

Climate Change Action in the Miami Valley

MVRPC Technical Advisory Committee

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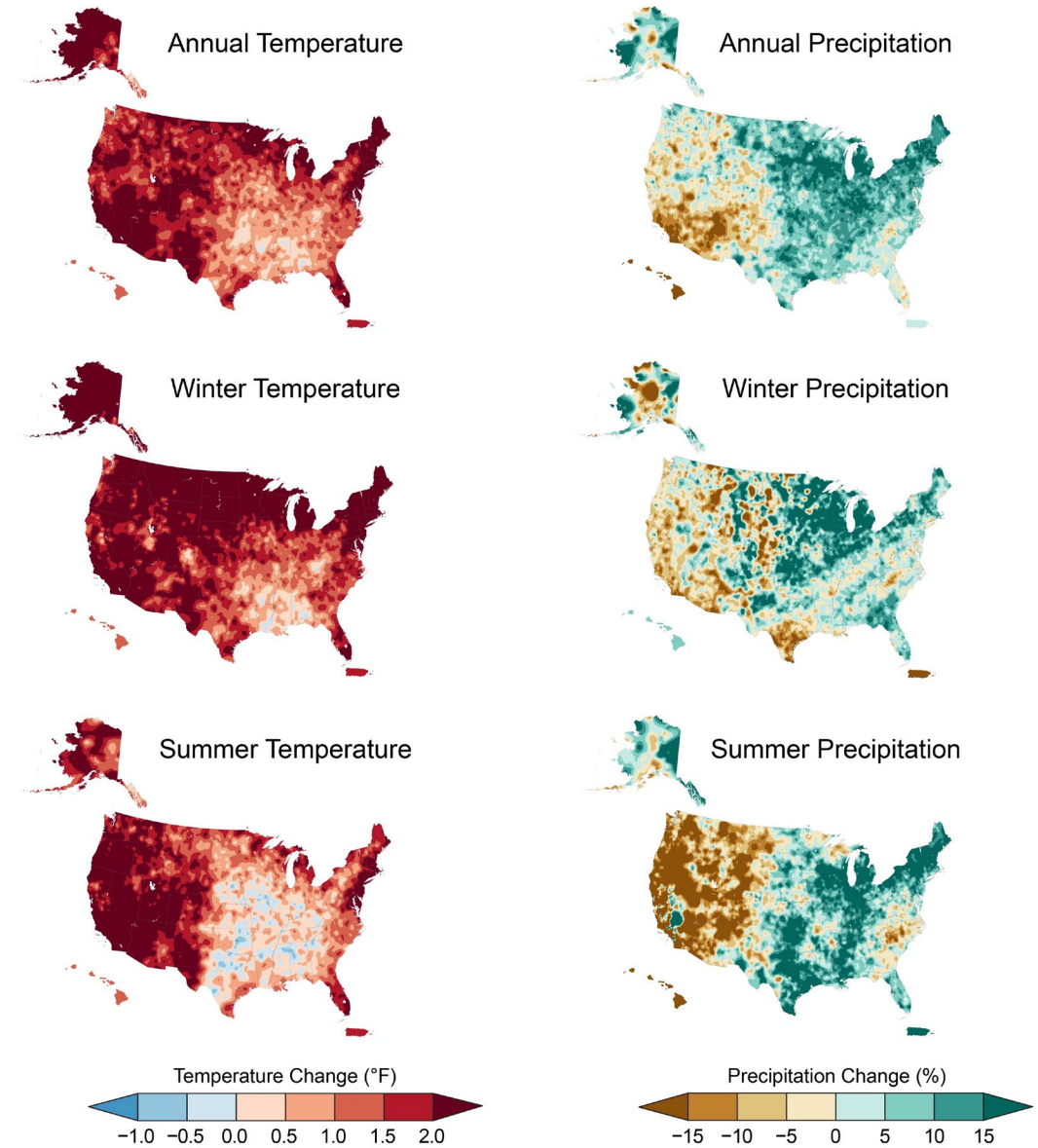
THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

5th National Climate Assessment

- Annual average temperatures have increased; 0.5°F-2.0°F
- Amplification of warming toward Great Lakes and northern latitudes
- Seasonal differences – strong winter warming
- More recent Summer/Fall “warming hole” (Partridge et al. <https://doi.org/10.1002/2017gl076463>)

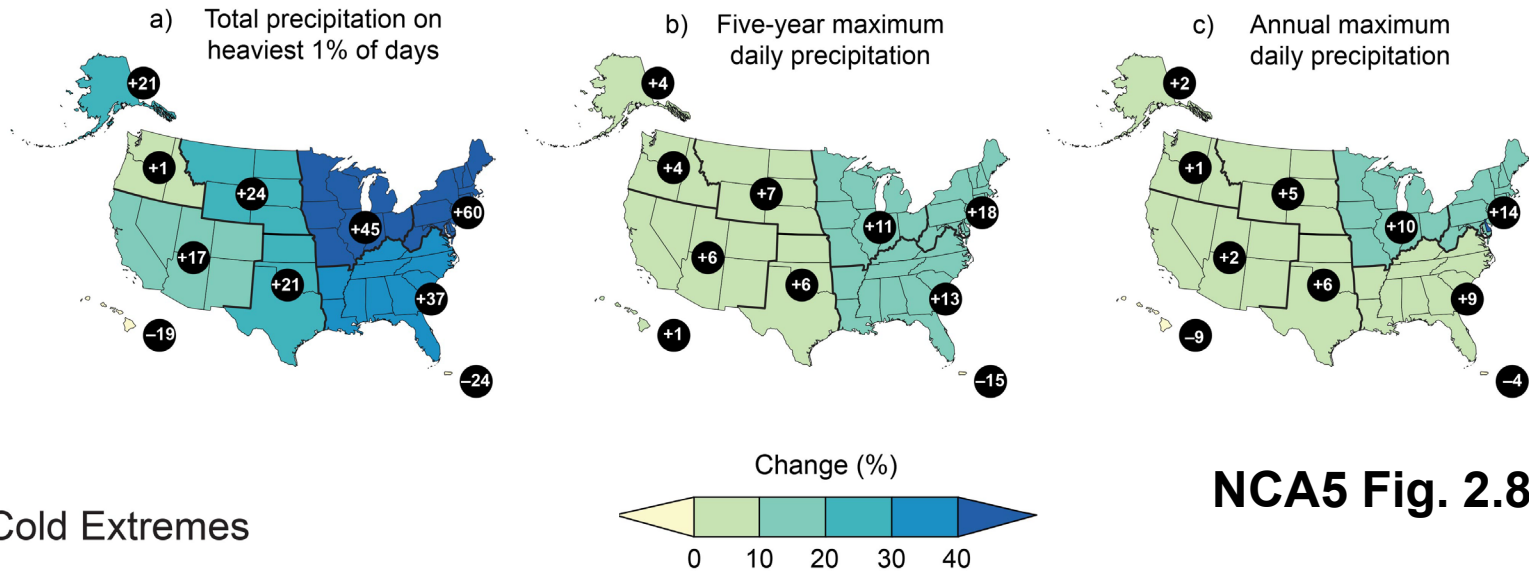
Observed Changes in Annual, Winter, and Summer Temperature and Precipitation



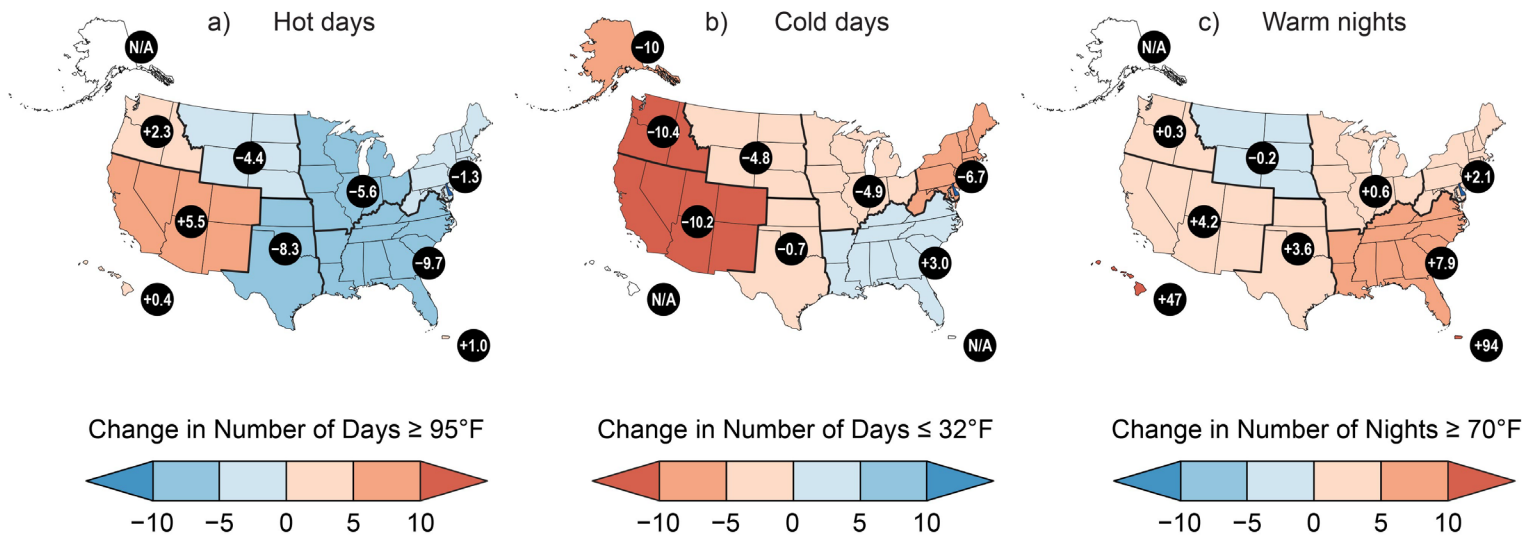
NCA5 Fig. 2.4

Observed Changes in Extremes

Observed Changes in Hot and Cold Extremes



NCA5 Fig. 2.8

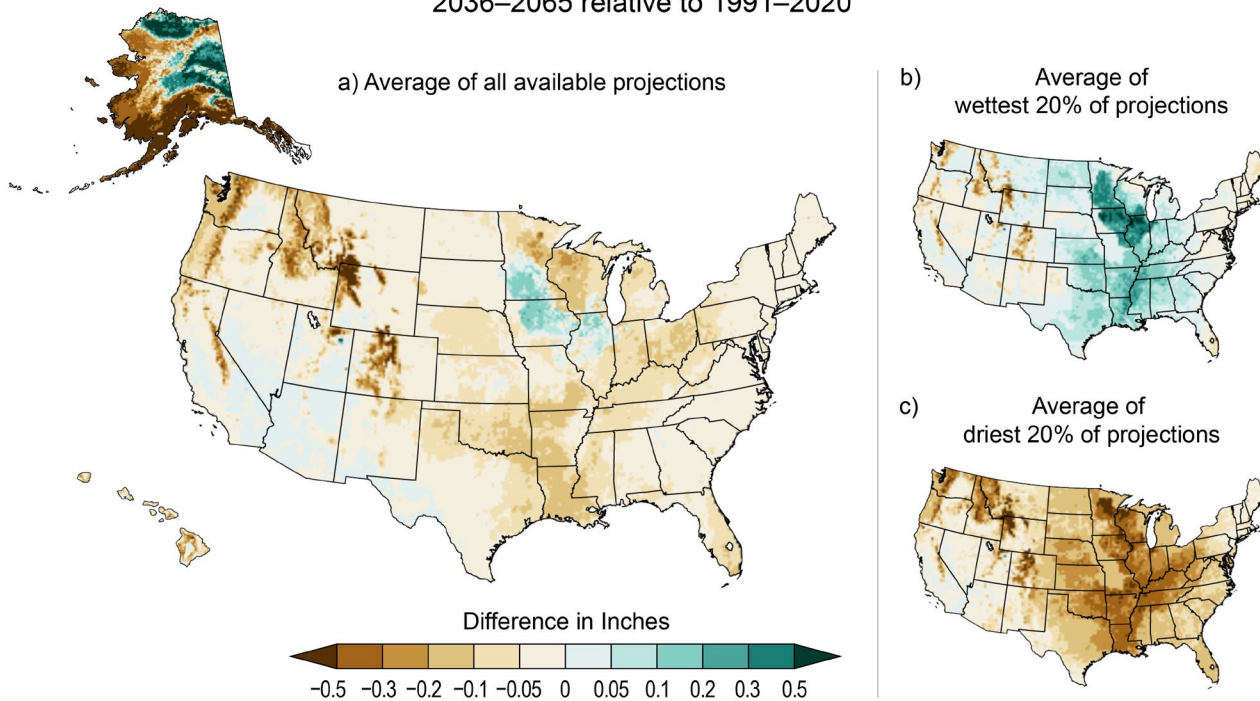


5th National Climate Assessment:
<https://nca2023.globalchange.gov/chapter/2/>

3 NCA5 Fig. 2.7

Midwest Key Message 5

Projected Changes in Average Summer (June–August) Soil Moisture by Midcentury 2036–2065 relative to 1991–2020



NCA5 Fig. 4.6: Projected Changes in Average Summer (June–August) Soil Moisture by Midcentury

Projected Changes in Cumulative Seasonal and Annual Runoff (2036–2065 compared to 1991–2020)

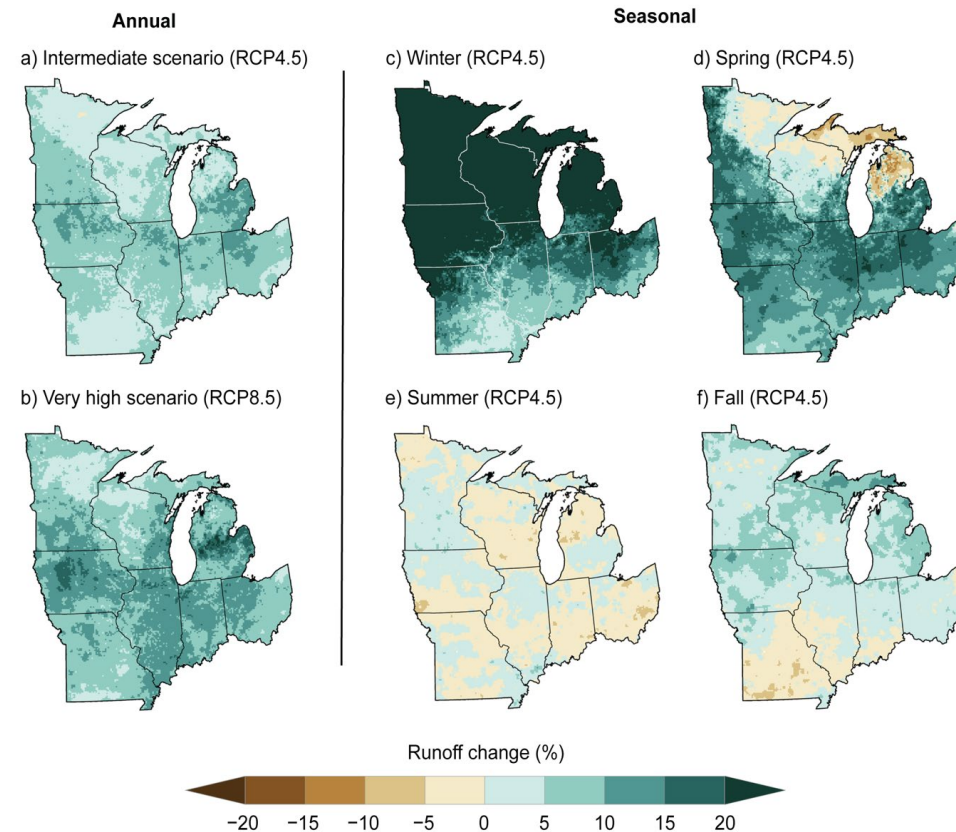
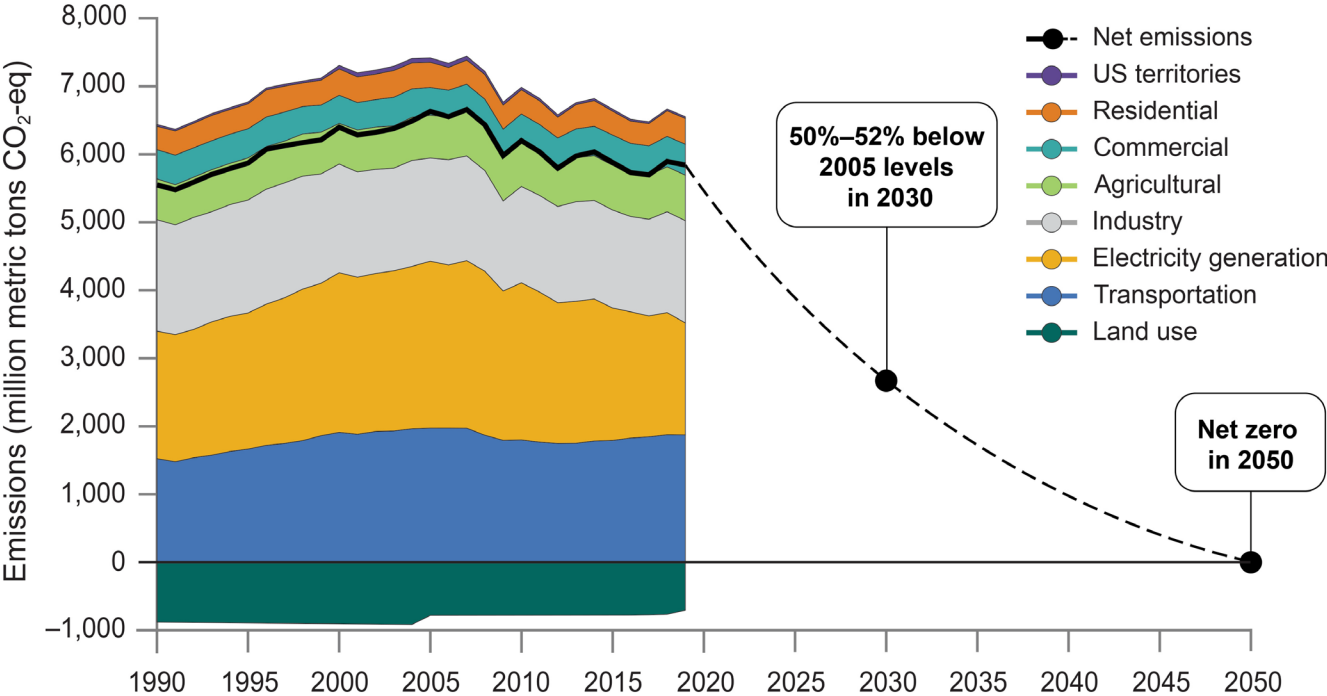


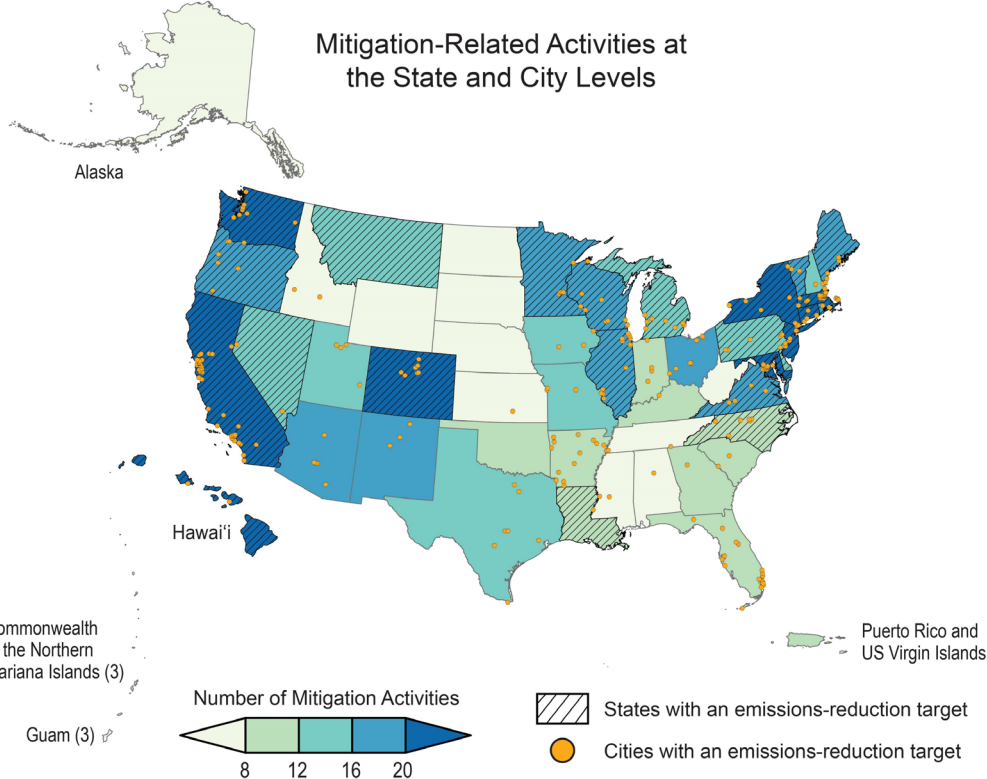
Figure 24.11. Projected changes in cumulative local runoff will lead to increased flooding susceptibility in winter and spring with, increased flash drought potential in summer.

Emission Reduction Targets

US Greenhouse Gas Emissions by Sector with 2030 and 2050 Goals Added



NCA5 Fig. 32.1



NCA5 Fig. 32.20

Why Should the Miami Valley Take Action?

CARE

COSTS

CO-BENEFITS

Six key facts about global warming in 12 words

IT'S REAL	Global warming is happening.
IT'S US	Human activity is the main cause.
EXPERTS AGREE	More than 97% of the world's climate experts are convinced, based on the data, that human activity is warming the planet.
IT'S BAD	The impacts are serious, and they affect people, especially our children and grandchildren.
OTHERS CARE	You're not alone. Most people are worried about global warming, and they support climate action.
THERE'S HOPE	There are actions we can take that will make a big difference.

Broad Health Concerns

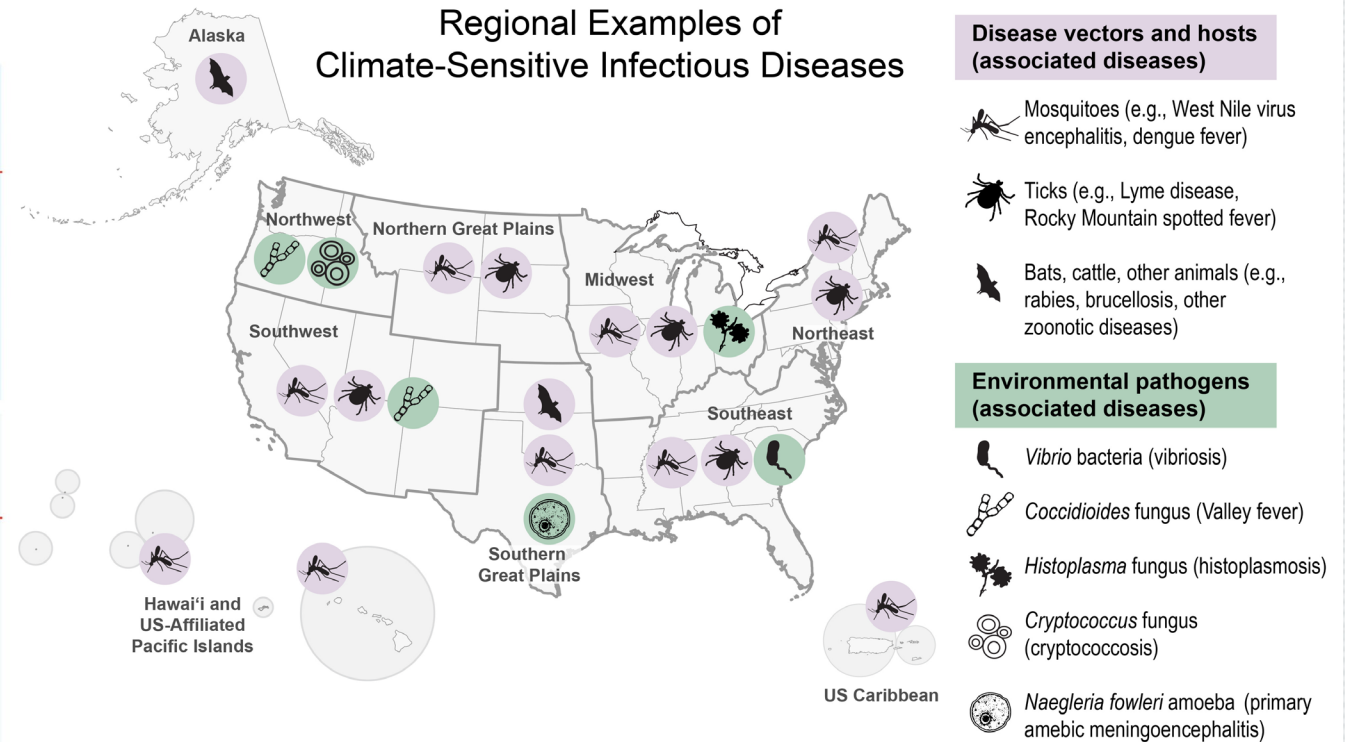
5th National Climate Assessment:
<https://nca2023.globalchange.gov/chapter/15/>

Heat and Health Equity



NCA5 Fig. 15.1

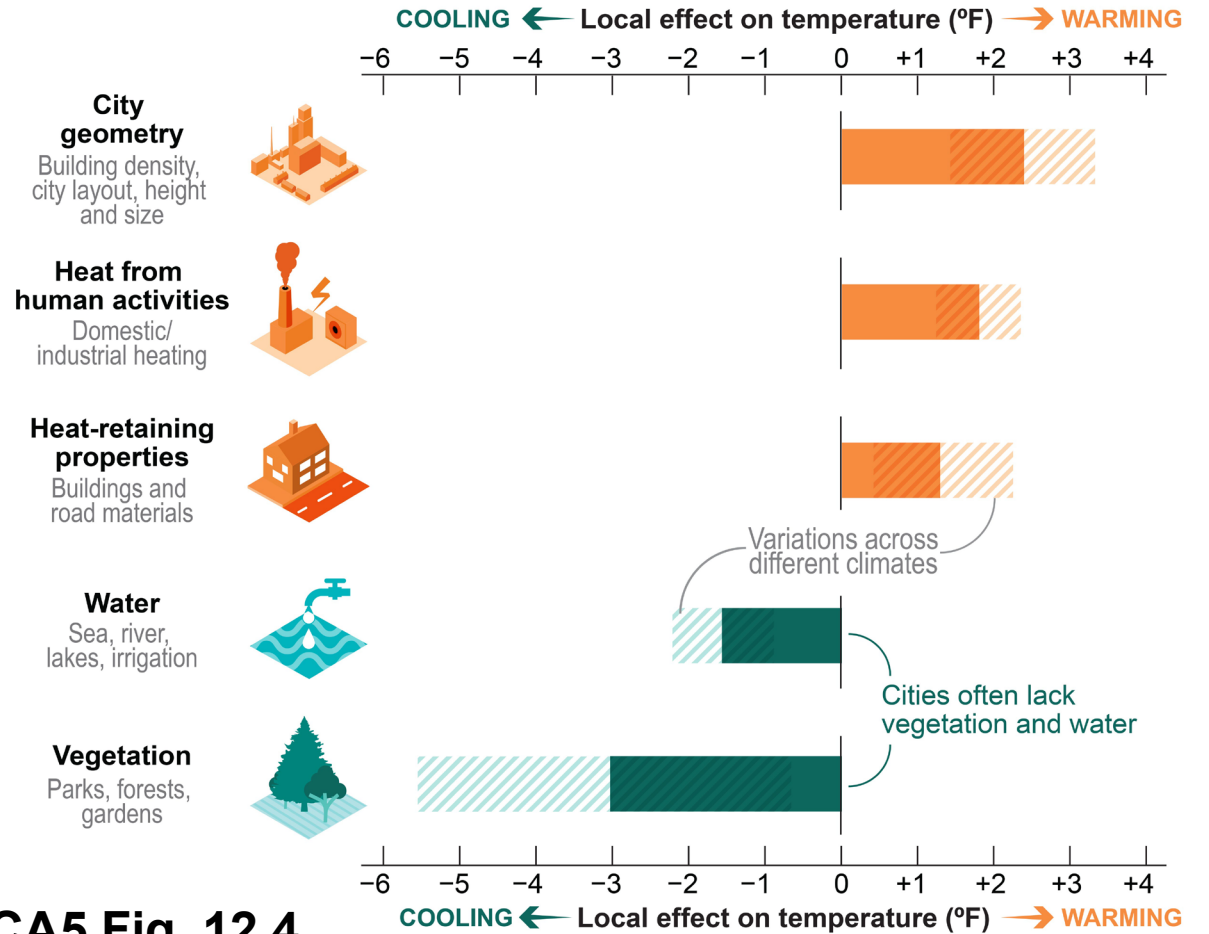
Regional Examples of Climate-Sensitive Infectious Diseases



NCA5 Fig. 15.2

Impacts on Community Conditions

Effects of the Built Environment on Local Temperatures



5th National Climate Assessment:
<https://nca2023.globalchange.gov/chapter/12/>

NCA5 Fig. 12.4

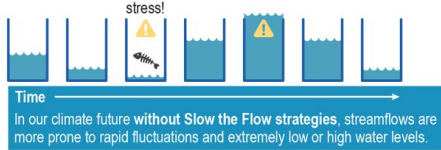
Extreme Rainfall/Cultural Identity

Extreme Precipitation Impacts

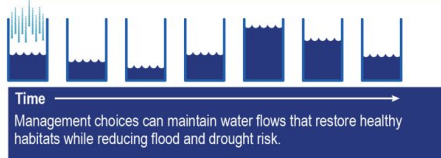


Flood and drought risk

No adaptation
More extreme precipitation increases risks



With adaptation
Adaptation reduces risks



Adaptation benefits

- Increase watershed storage
- Improve fish habitat
- Increase recreation opportunities
- Improve water quality
- Reduce erosion

Figure 24.5. Extreme precipitation events have adverse impacts on aquatic and terrestrial ecosystems, human health, infrastructure, and economies. Conservation and management strategies can help moderate these impacts.

Ecological Services of Ice-Covered Inland Waters

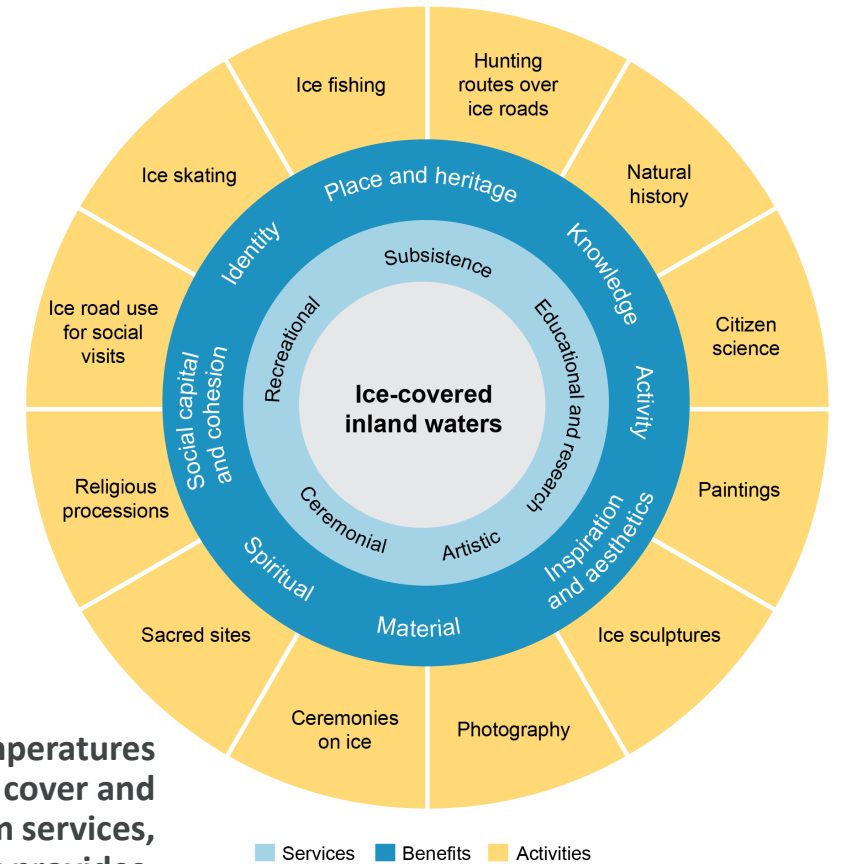


Figure 24.6. Rising winter temperatures are decreasing inland lake ice cover and the associated ecosystem services, benefits, and activities it provides.

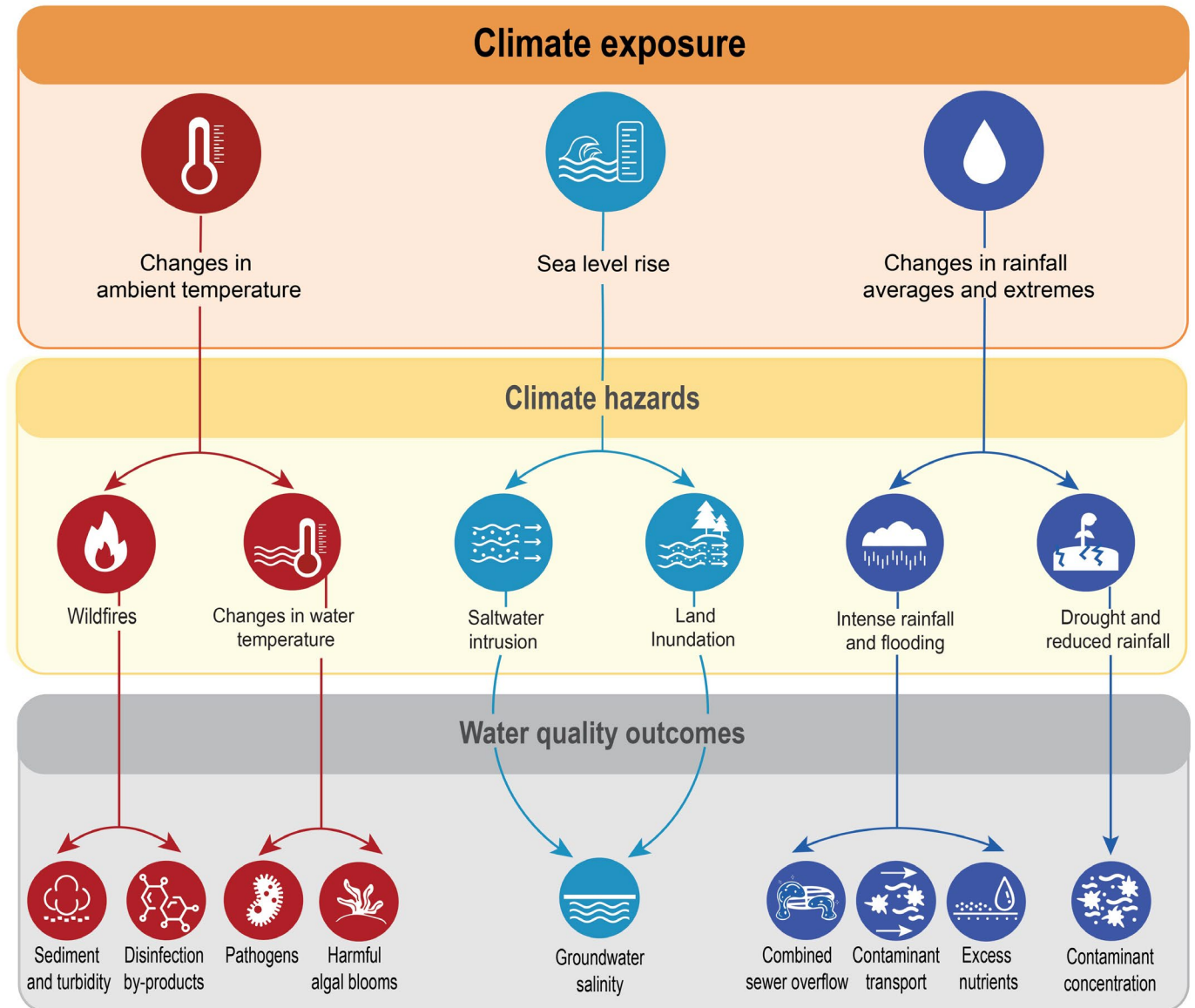
CARE

Climate Change Impacts to Water Quality



<https://nca2023.globalchange.gov/chapter/4/>

Climate Change Impacts to Water Quality

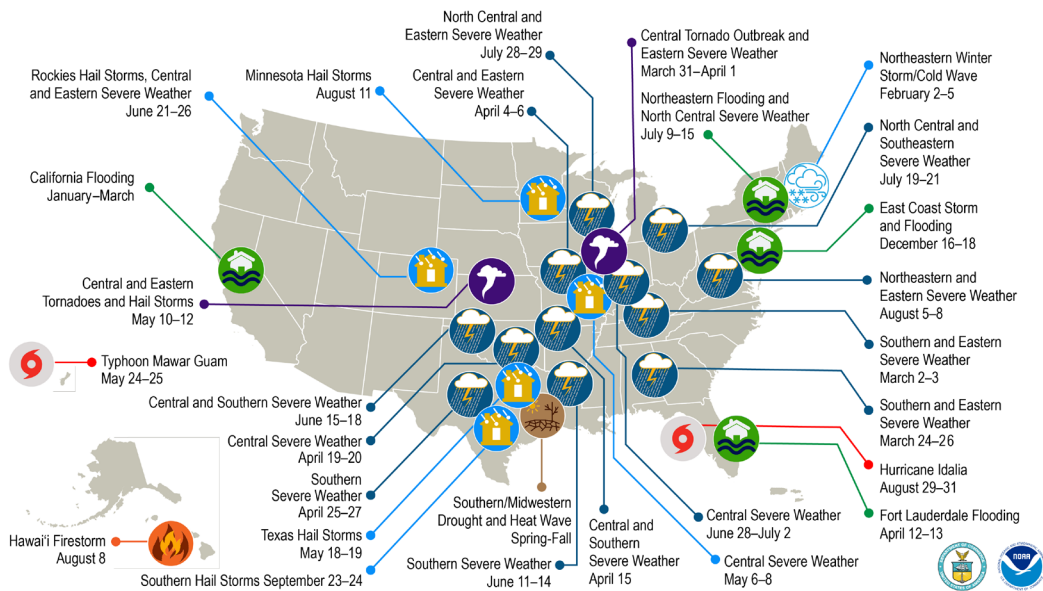


COSTS

Billion Dollar Disasters & Floods

U.S. 2023 Billion-Dollar Weather and Climate Disasters

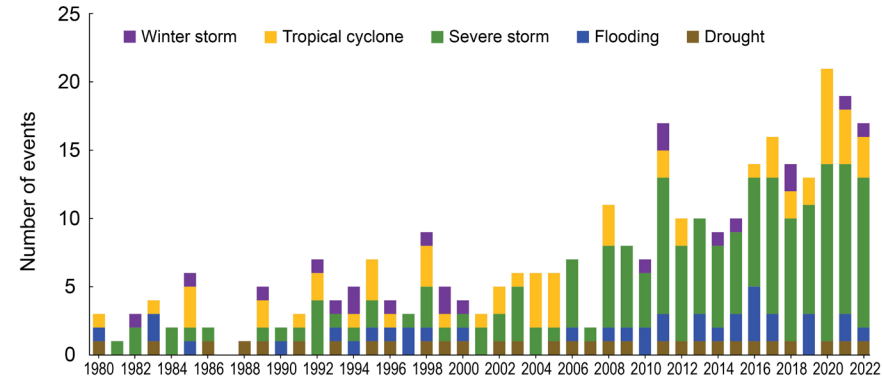
- Drought/Heat Wave
- Flooding
- Hail
- Hurricane
- Severe Weather
- Tornado Outbreak
- Wildfire
- Winter Storm/Cold Wave



This map denotes the approximate location for each of the 28 separate billion-dollar weather and climate disasters that impacted the United States in 2023.

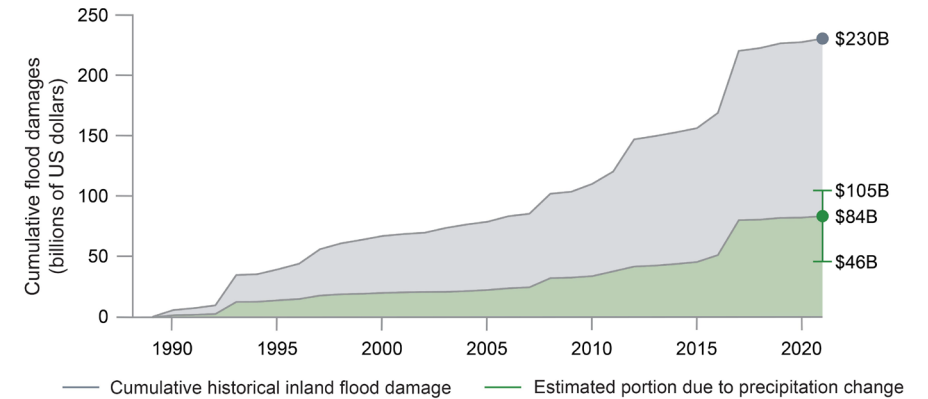
NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2023). <https://www.ncei.noaa.gov/access/billions/>

Water-Related Billion-Dollar Disasters in the United States



<https://nca2023.globalchange.gov/chapter/4/>

Flood Damages Associated with Precipitation Change



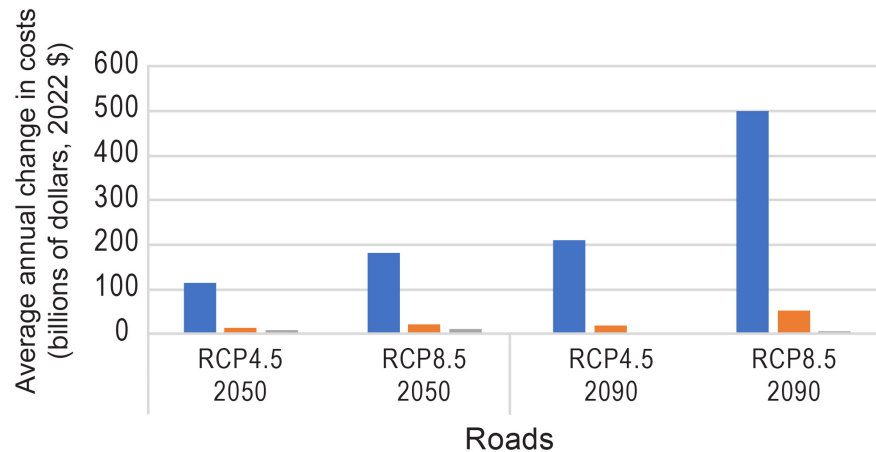
“Climate change–driven changes in precipitation amount and duration, snowpack/snowmelt, and soil moisture have combined with land-cover change and increasing property values to increase overall economic damages from floods.”

COSTS

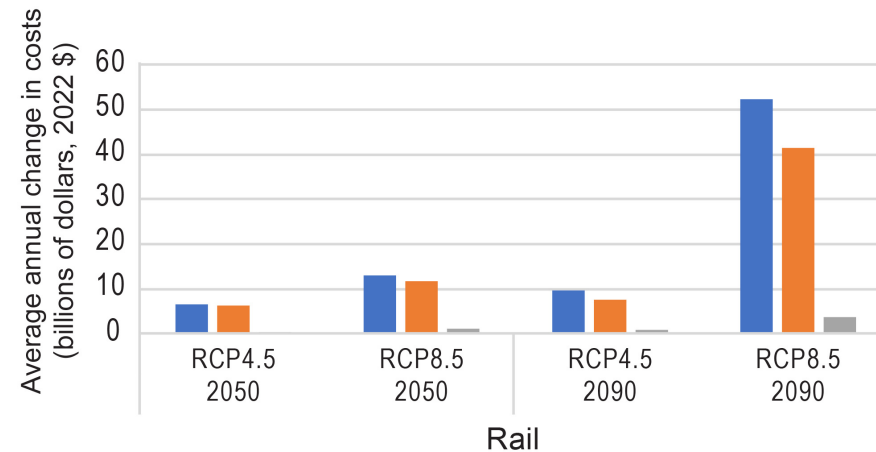
Road and Rail Adaptation

Estimated Annual Change in Costs Due to Climate Change

a) Estimated annual average change in costs due to climate change across adaptation scenarios for roads (in 2050 and 2090 compared to 1986–2005)



b) Estimated annual average change in costs due to climate change across adaptation scenarios for the rail sector (in 2050 and 2090 compared to 1986–2005)



■ No Adaptation ■ Reactive Adaptation ■ Proactive Adaptation

<https://nca2023.globalchange.gov/chapter/31/>

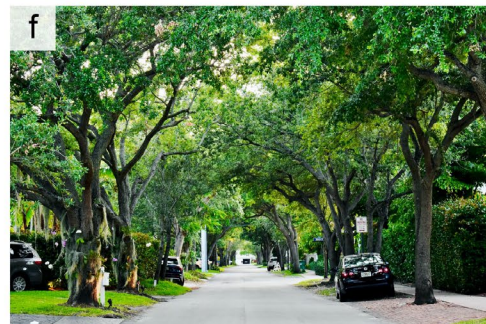
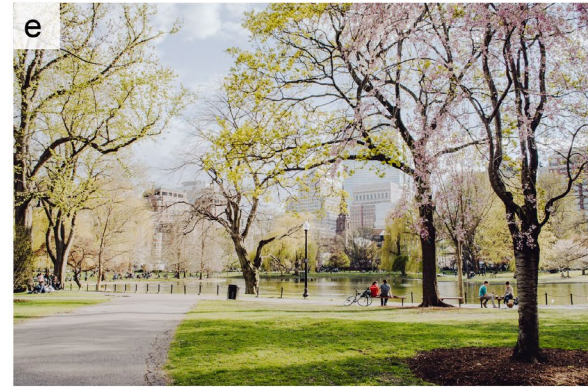
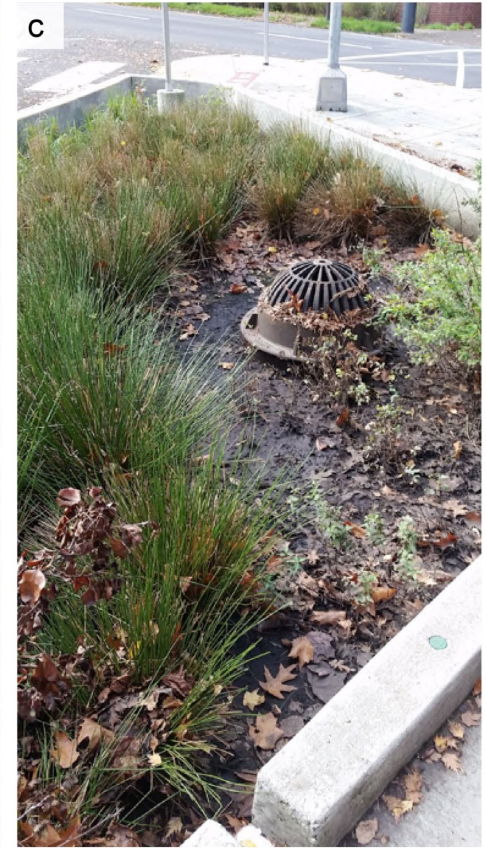
CO-BENEFITS

Urban Adaptation and Mitigation

- Green roofs for stormwater runoff retention
- Investments in design, construction, and long-term maintenance
- Done in just and equitable ways

<https://nca2023.globalchange.gov/chapter/12/>

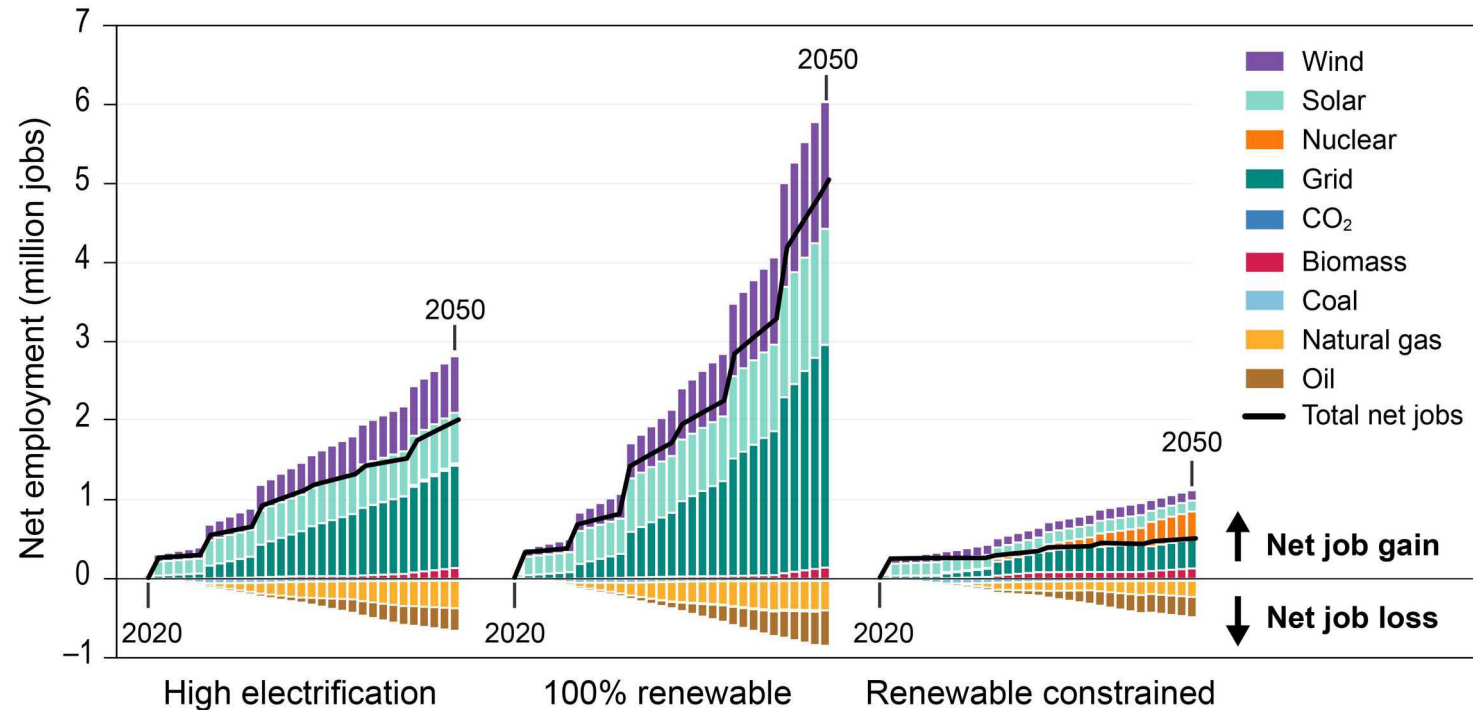
Green, Blue, and Nature-Based Solutions



CO-BENEFITS

Potential Job Creation

Energy Employment (2020–2050) for Alternative Net-Zero Pathways



“A shift toward renewables is projected to increase the total number of jobs in the energy sector.”

<https://nca2023.globalchange.gov/chapter/32/>

Thank You!



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