

**CLIMATE CHANGE, EXTREME WEATHER,
AND PUBLIC HEALTH, OH MY!
BUT DON'T RUN AWAY! WE HAVE SOME IDEAS**

Chicago Metropolitan Agency for Planning

August 11, 2014

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Today's talk: Climate change, public health, and community vulnerability

Homewood Memorial Cemetery, Homewood IL
A.P. file photo in the Chicago Tribune Aug. 25, 1995



- Climate change
- Health impacts of climate change: it's not just about heat
- Vulnerability of communities to health impacts of climate change
- Adaptation

“We just had a long, cold winter. It feels more like global cooling.”

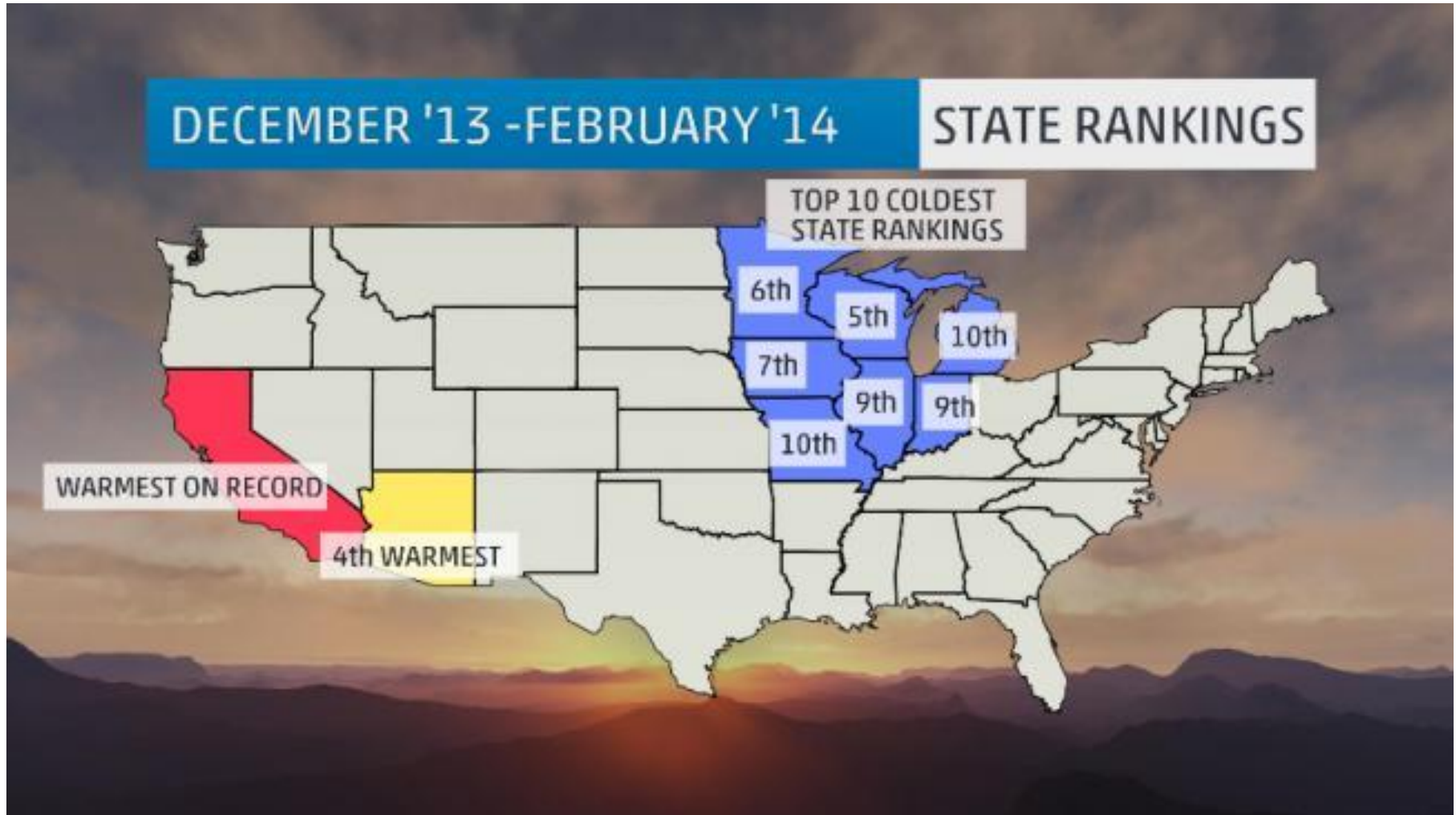
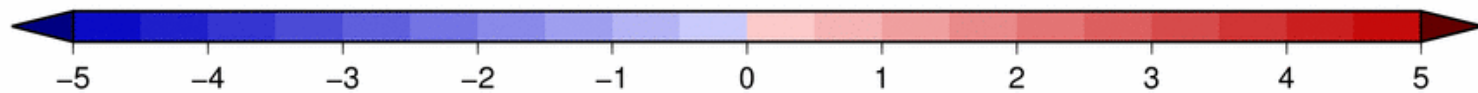
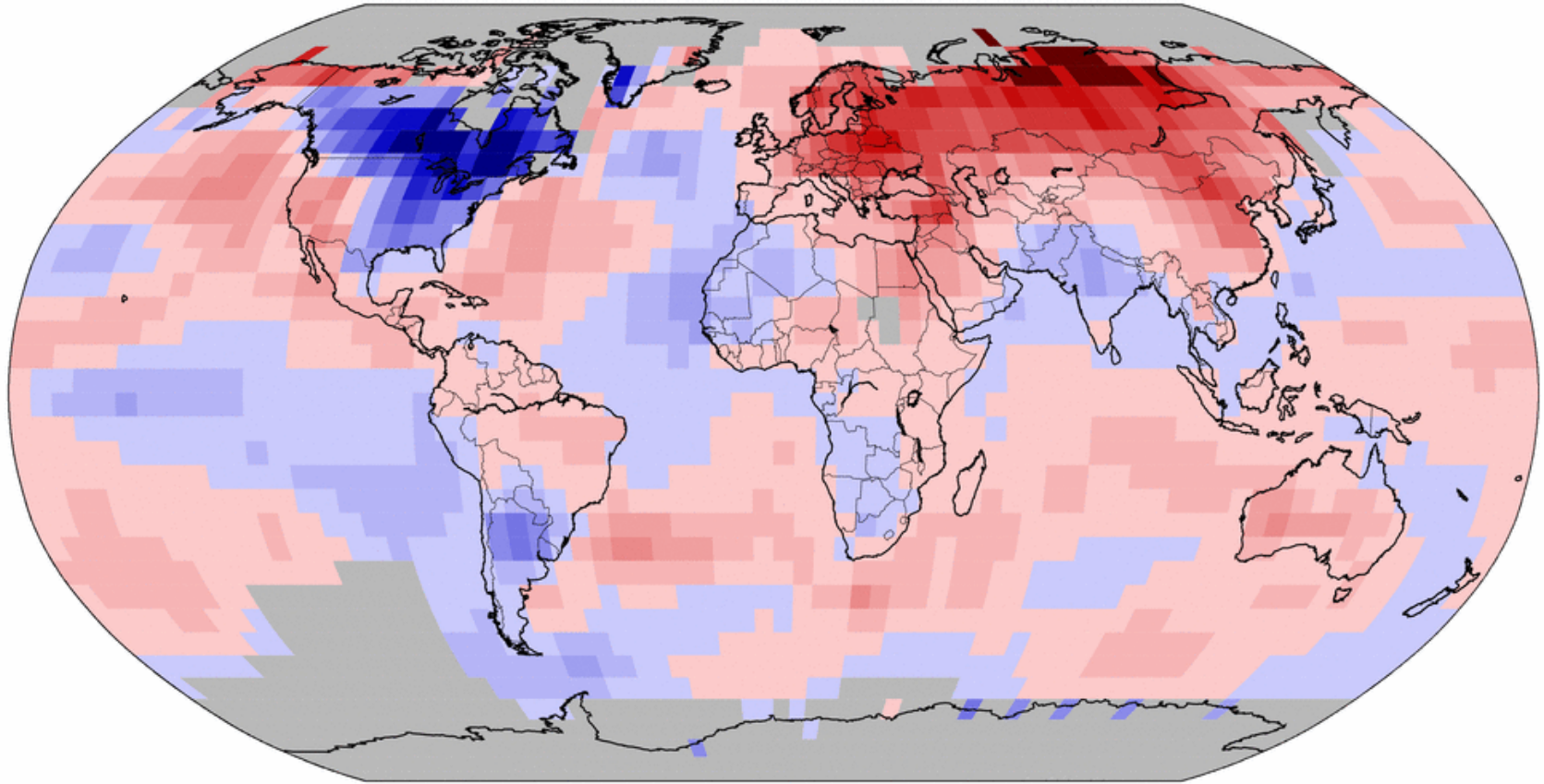


Image: NOAA/National Climatic Data Center

Land & Ocean Temperature Departure from Average Mar 2014 (with respect to a 1981–2010 base period)

Data Source: GHCN-M version 3.2.2 & ERSST version 3b



Degrees Celsius



NOAA's National Climatic Data Center
Tue Apr 15 07:56:01 EDT 2014

Please Note: Gray areas represent missing data
Map Projection: Robinson


Weather vs. Climate


5-Day Forecast for Chicago


My 5 Day Forecast

Updated: Aug 8, 2014, 2:05pm CDT

 Desktop App

Today
Aug 8  **76°** 67°
CHANCE OF RAIN: 0% WIND: NE at 12 mph
Mostly Sunny [Details](#)

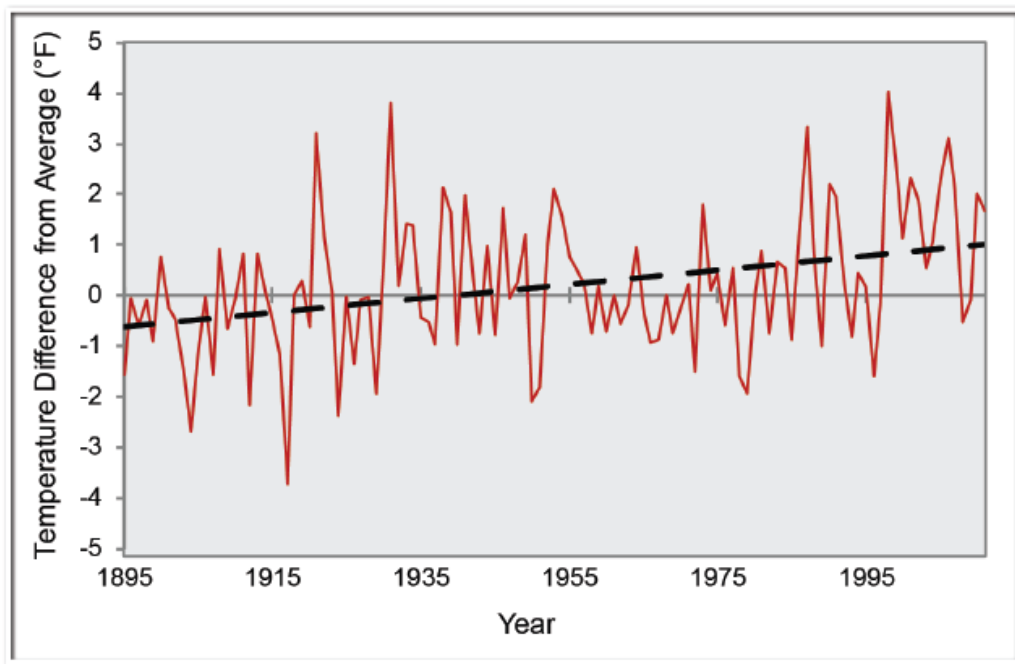
Sat
Aug 9  **74°** 68°
CHANCE OF RAIN: 0% WIND: ENE at 13 mph
Sunny [Details](#)

Sun
Aug 10  **75°** 68°
CHANCE OF RAIN: 10% WIND: NE at 11 mph
Mostly Sunny [Details](#)

Mon
Aug 11  **76°** 67°
CHANCE OF RAIN: 10% WIND: NNE at 9 mph
Mostly Sunny [Details](#)

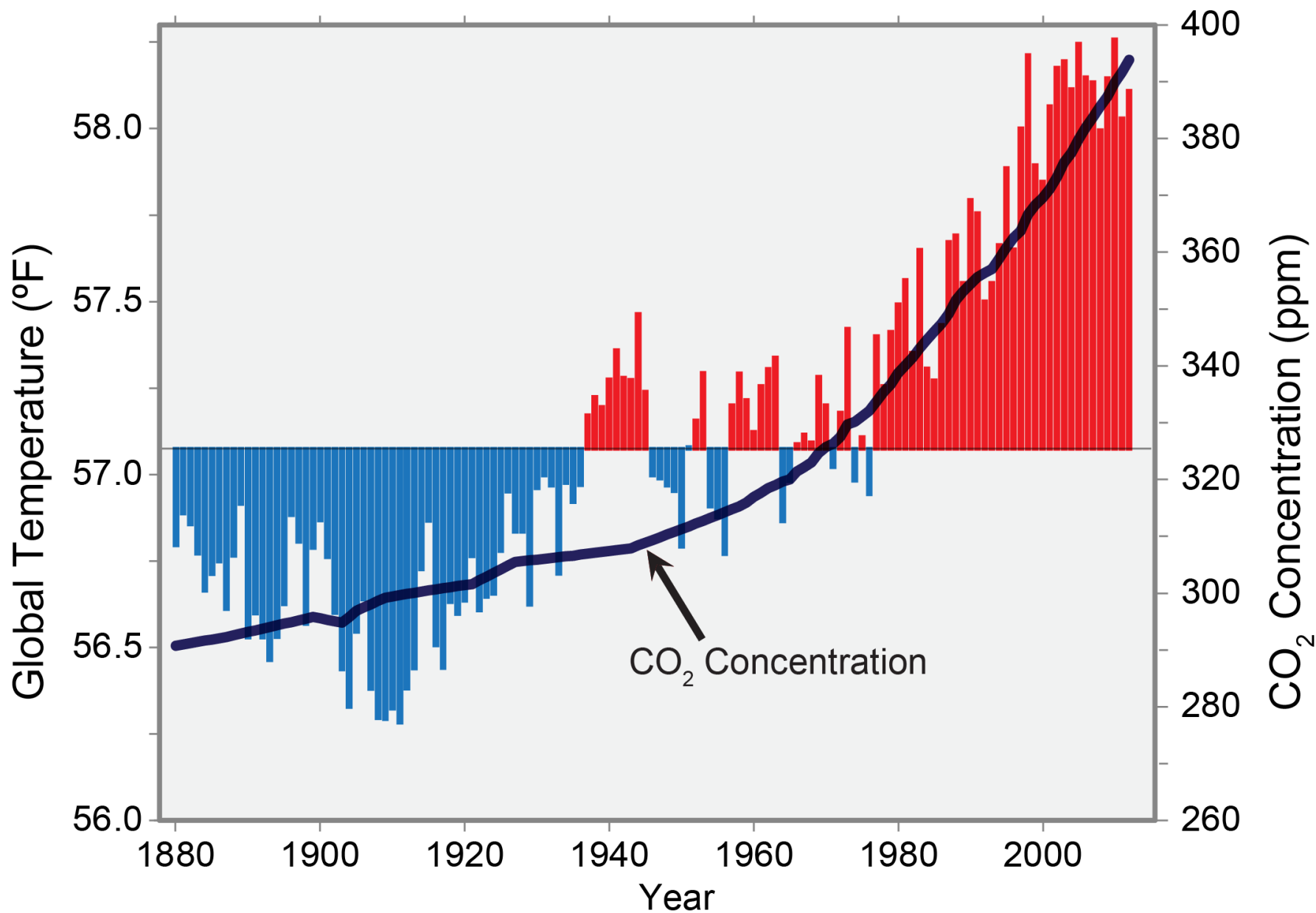
Tue
Aug 12  **72°** 63°
CHANCE OF RAIN: 40% WIND: N at 14 mph
Scattered T-Storms [Details](#)

Average Temperatures across the Midwest from 1895-2010

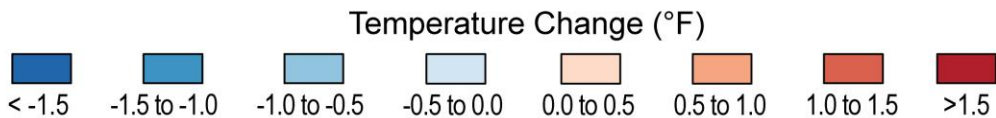
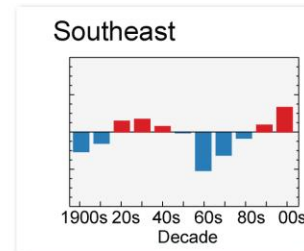
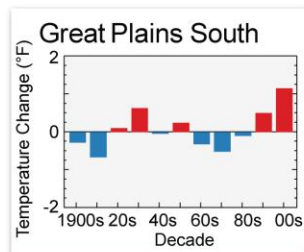
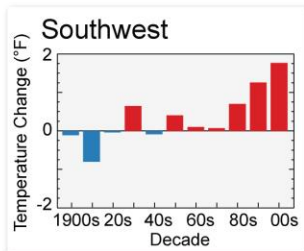
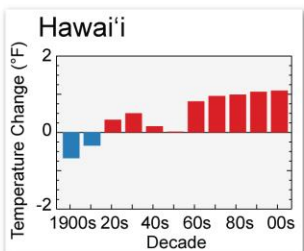
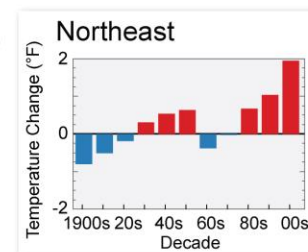
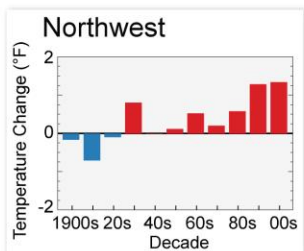
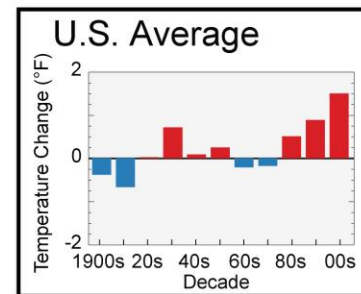
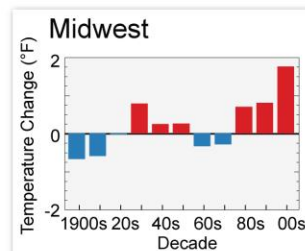
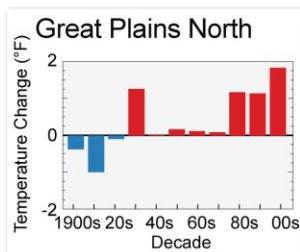
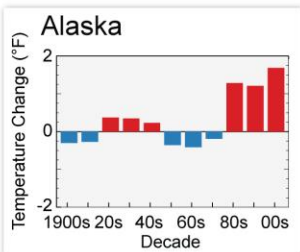


National Climate Assessment: <http://ncadac.globalchange.gov/>

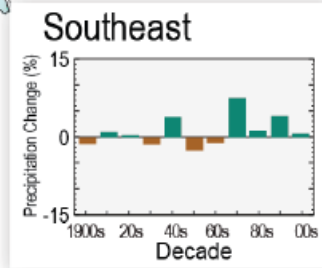
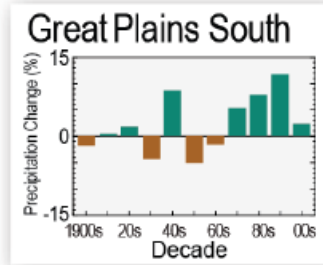
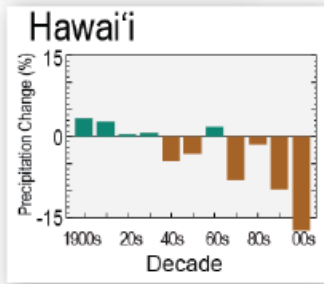
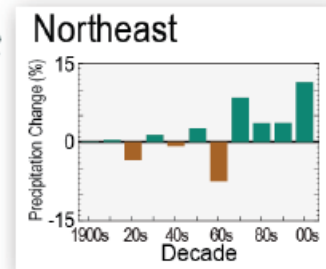
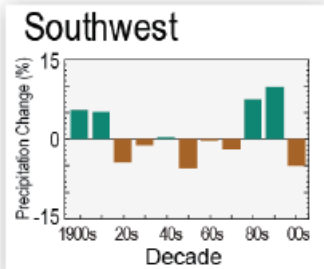
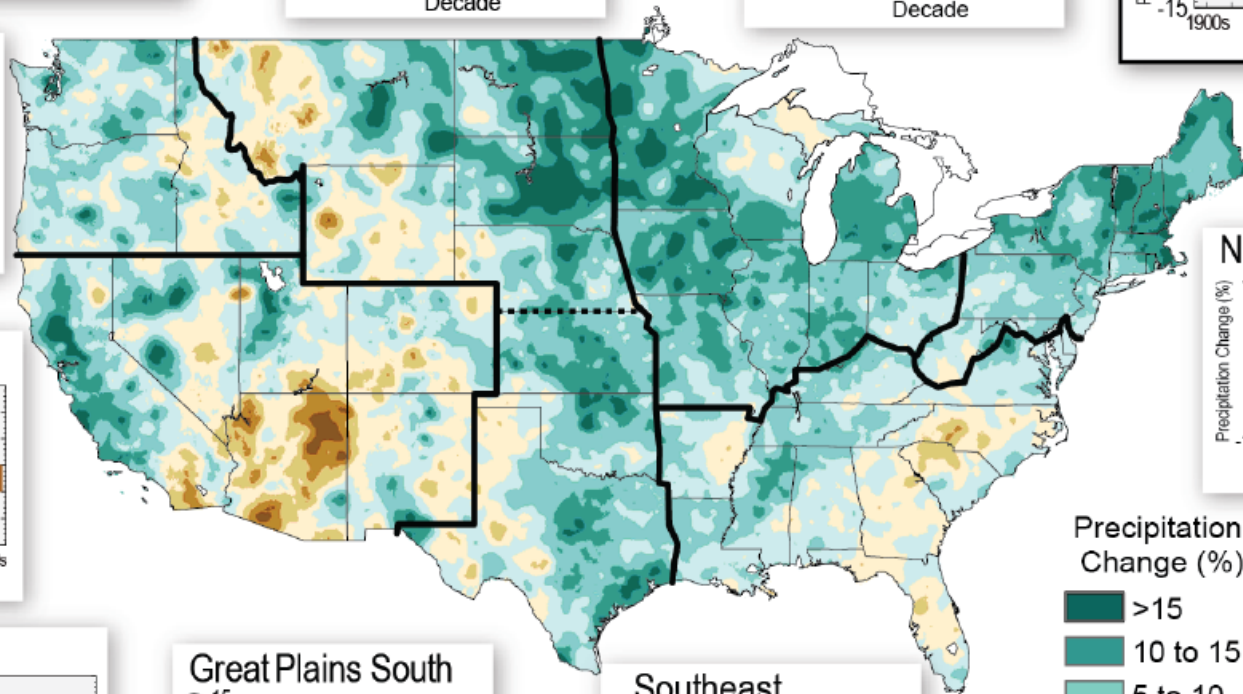
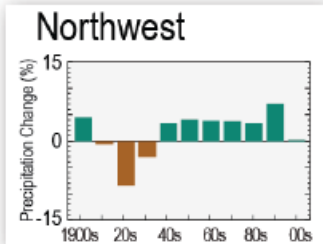
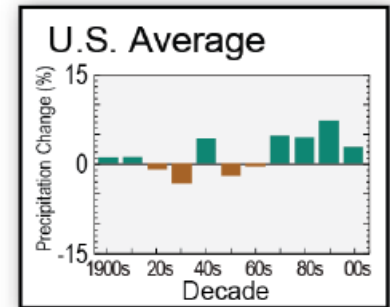
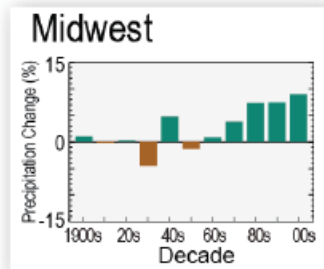
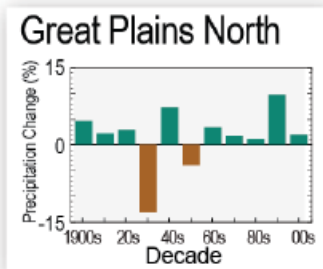
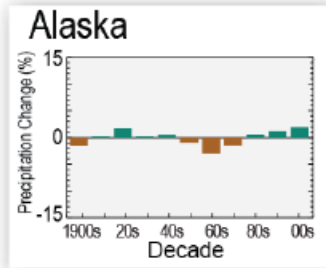
Global Temperature and Carbon Dioxide



Observed U.S. Temperature Change



Observed U.S. Precipitation Change

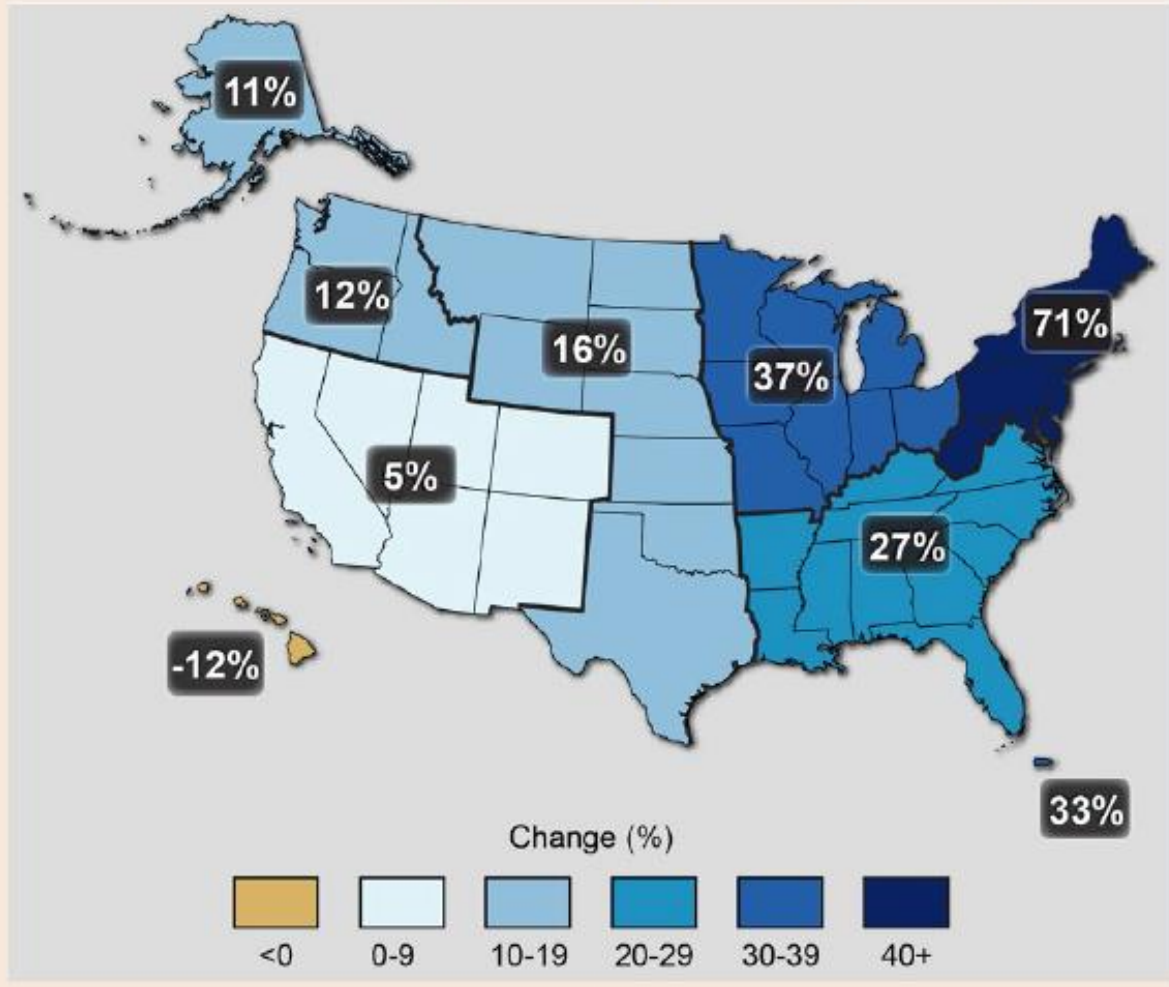


Precipitation Change (%)

- >15
- 10 to 15
- 5 to 10
- 0 to 5
- 5 to 0
- 10 to -5
- 15 to -10
- <-15

Percent of annual rainfall that comes down in top 1% of rain events

Observed Change in Very Heavy Precipitation



Blue algae and climate change

Ohio's 4th largest city has no drinking water

Toledo-area water advisory expected to continue through Sunday as leaders await tests; water stations to remain open

Microcystin found in samples; boiling not recommended



Water ban over, Toledo drinks from tap again; Erie algae a big problem

Climate change health effects in US

**CLIMATE CHANGE:
TEMPERATURE RISE
SEA LEVEL RISE**



HEAT

Heat stress

**FLOODS,
HURRICANES**

**Mold, injuries, fatalities,
waterborne diseases, carbon
monoxide poisoning, trauma**

WILDFIRES

**Injuries, fatalities, respiratory,
trauma**

DROUGHTS

**Water quality, trauma, food
supply**

**AIR
POLLUTION**

Allergies, asthma, respiratory

VECTORS

**Vectorborne diseases: West
Nile Virus, Lyme Disease,
encephalitis, Rocky Mountain
Spotted Fever**

***Overwhelmed medical systems**

Climate change Health Effects in IL

**CLIMATE CHANGE:
TEMPERATURE RISE
MORE/HEAVIER RAIN**



HEAT

FLOODS

**AIR
POLLUTION**

VECTORS

Heat stress; harmful algal blooms

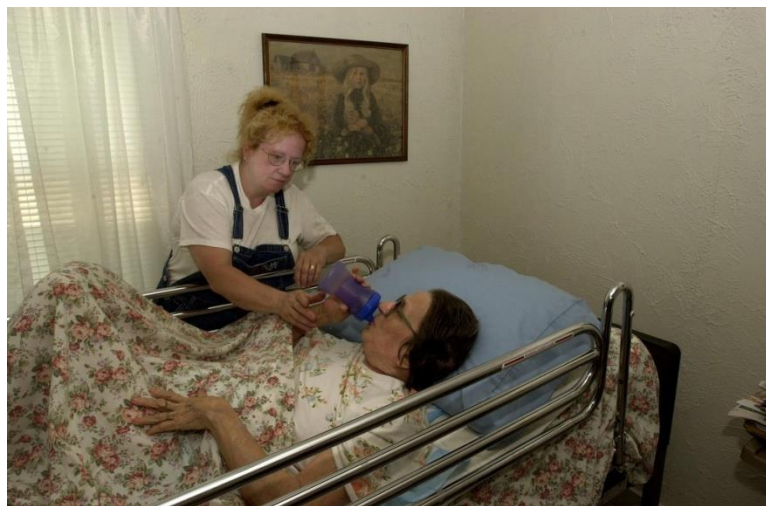
Mold, injuries, fatalities, waterborne diseases, carbon monoxide poisoning, trauma

Ozone, allergies, asthma, respiratory

Vectorborne diseases: West Nile Virus, Lyme Disease, Rocky Mountain Spotted Fever

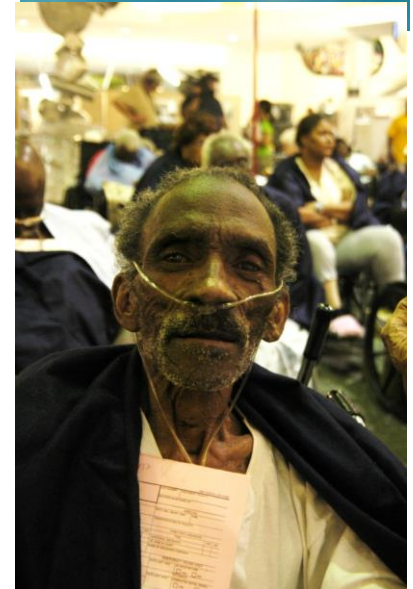
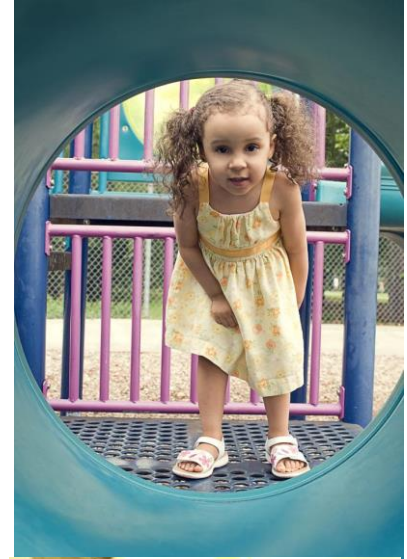
***Overwhelmed medical systems**

Population Vulnerability: Who is at increased risk for heat and where are they?

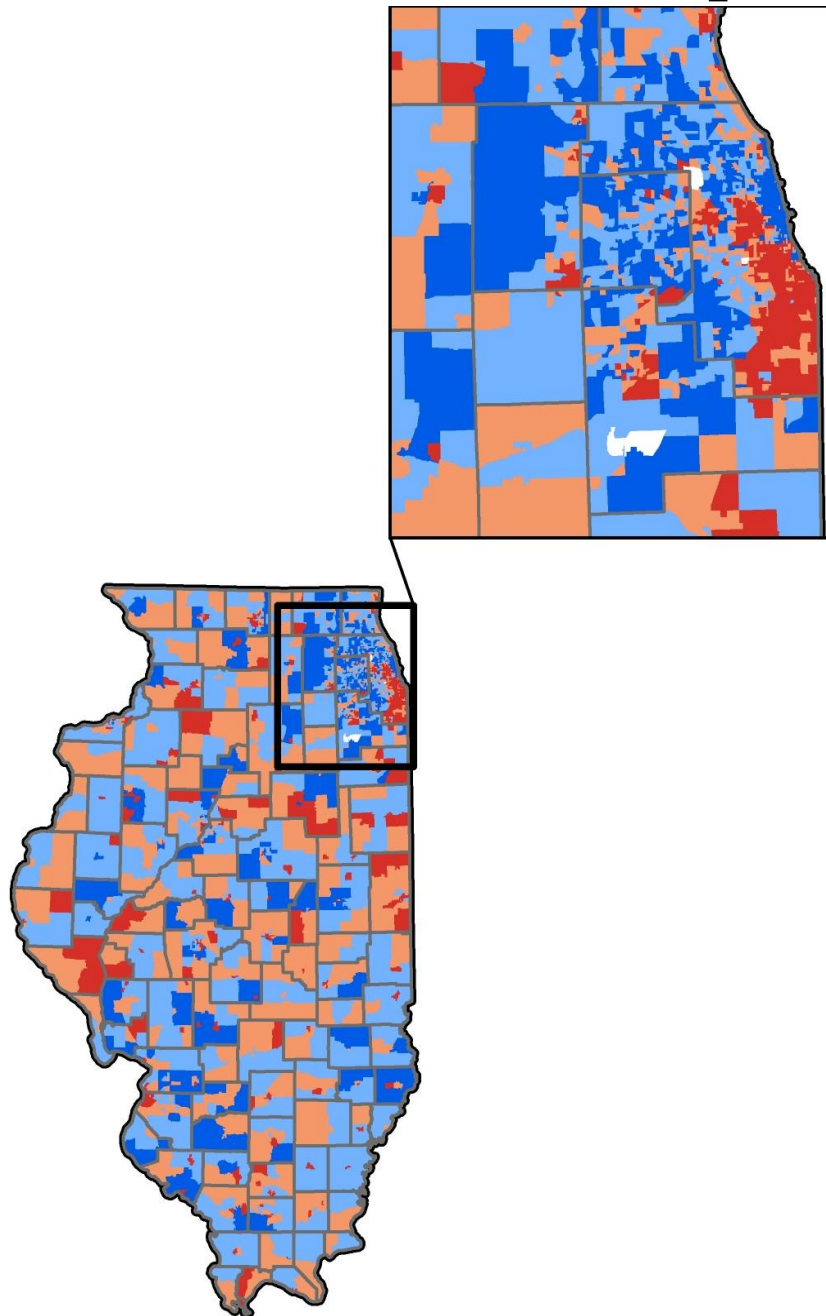
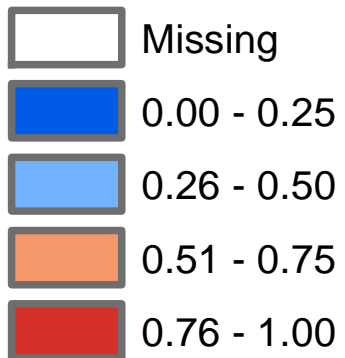


CDC's Social Vulnerability Index (SVI)

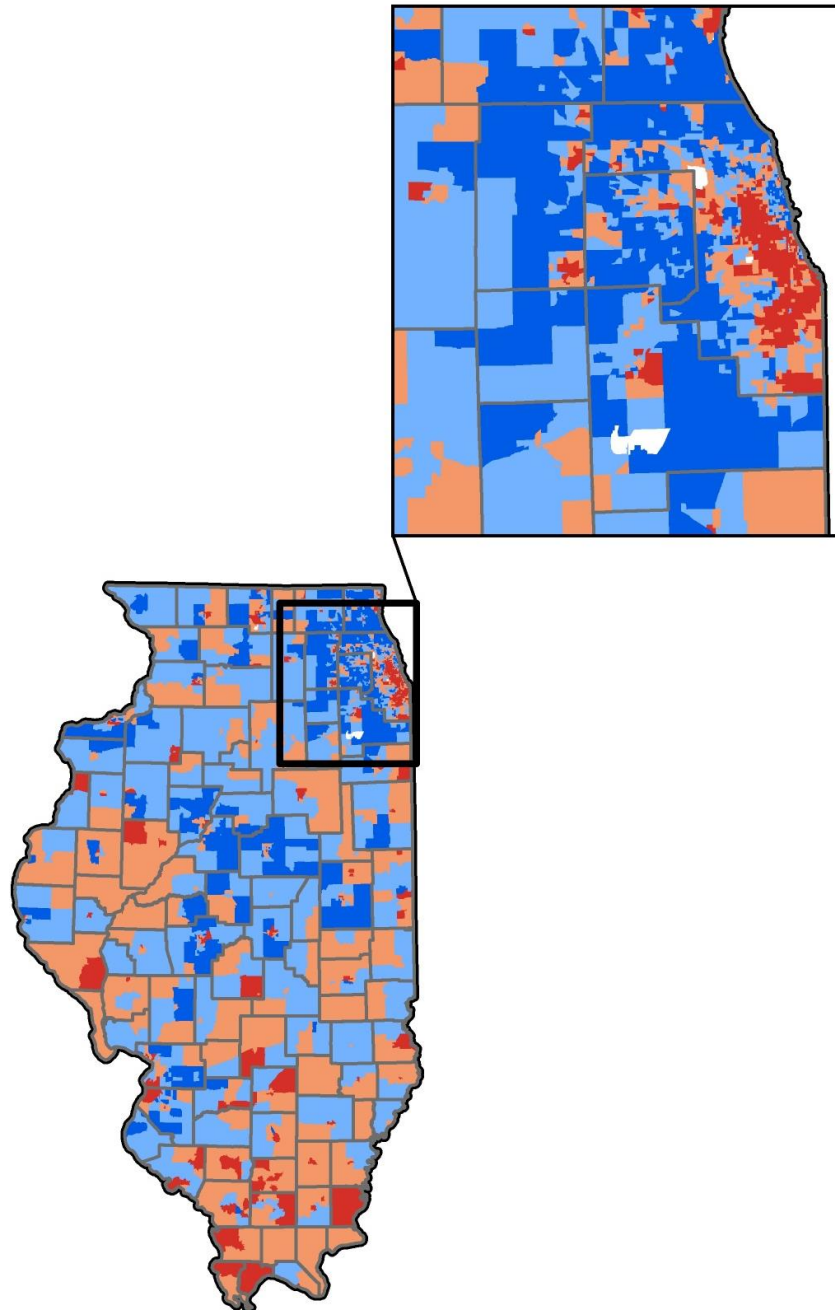
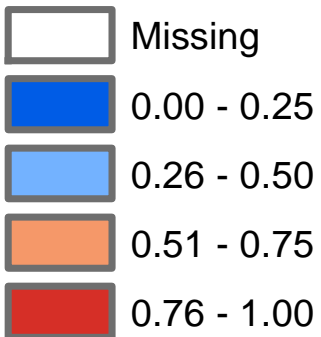
- Tool created to help public health officials and local planners better prepare communities to respond to emergency events such as severe weather, floods and disease outbreaks
- The SVI indicates the relative vulnerability of every U.S. Census tract, ranked by 14 social factors including percent of tract:
 - Children, elderly, disabled
 - Poverty, unemployment, education
 - Mobile homes, household with no vehicle



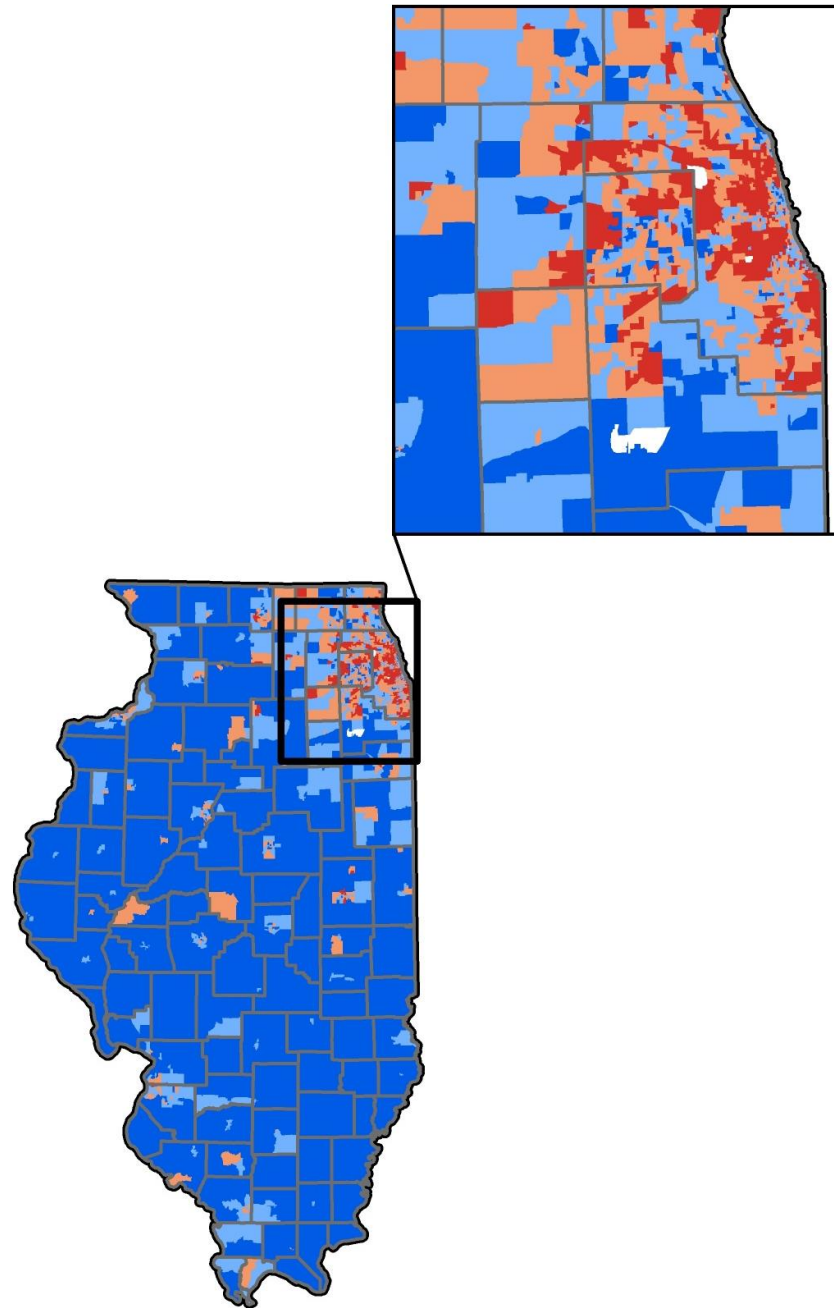
SVI Theme: Household Composition



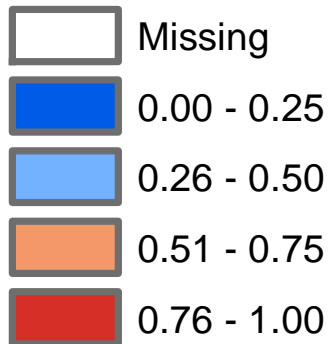
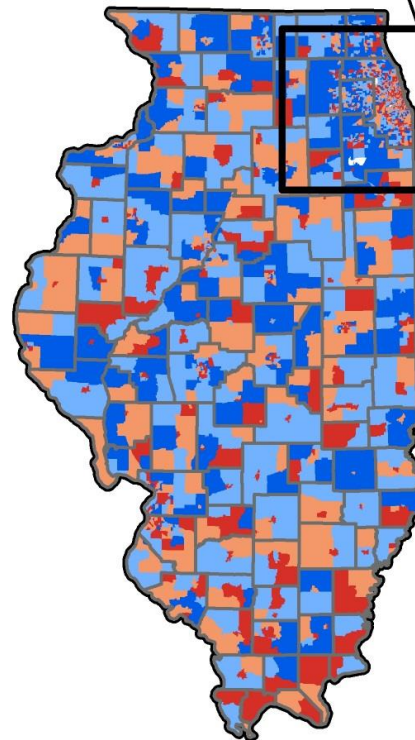
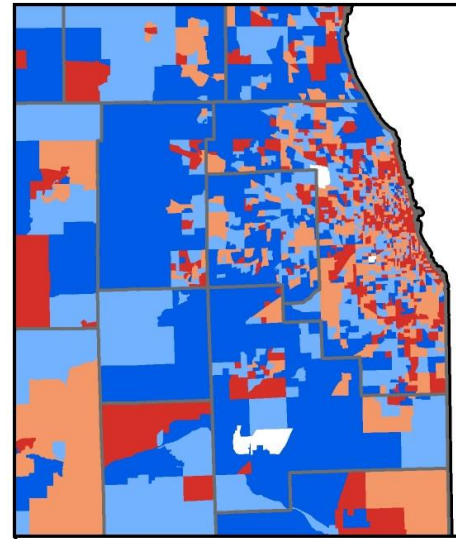
SVI Theme: Socioeconomic Status



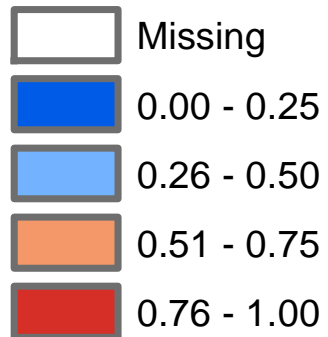
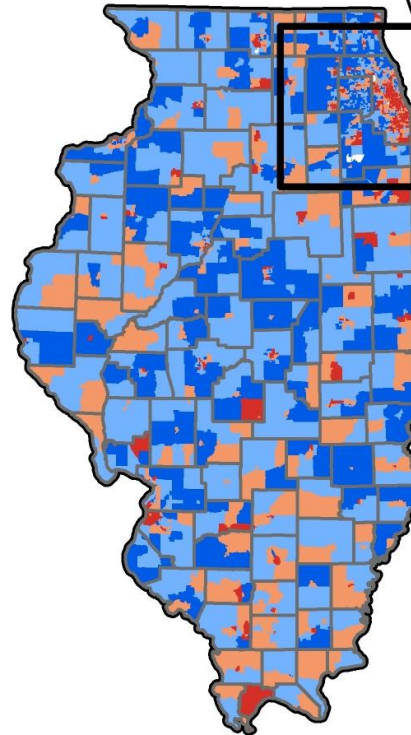
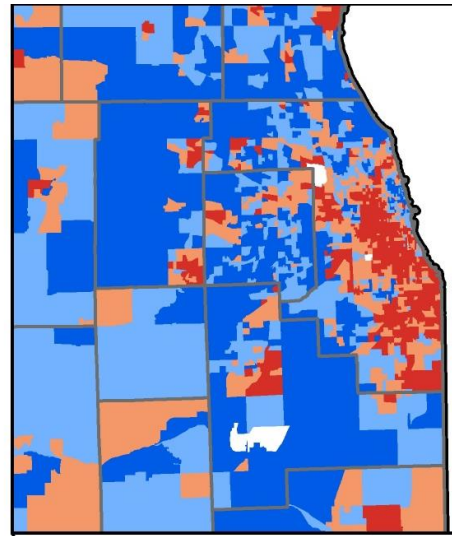
SVI Theme: Minority Status/language



SVI Theme: Housing/transportation

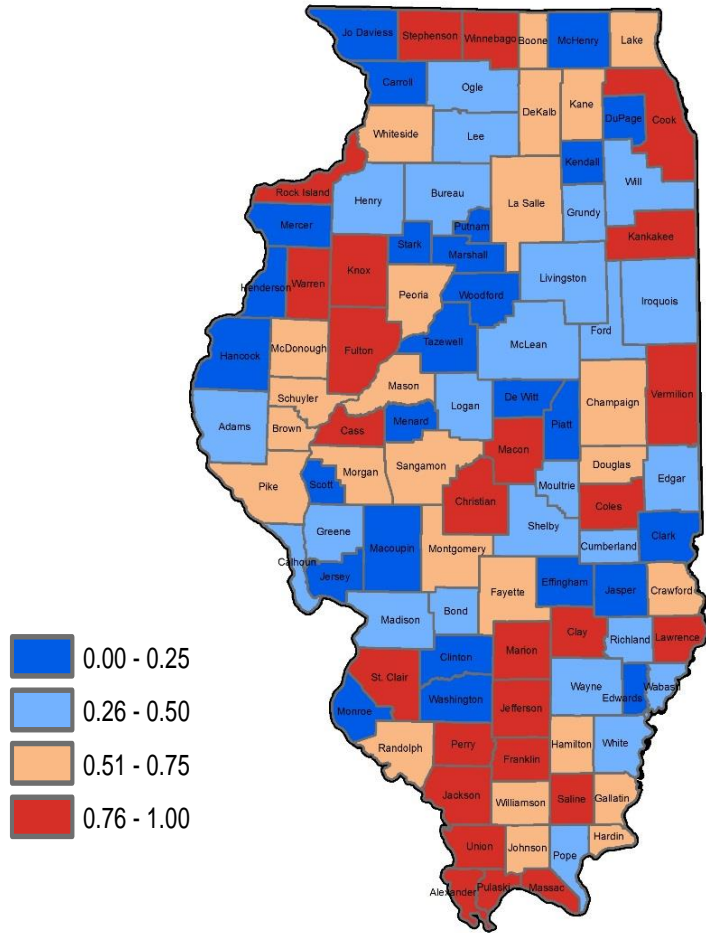


Overall SVI

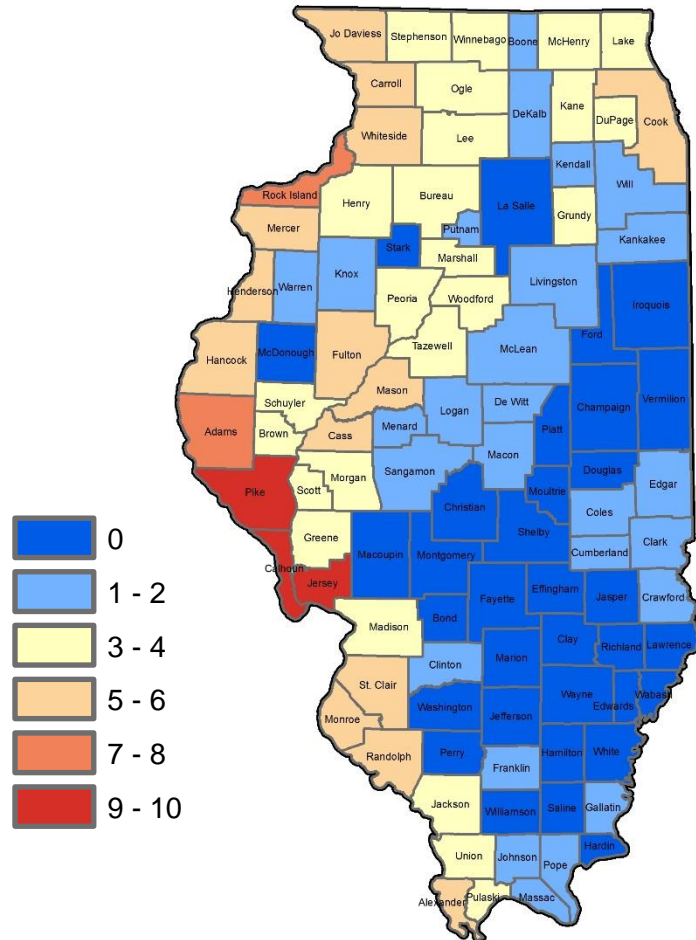


Overall SVI

Flood disaster declarations

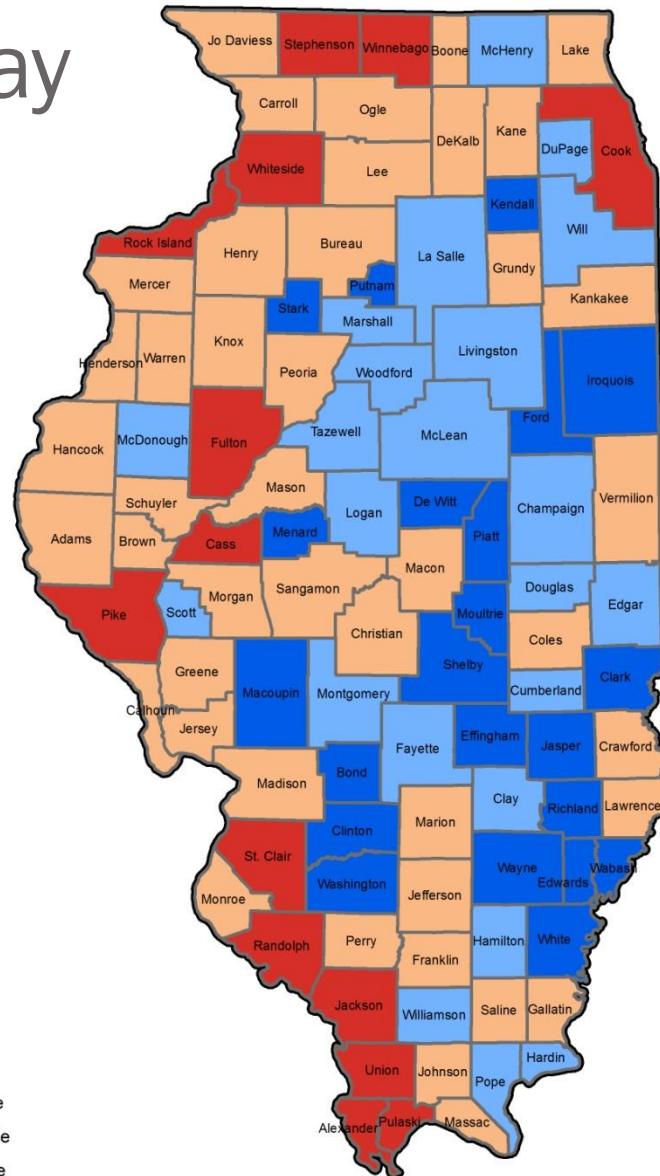


+



=

SVI + Flood Overlay





WHAT
CAN I
DO?!!

Adaptation



Photo credit <http://www.tigerphilosophy.com/tag/young/>

Adaptation

“Adjustments in a system’s behavior and characteristics that enhance its ability to cope with external stress”

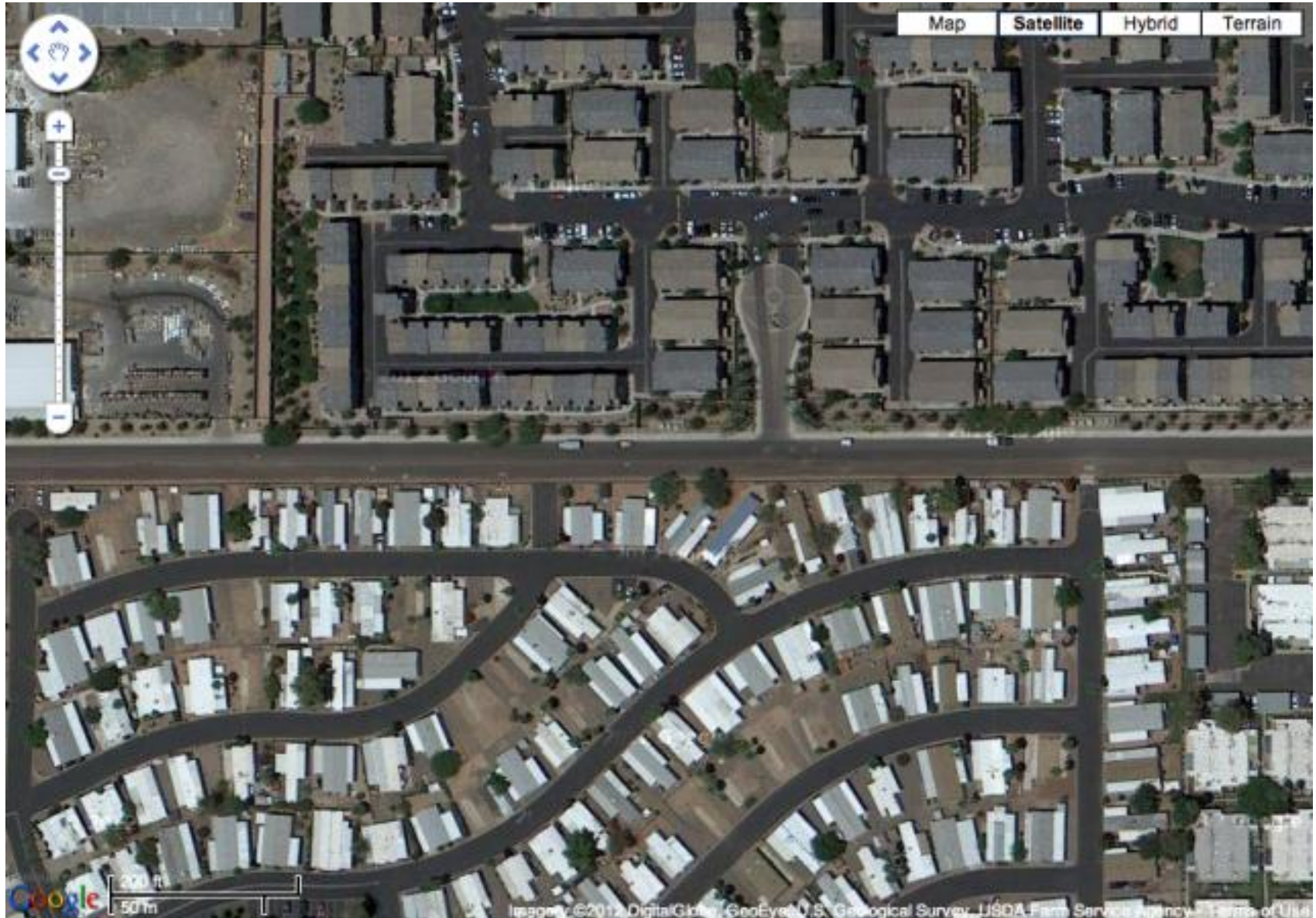
(Smit 2006)







<http://www.twinspanbridge.com>

Photo credit: Associated Press
I-10, August 30, 2005

Adaptation: black roofs to white roofs



		Mitigation	
		Favorable	Unfavorable
Adaptation	Favorable		
	Unfavorable		

Mitigation, adaptation, and public health co-benefits



↓ need for A/C

↓ urban heat island effect

↓ Storm water runoff

↑ greenspace, physical activity

Alternative transportation and public health co-benefits



Decreased CO₂
pollution

Decreased
asthma triggers
(PM, ozone)

Increased
physical
activity

Local adaptation strategies: Planning and Programs

- Incorporate climate change into planning processes
 - Review and update heat response plans and all hazards mitigation plans
 - Including climate change indicators into community needs assessments (ie: IPLAN)
- Green roofs (ie: Portland's Ecoroof Program)
- Urban tree planting
- Pervious roads (ie: Chicago Green Alley Program)

Local Adaptation Strategies: Planning and Programs

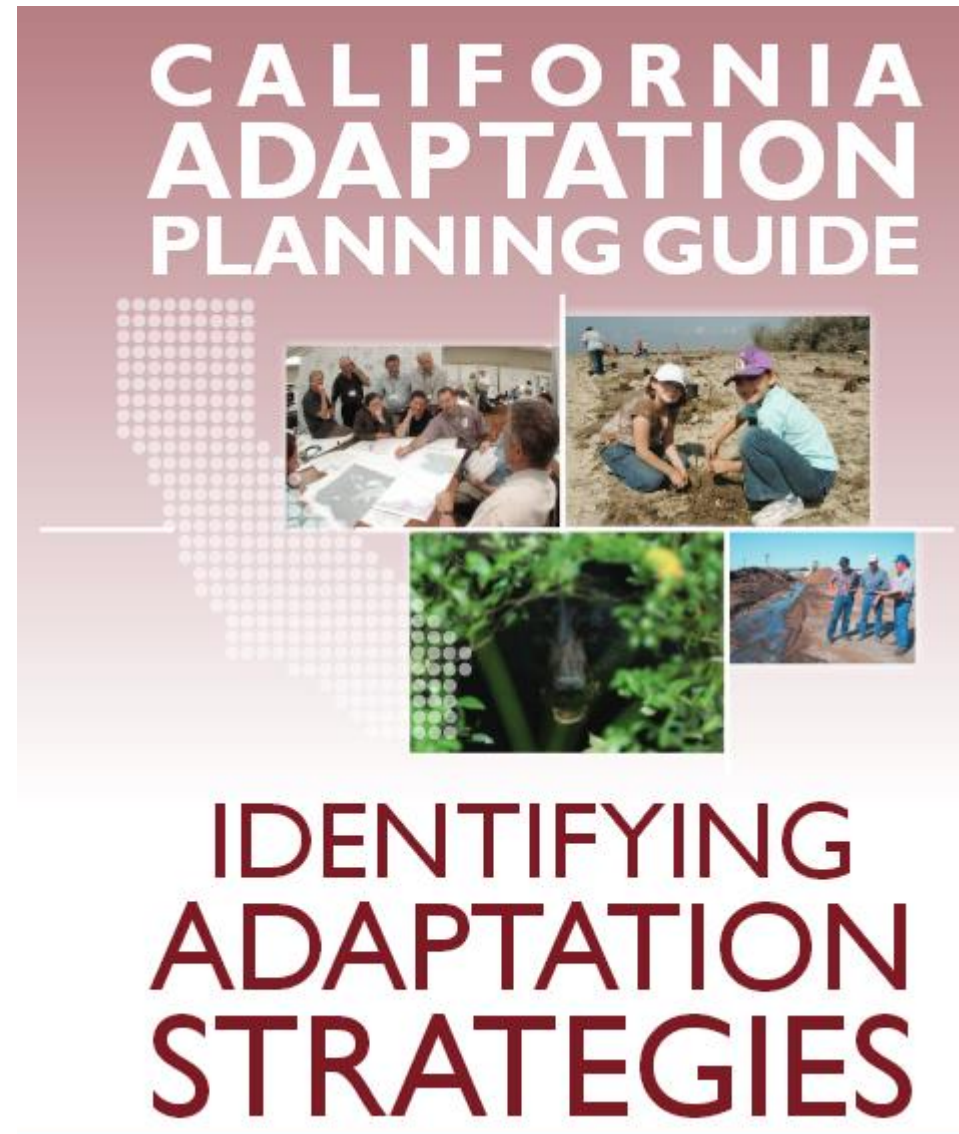
Water Plazas/ Watersquares – Rotterdam, Netherlands



Fill up during heavy rain events but act as a playground or open public spaces during dry events

Local Adaptation Strategies: CA Adaptation Planning Guide

1. Planning for Adaptive Communities
2. Defining Local & Regional Impacts
3. Understanding Regional Characteristics
4. Identifying Adaptation Strategies



Local adaptation strategies: City ordinances addressing heat island

- Commercial Development Design Guidelines for Manor, Texas
 - “The purpose of this document.....Minimize Heat Island by incorporating large shade trees into the site design with larger interior landscape areas within parking lots.”
- City of Goodyear (Arizona) Design Guidelines
 - “Parking and Vehicle Circulation....Canopy trees and other forms of landscaping in parking lots shall be used to break up the scale of large parking lots, provide additional shading and reduce ‘heat island’ impacts.”

Local adaptation strategies: Local Health Departments

- Educating their population
- Incorporating climate change into planning processes
 - All Hazards Mitigation Plans, Heat Alert Response Plans, IPLAN
- Surveillance systems for climate sensitive diseases
 - Vectorborne
 - Waterborne post floods
 - Heat
 - Heat illnesses
 - Violence

What climate change adaptation currently looks like in Illinois

- Climate and Health Adaptation Plan for Illinois
- Changed public health emergency preparedness grant language for local health departments and resource hospitals
- Heat toolkit for local health departments
- Heat syndromic surveillance
- Building awareness among public health professionals and general public
 - Videos
 - Educational presentations
 - Website



Governor Quinn Signs Legislation to Help Combat Flooding in Illinois - \$2 billion

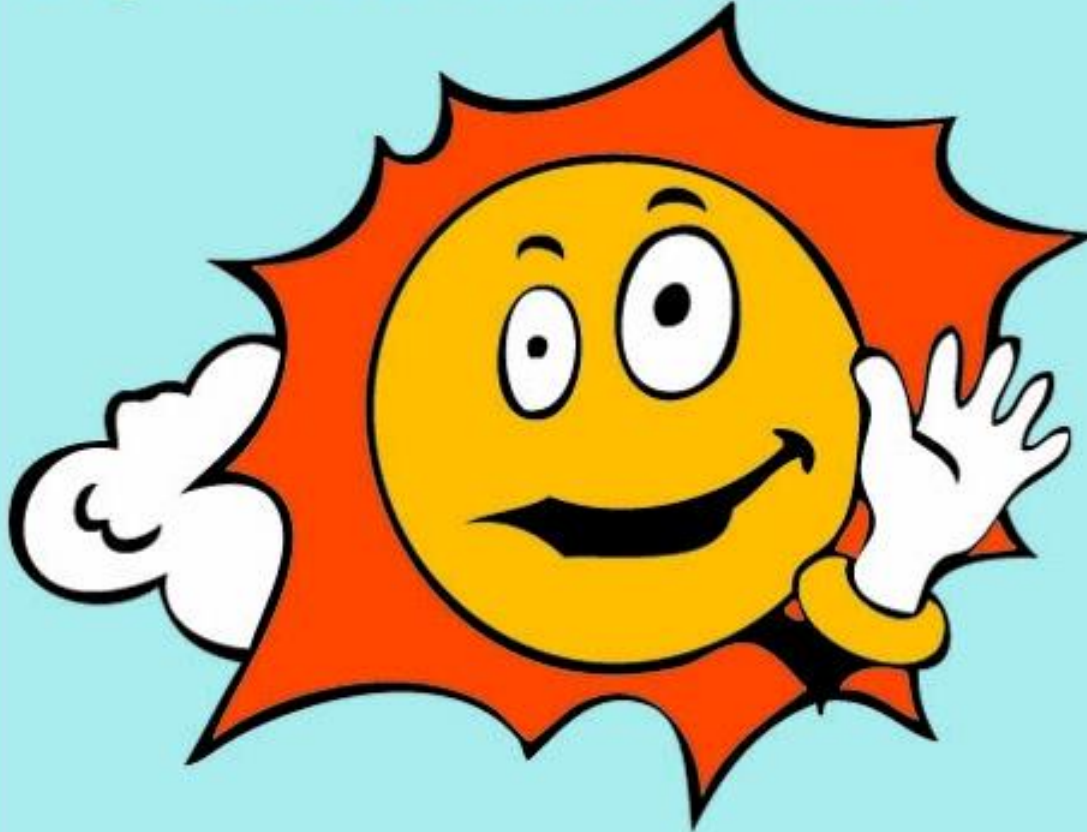
- The legislation makes stormwater management and treatment projects available for state financial assistance following last year's record rainfall and severe flooding that affected communities across Illinois.



- “During last year’s record rainfall and flooding, we learned the hard lesson that flash flooding can have devastating effects,” Governor Quinn said. “The Illinois Clean Water Initiative will now be able to help communities be more prepared than ever before in managing stormwater while creating thousands of construction jobs. This legislation will help to prevent flooding and protect our drinking water from pollution.”

Thank you! Questions?

if You Saw A Heat Wave



Would You Wave Back?

CDC SVI: US Census variable definitions

Variable	2000 Census Table Variable(s)	Additional Description	Domain
Percent individuals below poverty	P88	Individuals below poverty="under .50" + ".50 to .74" + ".75 to .99." Percent of persons below federally defined poverty line, a threshold that varies by the size and age composition of the household. Denominator is total population where poverty status is checked.	Socioeconomic Status
Percent civilian unemployed	P43	Based on total population 16+. Civilian persons unemployed divided by total civilian population. Unemployed persons actively seeking work.	↓
Per capita Income in 1999	P82	The mean income computed for every person in the census tract.	
Percent persons with no high school diploma	P37	Percent of persons 25 years of age and older, with less than a 12 th grade education (including individuals with 12 grades but no diploma).	
Percent persons 65 years of age or older	P8		Household Composition/Disability
Percent persons 17 years of age or younger	P8		
Percent persons more than 5 years old with a disability	P42	Percent of civilian population not in an institution who are 5 years of age and older with a disability.	