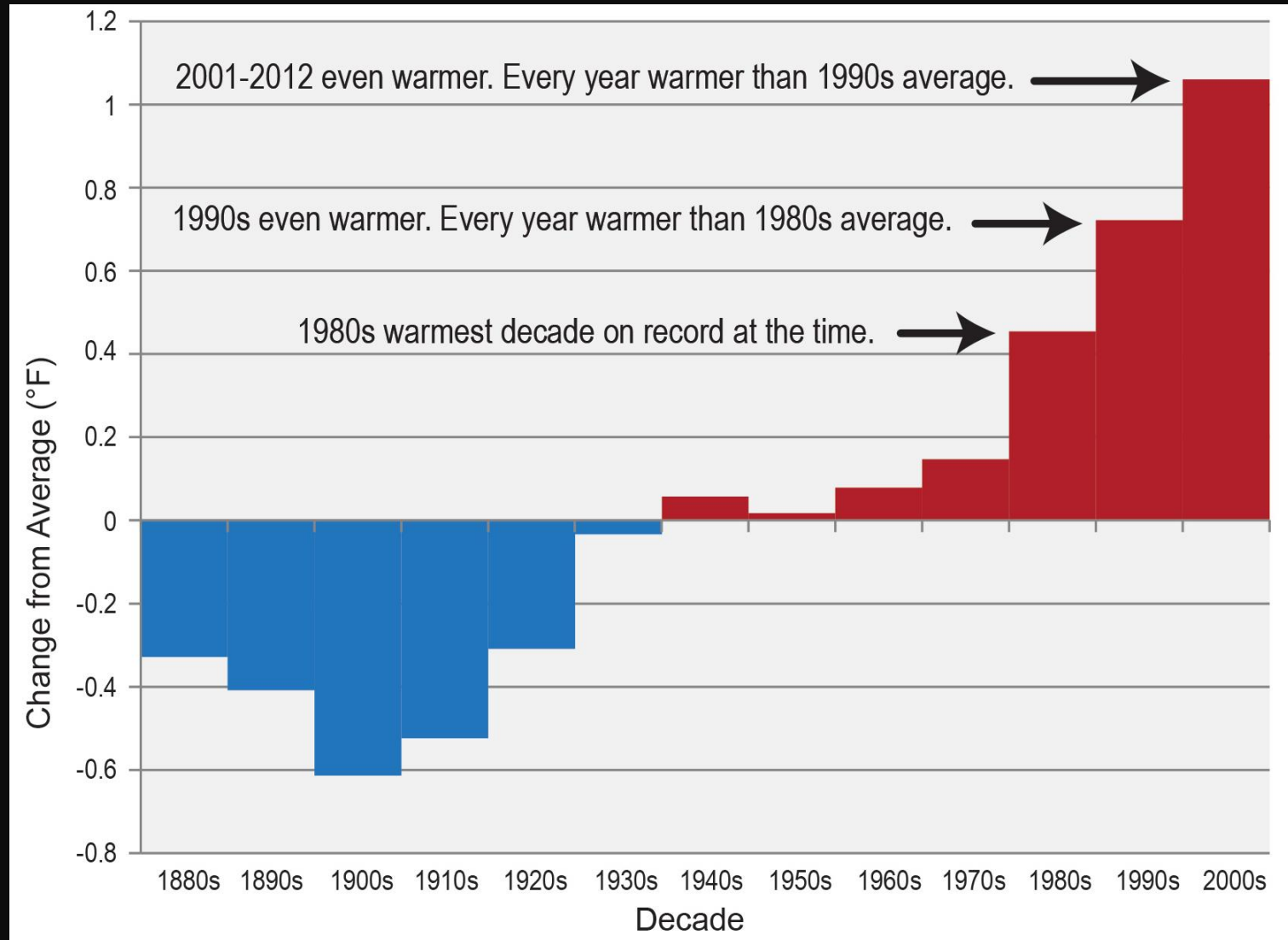


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U.S. Global Change Research Program

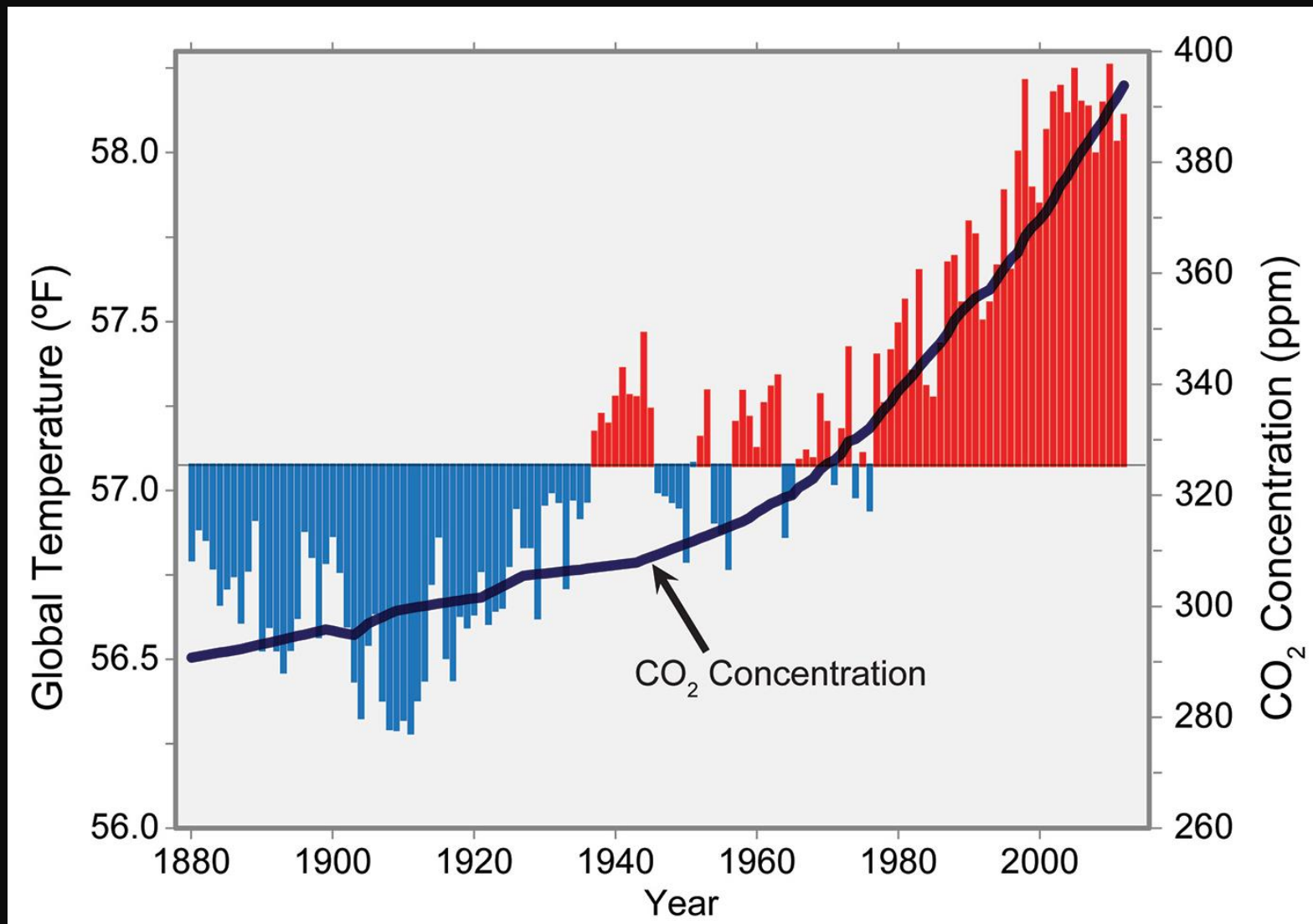


Temperature Change by Decade



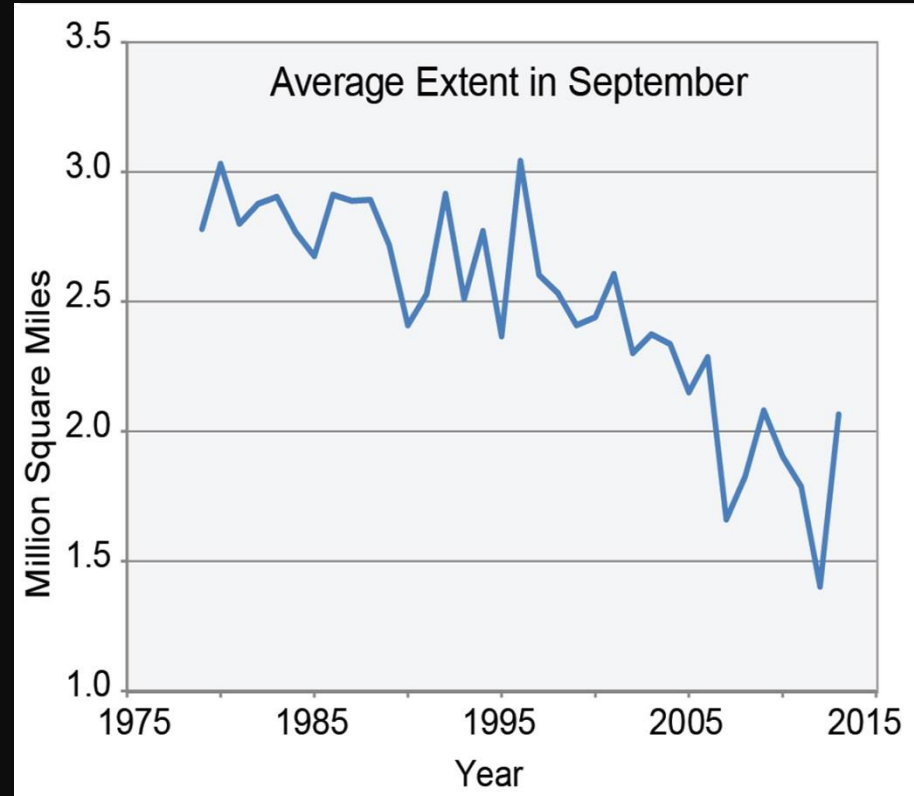
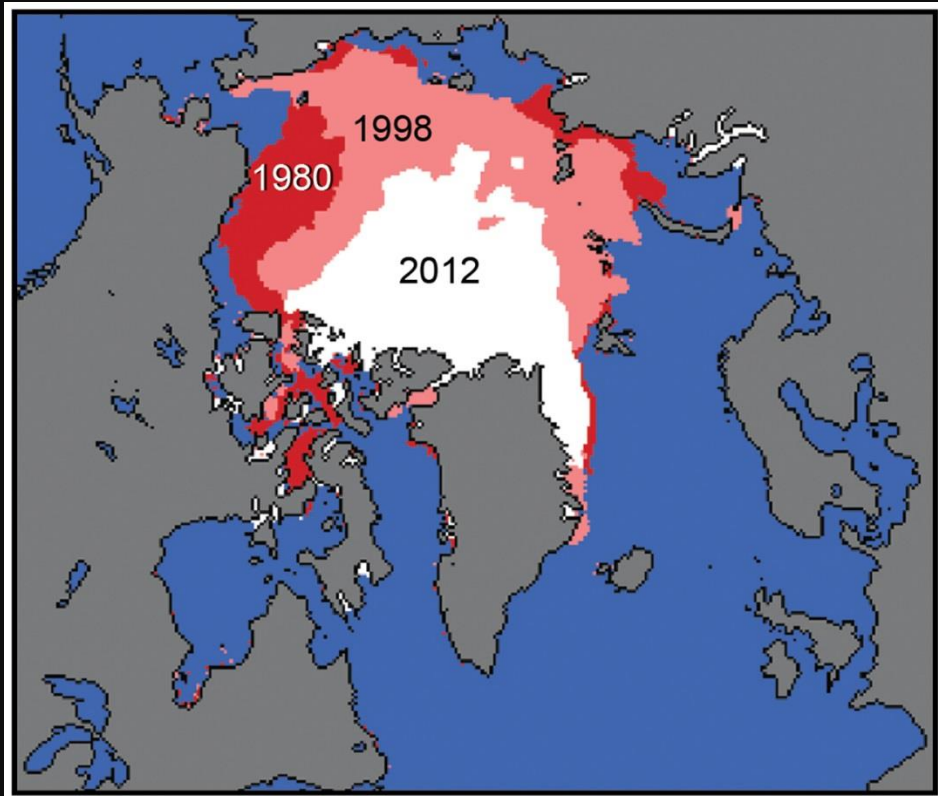


Global Temperature and Carbon Dioxide



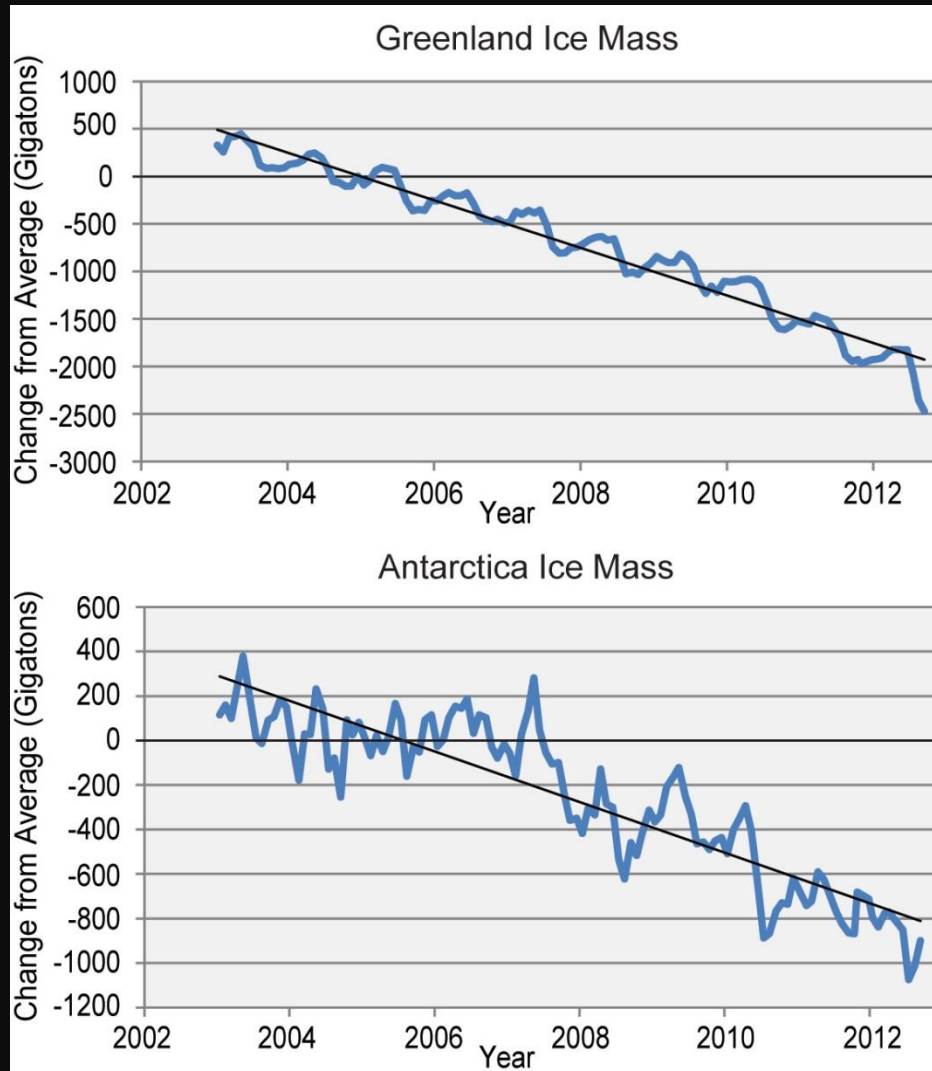


Arctic Sea Ice Decline



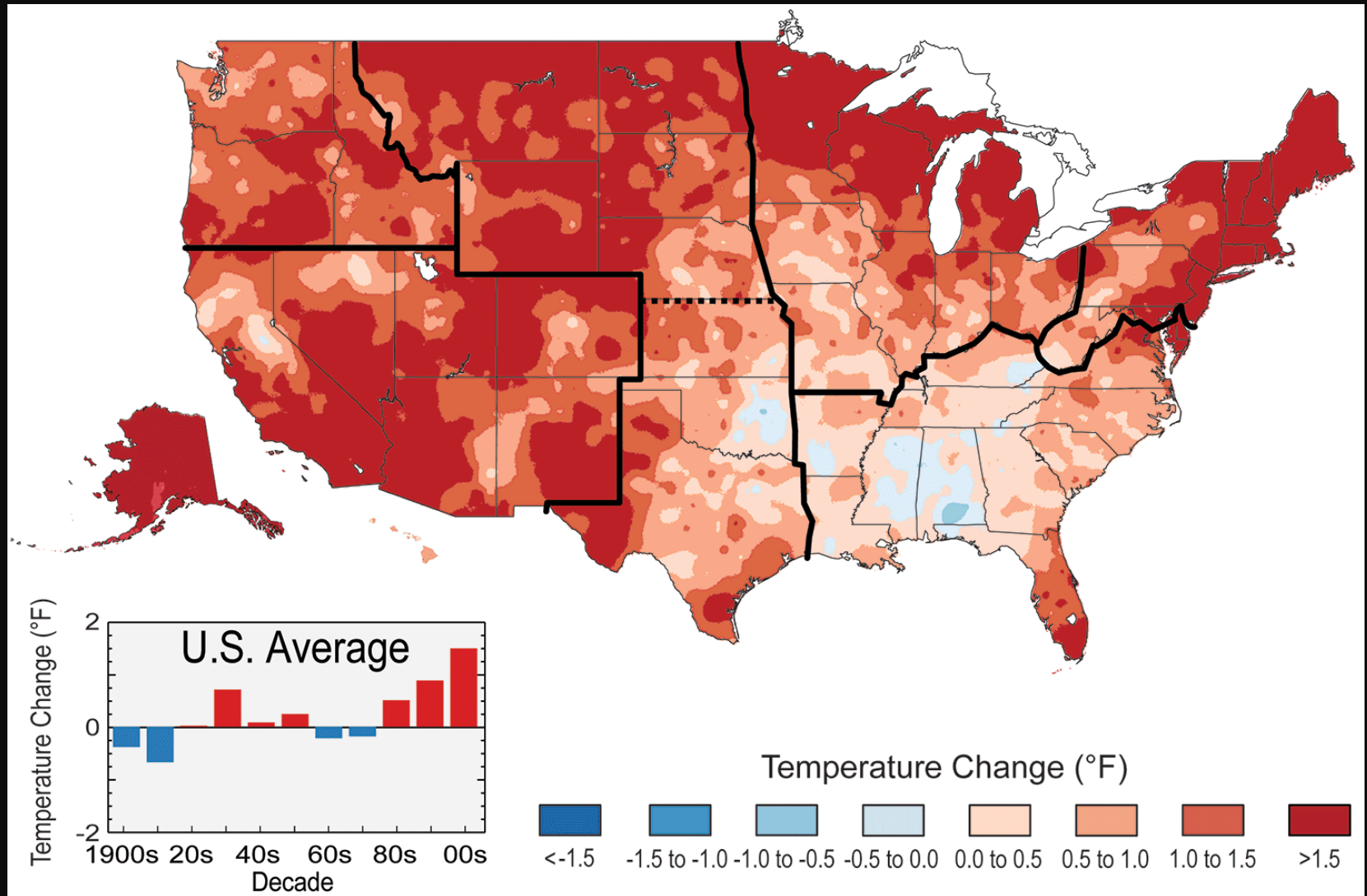


Ice Loss from the Two Polar Ice Sheets



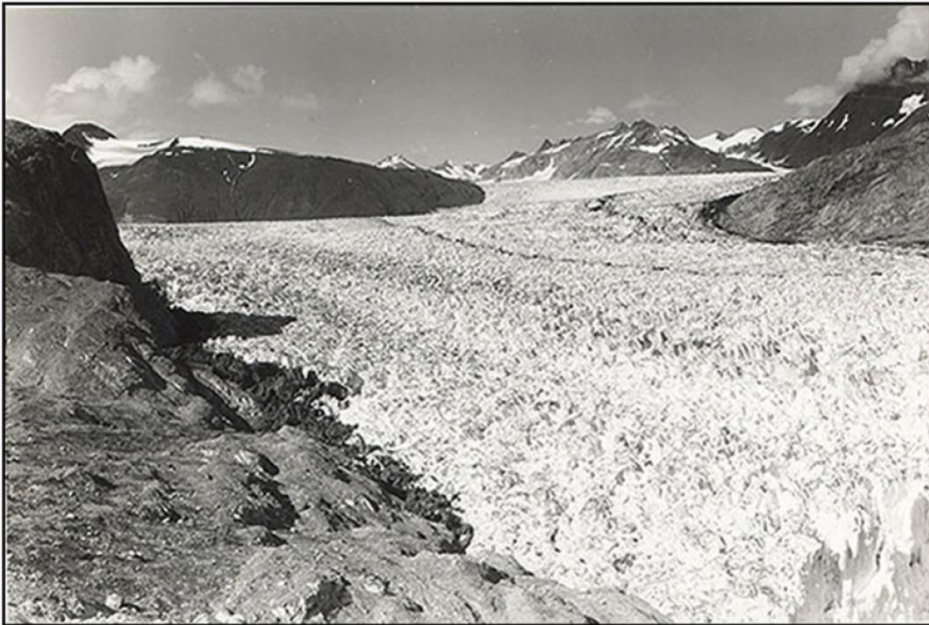


Observed U.S. Temperature Change



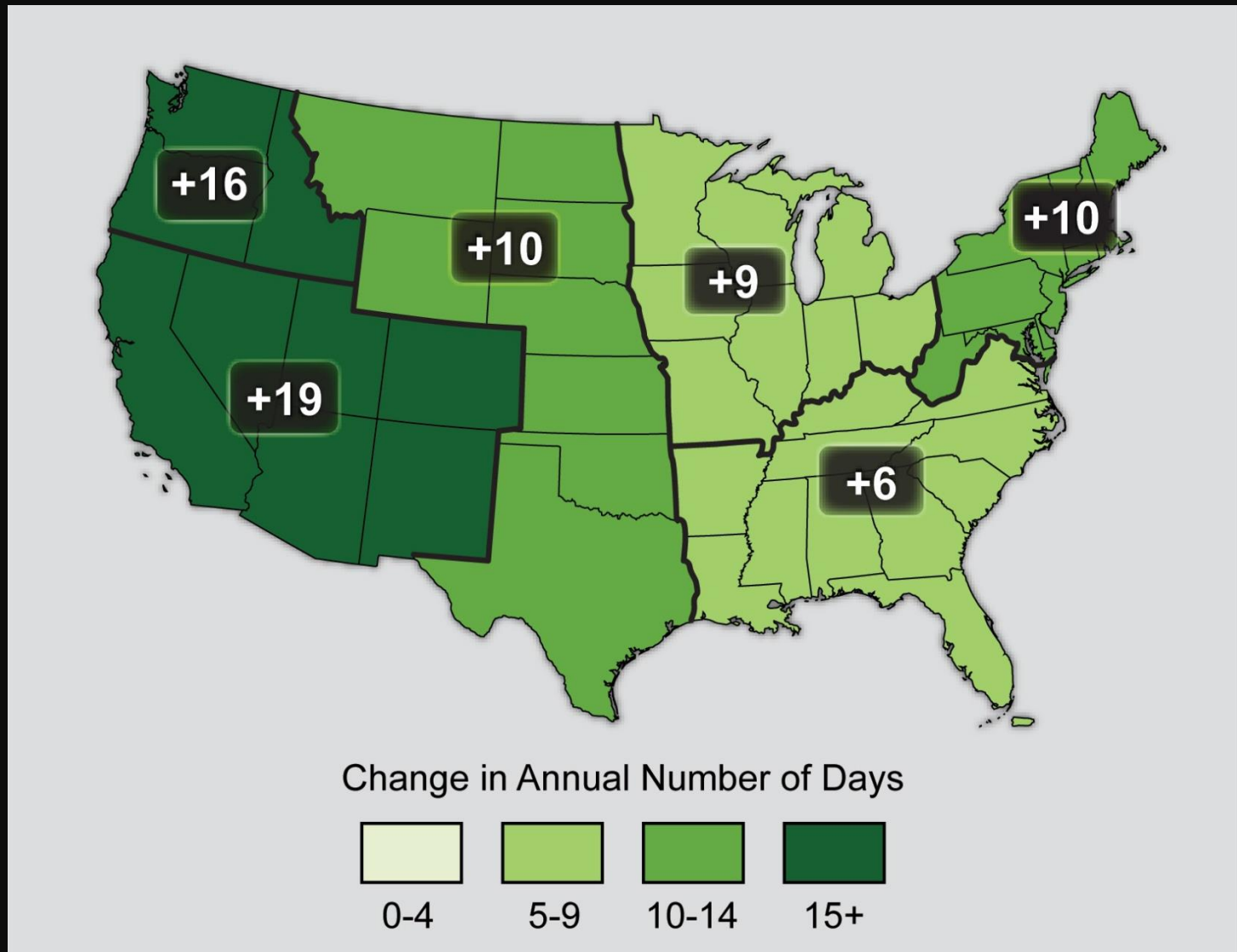


Muir Glacier Decline



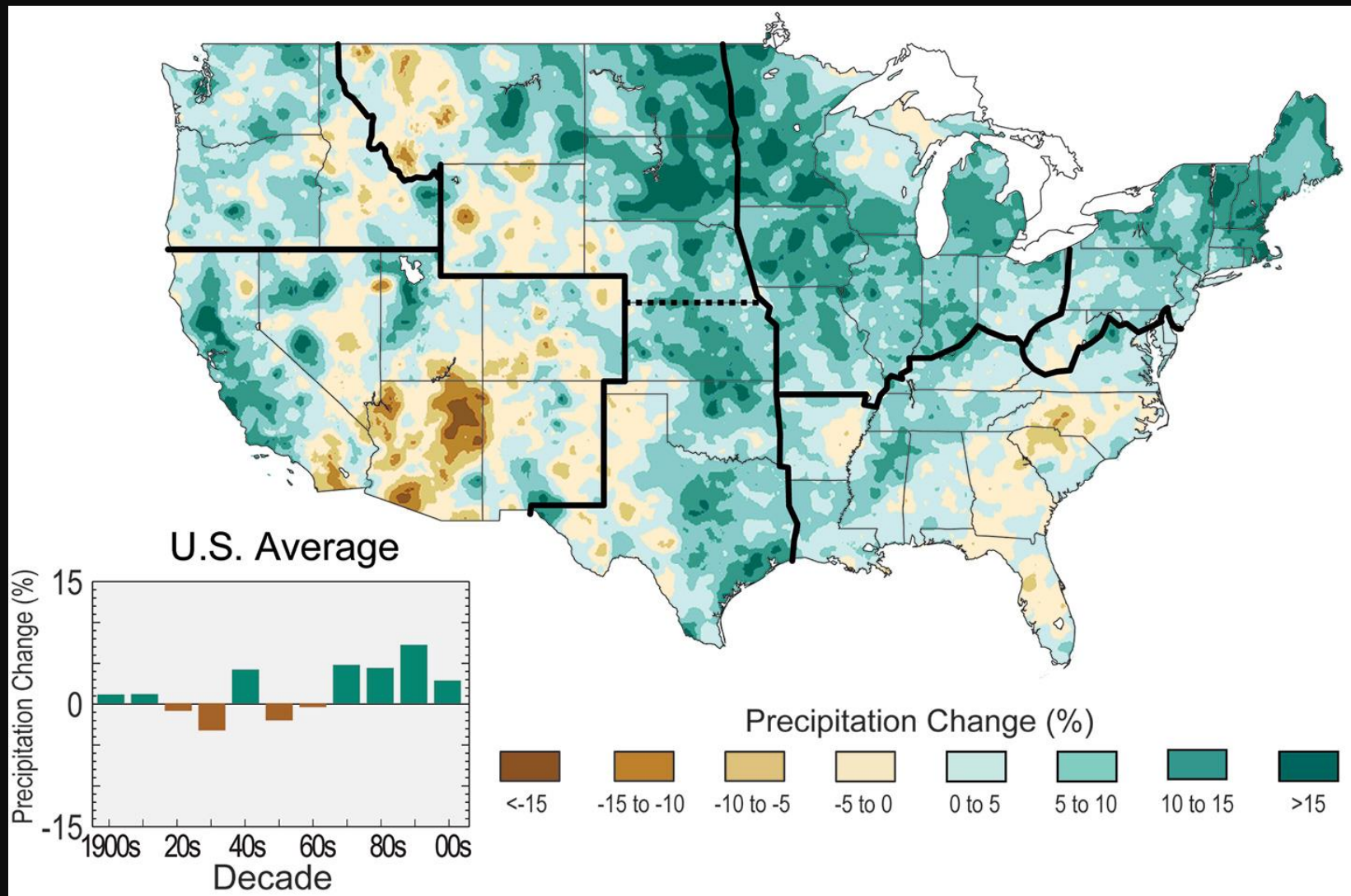


Observed Increases in Frost-Free Season



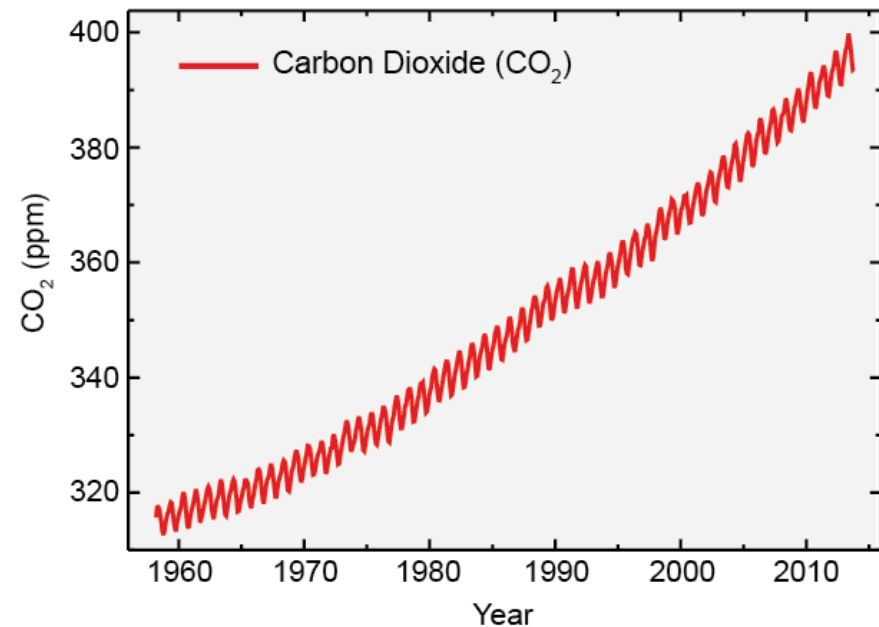
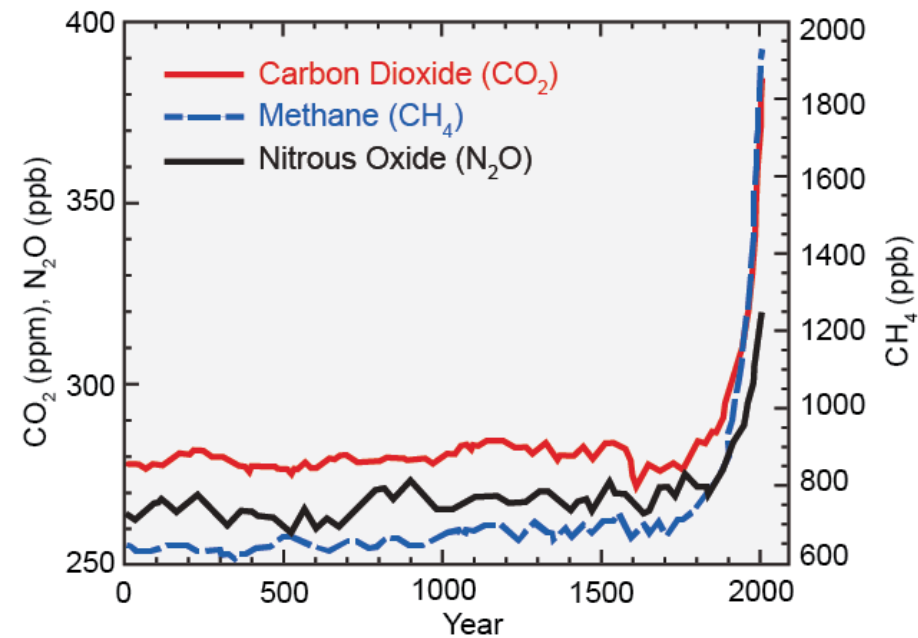


Observed U.S. Precipitation Change



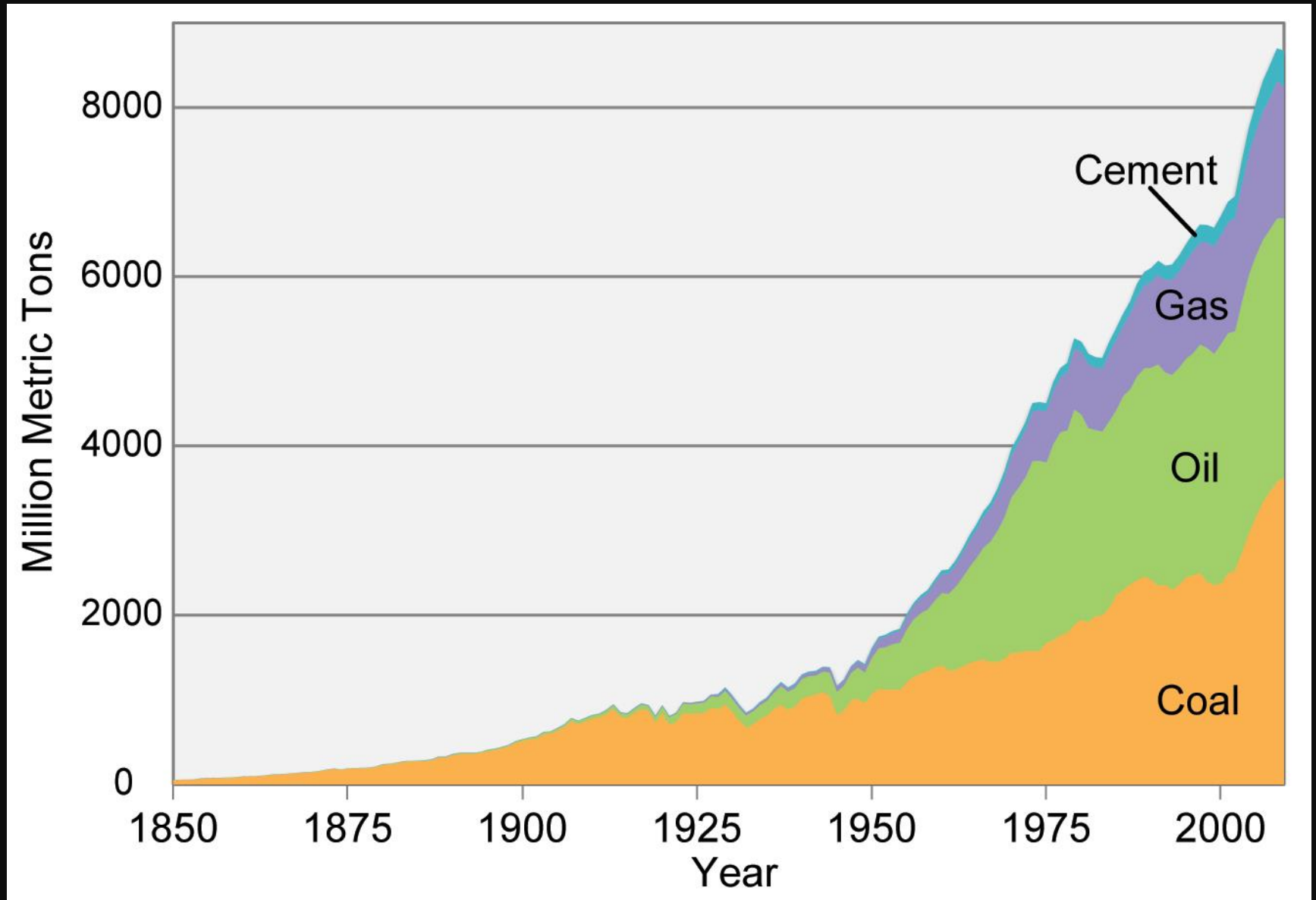


Heat-Trapping Gas Levels





Carbon Emissions in the Industrial Age



EXTREME WEATHER



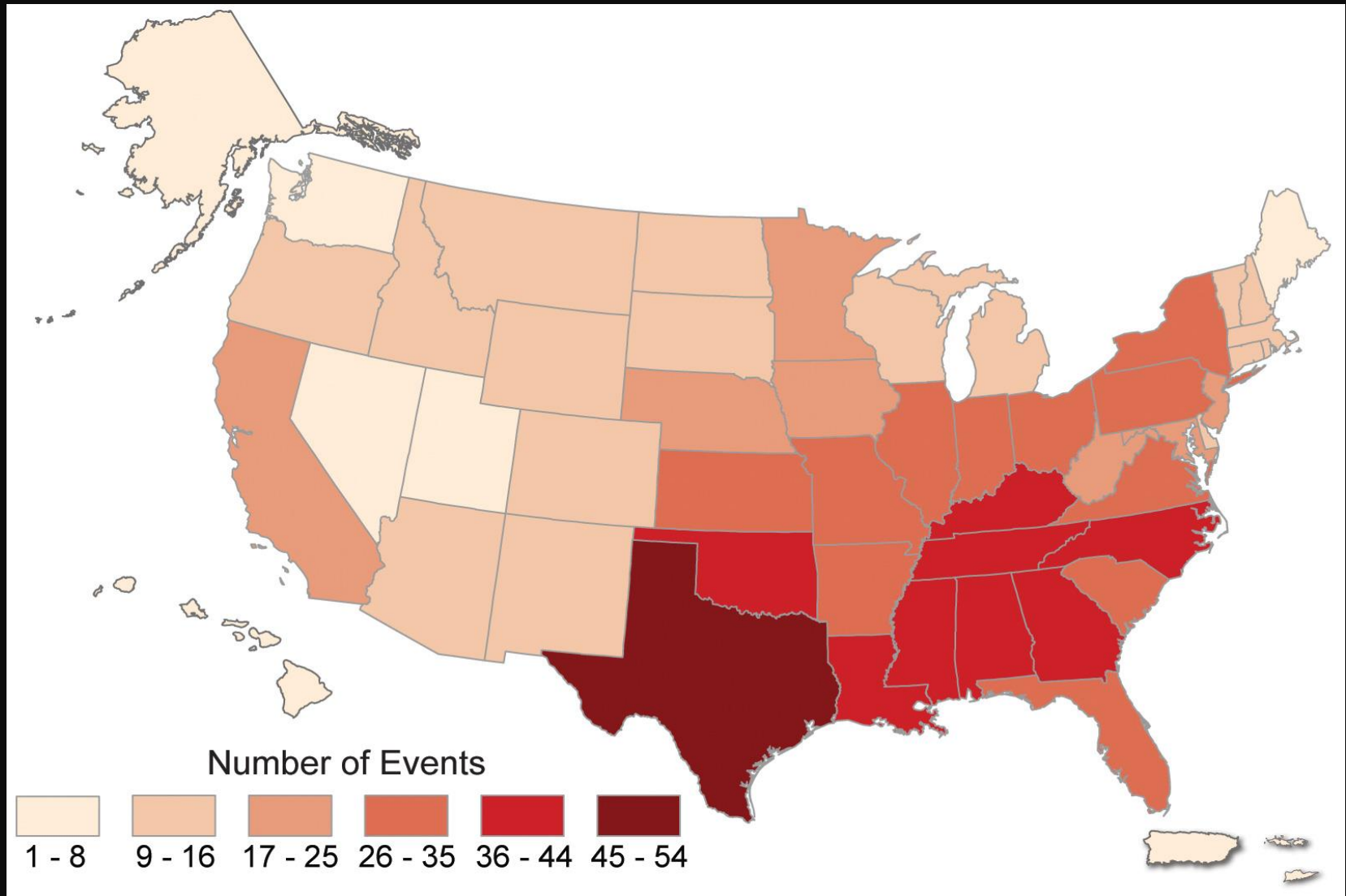
GlobalChange.gov

U.S. Global Change Research Program



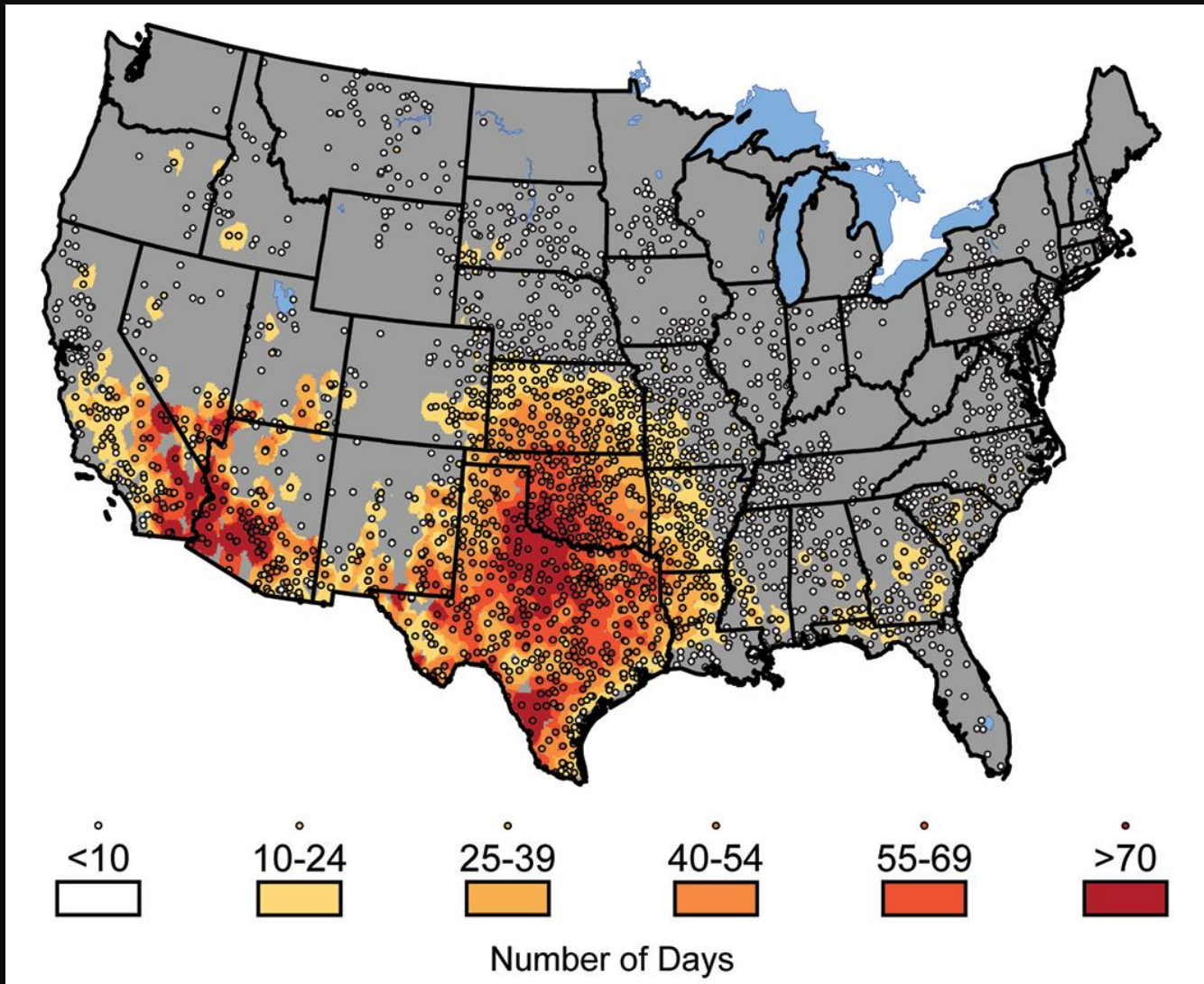
Billion Dollar Weather/Climate Disasters

1980-2012



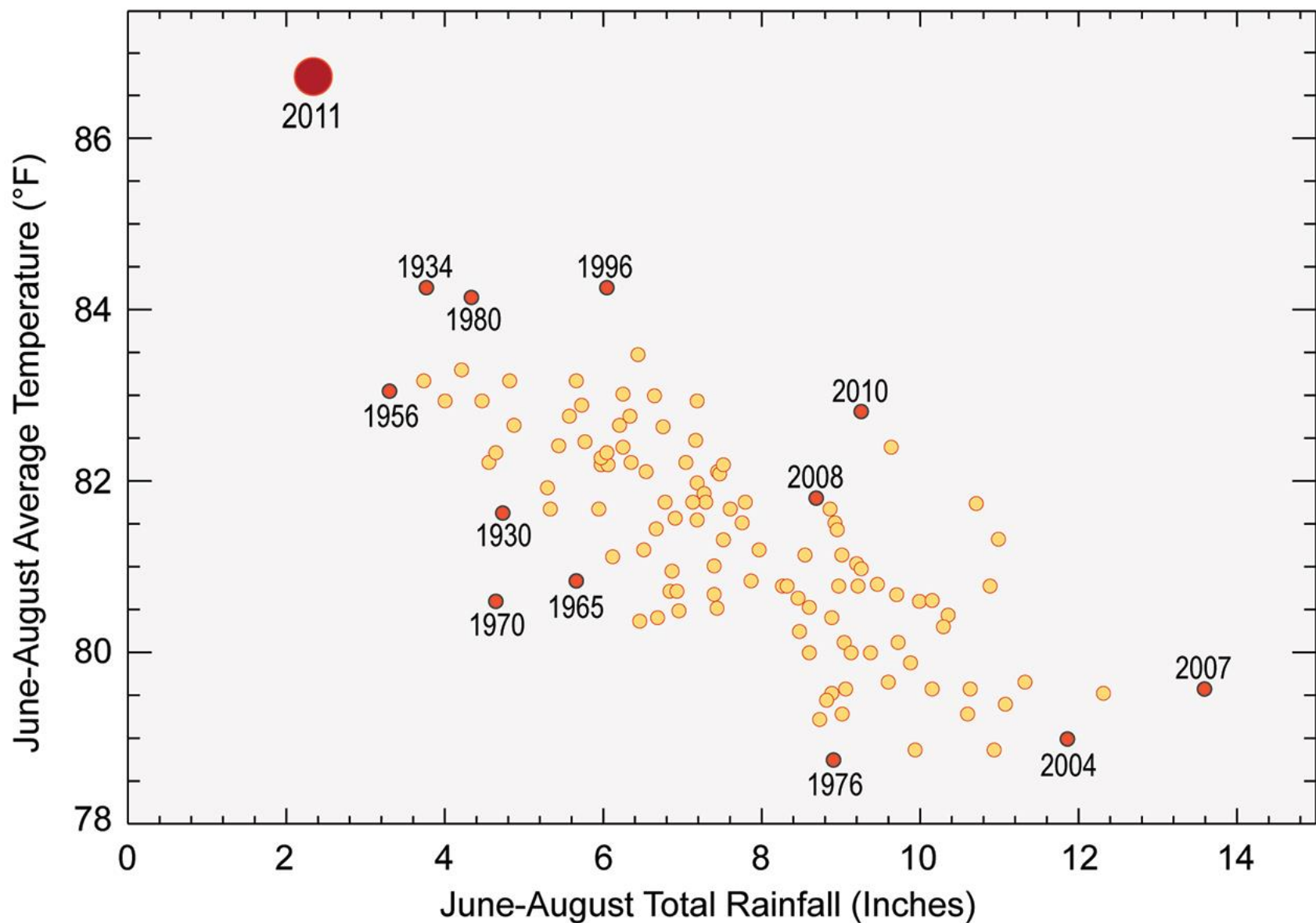


100-degree Days in 2011



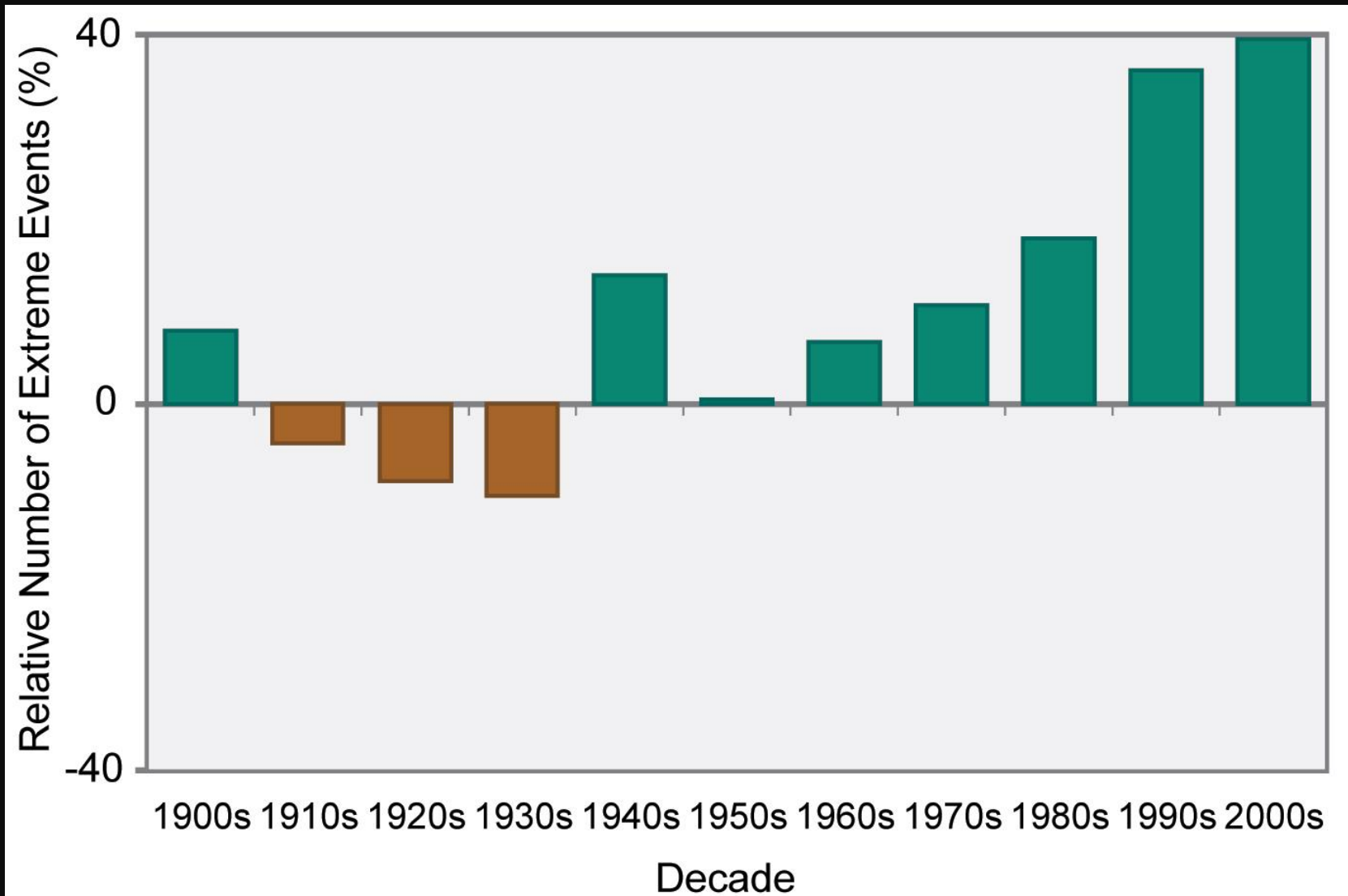


Texas Summer 2011: Record Heat and Drought



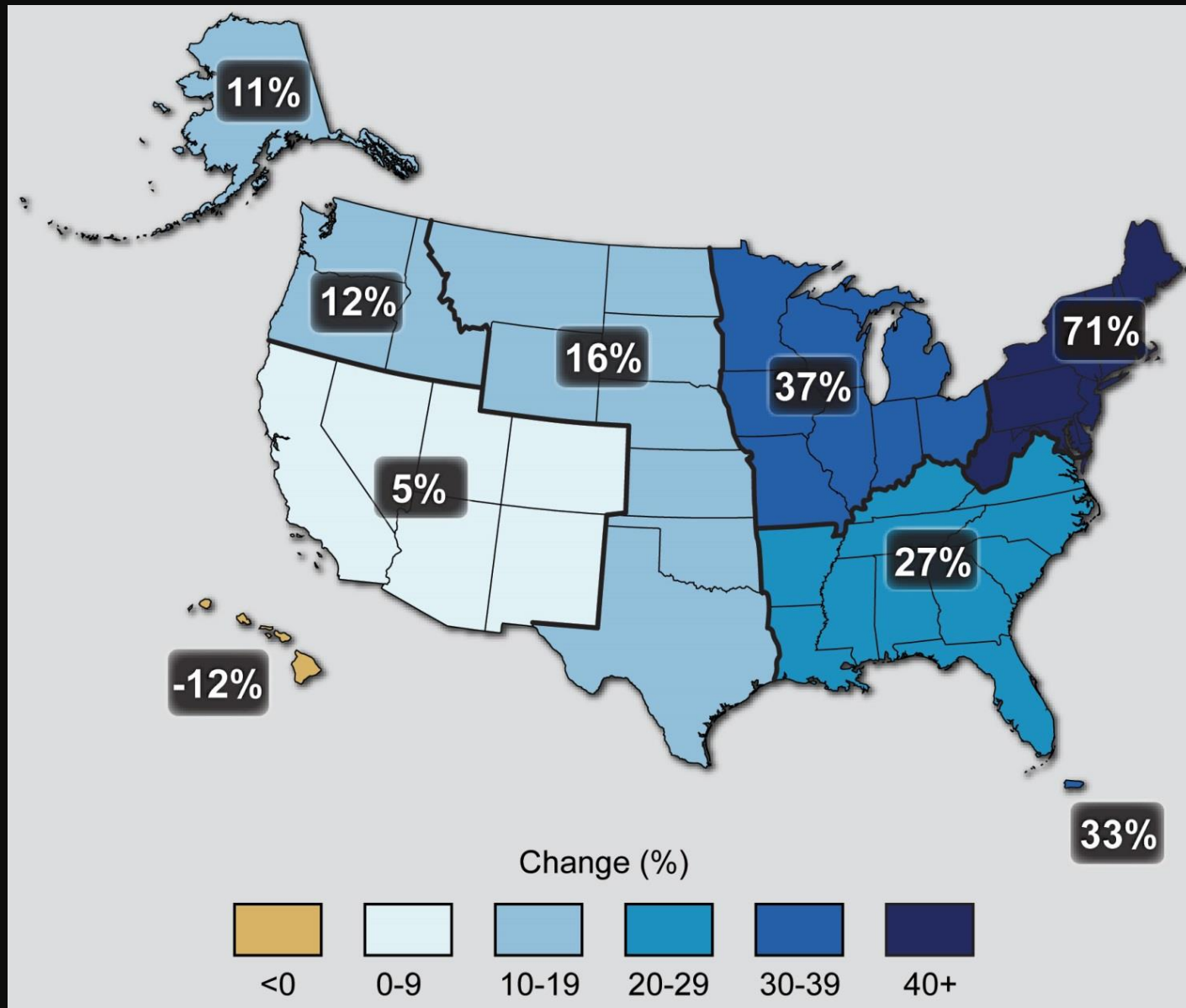


Observed U.S. Trends in Heavy Precipitation



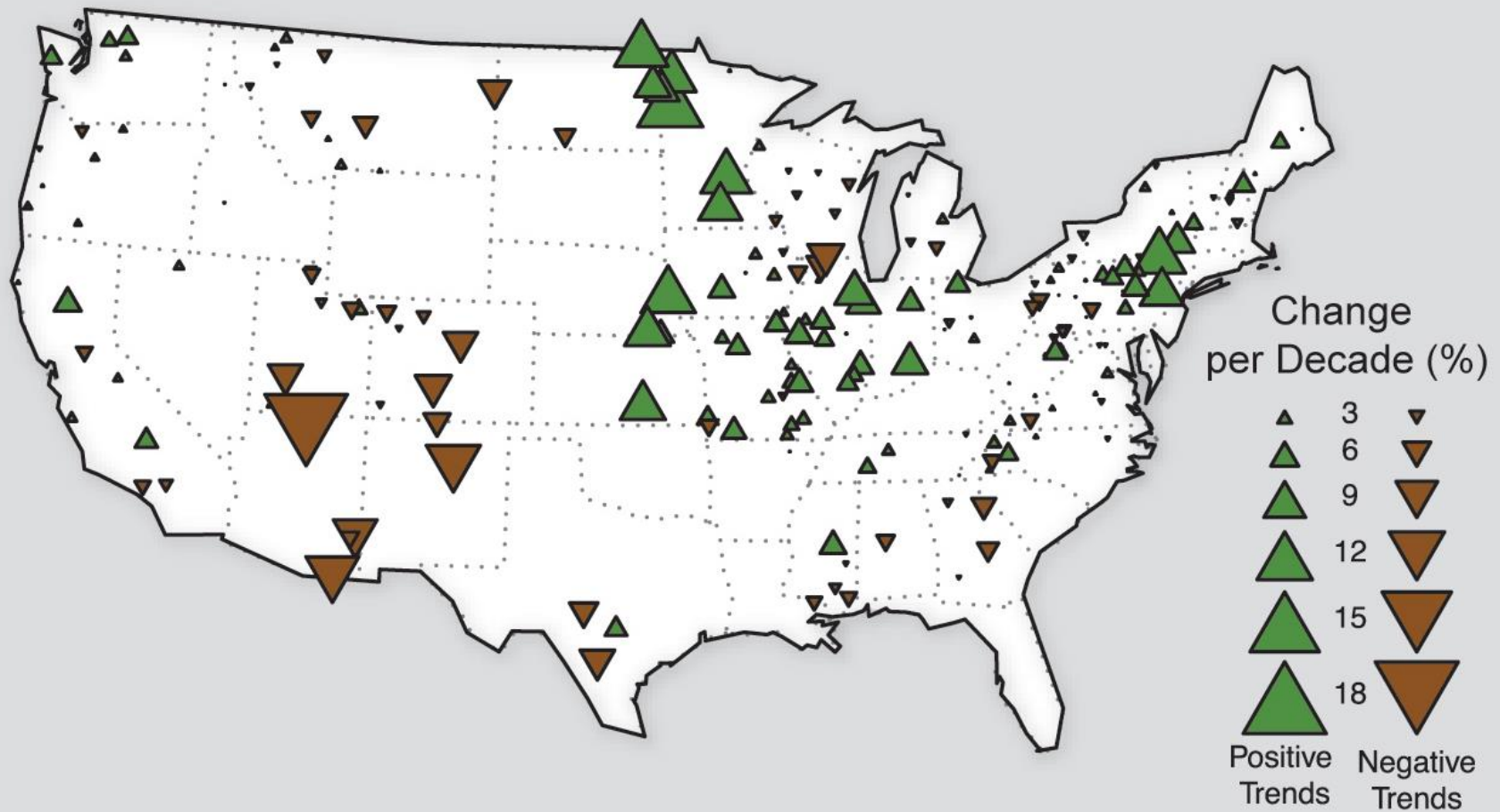


Observed Change in Very Heavy Precipitation





Trends in Flood Magnitude



FUTURE CLIMATE

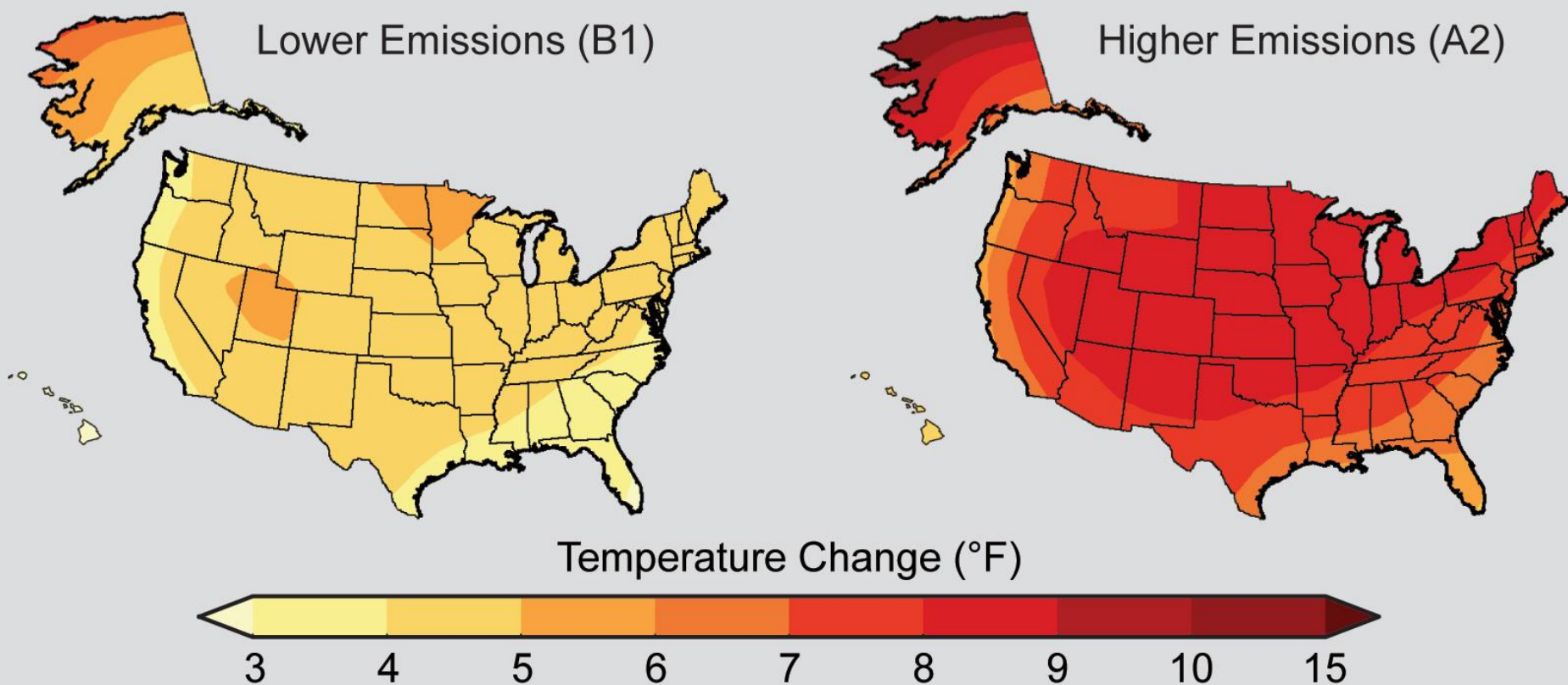


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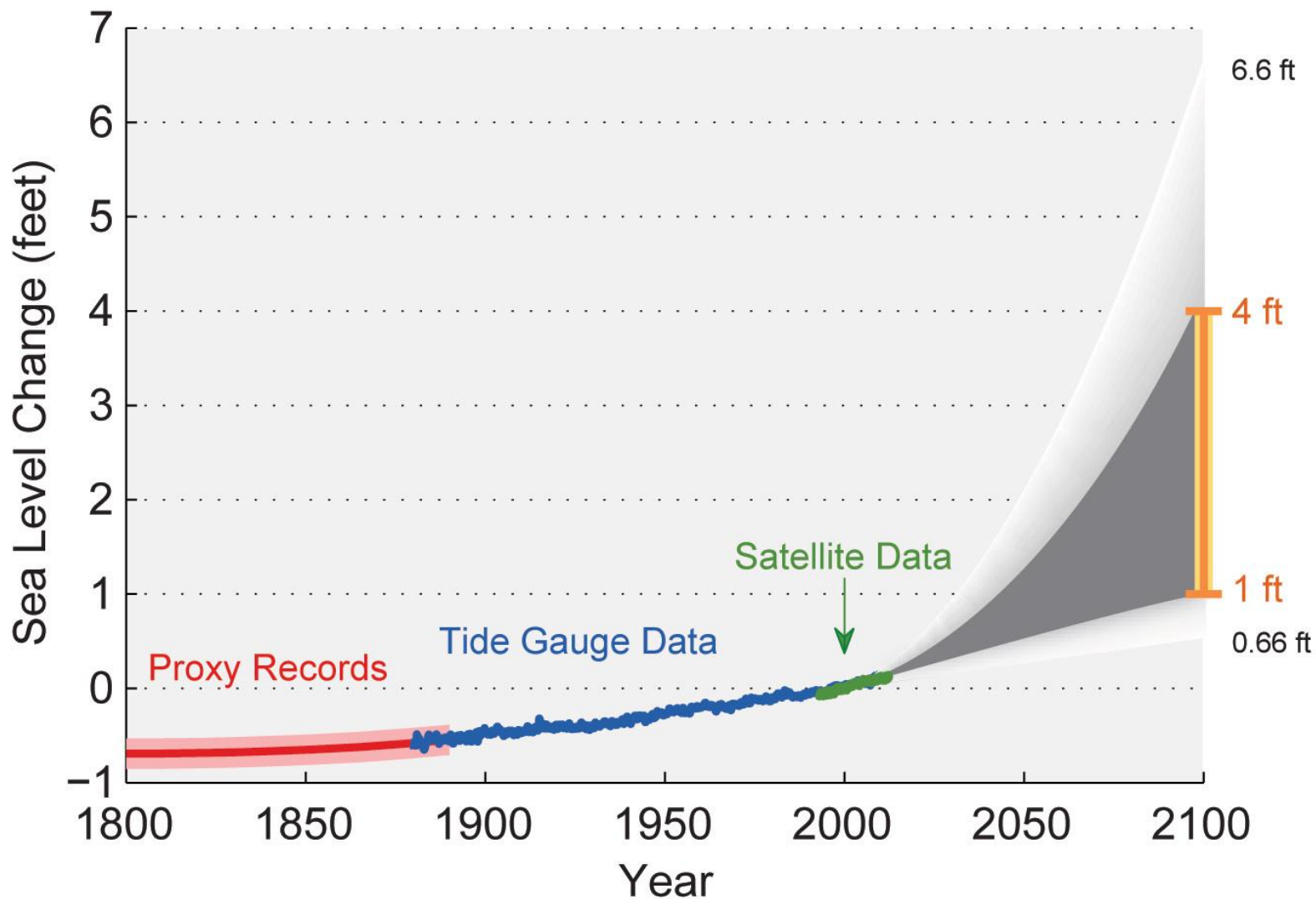


Projected Temperature Change



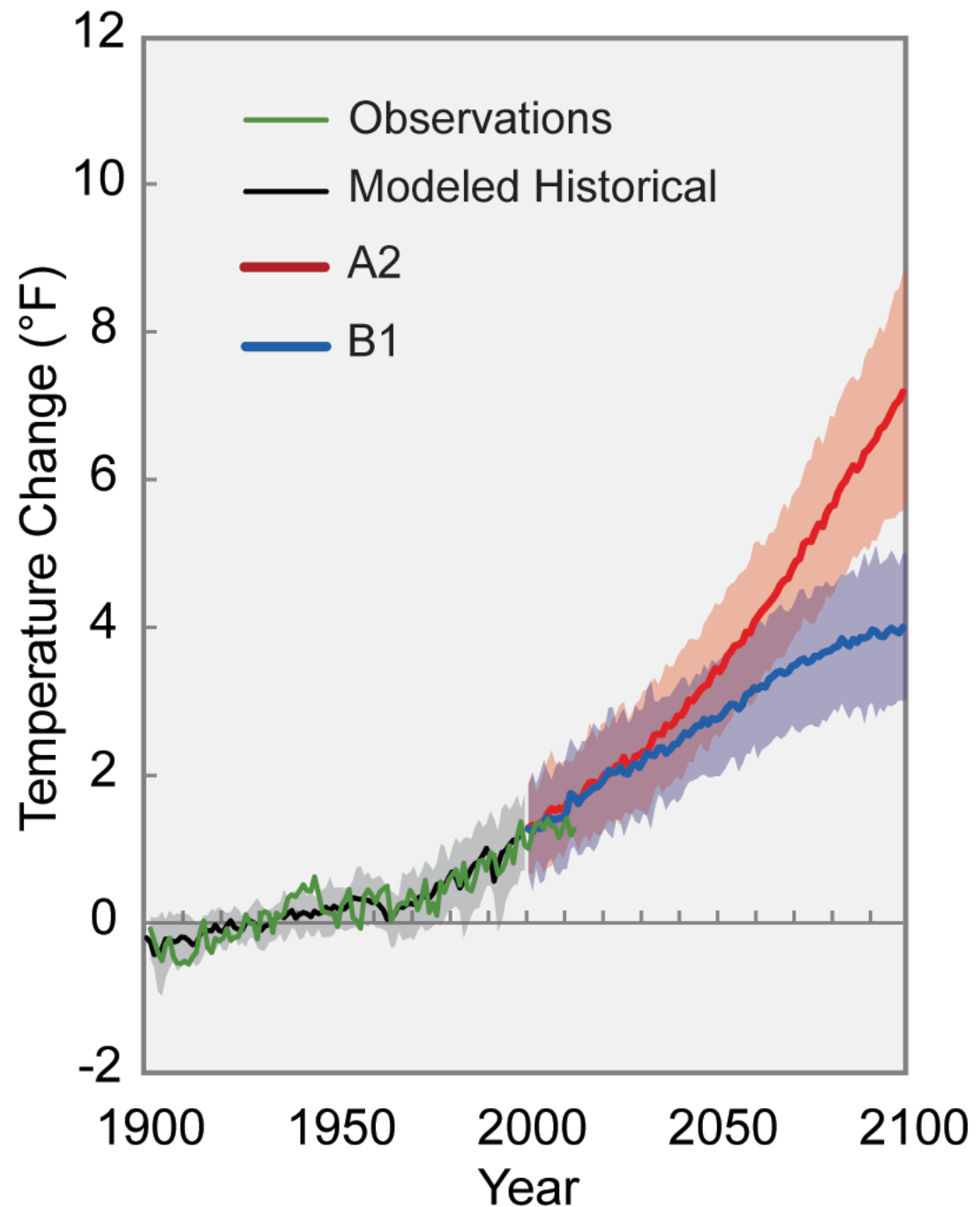


Past and Projected Changes in Global Sea Level





Projected Global Temperature Change



WIDESPREAD IMPACTS



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Storm Surge + Sea Level Rise





Cascading Effects



HUMAN HEALTH



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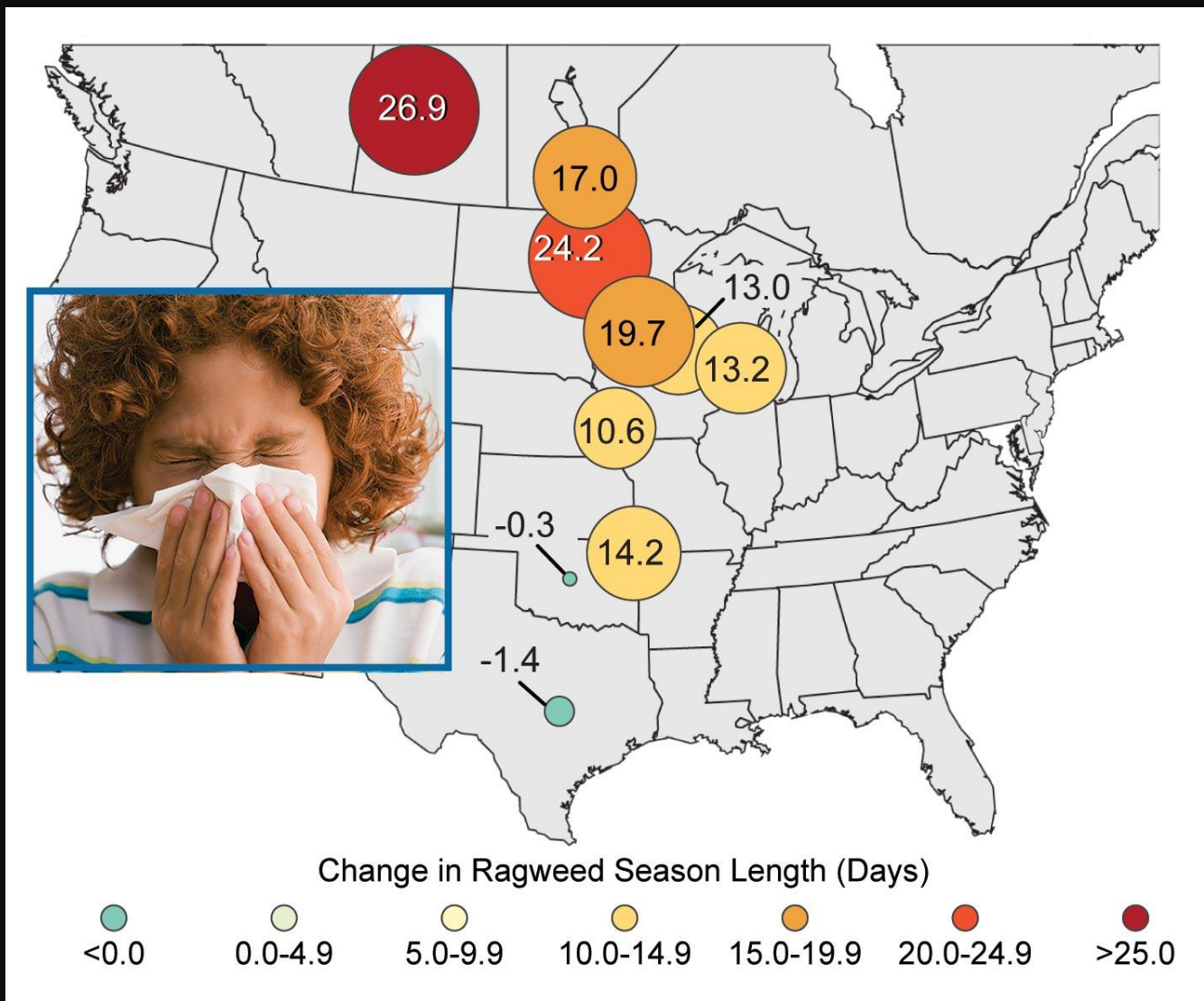


Wildfire Smoke has Widespread Health Effects





Ragweed Pollen Season Lengthens





Multiple Benefits



Urban • Transportation • Energy

INFRASTRUCTURE



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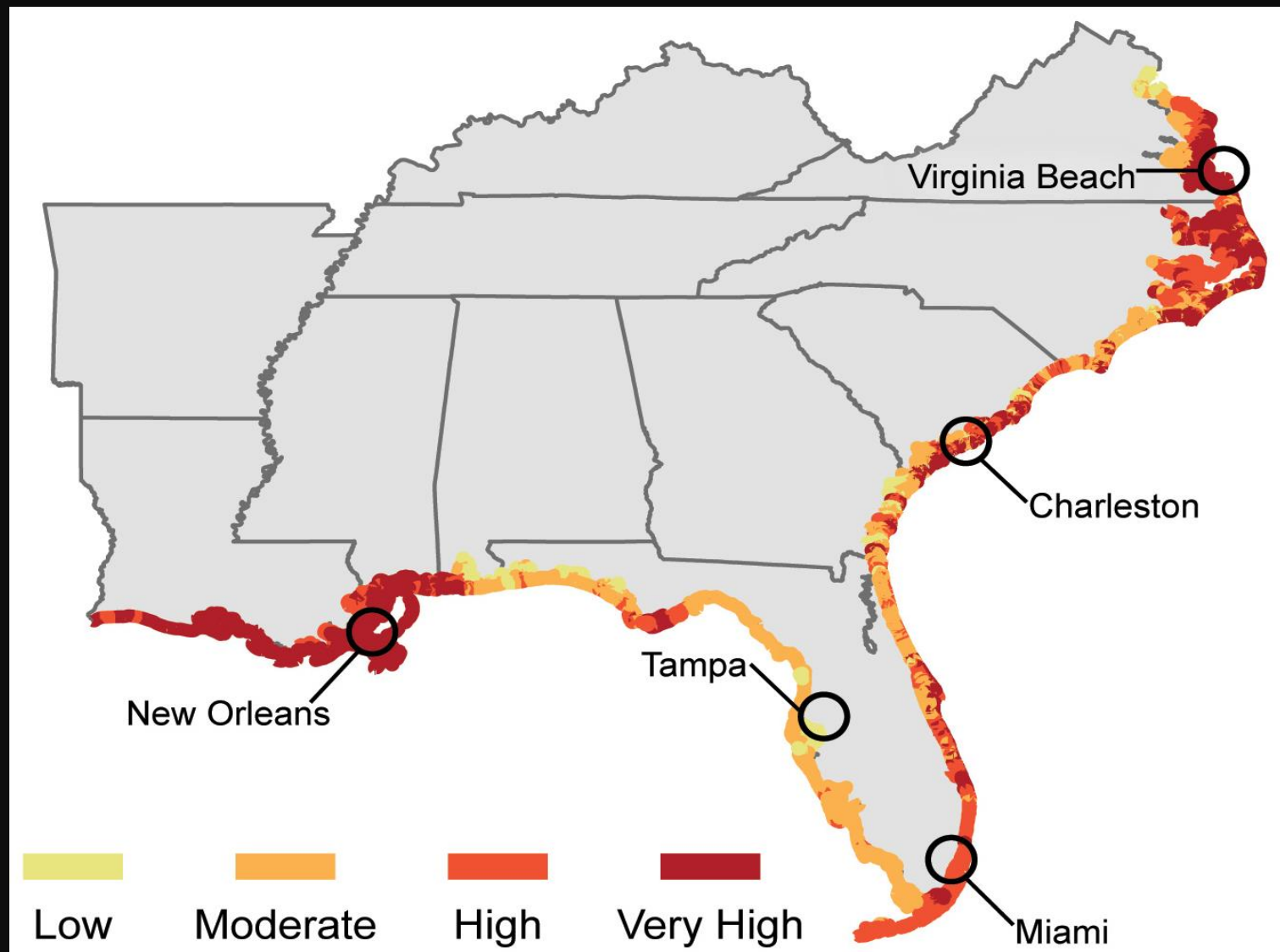


Urban Infrastructure



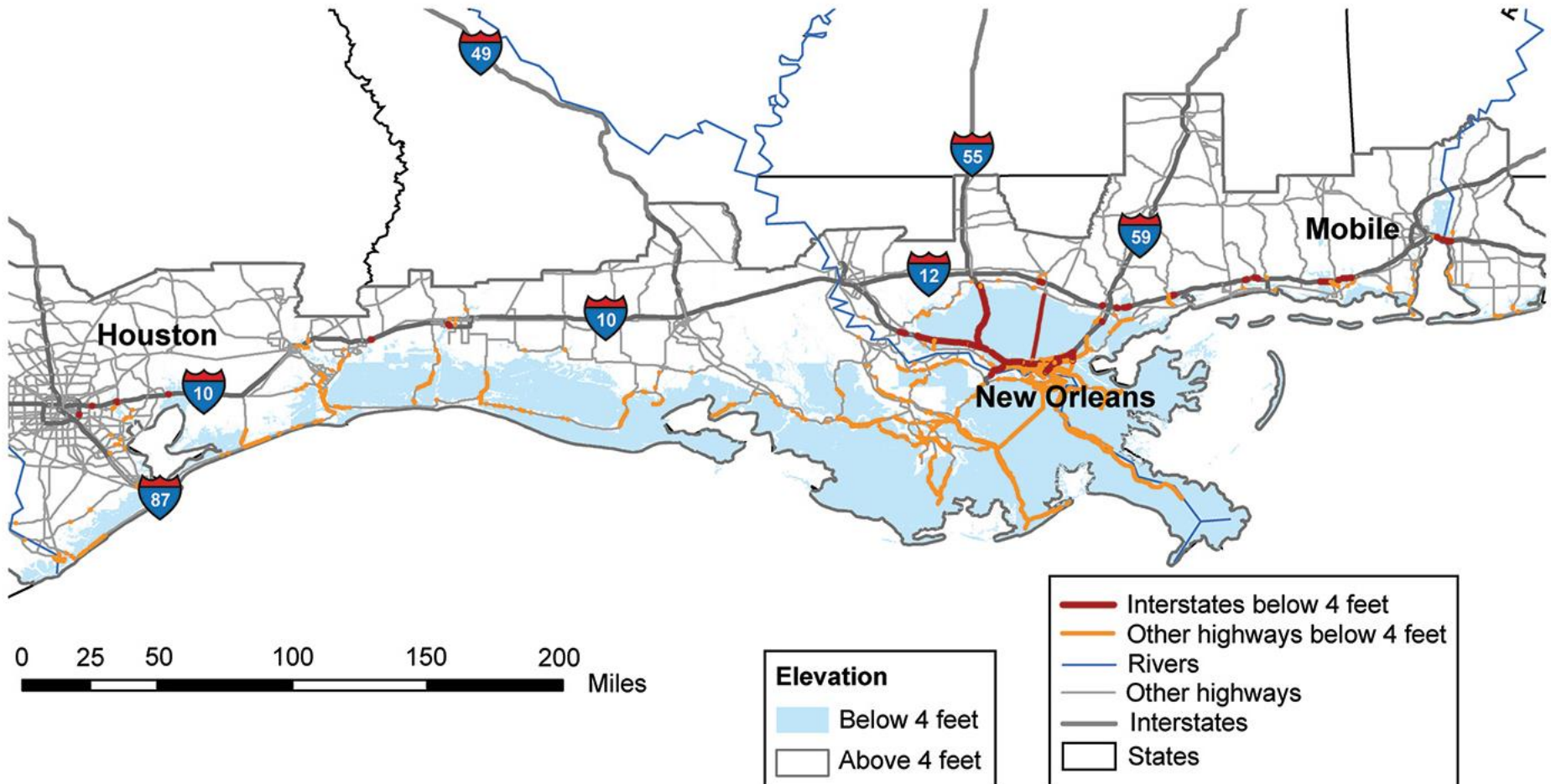


Vulnerability to Sea Level Rise



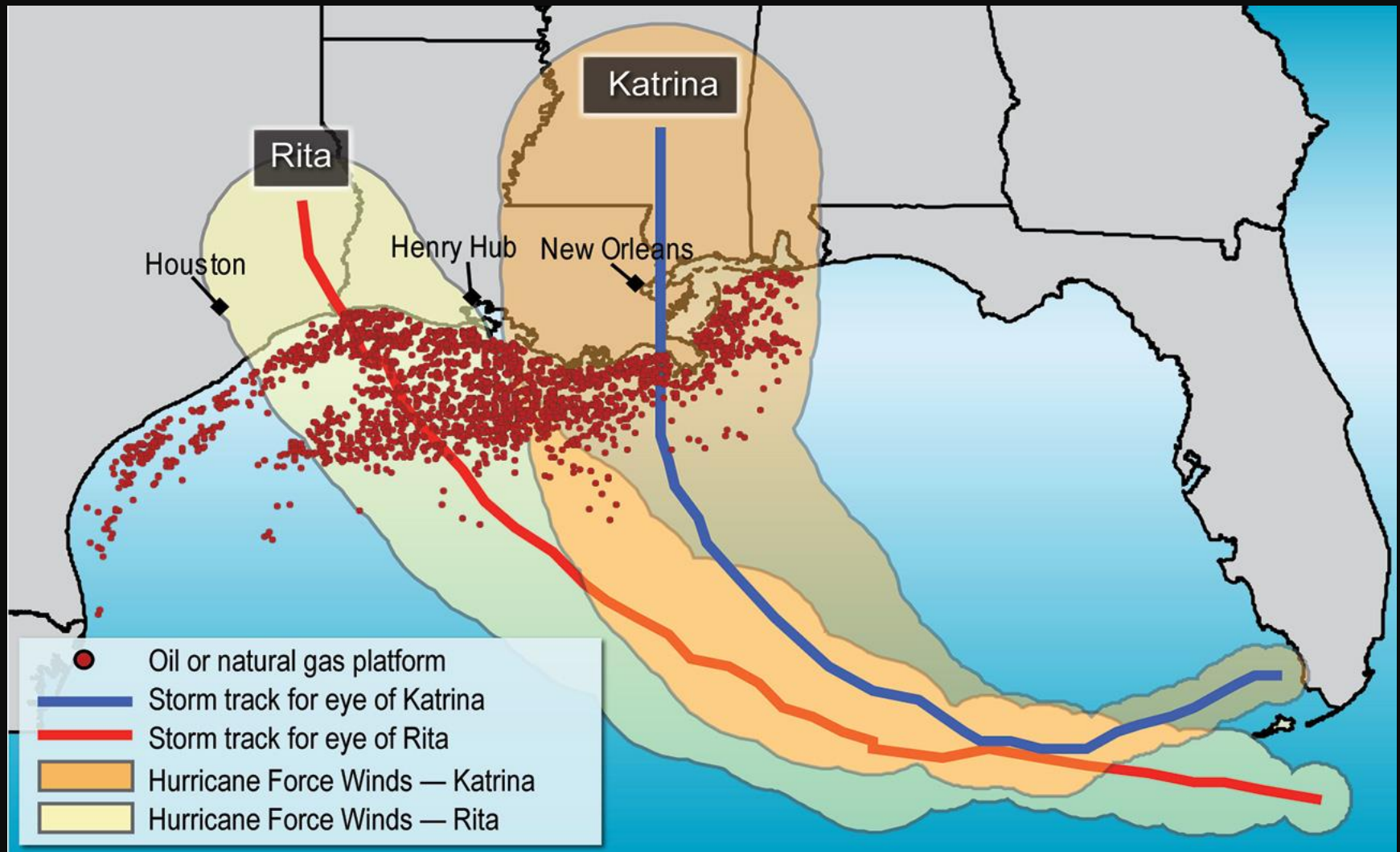


Gulf Coast Transportation Hubs at Risk



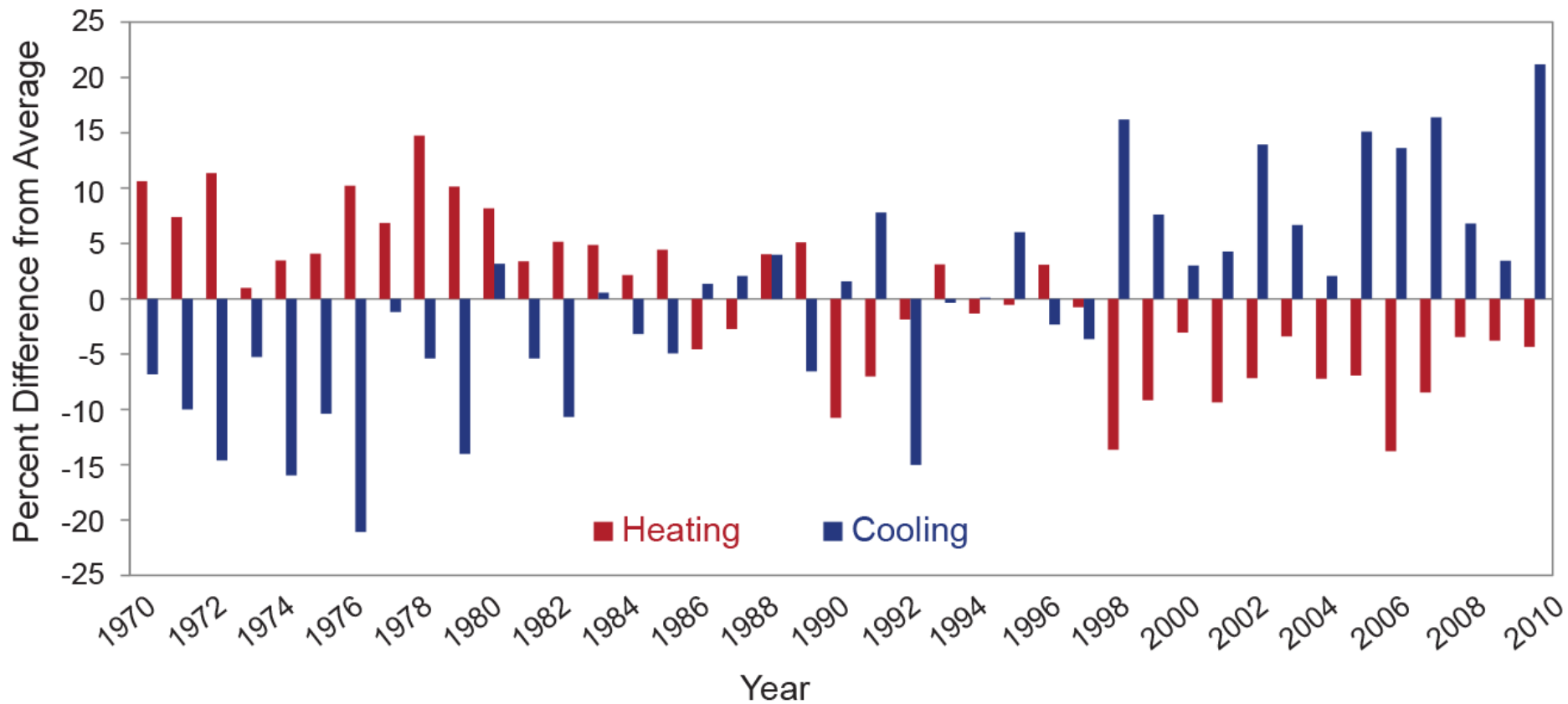


Paths of Hurricanes Katrina and Rita Relative to Oil and Gas Production Facilities





Increase in Cooling Demand and Decrease in Heating Demand



Water Resources • Energy, Water, and Land Use

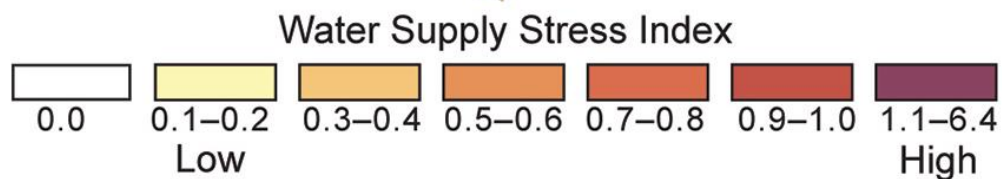
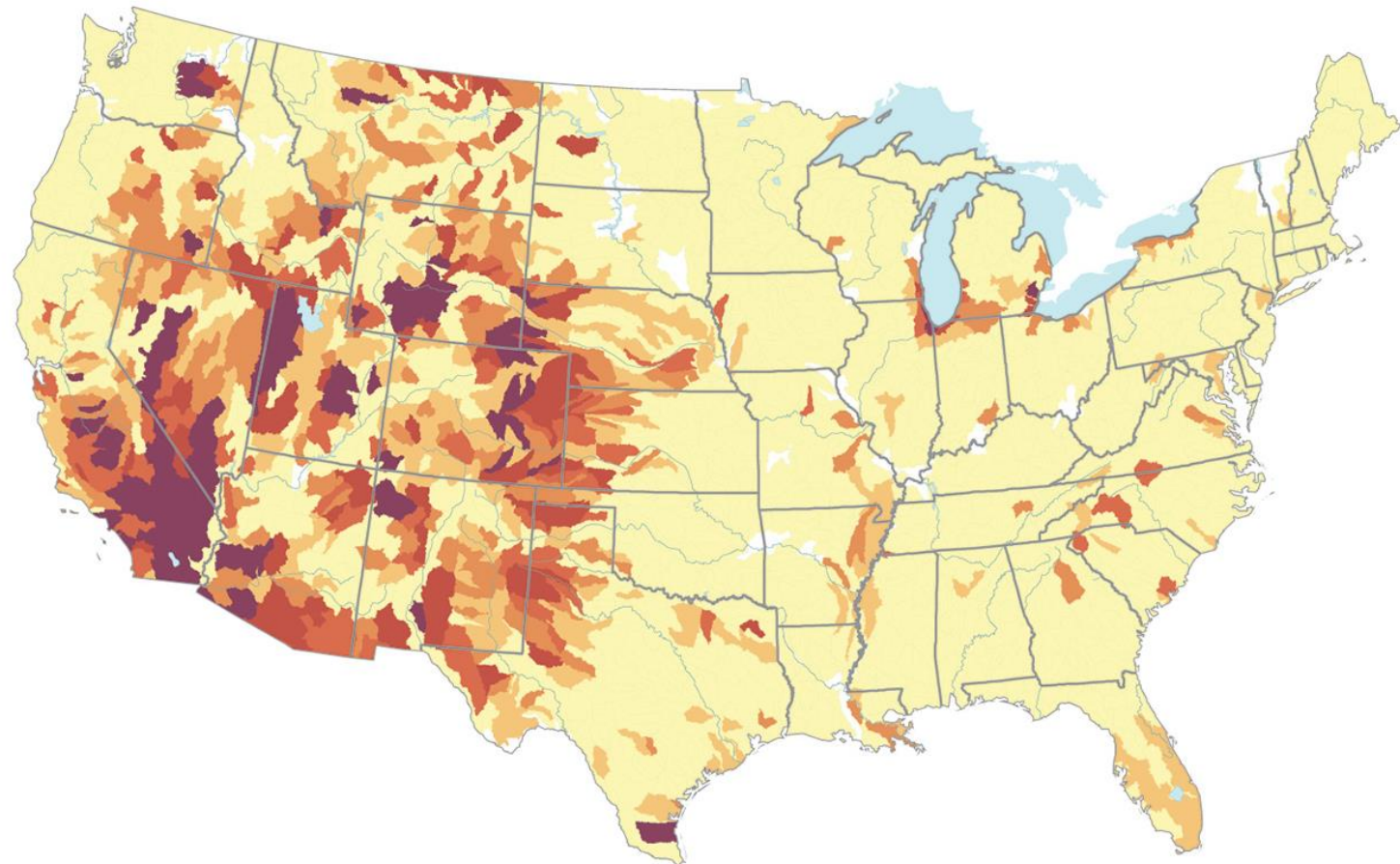
WATER



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Water Stress in the U. S.

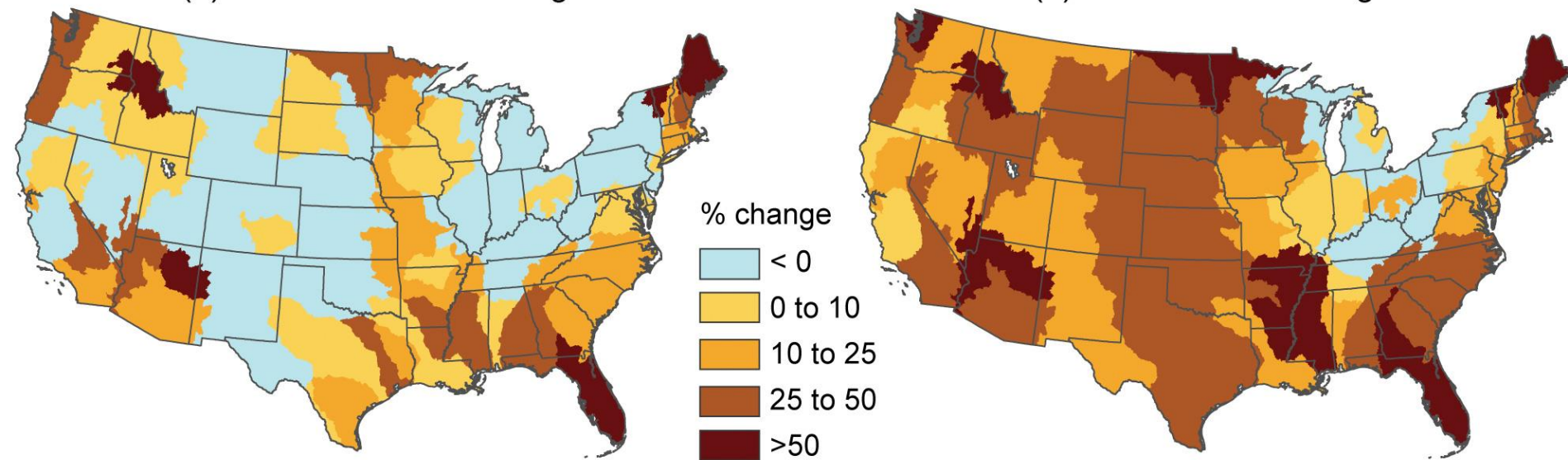




Projected Changes in Water Withdrawals

(a) Without Climate Change

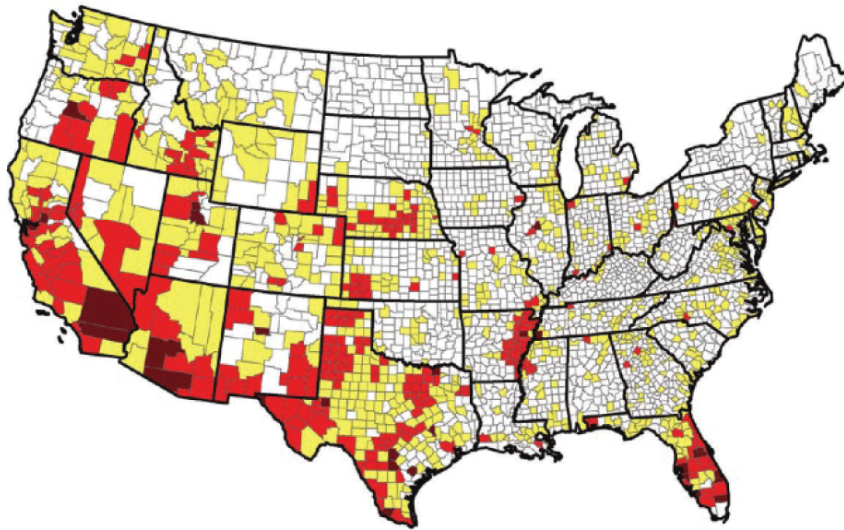
(b) With Climate Change



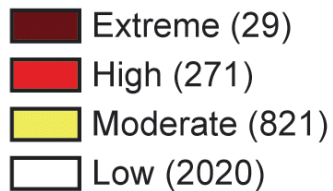


Water Supplies Projected to Decline

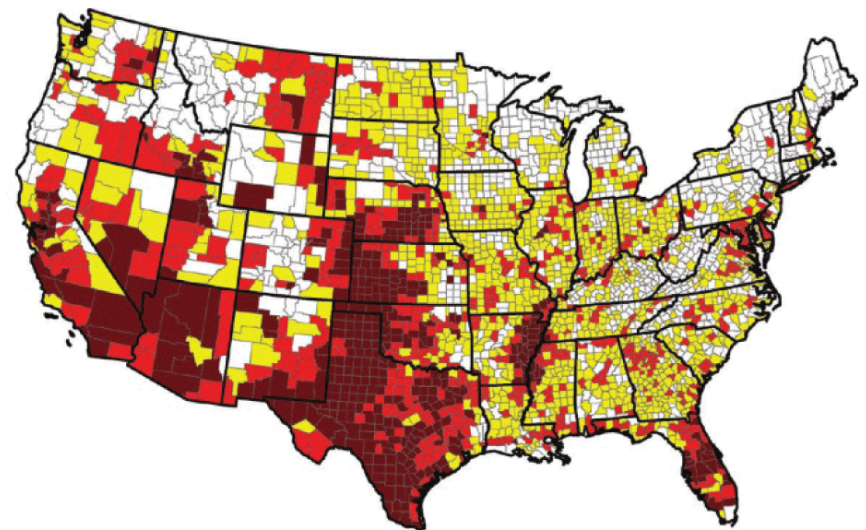
(a) No Climate Change Effects



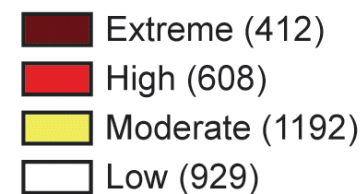
Water Supply Sustainability Risk Index (2050)



(b) Climate Change Effects

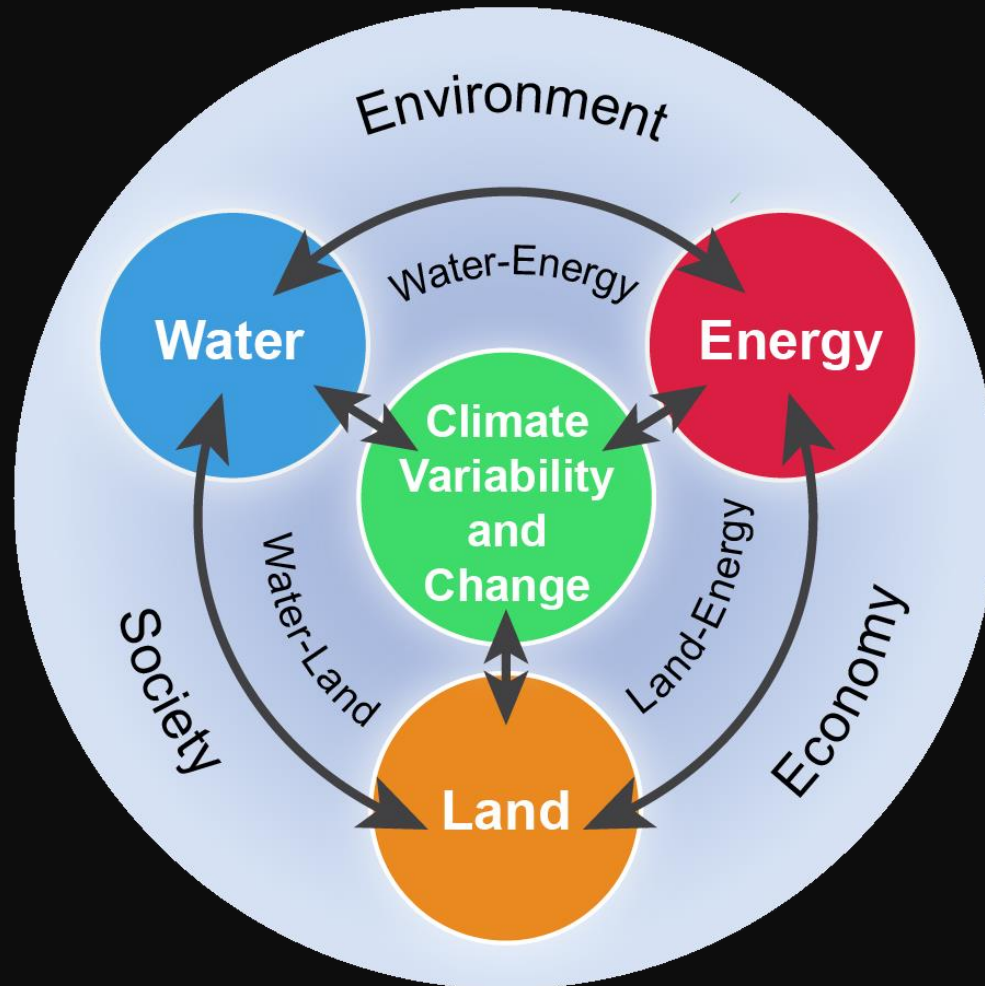


Water Supply Sustainability Risk Index (2050)





Energy, Water, Land, and Climate Interactions



AGRICULTURE

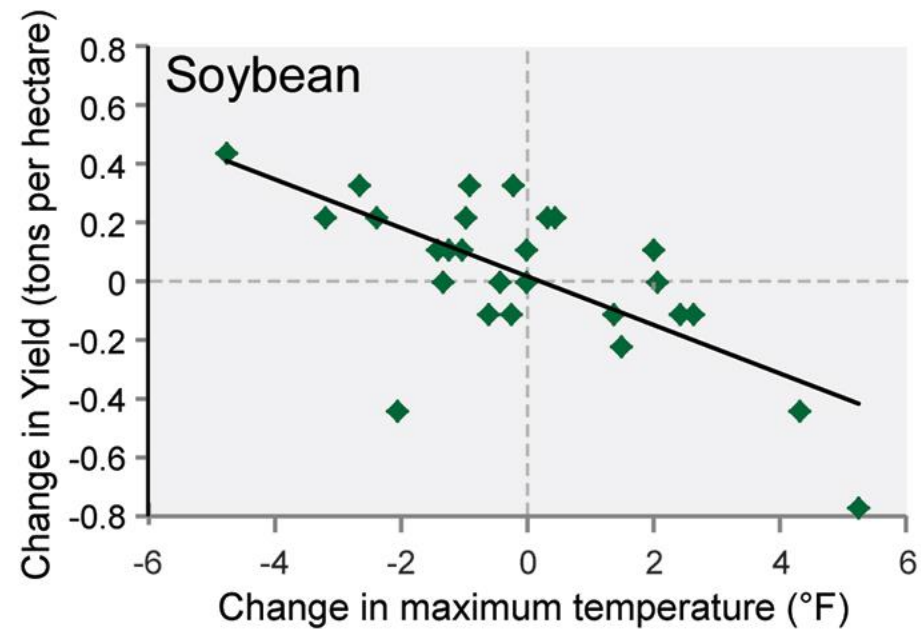
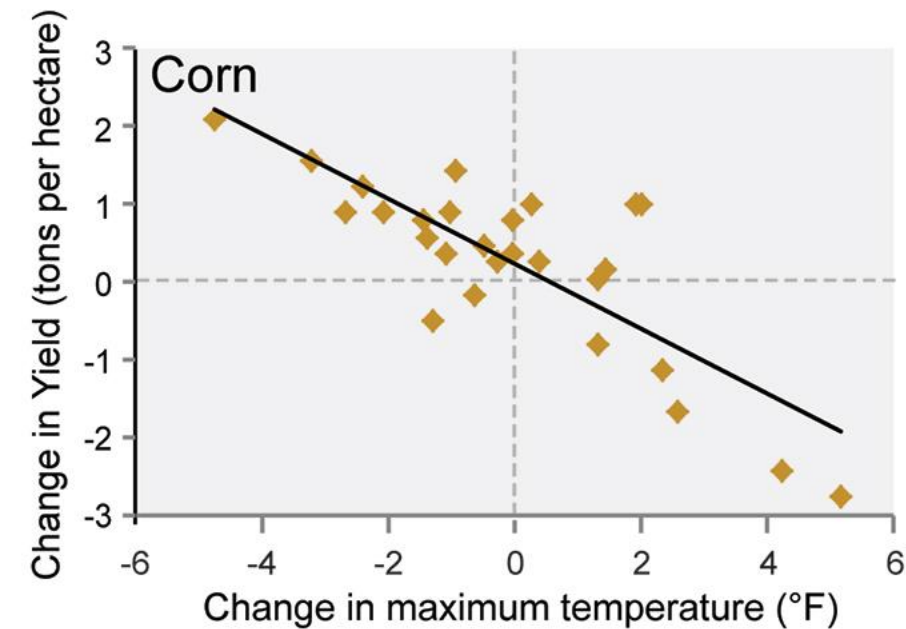


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Crop Yields Decline under Higher Temperatures



INDIGENOUS PEOPLES



Alaska Natives Face Multiple Climate Impacts



Ecosystems and Biodiversity • Forests • Land Use and Land
Cover Change • Biogeochemical Cycles

ECOSYSTEMS AND BIODIVERSITY

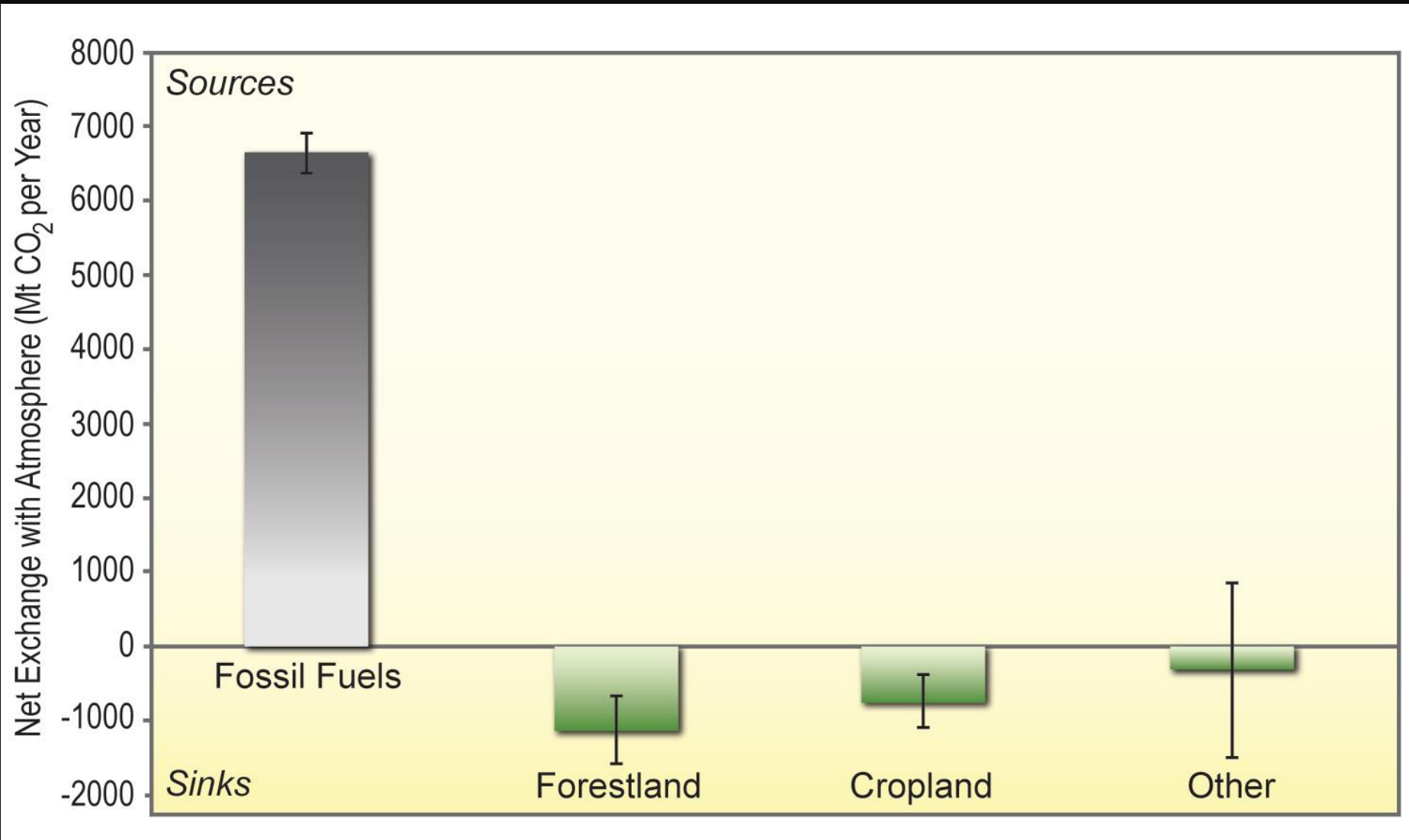


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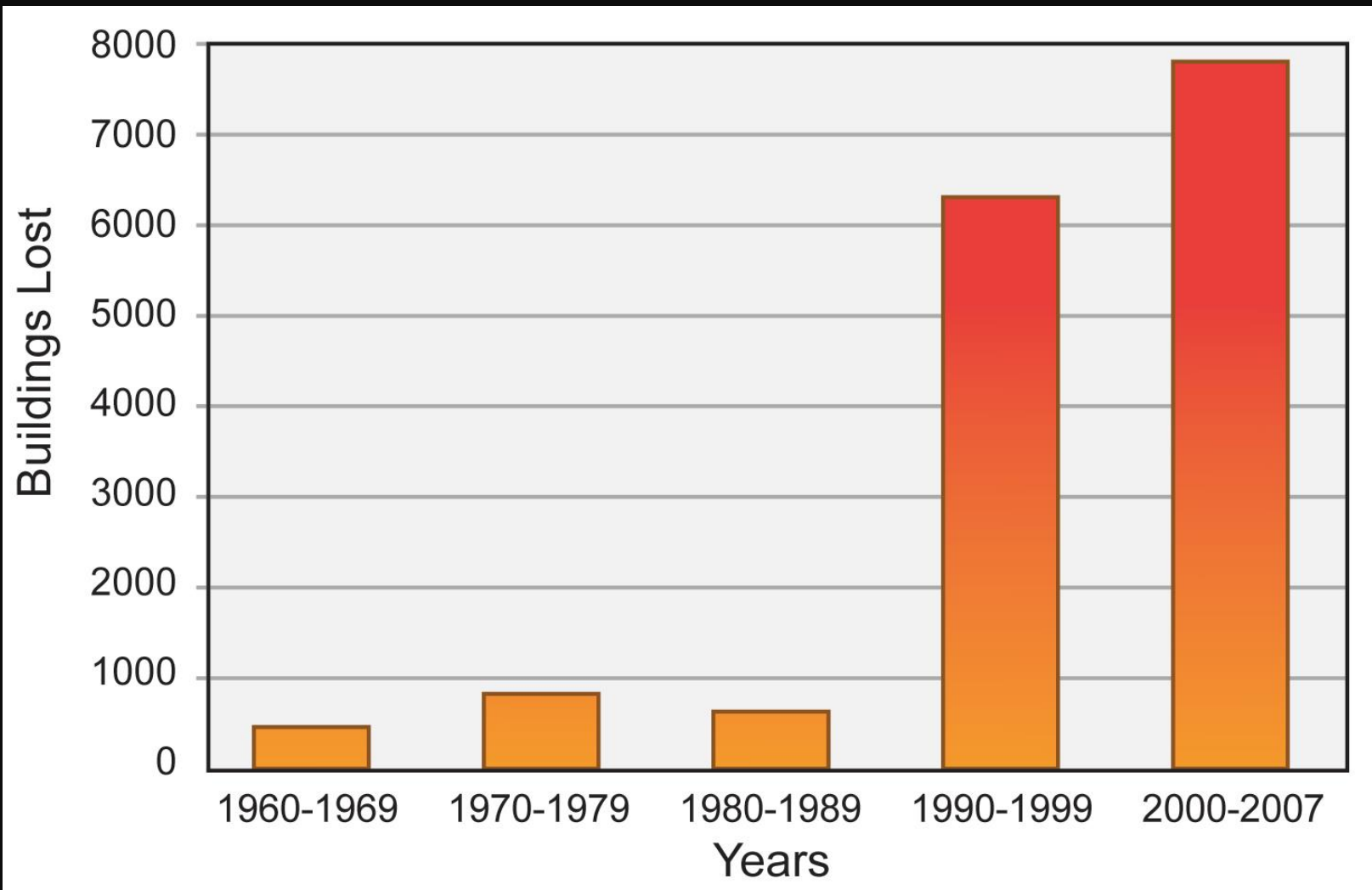


Major North American CO₂ Sources and Sinks





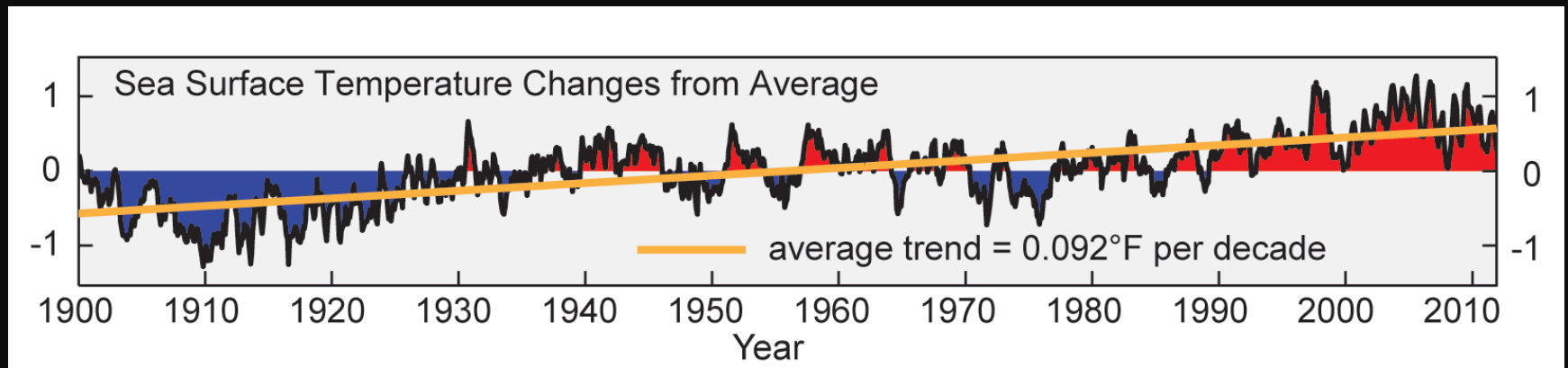
Building Loss by Fires at California Wildland-Urban Interfaces



OCEANS

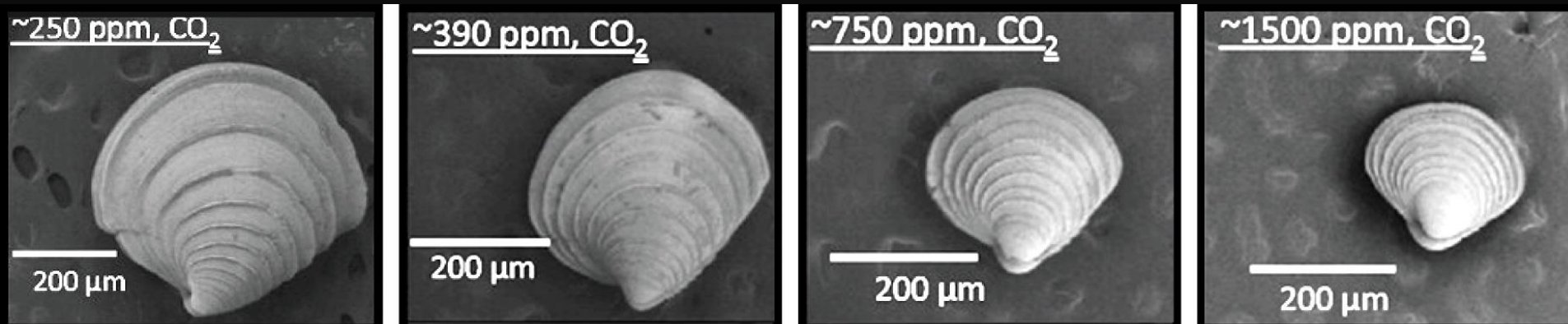


Observed Ocean Warming



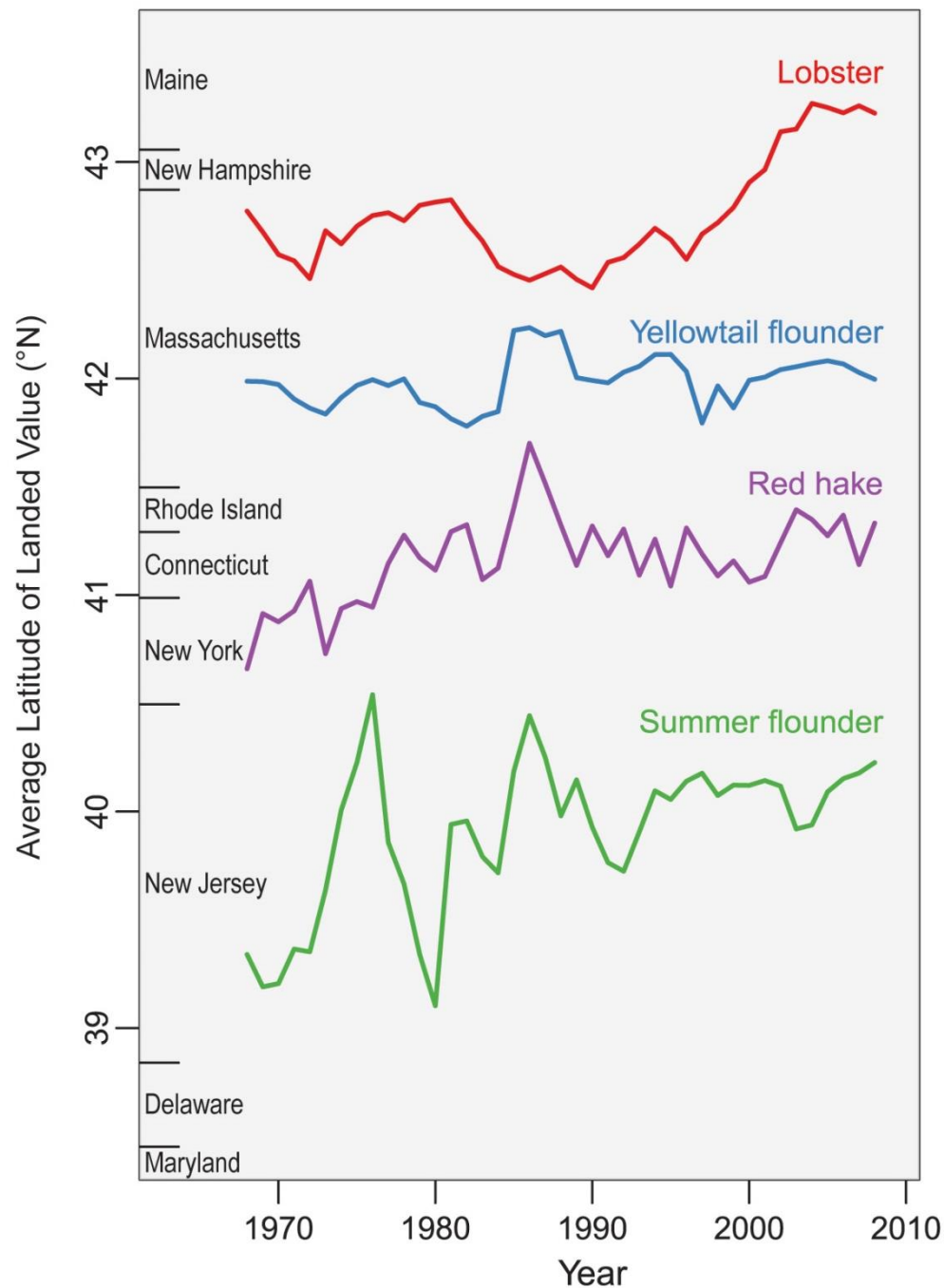


Ocean Acidification Reduces Size of Clams





Fisheries Shifting North



Decision Support • Mitigation • Adaptation

RESPONSES



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Mitigation



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Reducing Emissions





Increasing Efficiency





Adaptation



©Esperanza Stancioff, UMaine Extension and Maine Sea Grant



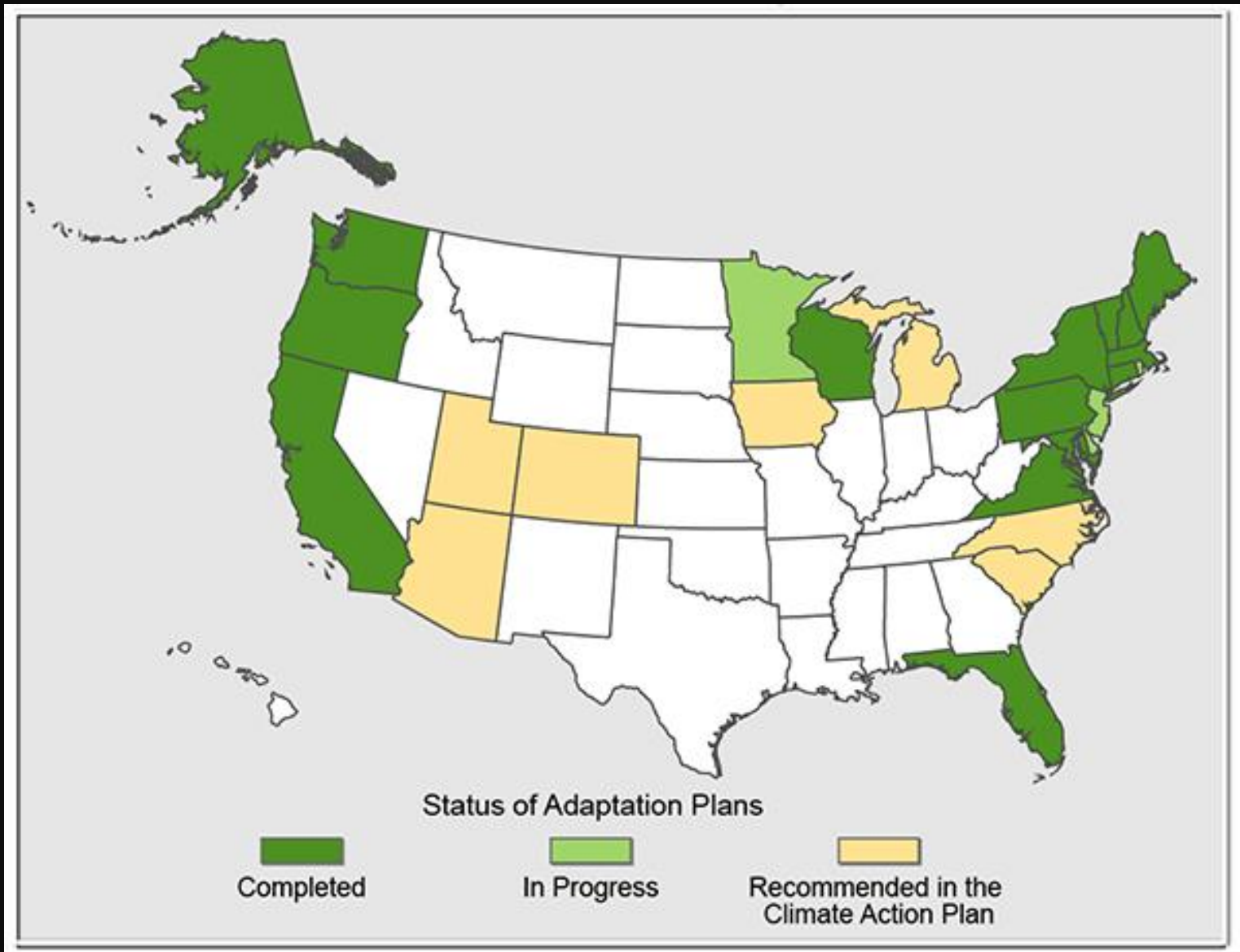
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FEMA photo by Wendell A. Davis Jr.



Status of State Adaptation Plans





The Southeast Florida Regional Compact



SUSTAINED ASSESSMENT

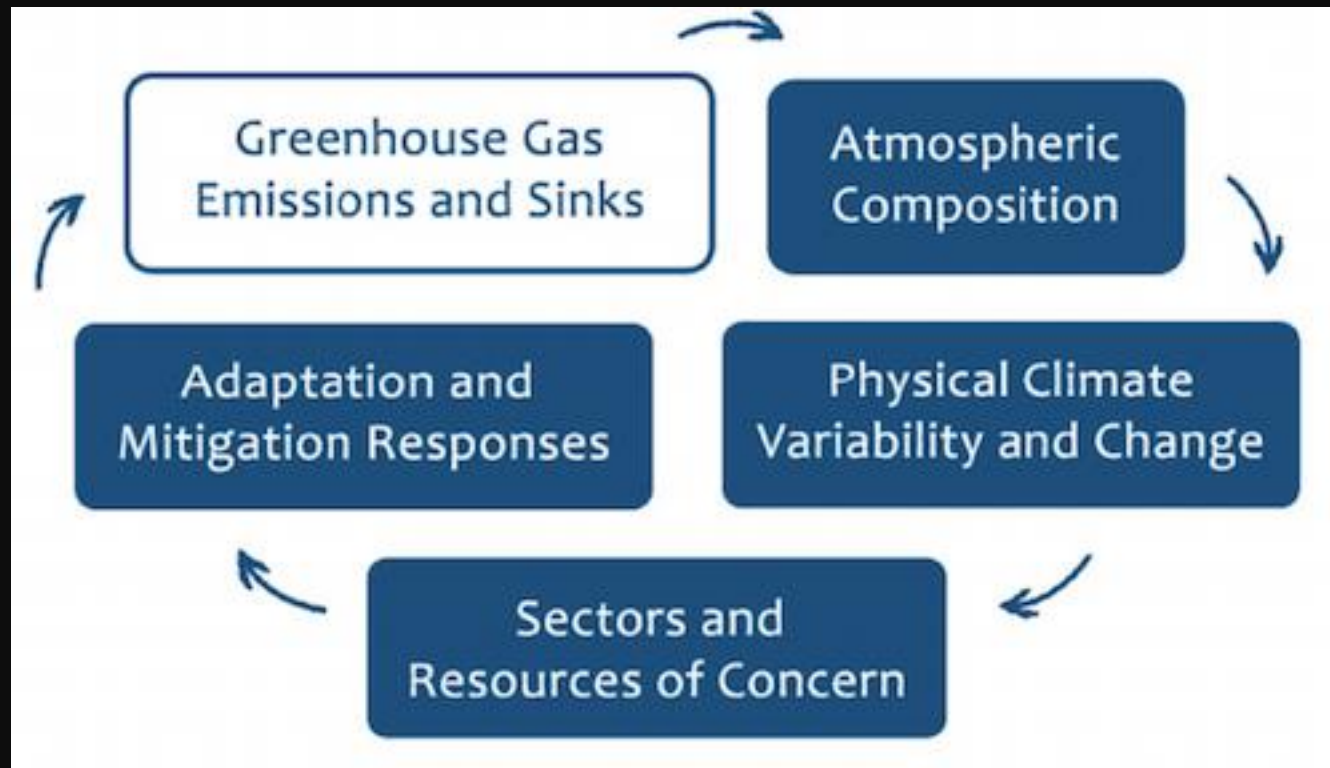


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Indicators System





Special and Foundational Reports

- Inform mitigation and adaptation activities
- Investigate emerging issues of concern
- Consider tradeoffs among different courses of action
- Test various types of data analyses and develop scenarios
- Respond to pressing stakeholder and government needs



NCAnet: Partners in Assessment

130+ partner organizations

- Professional societies
- Academic institutions and consortia
- Non-governmental organizations
- Local and state government departments
- Private sector

Online at

<http://ncanet.usgcrp.gov>

- Host events that leverage NCA
- Translate & share NCA with members and stakeholders
- Toolkit of materials related to USGCRP and the NCA

Third National Climate Assessment

Climate Change Impacts in the United States

<http://nca2014.globalchange.gov>

#NCA2014



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Susan Aragon-Long: saragonlong@usgcrp.gov



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