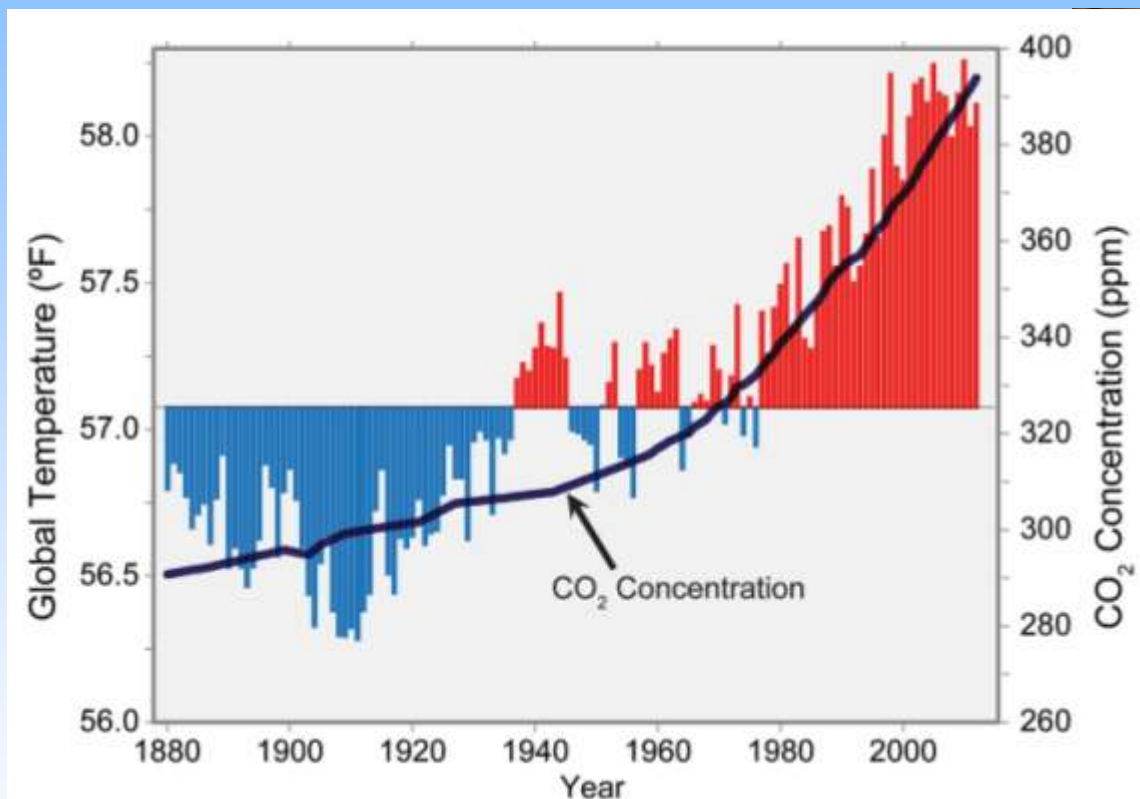


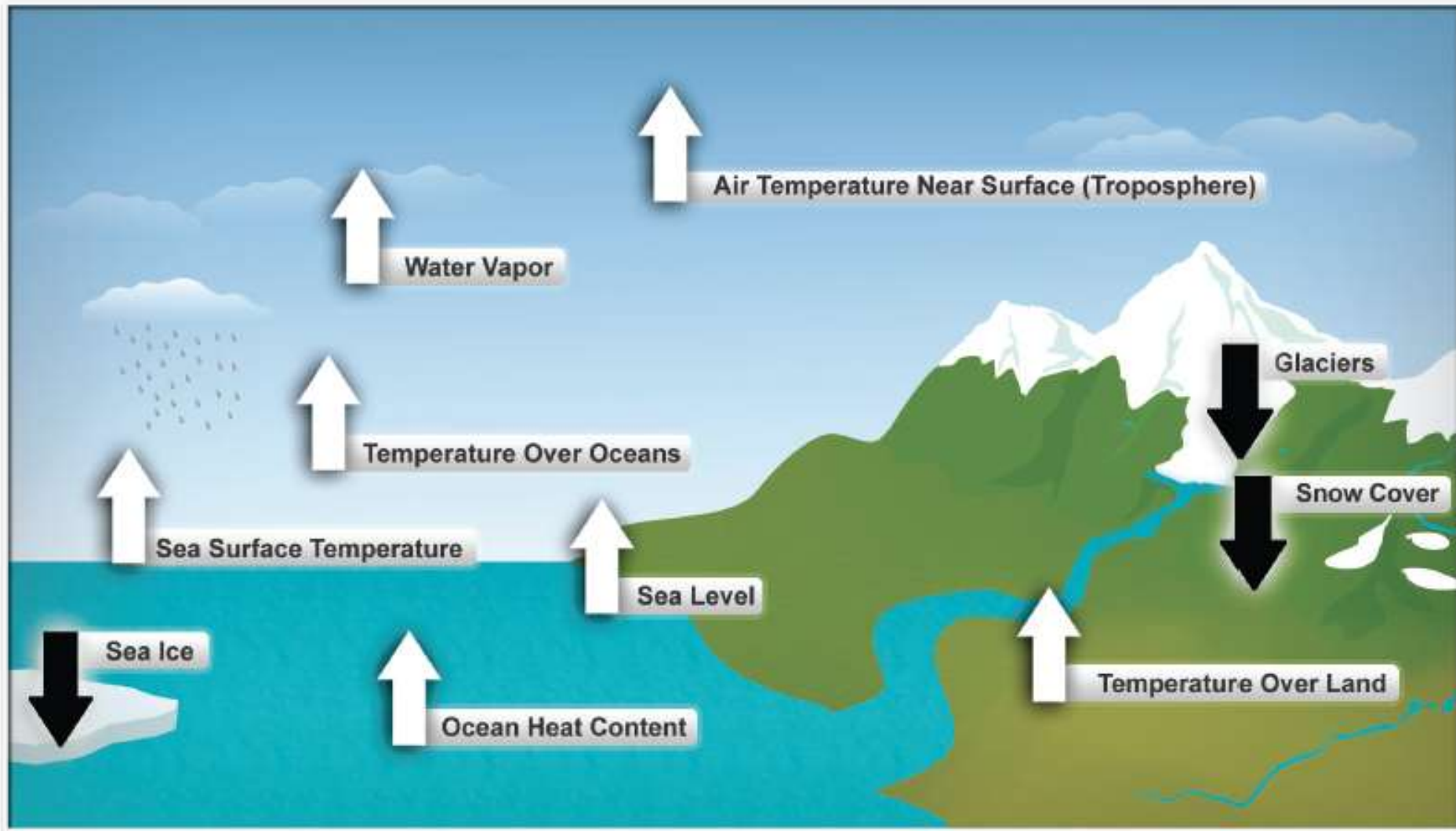
Regional Climate Change in New England: Update from the National Climate Assessment

Scott Doney, Woods Hole Oceanographic Institution

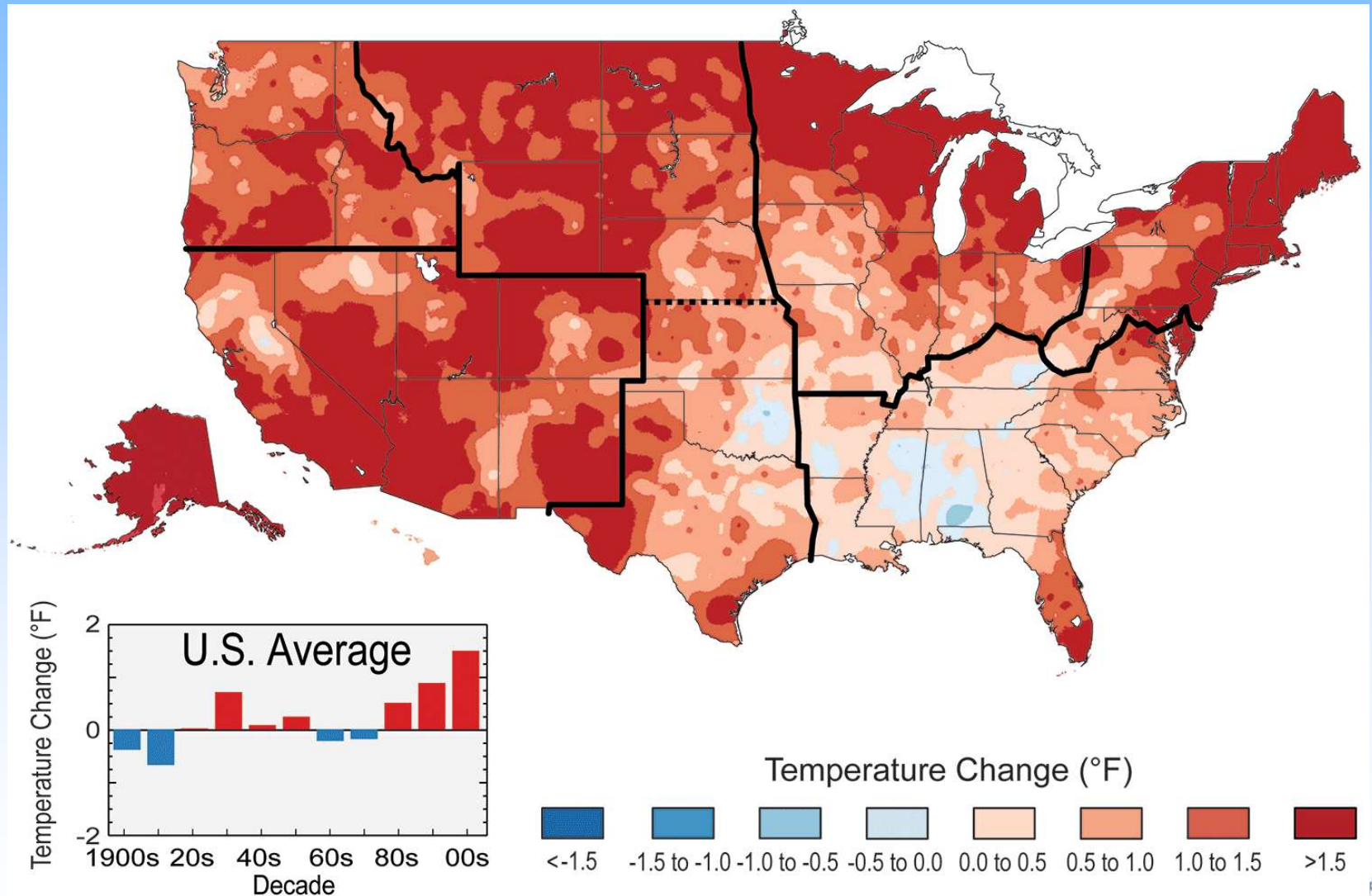


Global Climate is Changing Now

Ten Indicators of a Warming World

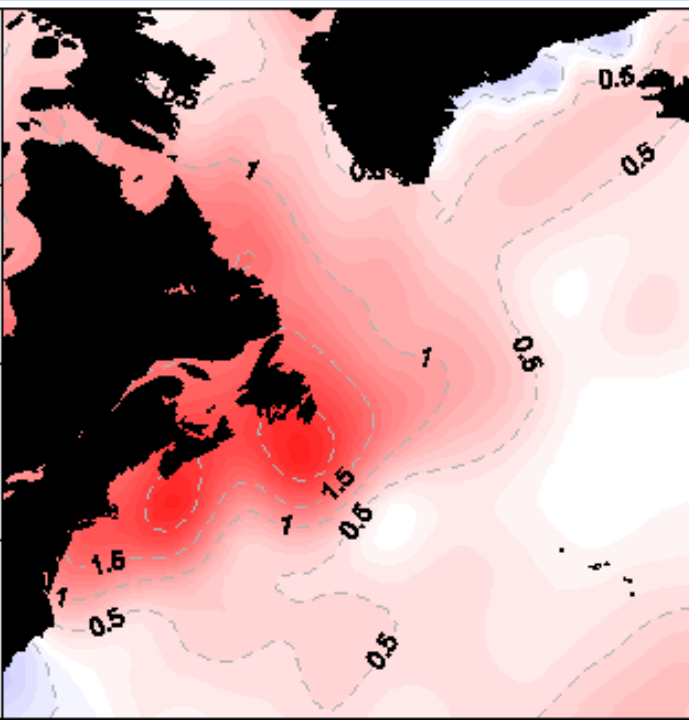


Observed U.S. Temperature Change

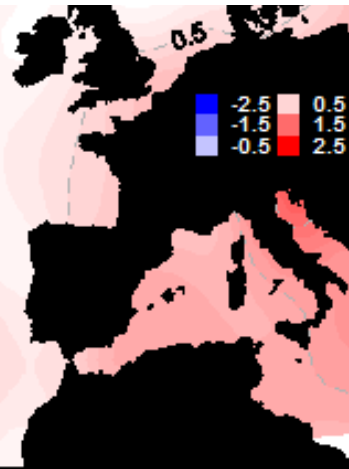
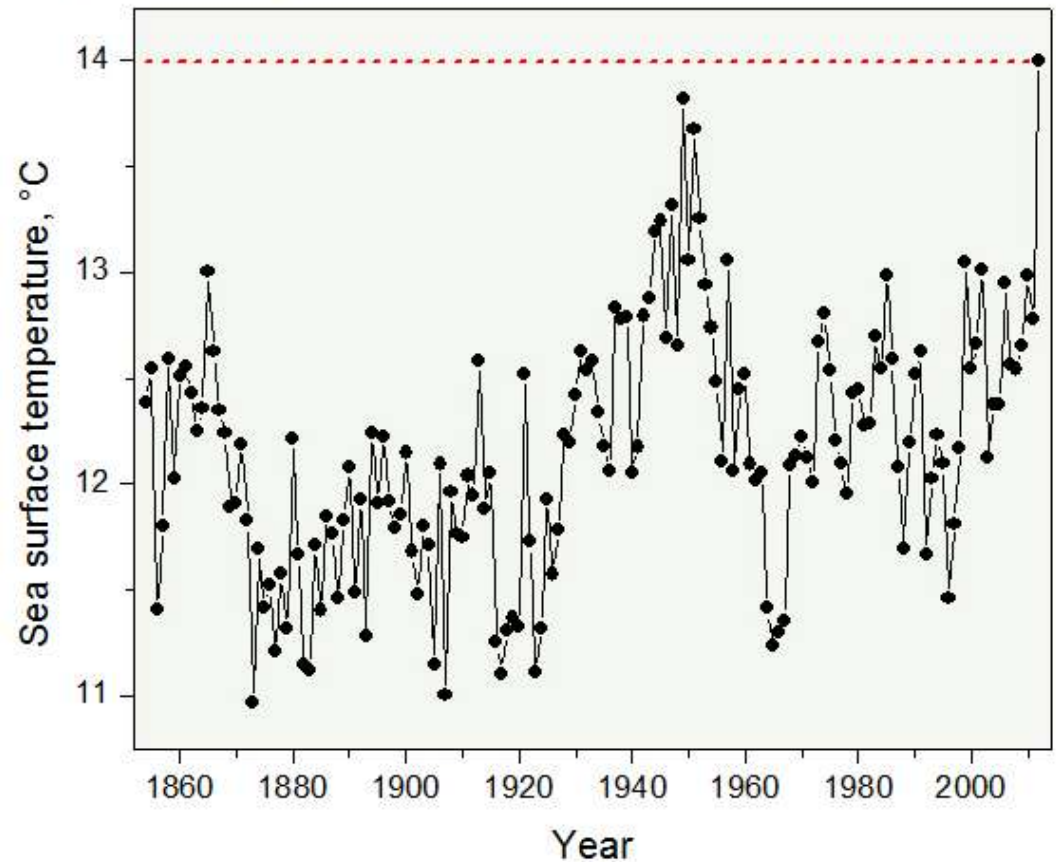


Northeast Shelf Ecosystem

2012 Sea Surface Temperature Anomalies



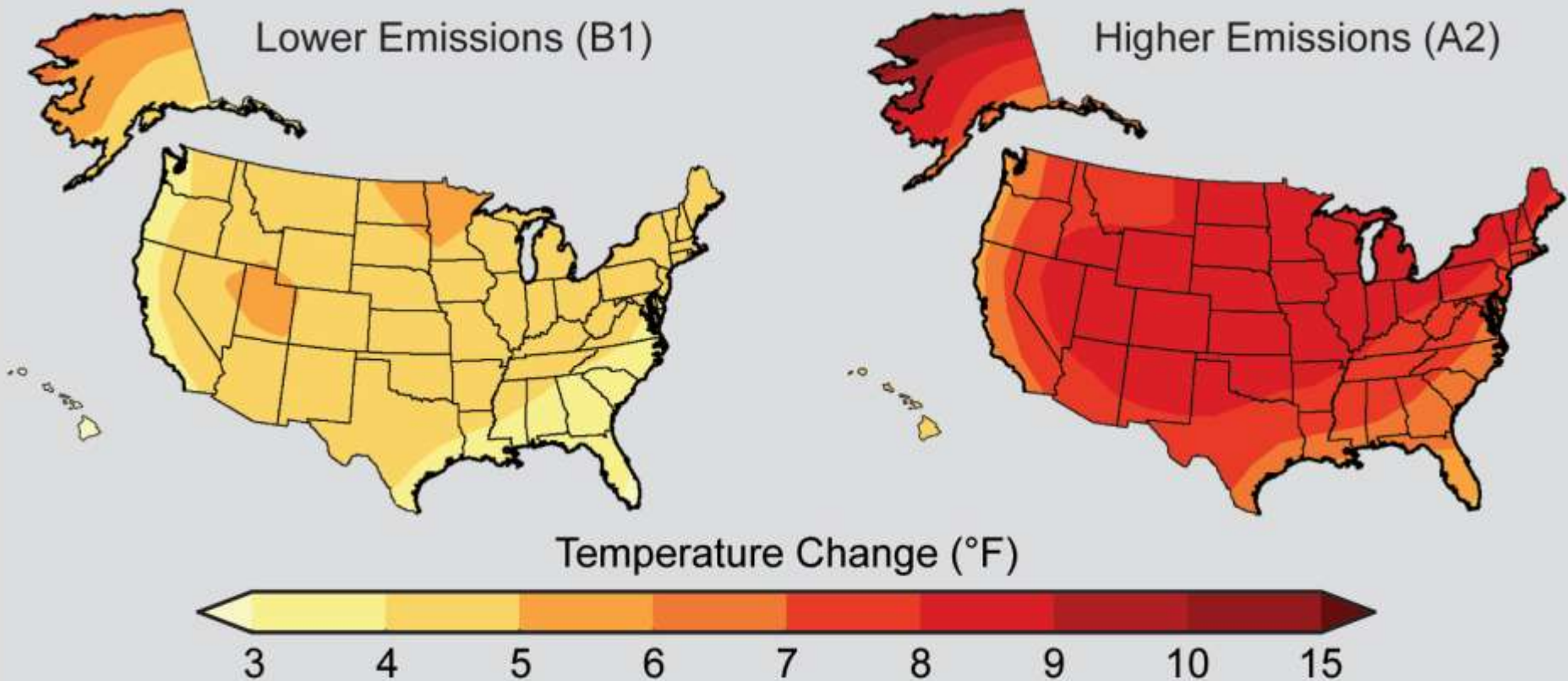
Long-Term Temperature Trends for the Northeast Shelf Ecosystem



Ecosystem Advisory
Northeast Fisheries Science
Center, NMFS

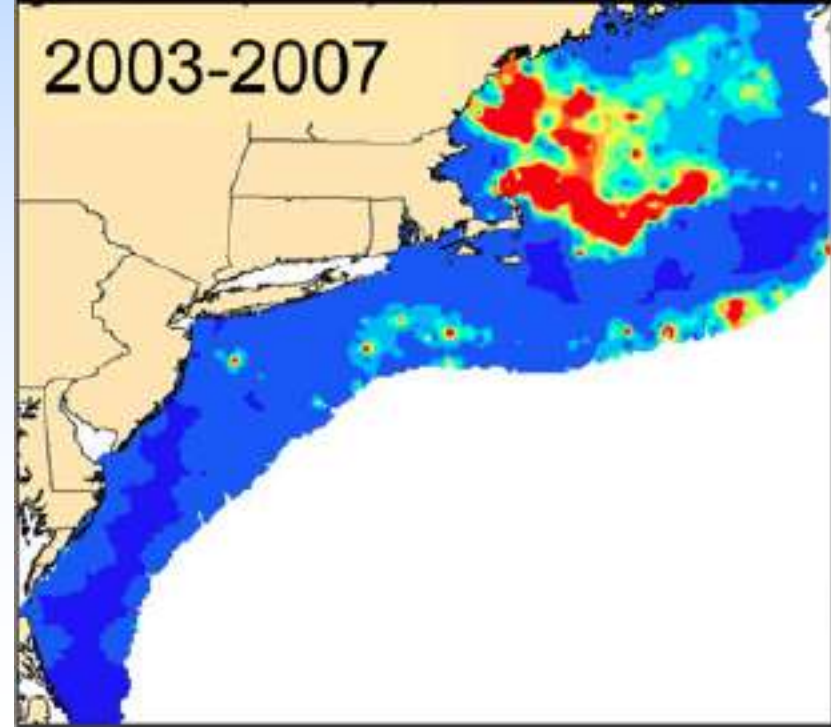
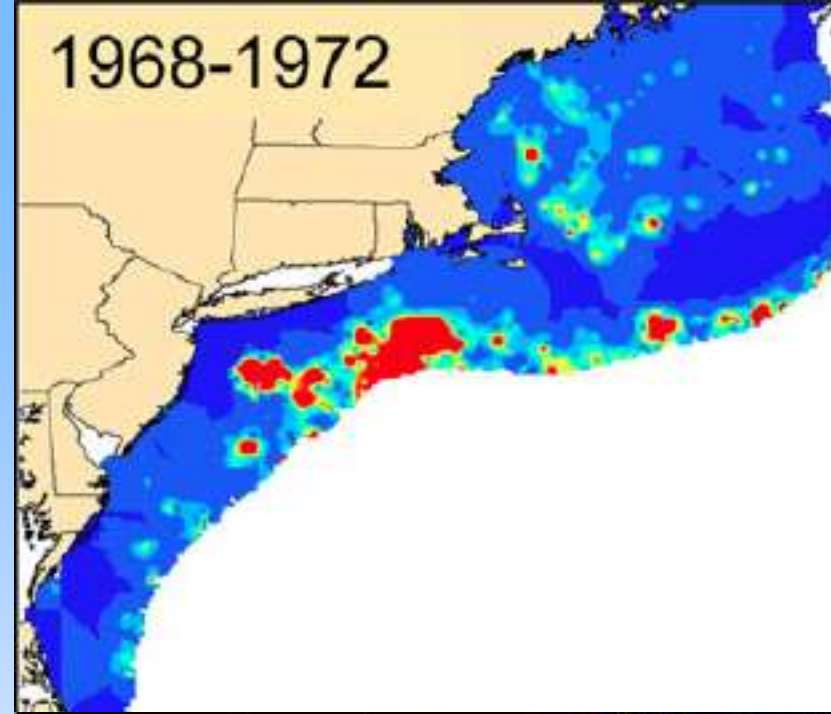
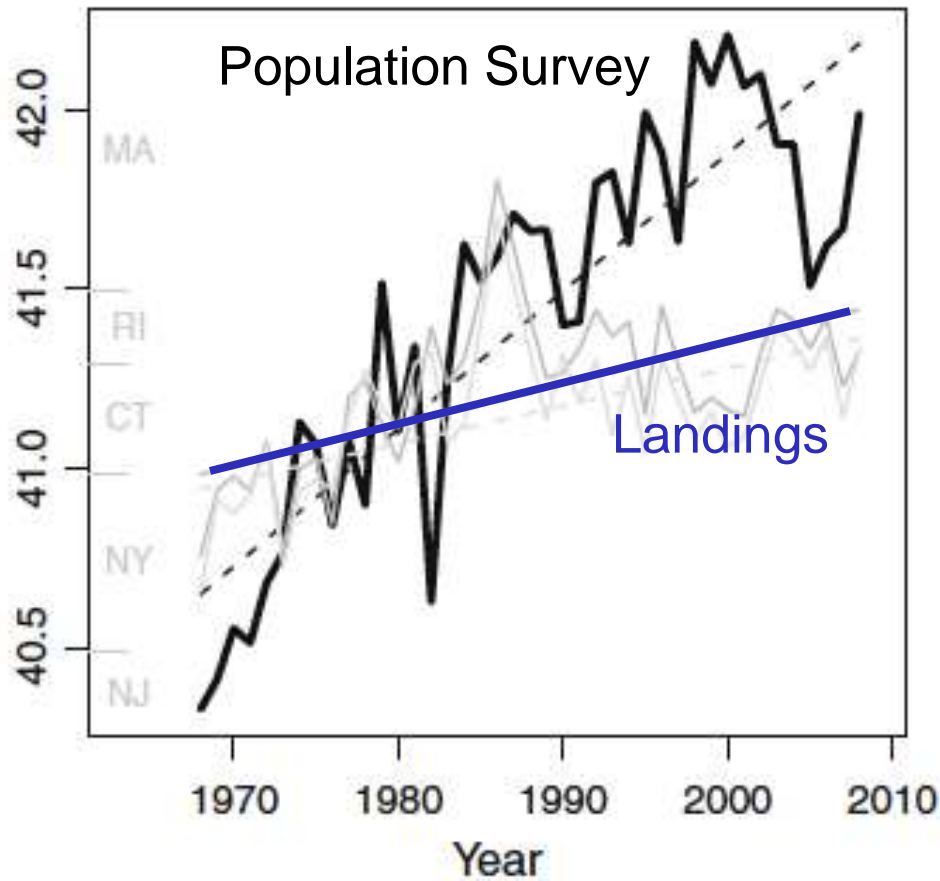


Projected Temperature Change



Poleward Range Shifts in Marine Species

Red Hake



Nye et al. MEPS 2010

Pinsky & Fogarty Climatic Change 2012

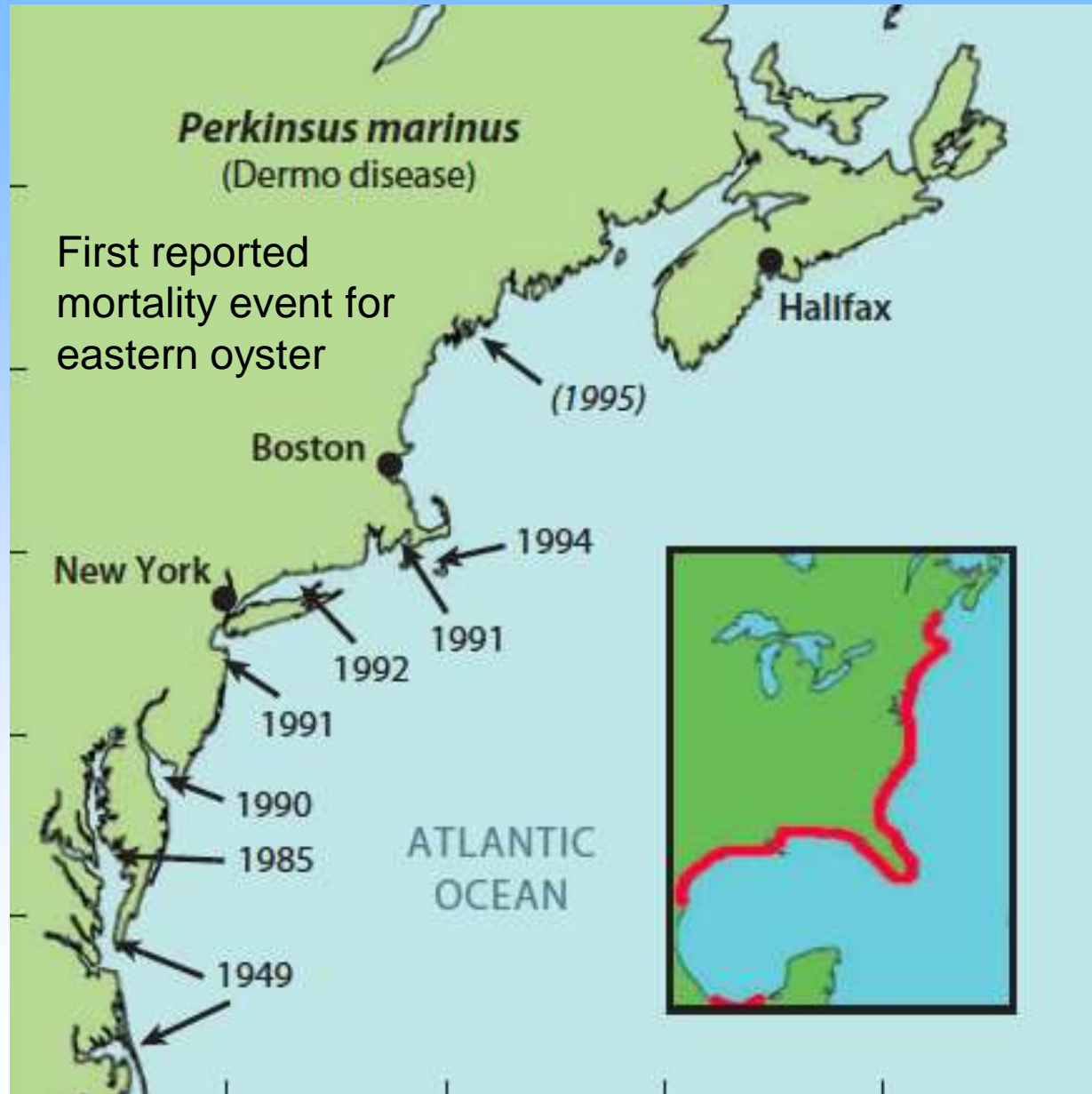
Regional Fisheries Impacts

Species	Direction of Impact
Atlantic cod (<i>Gadus morhua</i>)	Negative
Atlantic croaker (<i>Micropogonias undulatus</i>)	Positive
Atlantic lobster (<i>Homarus americanus</i>)	Ambiguous, but perhaps more negative
Atlantic sea scallop (<i>Placopecten magellanicus</i>)	Negative
Blue crab (<i>Callinectes sapidus</i>)	Negative

Table 4-4. Known or expected direction of social and economic impacts on some major northeast commercial and recreational species (based on Hare et al., 2010; Fogarty et al., 2008; Frumhoff et al., 2007).

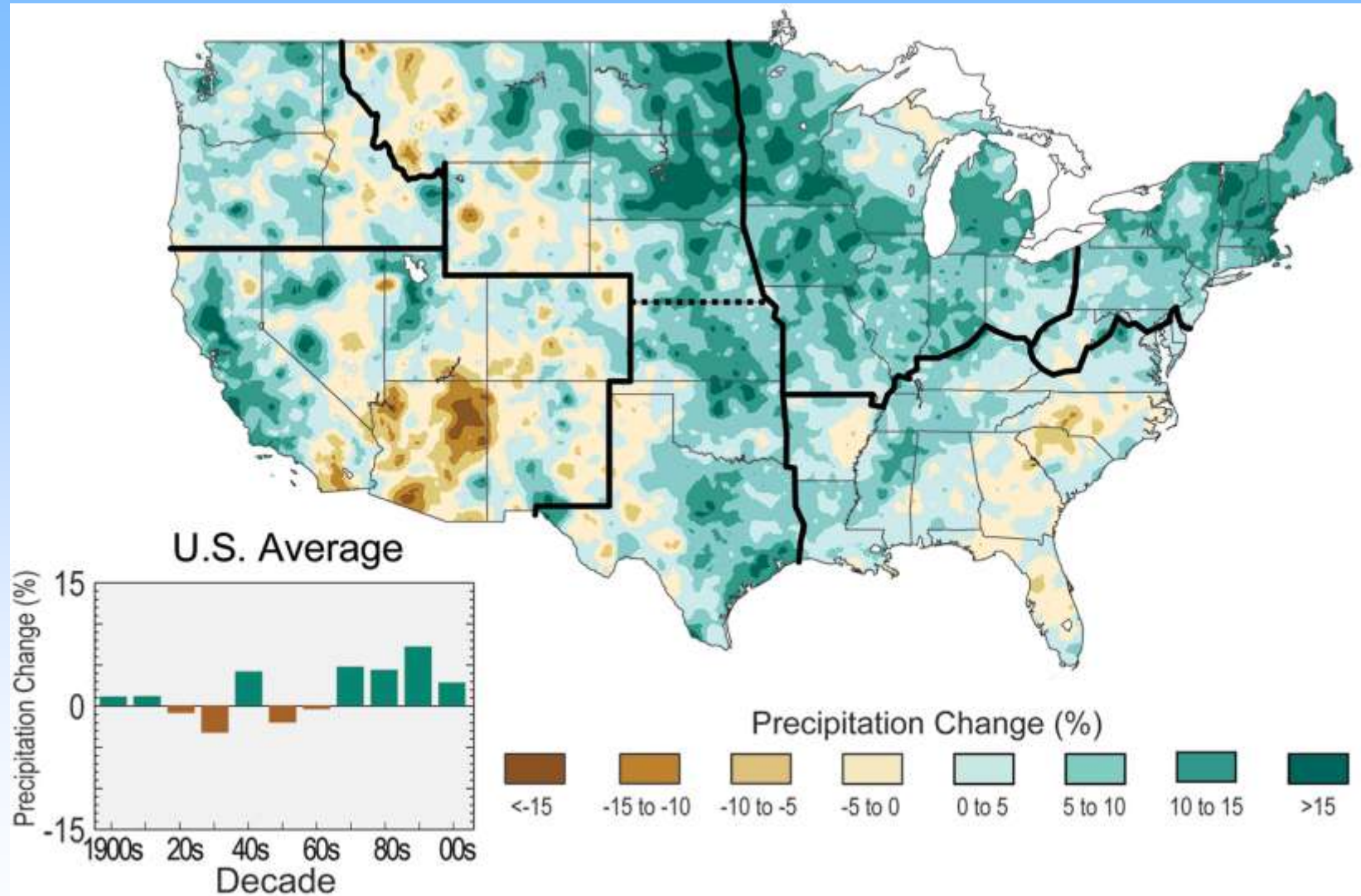
Griffis & Howard,
National Climate
Assessment
Marine Resources
Technical Input (2012)

Climate Warming & Marine Diseases



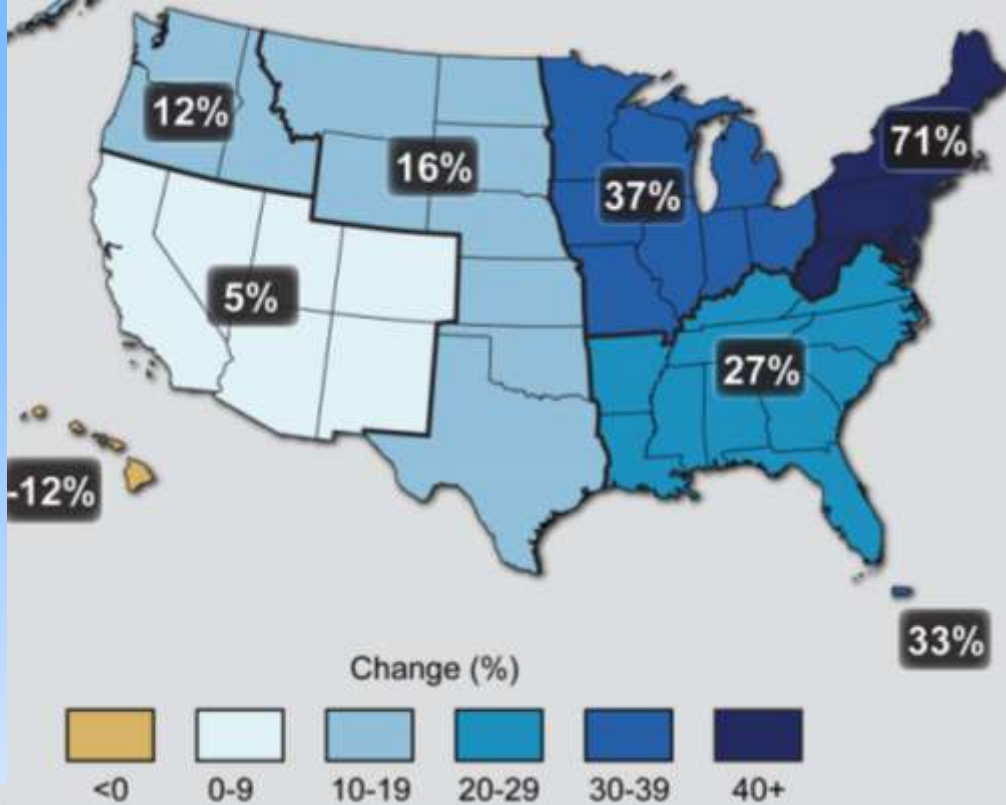
Burge et al.
Ann. Rev. Marine Sci.
2014

Observed U.S. Precipitation Change



More Intense Precipitation Events & Flooding in Northeast

Observed Change in Very
Heavy Precipitation

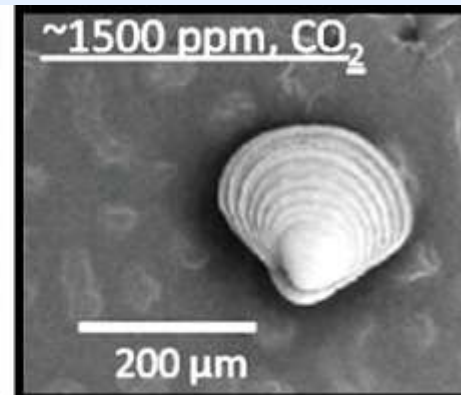
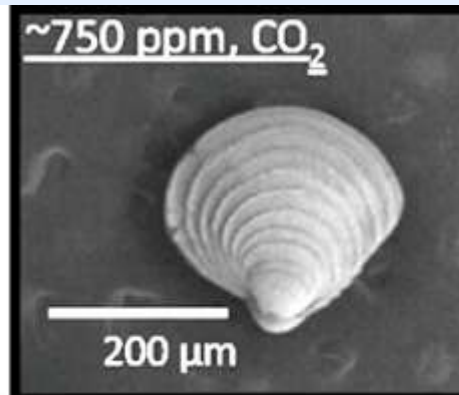
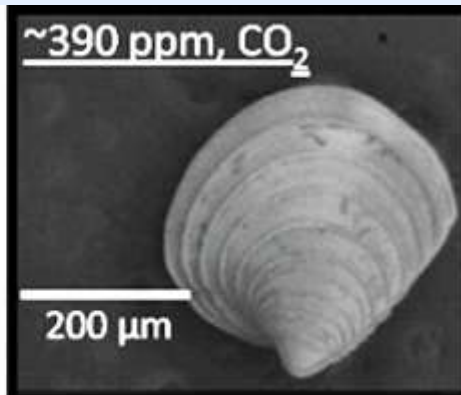
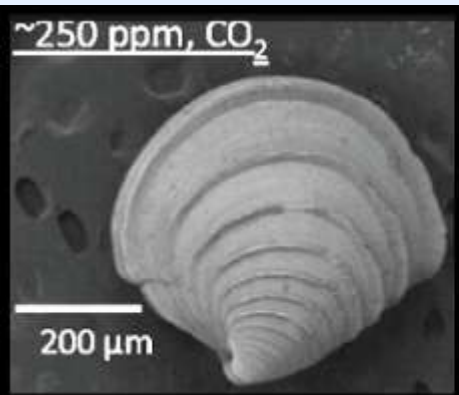
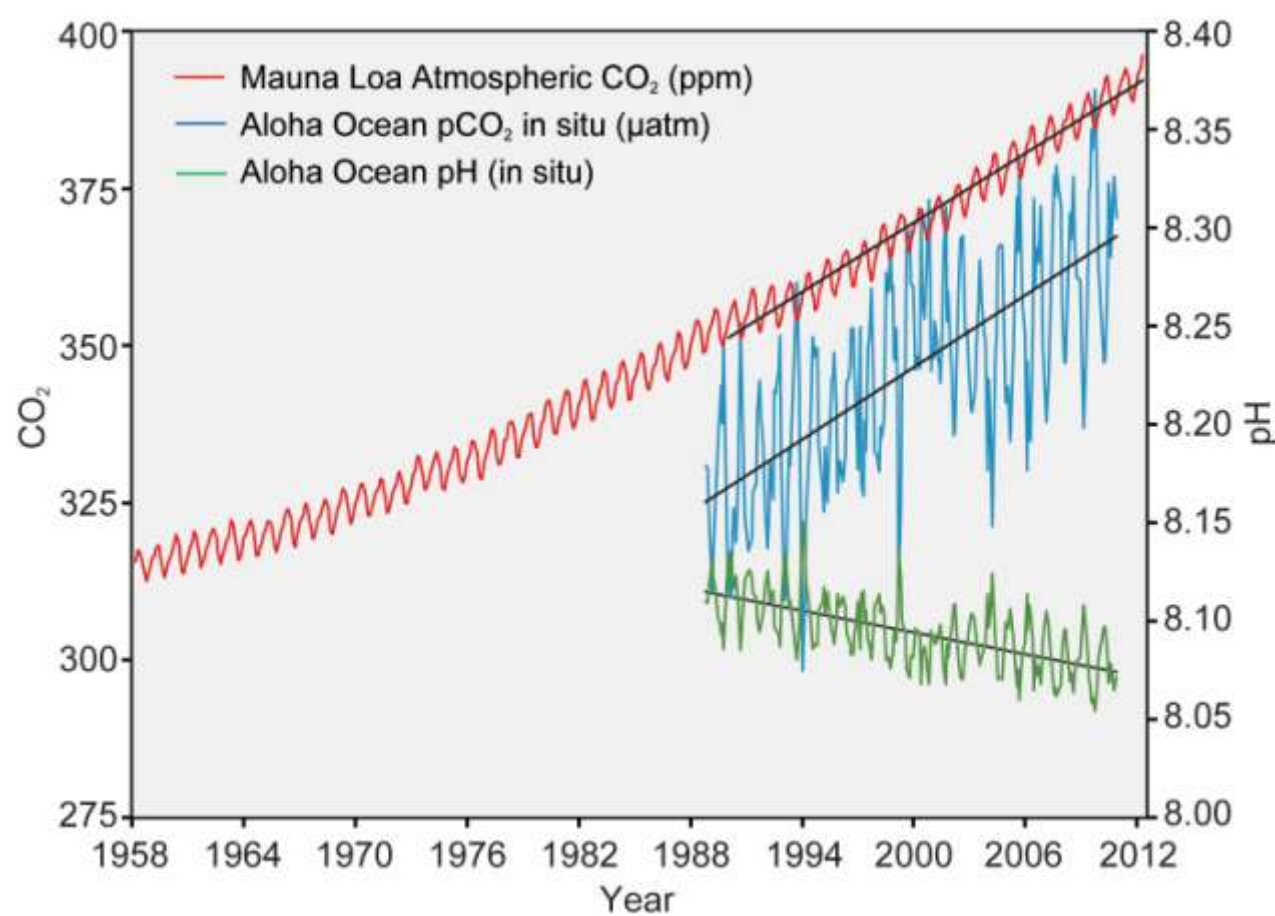


Observed U.S.
Flooding

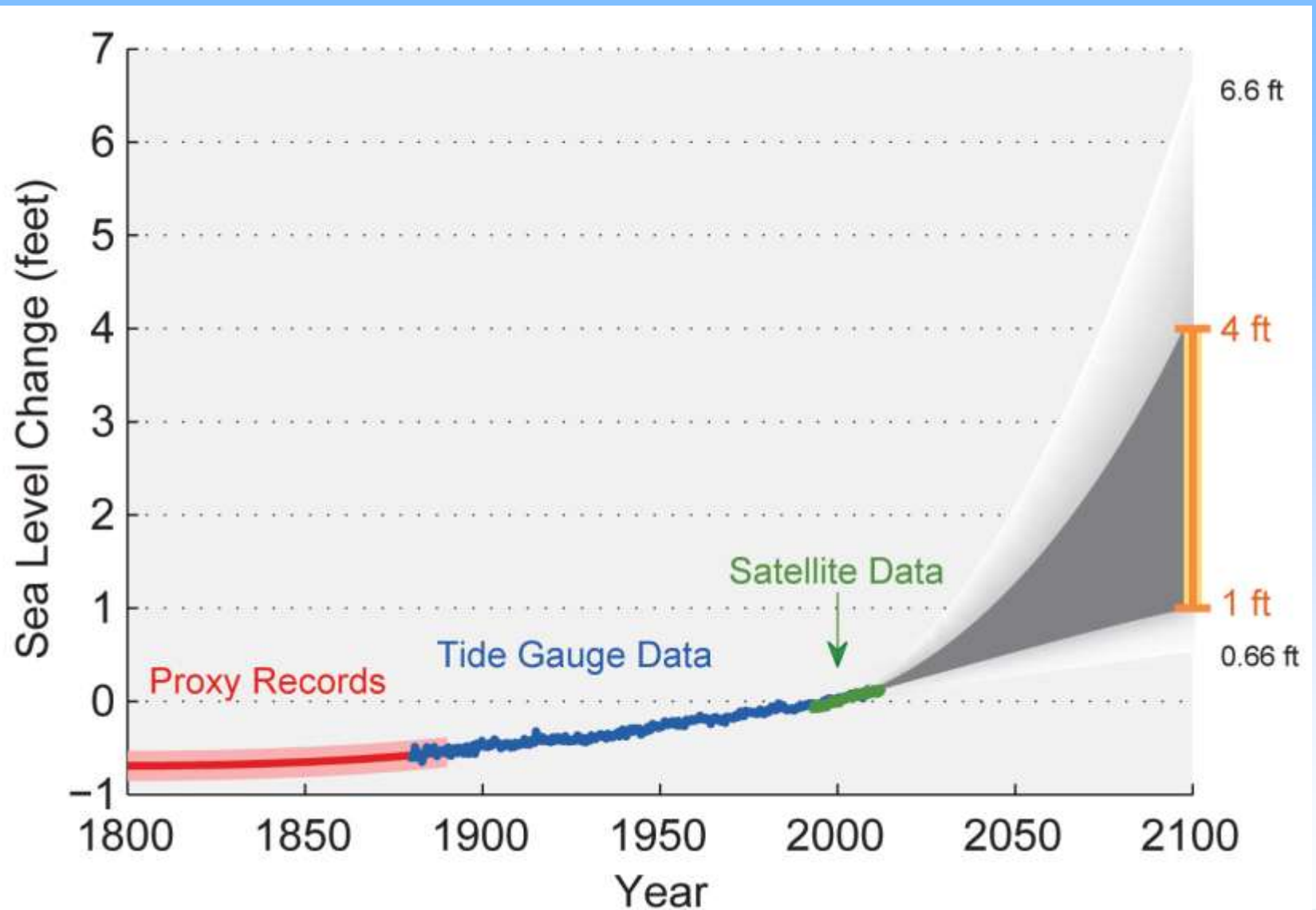


Oceans Absorb CO₂ & Become More Acidic

Ocean acidification reduces size of clams

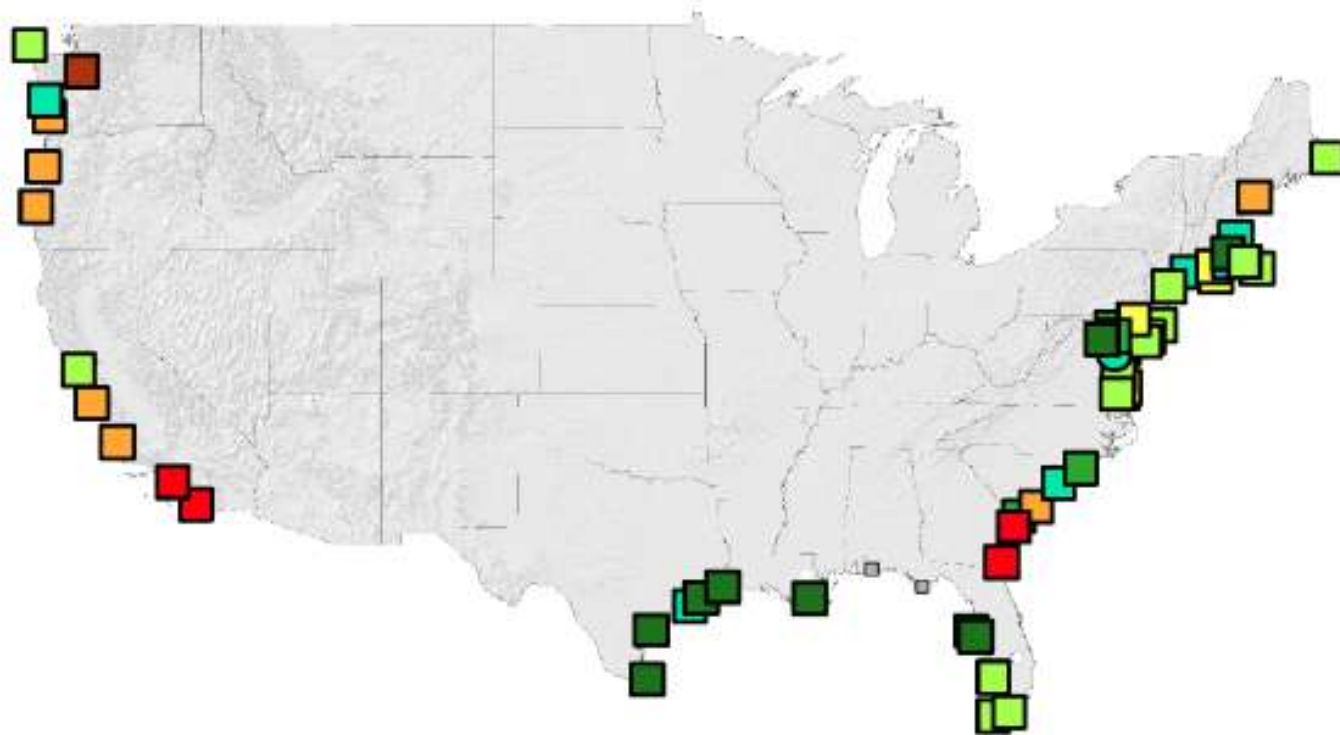


Past and Projected Changes in Global Sea Level

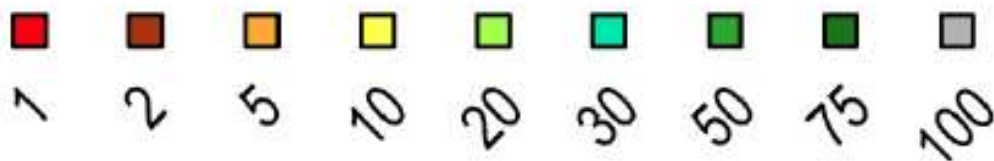


Revised Return Time for Current 100-Year Event

Sea-level Rise & Storm Surge



100-year event return time (years)



Ocean Benefits & Adaptation

Climate Change Process

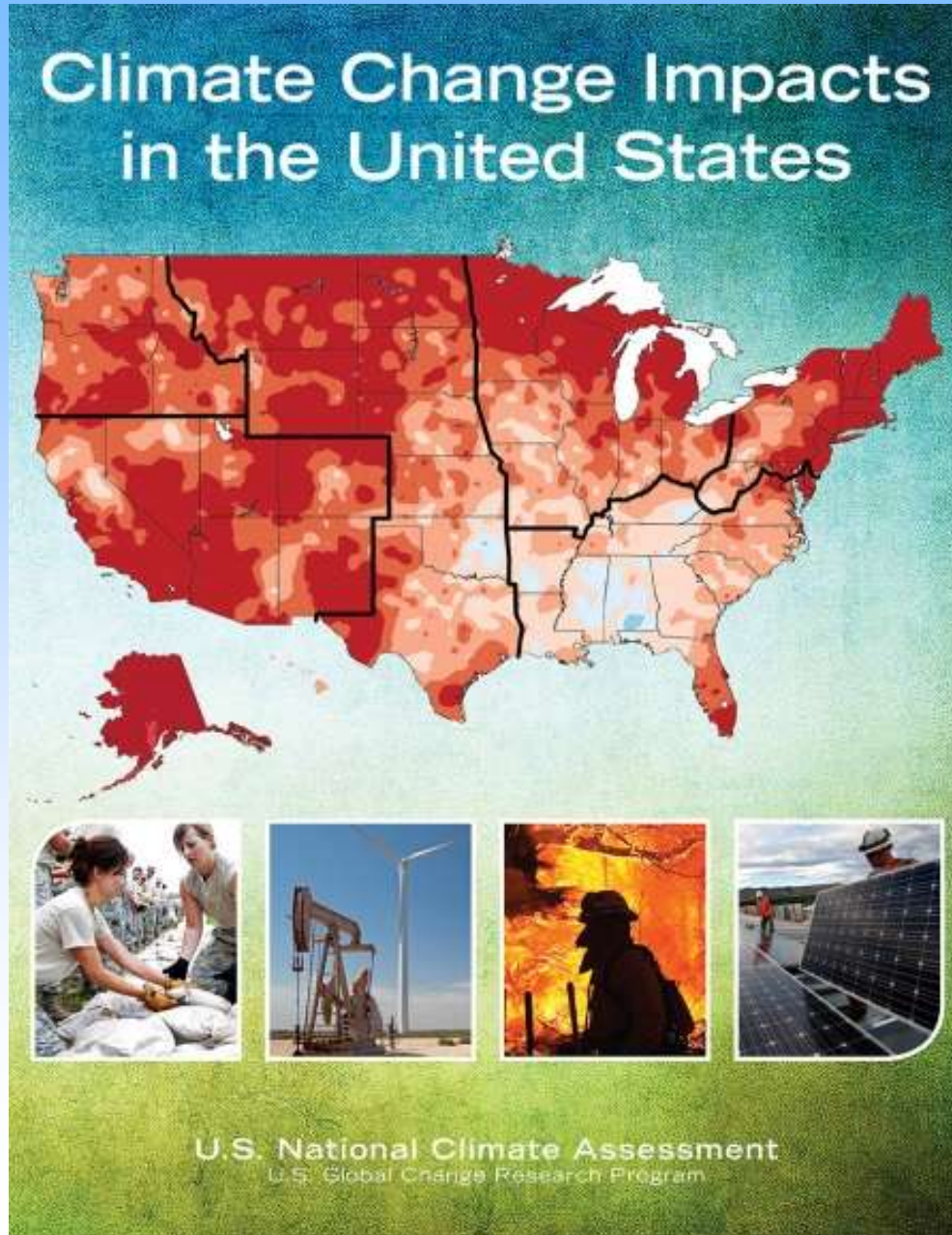
Ocean Benefit

Proposed Action



Ruckleshaus, Doney et al.
Marine Policy 2013

Third National Climate Assessment

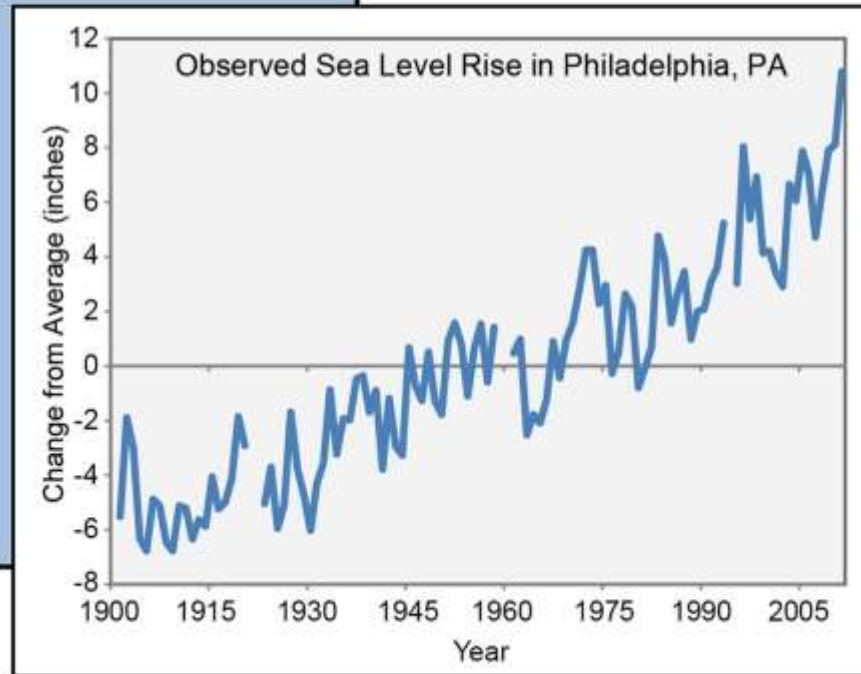
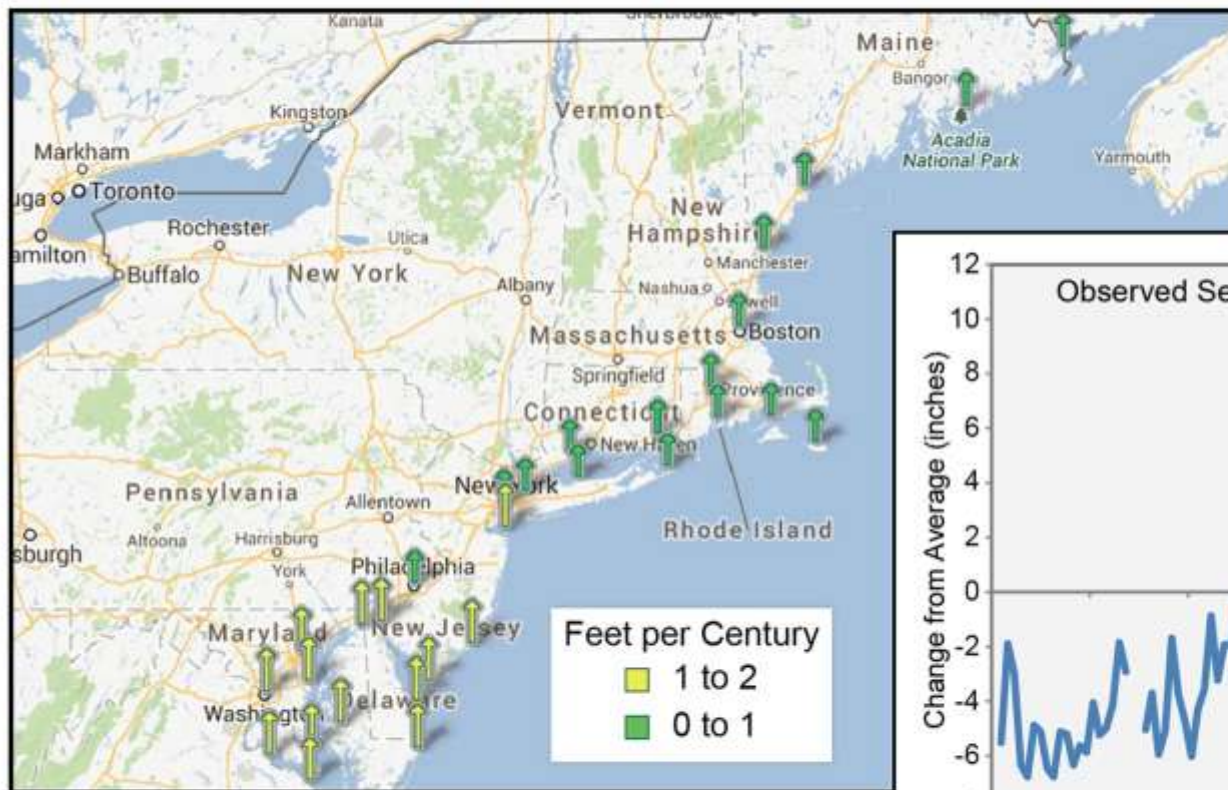


<http://nca2014.globalchange.gov>



Extra Slides

Sea Level is Rising

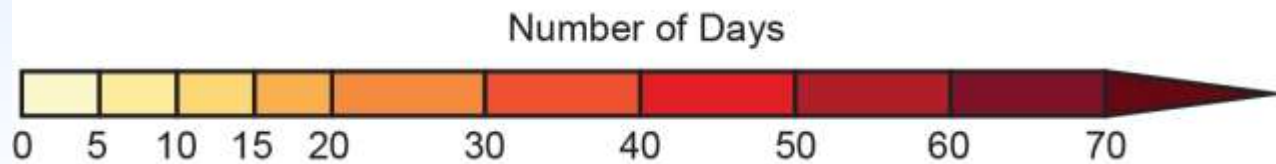
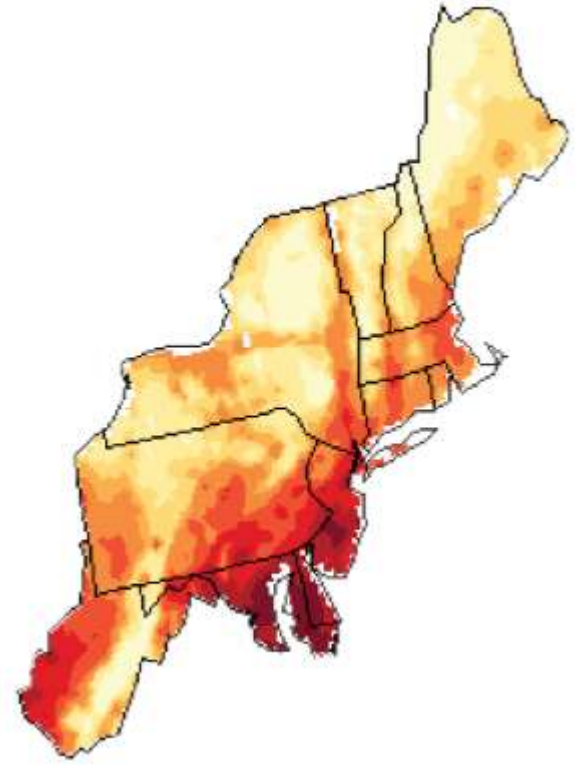
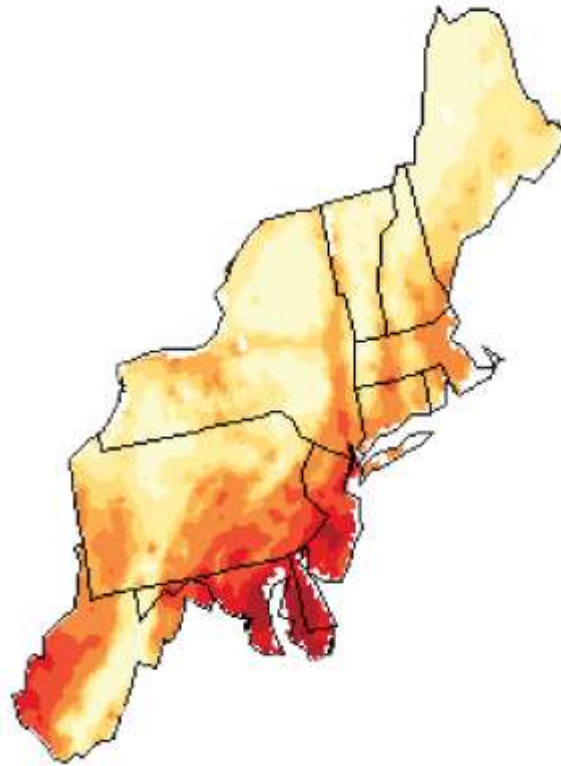
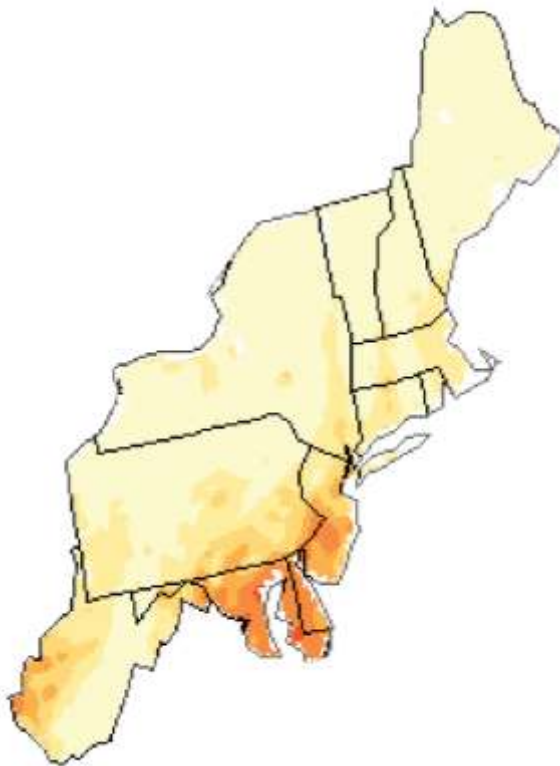


Projected Number of Days over 90° F

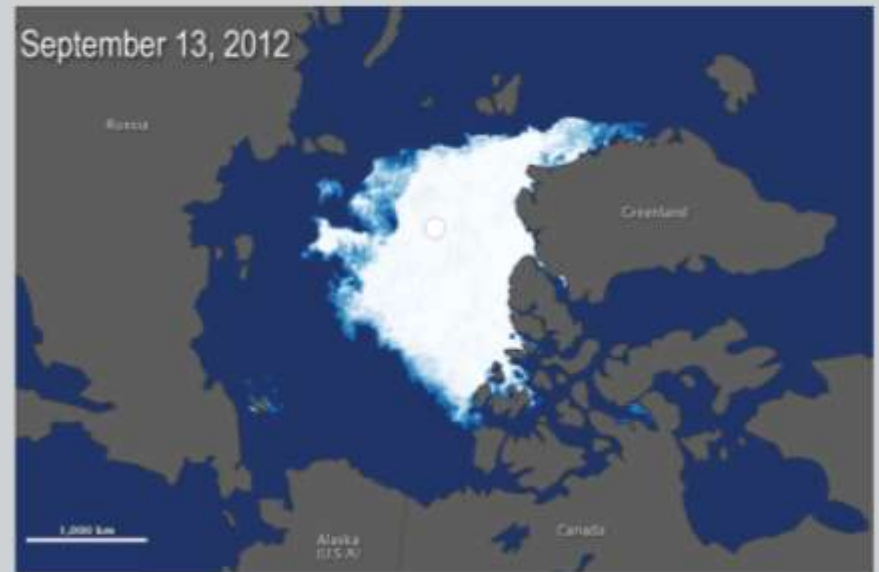
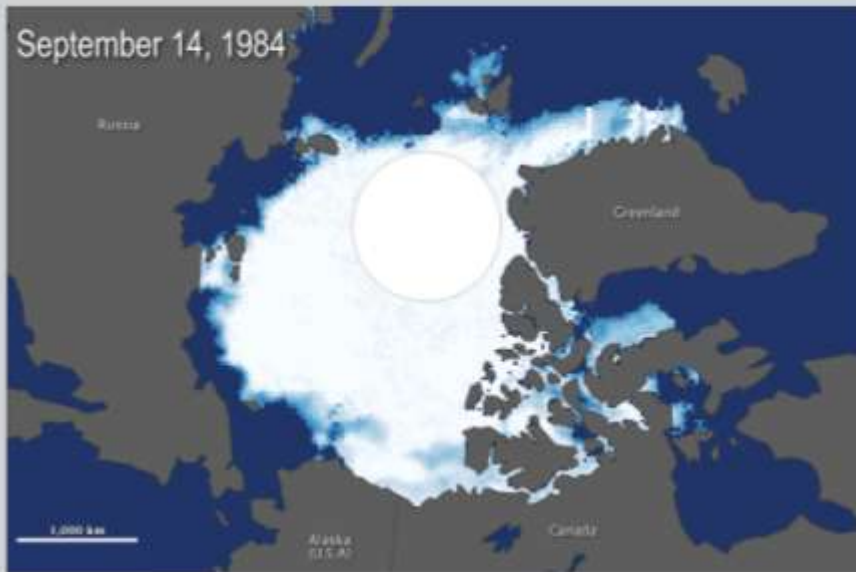
Historical Climate

Lower Emissions (B1)

Higher Emissions (A2)



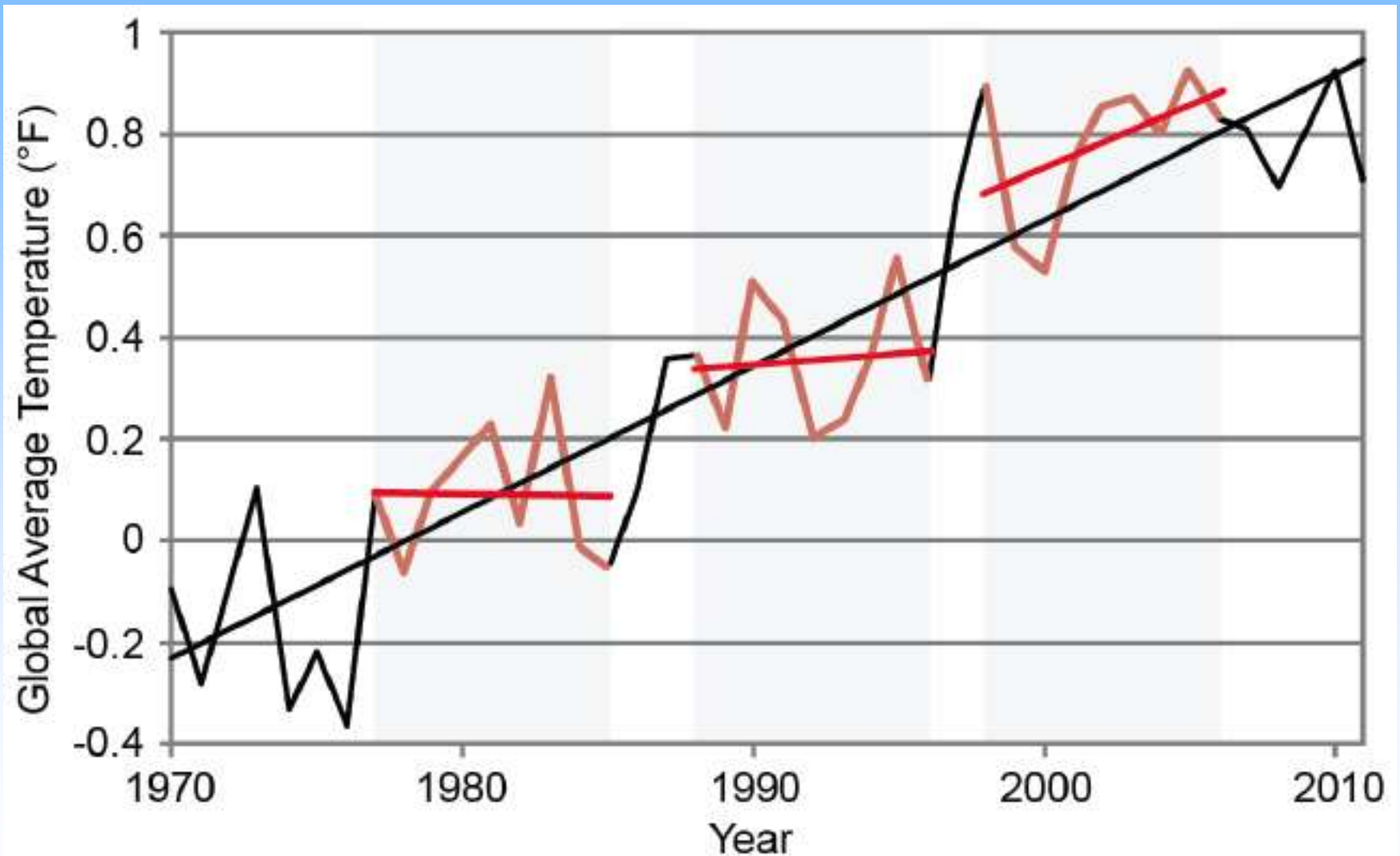
Arctic Sea Ice Decline



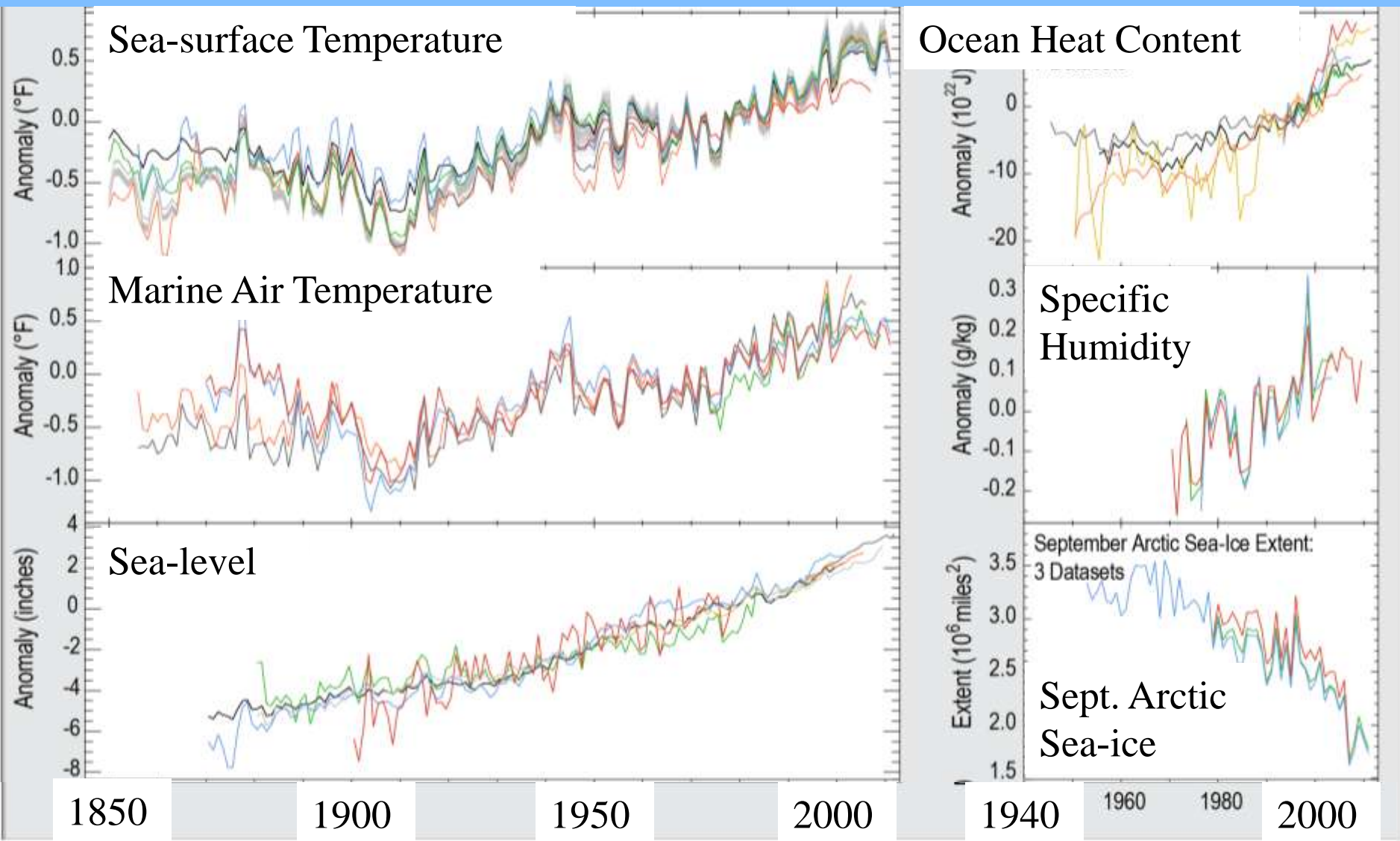
Sea Ice Concentration (percent)



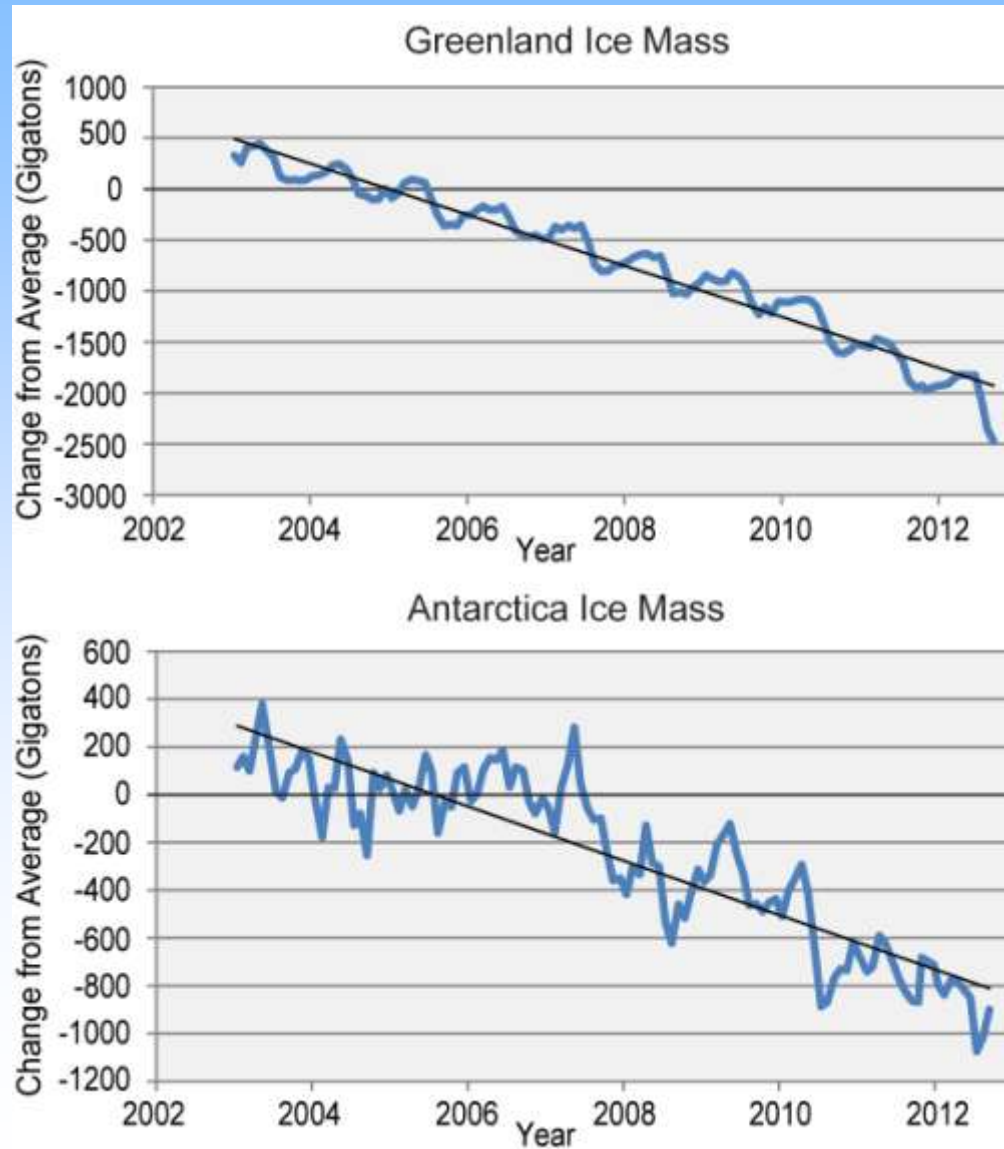
Long-Term Warming versus Short-Term Variation

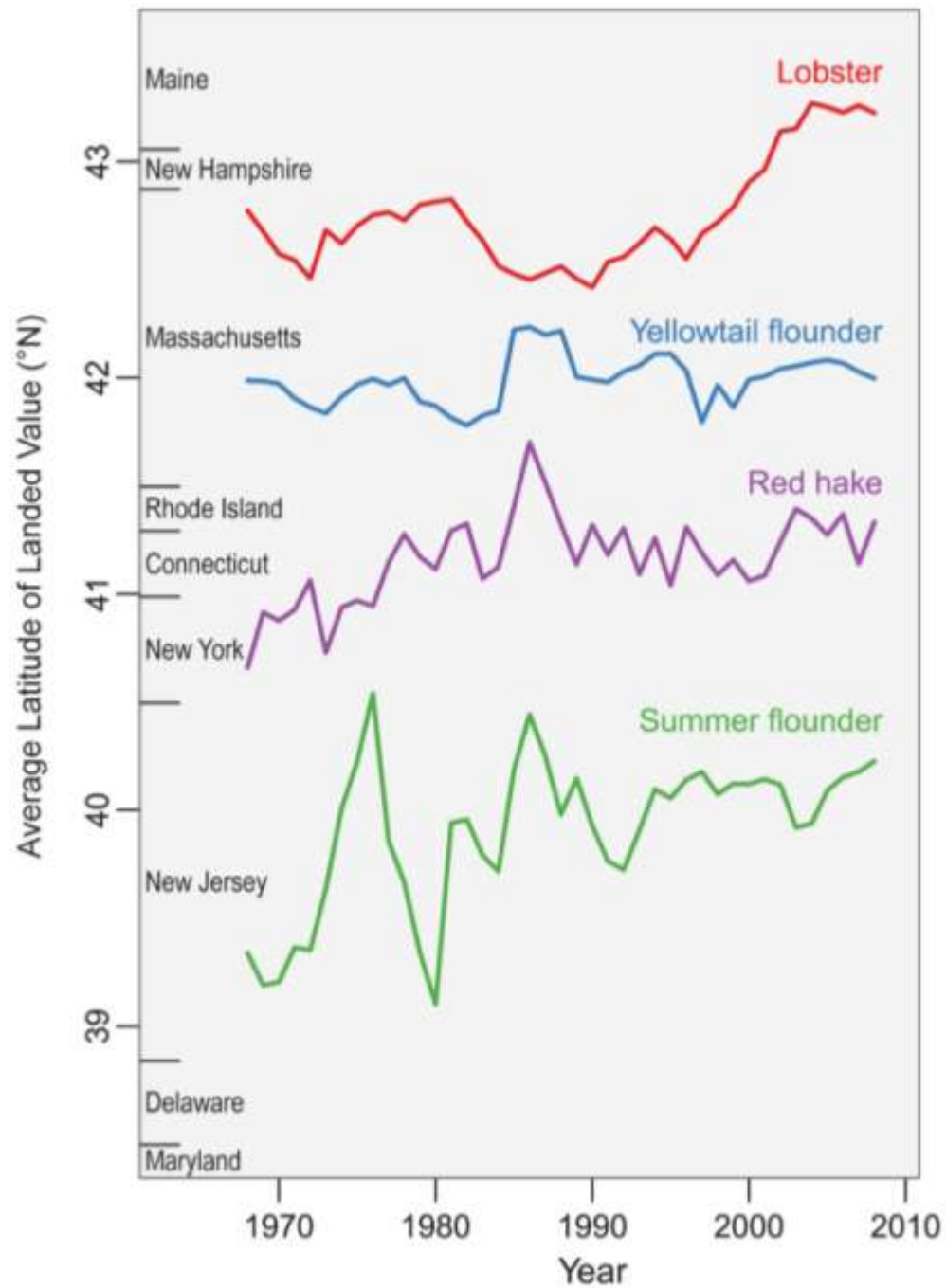


Natural Variability & Anthropogenic Trends



Ice Loss from the Two Polar Ice Sheets





Flooding and Hurricane Irene



Northeast already feeling the effects of increases in some types of extreme weather and sea level rise



© Stan Honda/AFP/Getty Images

There are many actions we can take to reduce future climate change and its impacts and to prepare for the impacts we can't avoid



©Dennis Schroeder, NREL



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