

Climate Change Action in the Miami Valley

MVRPC Board Meeting

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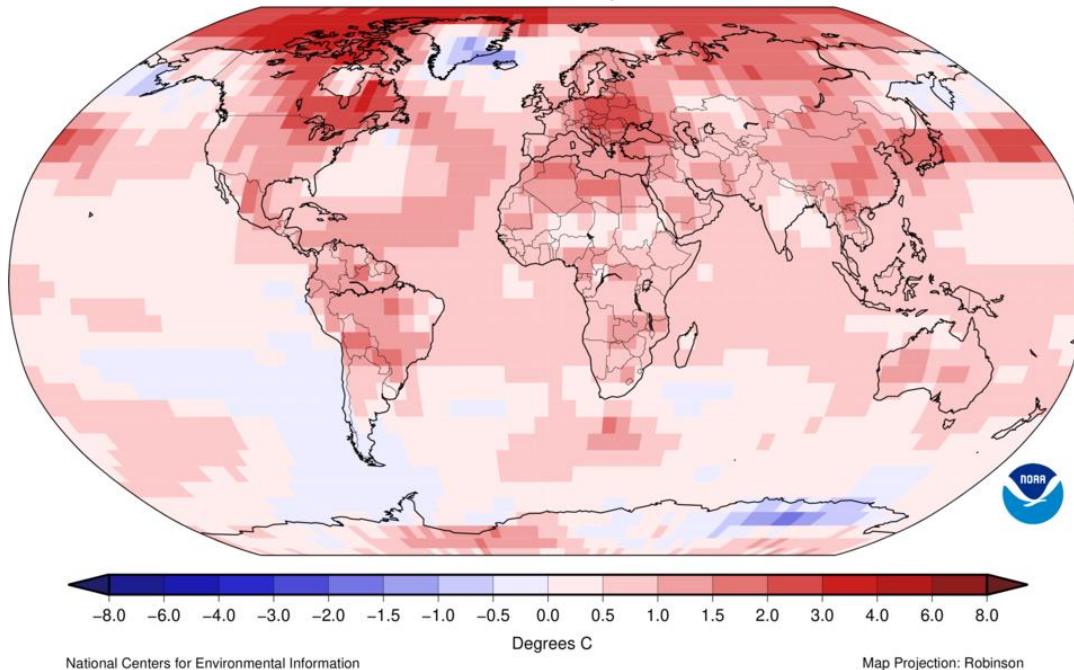
THE OHIO STATE UNIVERSITY

COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

Global Temperatures in 2024

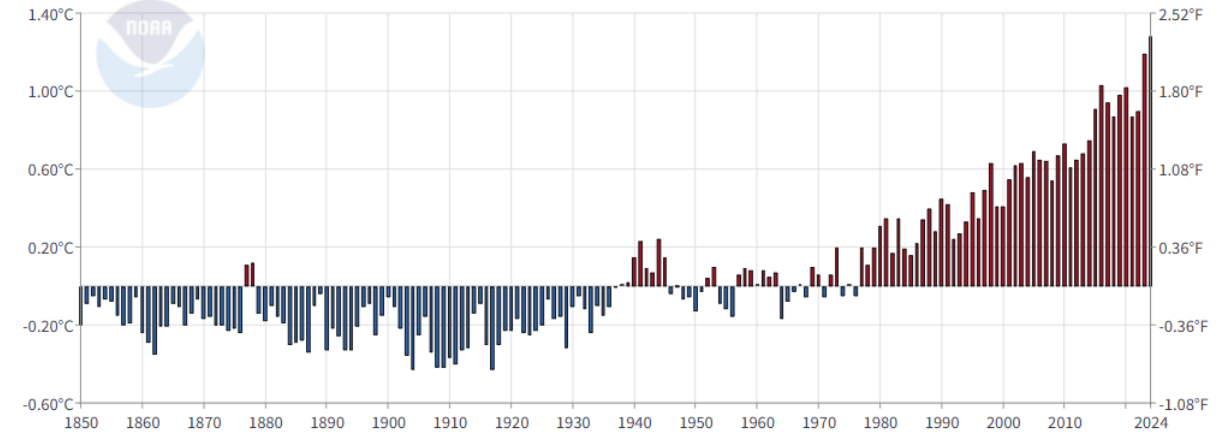
Land & Ocean Temperature Departure from Average Jan-Dec 2024
(with respect to a 1991-2020 base period)

Data Source: NOAA GlobalTemp v6.0.0-20250106



Global Land and Ocean Average Temperature Anomalies

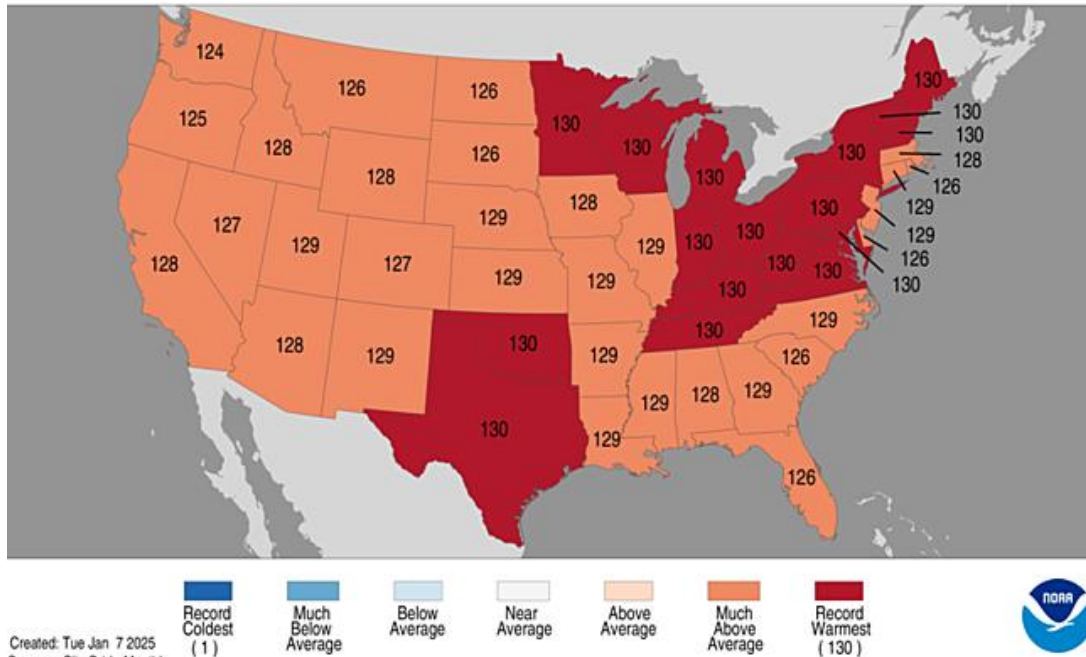
January-December



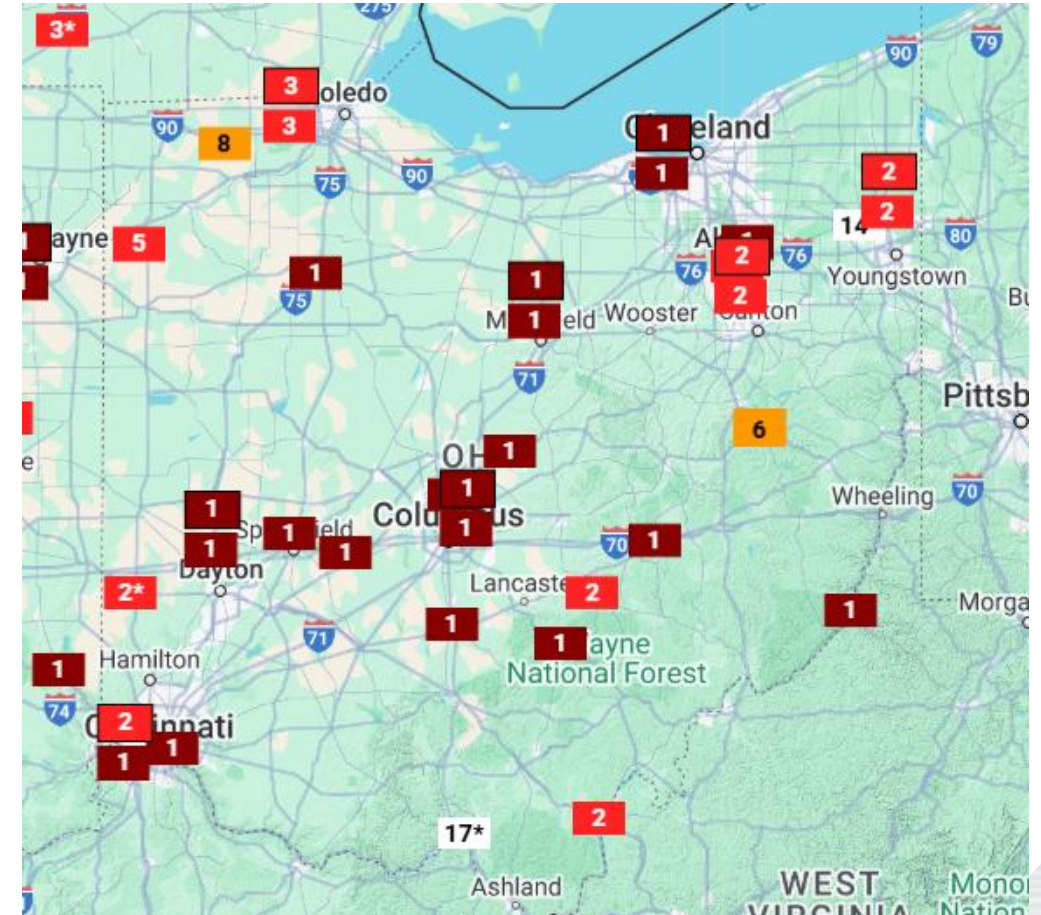
- 2024 was the warmest year since 1850
- Top 10 warmest years have occurred the last 10 years

US/Ohio Temperatures in 2024

Statewide Average Temperature Ranks
January - December 2024
Ranking Period: 1895-2024
NOAA's National Centers for Environmental Information



- Warmest year on record for the U.S. (1895-2024)
- Warmest year on record for Ohio (1895-2025)



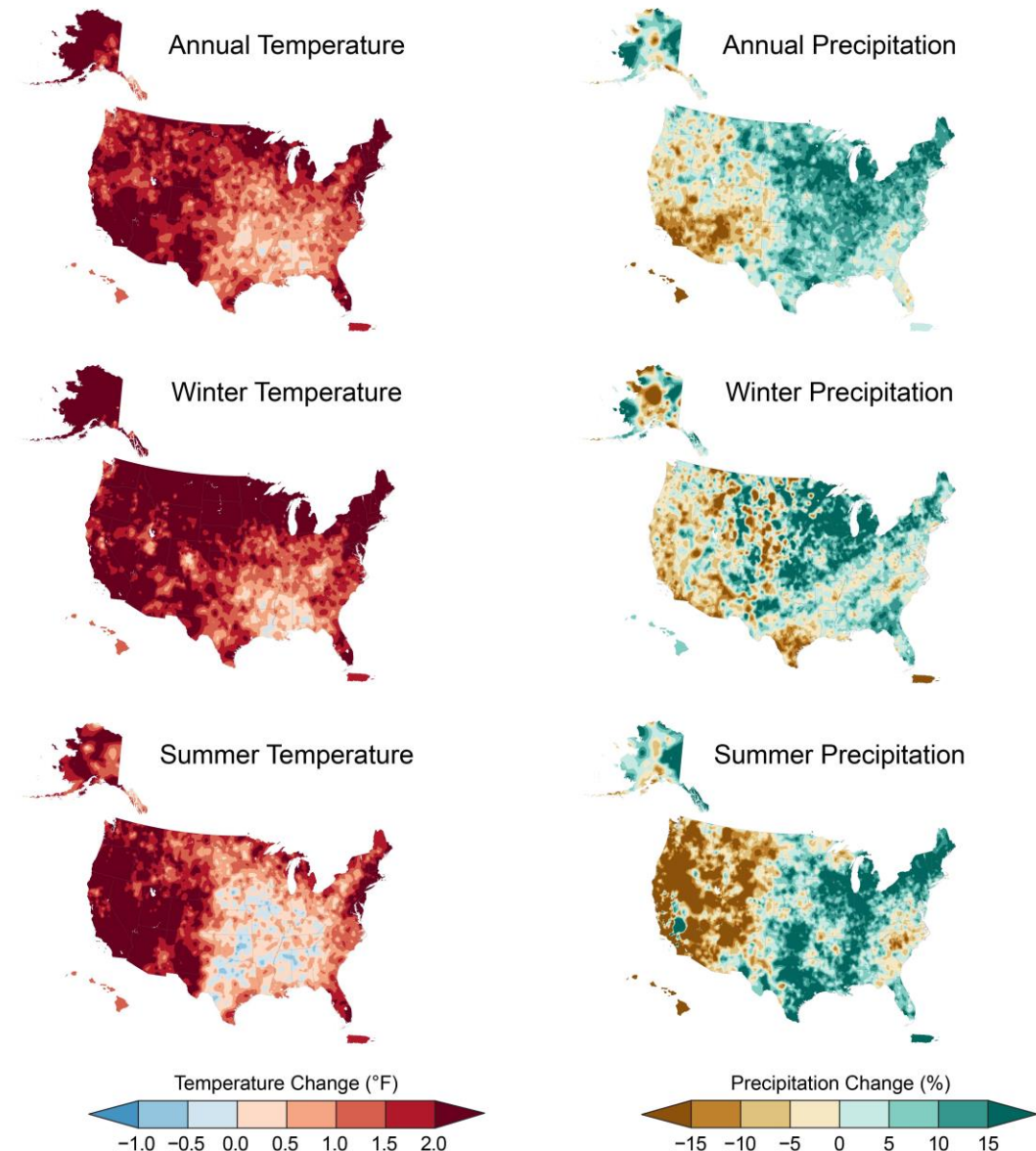
5th National Climate Assessment

- 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>)

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

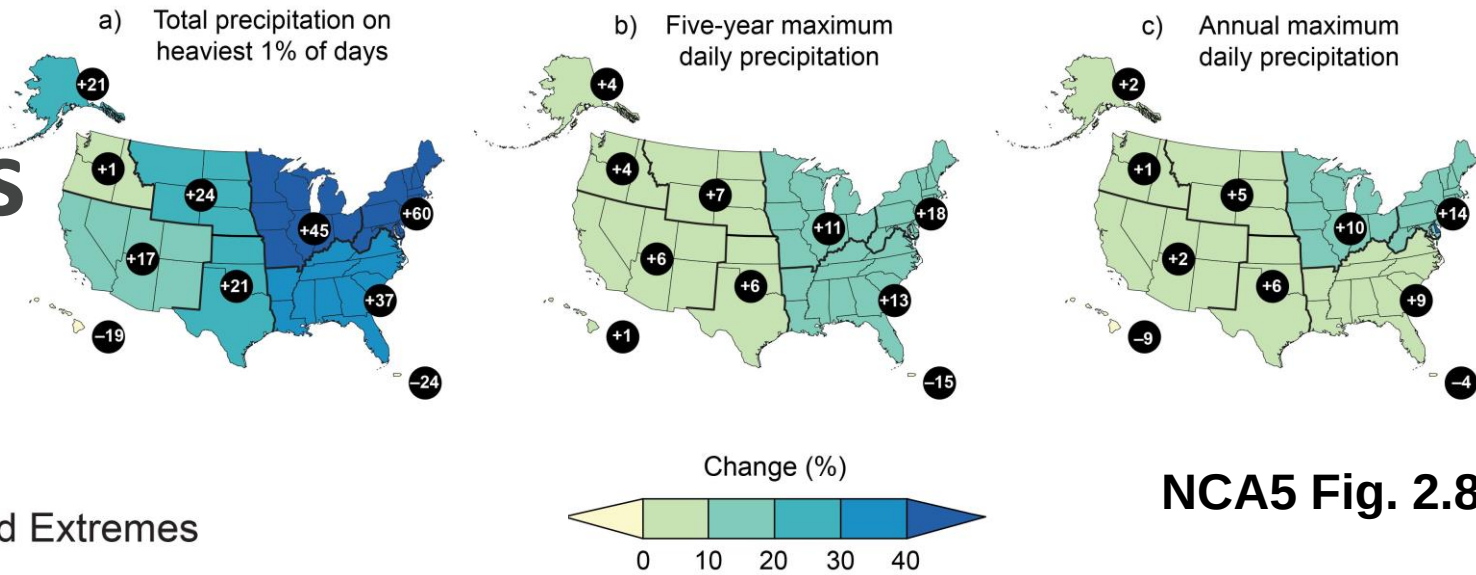
4

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



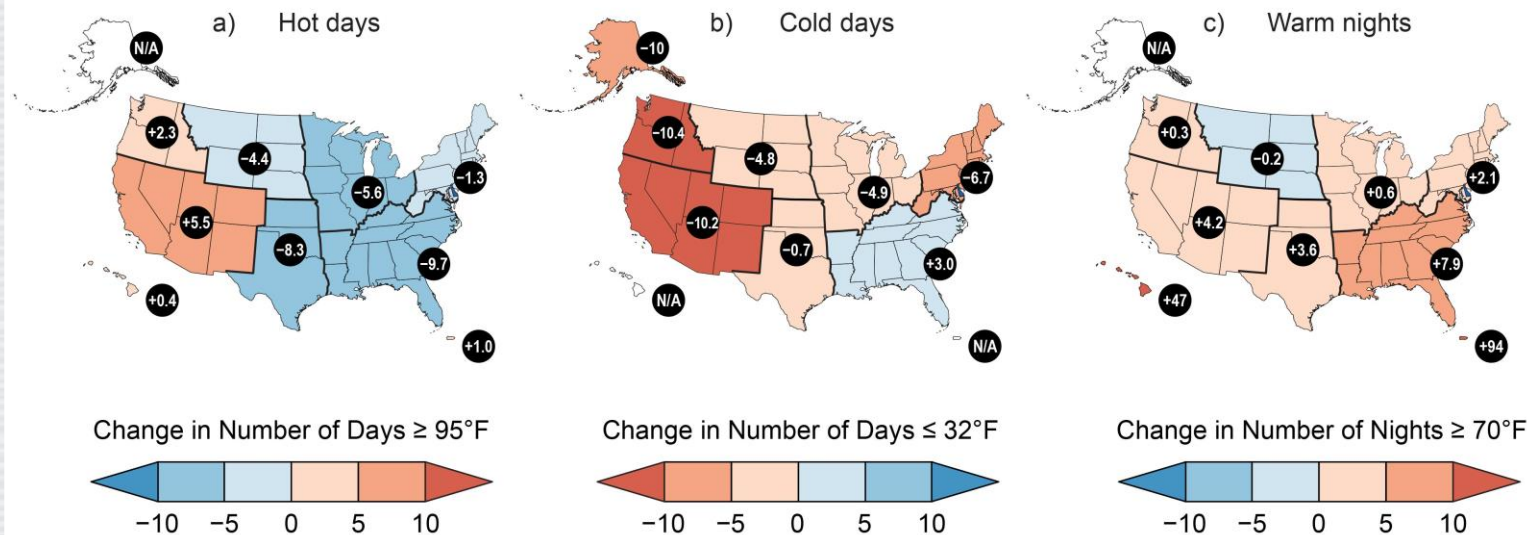
NCA5 Fig. 2.4

Observed Changes in Extremes



NCA5 Fig. 2.8

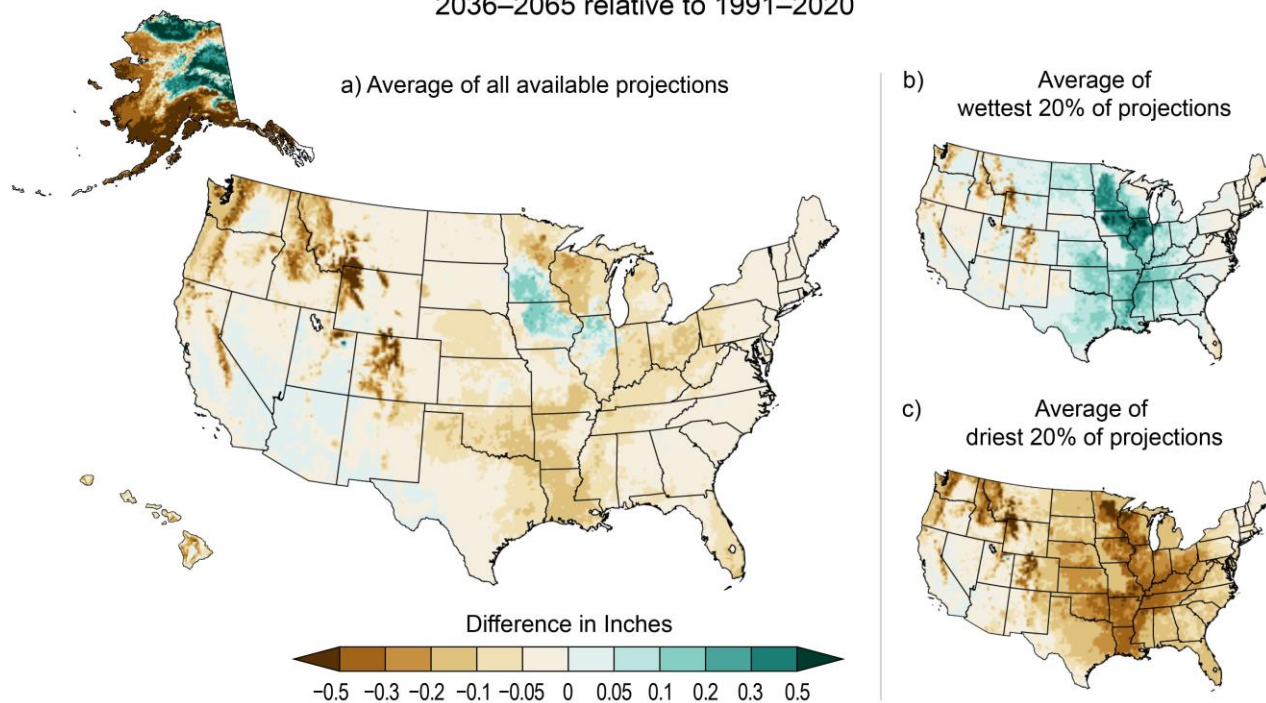
Observed Changes in Hot and Cold Extremes



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

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)

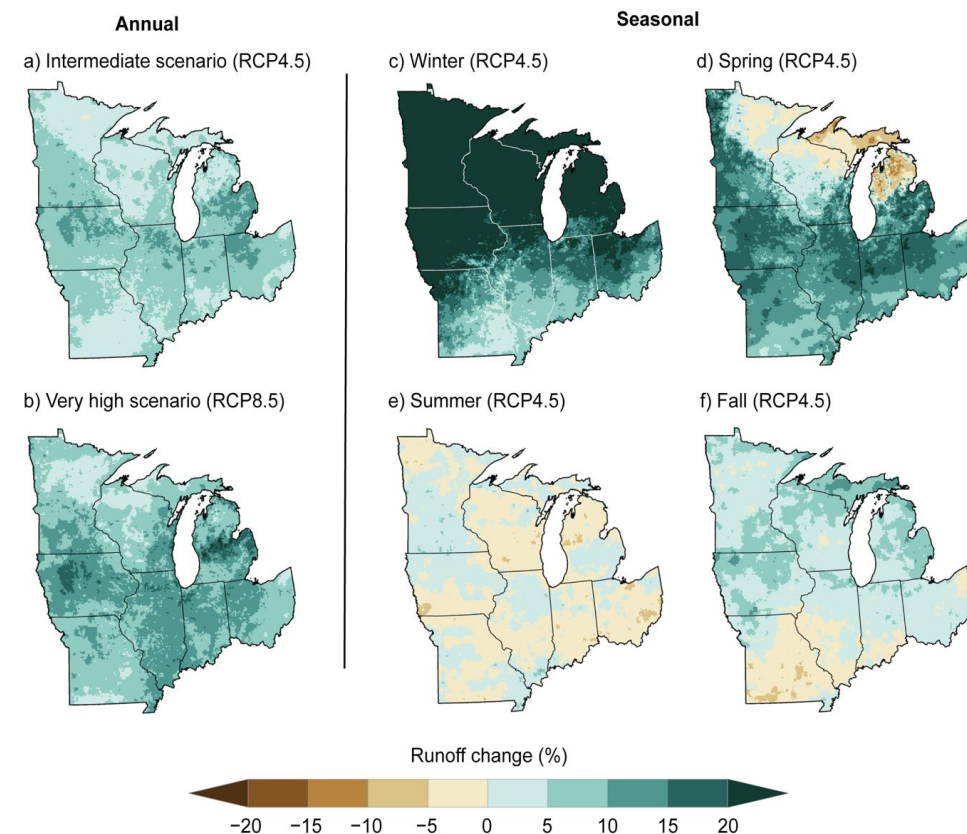
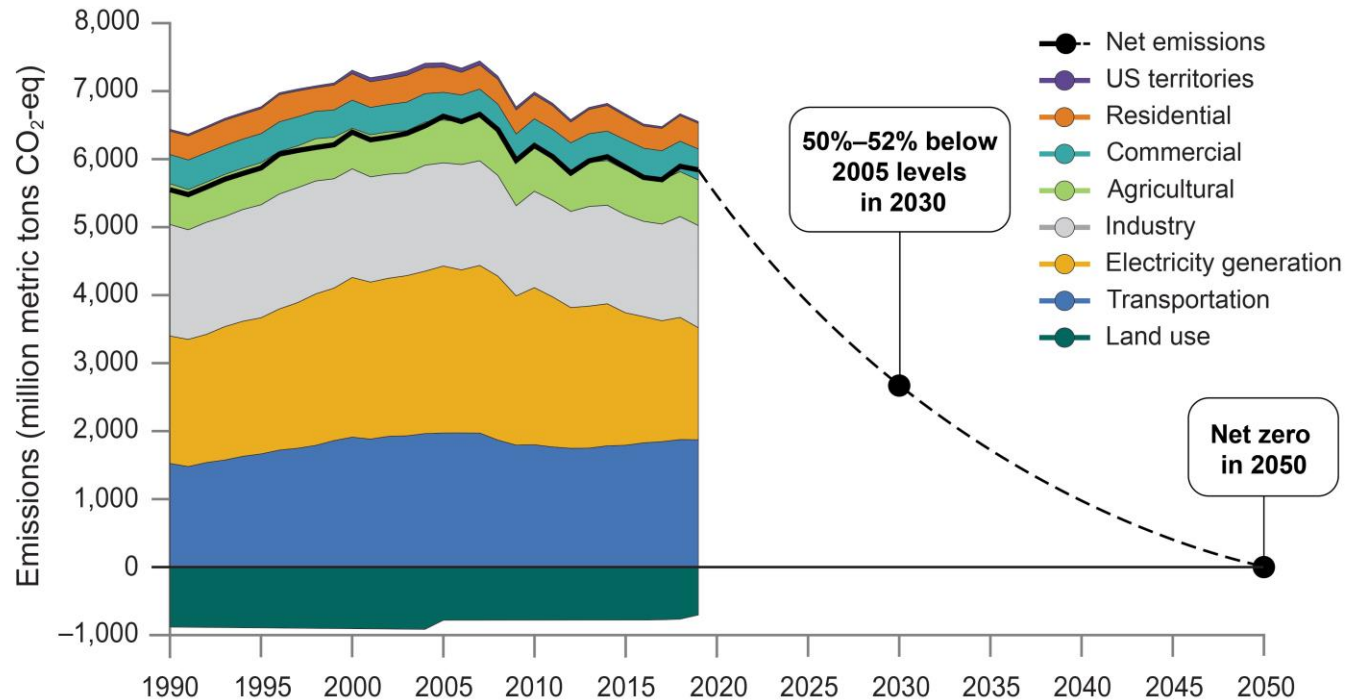


Figure 24.11. Projected changes in cumulative local runoff will lead to increased flooding susceptibility in winter and spring with, increased flash drought potential in summer.

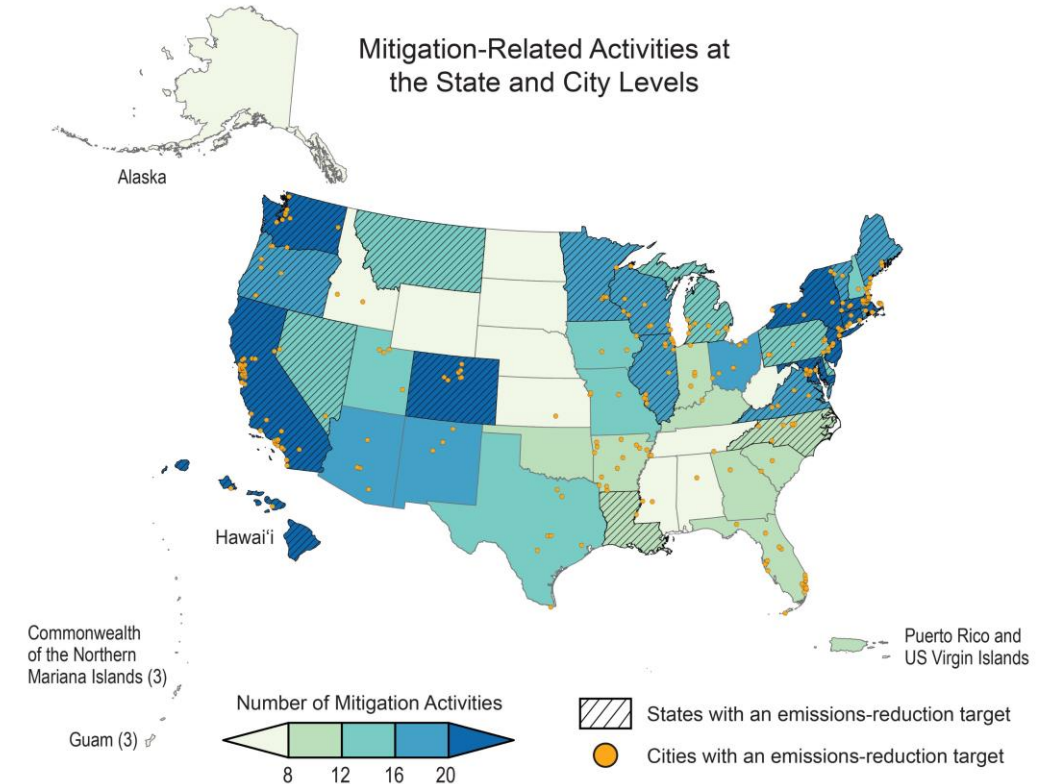
Emission Reduction Targets

5th National Climate Assessment:
<https://nca2023.globalchange.gov/chapter/32/>

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.



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COMMUNICATION

Broad Health Concerns

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

Heat and Health Equity



- Historically redlined communities (BIPOC and low-wealth communities) are often hotter than other neighborhoods.
- Access to cooling centers is more limited in some areas.

Location



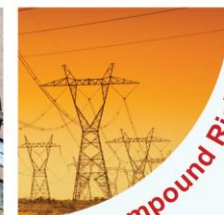
Social and Racial Factors

- Certain populations are more vulnerable to extreme heat and have less access to healthcare.
- Socially isolated individuals may have less access to cooling centers.



- Energy costs and the costs of repairs limit the ability to afford air-conditioning.
- Low-wealth residents often live in homes that provide less protection against extreme heat.

Economics



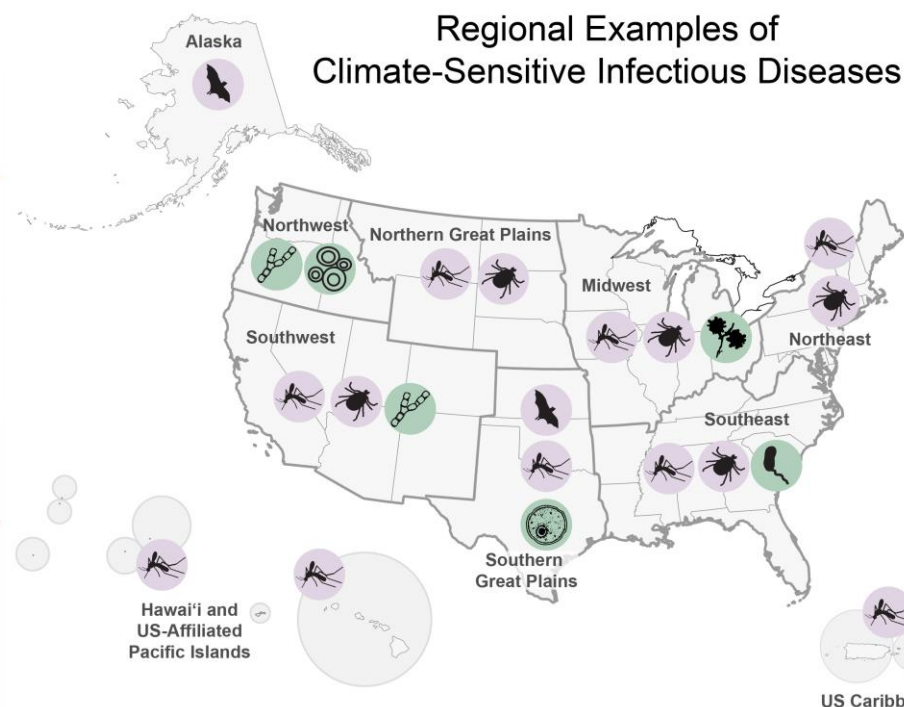
Compound Risks



- COVID-19 protocols reduced the accessibility and effectiveness of cooling centers.
- Disadvantaged populations are more at risk for heat-related illnesses during power outages.

NCA5 Fig. 15.1

Regional Examples of Climate-Sensitive Infectious Diseases



Disease vectors and hosts (associated diseases)

- Mosquitoes (e.g., West Nile virus encephalitis, dengue fever)
- Ticks (e.g., Lyme disease, Rocky Mountain spotted fever)
- Bats, cattle, other animals (e.g., rabies, brucellosis, other zoonotic diseases)

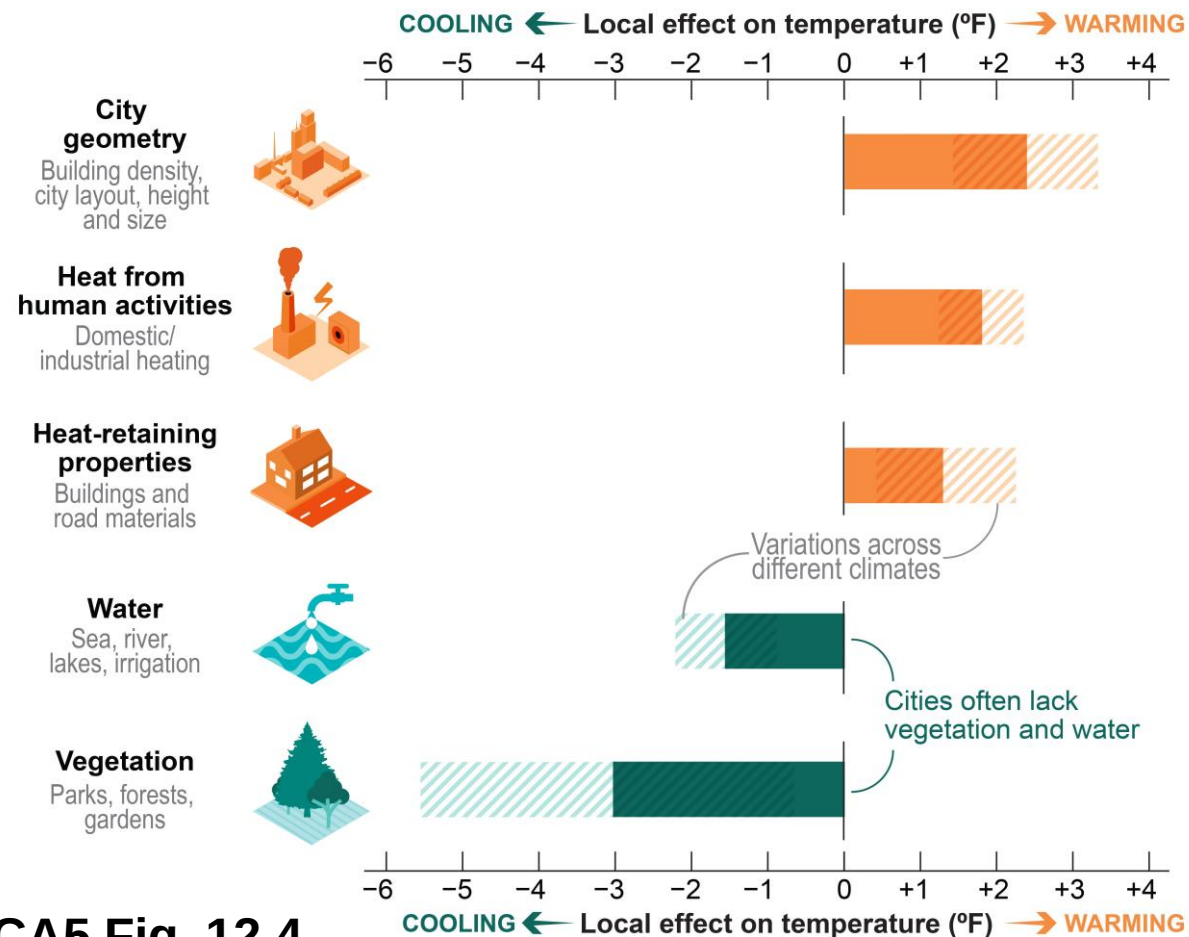
Environmental pathogens (associated diseases)

- Vibrio* bacteria (vibriosis)
- Coccidioides* fungus (Valley fever)
- Histoplasma* fungus (histoplasmosis)
- Cryptococcus* fungus (cryptococcosis)
- Naegleria fowleri* amoeba (primary amebic meningoencephalitis)

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

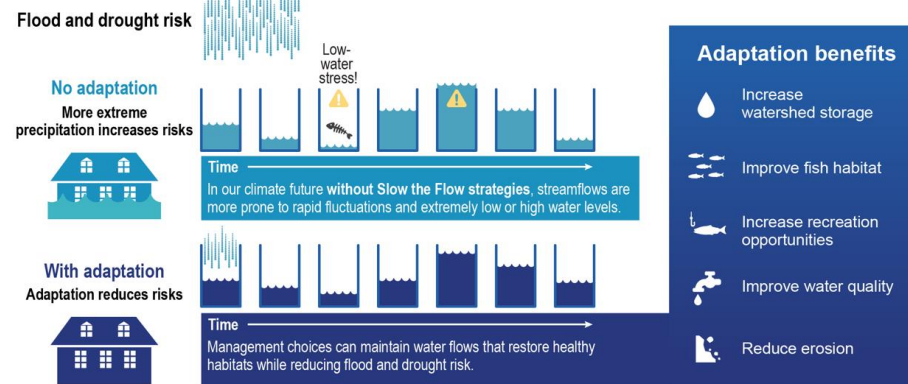


Figure 24.5. Extreme precipitation events have adverse impacts on aquatic and terrestrial ecosystems, human health, infrastructure, and economies. Conservation and management strategies can help moderate these impacts.

Ecological Services of Ice-Covered Inland Waters

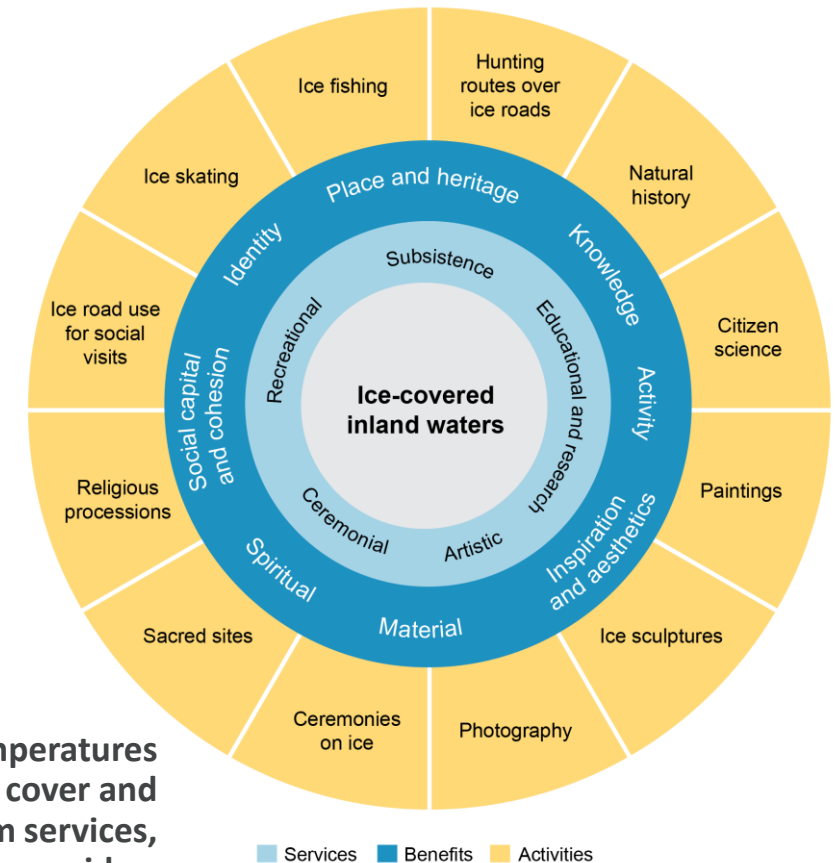


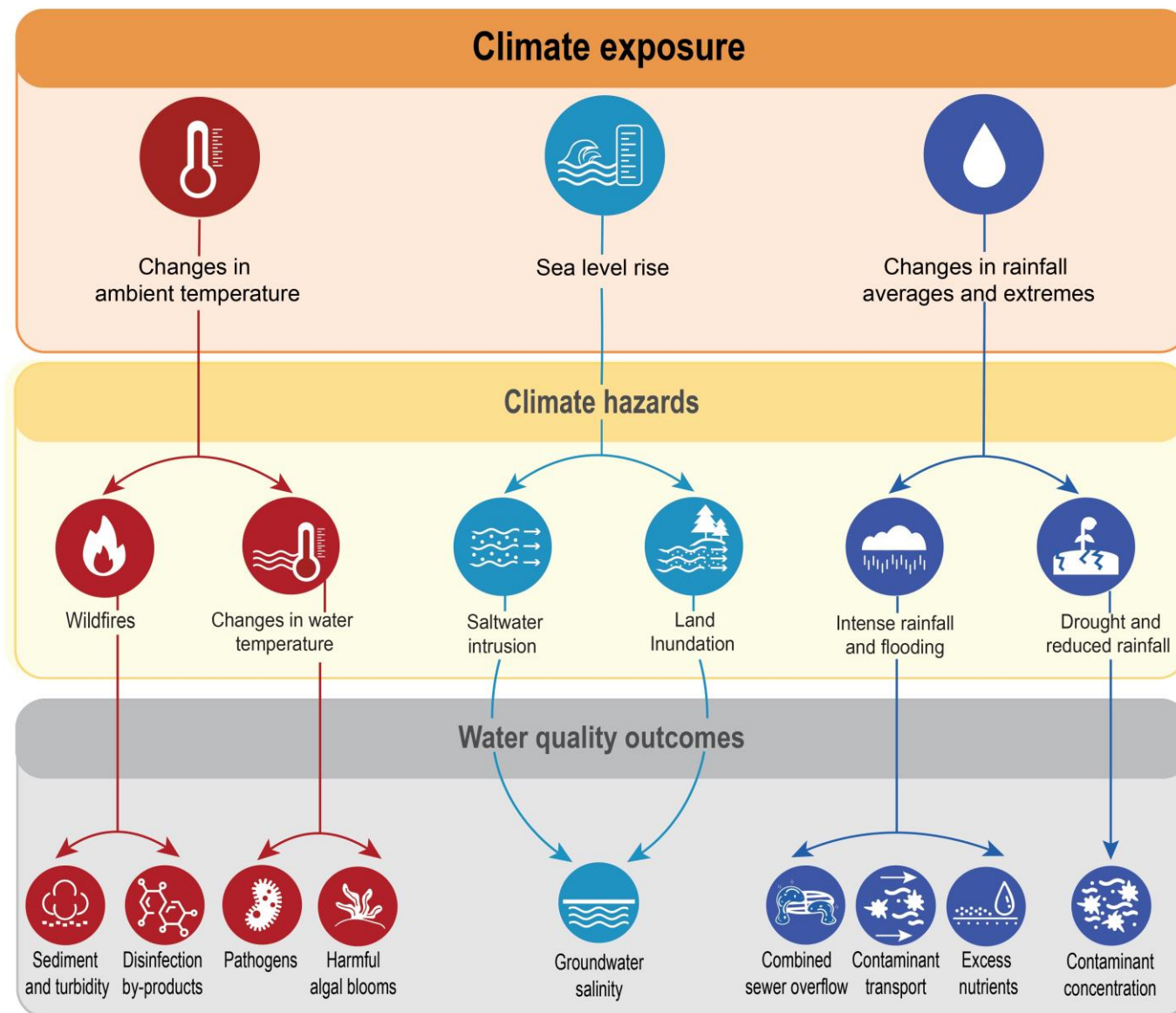
Figure 24.6. Rising winter temperatures are decreasing inland lake ice cover and the associated ecosystem services, benefits, and activities it provides.

Climate Change Impacts to Water Quality

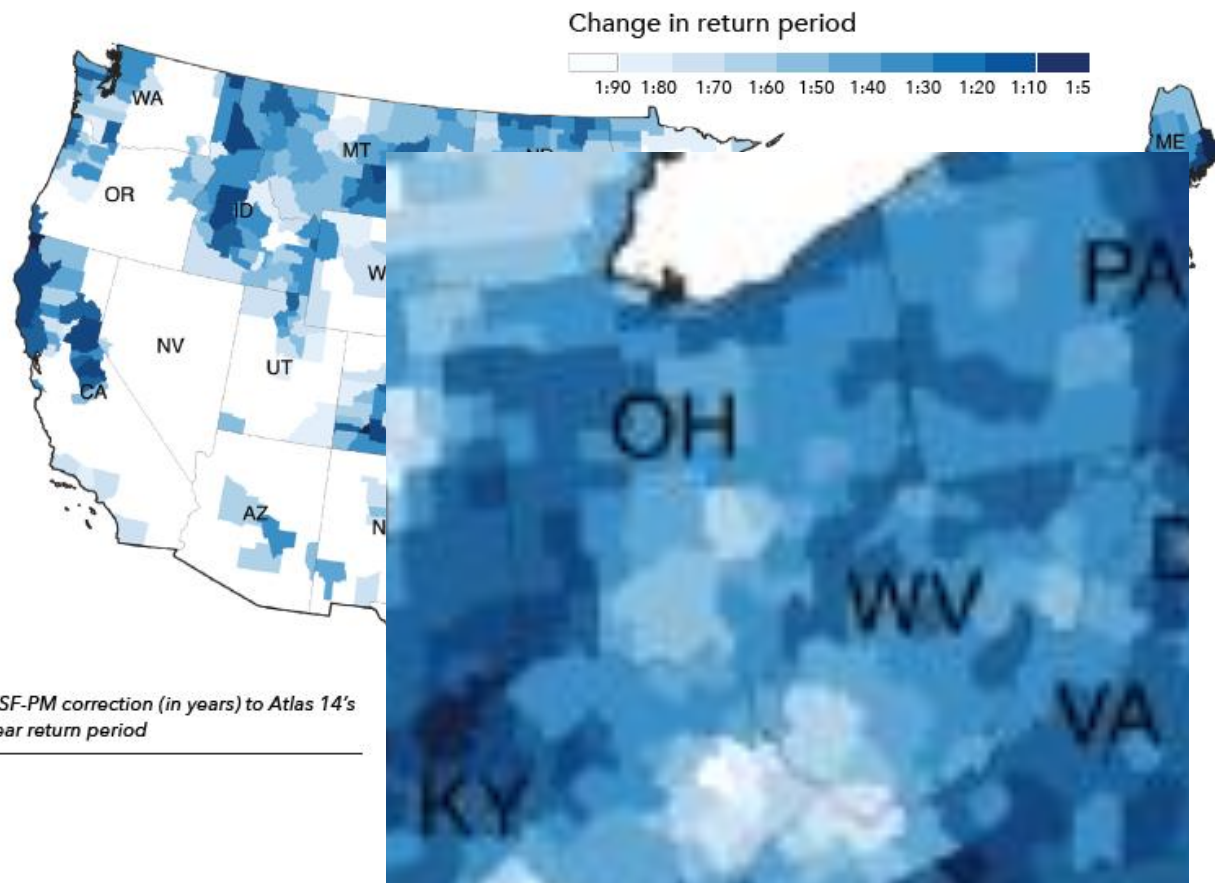


<https://nca2023.globalchange.gov/chapter/4/>

Climate Change Impacts to Water Quality



Increasing Risk of Extreme Rainfall



First Street Foundation:

<https://firststreet.org/research-lab/published-research/article-highlights-from-the-precipitation-problem/>

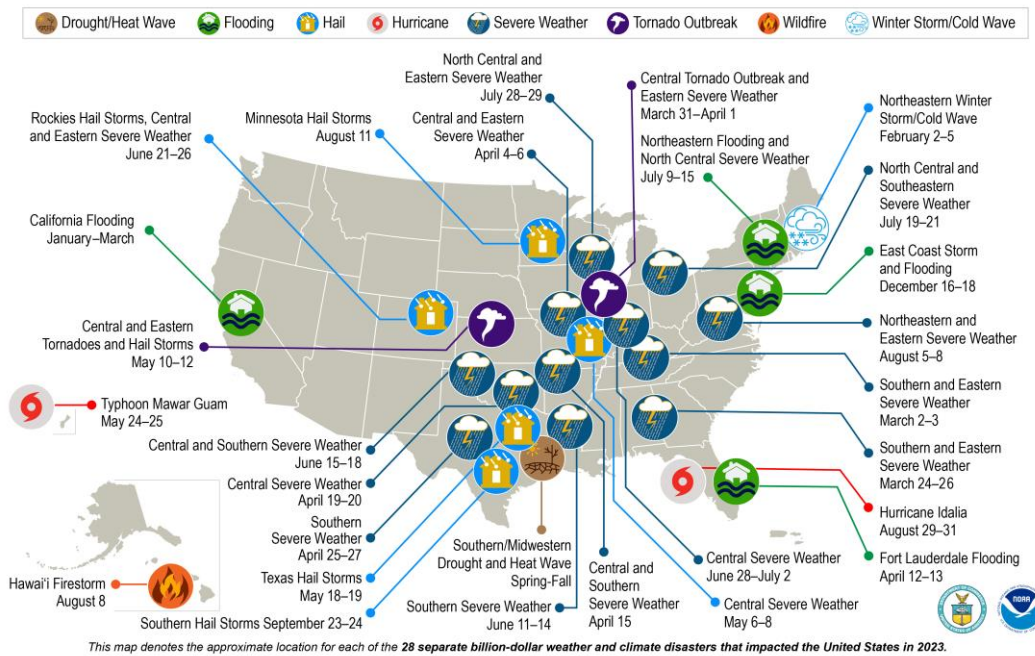
Table 3: Selected highly populated cities impacted by Atlas 14 to FSF-PM corrections

City	Atlas 14	Corrected for today	30 year correction
Baltimore, Maryland	1 in 100	1 in 14 (+614%)	1 in 12 (+733%)
Dallas, Texas	1 in 100	1 in 21 (+376%)	1 in 18 (+456%)
Washington, D.C.	1 in 100	1 in 21 (+376%)	1 in 19 (+426%)
New York City, New York	1 in 100	1 in 23 (+335%)	1 in 19 (+426%)
Philadelphia, Pennsylvania	1 in 100	1 in 29 (+245%)	1 in 20 (+400%)
Chicago, Illinois	1 in 100	1 in 29 (+245%)	1 in 26 (+285%)
Detroit, Michigan	1 in 100	1 in 34 (+194%)	1 in 16 (+525%)
Boston, Massachusetts	1 in 100	1 in 37 (+170%)	1 in 33 (+203%)

COSTS

Billion Dollar Disasters Floods

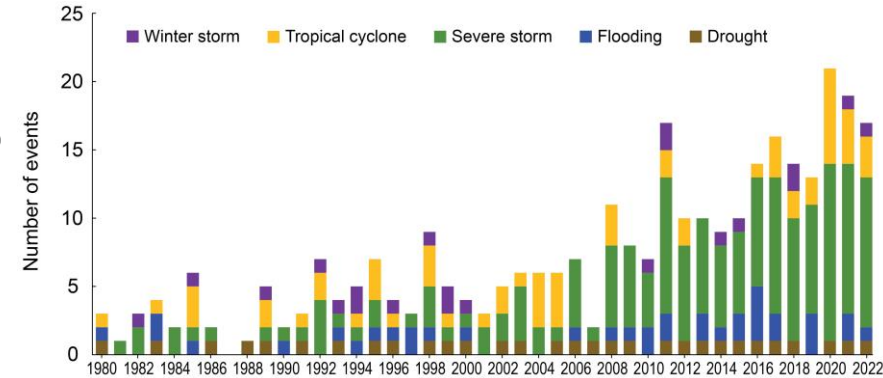
U.S. 2023 Billion-Dollar Weather and Climate Disasters



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

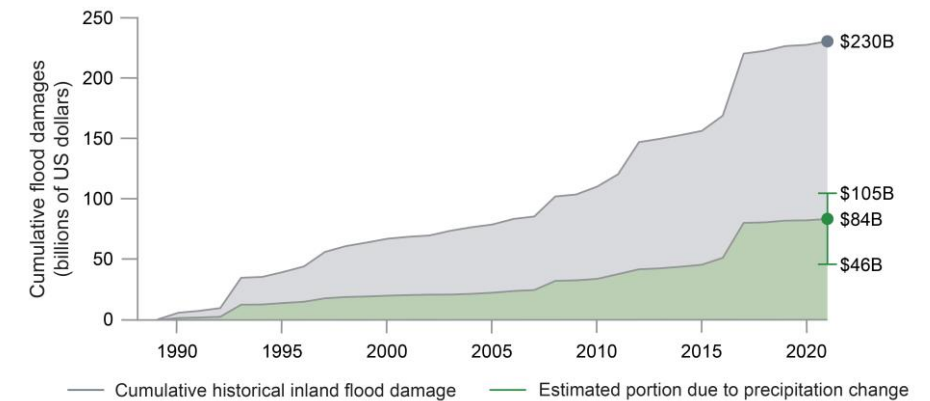
CFAES

Water-Related Billion-Dollar Disasters in the United States



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

Flood Damages Associated with Precipitation Change



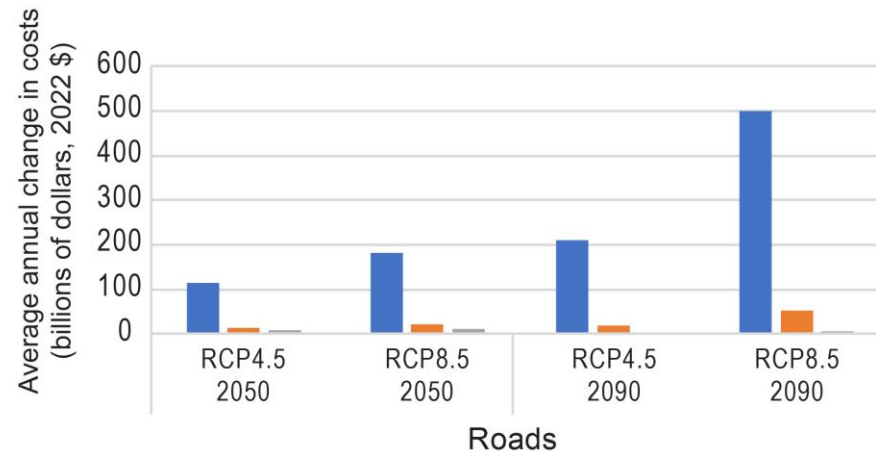
“Climate change–driven changes in precipitation amount and duration, snowpack/snowmelt, and soil moisture have combined with land-cover change and increasing property values to increase overall economic damages from floods.”

COSTS

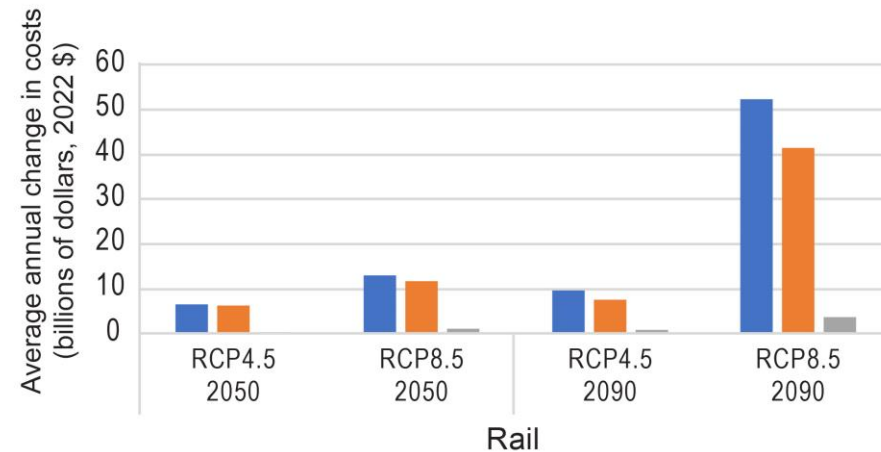
Road and Rail Adaptation

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

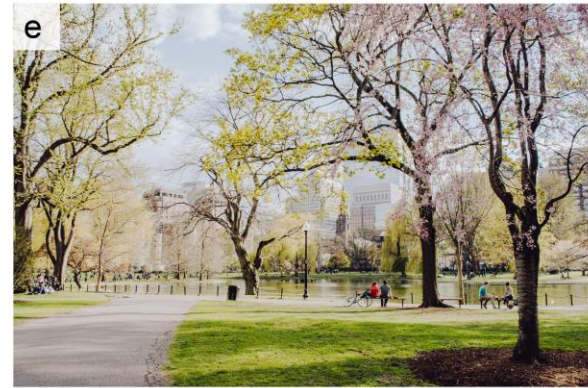
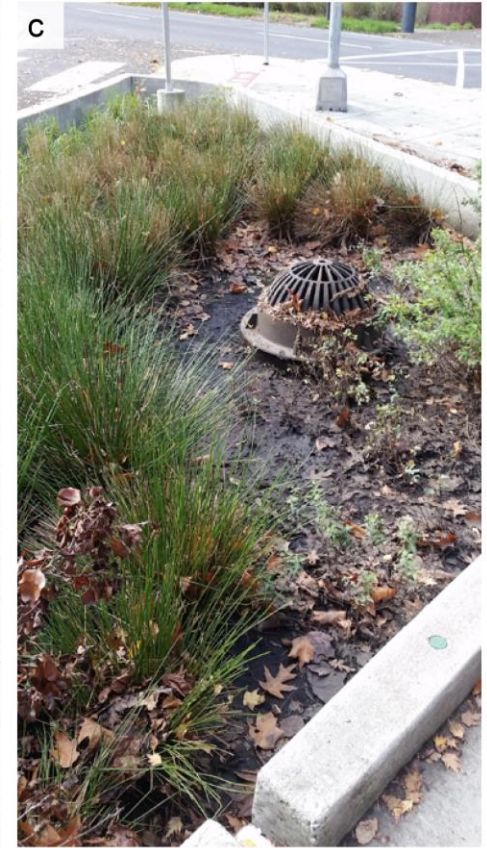
Urban Adaptation and Mitigation

- 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/>

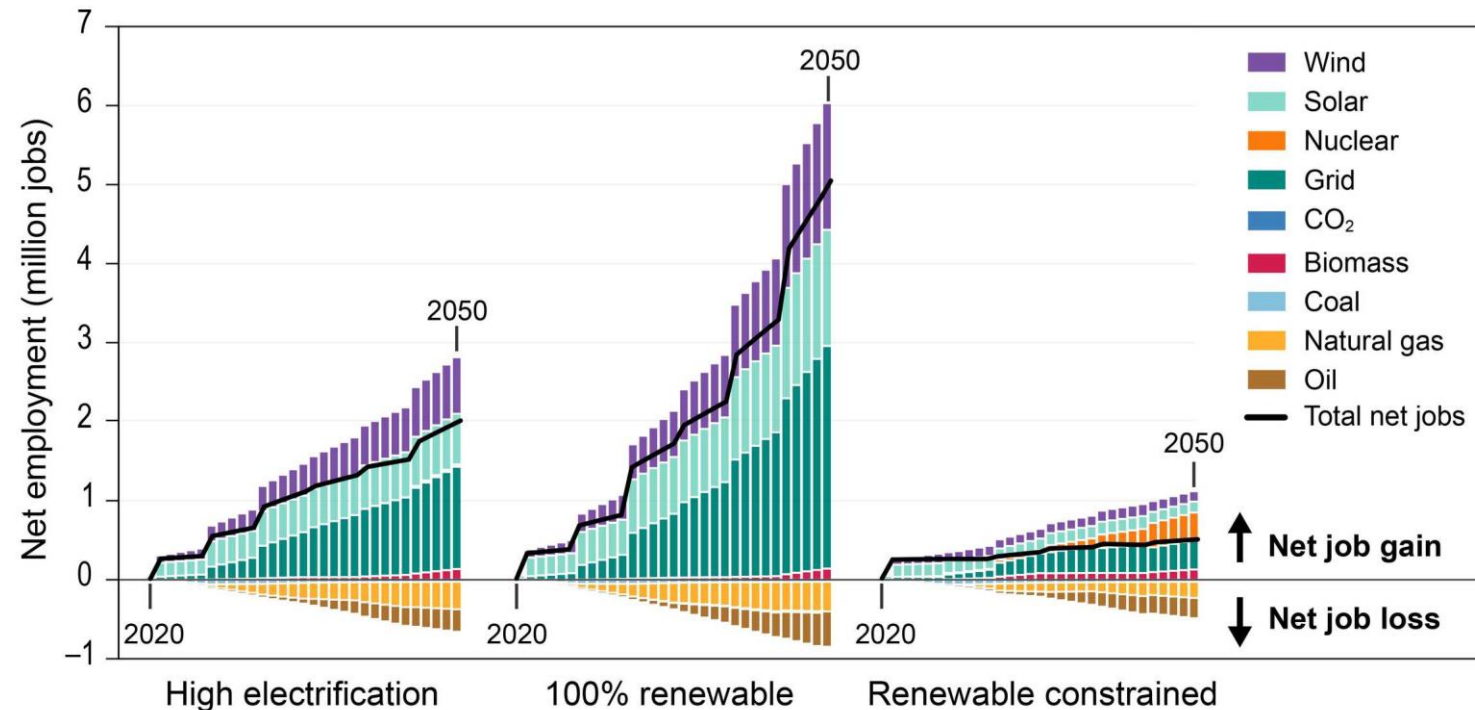
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Green, Blue, and Nature-Based Solutions



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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